

A new species of the genus *Pasiphaea* from the South Indian Ocean (Crustacea, Decapoda, Pasiphaeidae)

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ABSTRACT

Pasiphaea gelasinus n.sp. belongs to a group of *Pasiphaea* species characterized by a distally notched telson and a mid-dorsal carina on carapace and some or all abdominal segments. Within this group, it is distinguished by the rostral profile with anterior margin nearly vertical with a distinctive convexity, and by the presence of a distinct hollow laterally on the carapace on each side of the rostral base. The merus/ischium/basis spine formula for the first pereopod is 1-3/0/0 and for the second pereopod 7-12/0/0.

KEY WORDS

Pasiphaea gelasinus,
new species,
Pasiphaeidae,
Caridea,
Decapoda,
Crustacea,
South Indian Ocean.

RÉSUMÉ

Une nouvelle espèce du genre *Pasiphaea* du sud de l'océan Indien. *Pasiphaea gelasinus* n.sp. appartient à un groupe de *Pasiphaea* caractérisé par un telson terminé par une encoche et la présence d'une carène dorsale sur la carapace et sur quelques-uns ou tous les segments abdominaux. Dans ce groupe, cette espèce se distingue par le profil de son rostre dont le bord antérieur est presque vertical avec une convexité distincte et par la présence d'une dépression latérale nette sur la carapace, de chaque côté de la base du rostre. La formule donnant le nombre des épines sur le mérius, l'ischion et le basis des premiers péripodes est 1-3/0/0 et, pour les seconds, 7-12/0/0.

MOTS CLÉS

Pasiphaea gelasinus,
espèces nouvelles,
Pasiphaeidae,
Caridea,
Decapoda,
Crustacea,
océan Indien Sud.

INTRODUCTION

Recently, the Muséum national d'Histoire naturelle, Paris, carried out, under the leadership of Guy Duhamel, an exploratory fishing cruise on the seamounts off Saint Paul and Amsterdam Islands. The area is interesting from the zoogeographical view point, but little systematic research has been done in the area so far. During the examination of pelagic shrimps collected from that area, we found an undescribed large species of the genus *Pasiphaea* Savigny, 1816. It is nearly 150 mm in total length and is characterized by the carinated carapace and abdomen, the armed meri of the first and second pereopods, and the deeply forked distal margin of the telson. An unusual dimple-like hollow is uniquely present on either side of the rostral base. All type material is preserved at the Muséum national d'Histoire naturelle, Paris.

ABBREVIATIONS

CL carapace length, measured in decapod shrimps from the orbit to the mid-dorsal point of the posterior margin of the carapace;
 CP pelagic trawl;
 MNHN Muséum national d'Histoire naturelle, Paris.

SYSTEMATICS

Genus *Pasiphaea* Savigny, 1816

Pasiphaea gelasinus n.sp.

(Figs 1-3)

MATERIAL EXAMINED. — **South Indian Ocean.** Seamounts off Saint Paul and Amsterdam Islands, research campaign 1996, CP 10, 37°37.8'S - 77°51.8'E, depth 730-905 m, 3.VII.1996: holotype ♂, CL 35.2 mm (MNHN-Na 13438); paratypes 1 ♂, CL 32.0 mm, 1 ♀, CL 34.0 mm (MNHN-Na 13439). — CP 6, 37°37.2'S - 77°55.5'E, depth 310-520 m, 3.VII.1996: paratype ♀, CL 22.0 mm (MNHN-Na 13460). — CP 12, 37°37.9'S - 77°51.7'E, depth 685-830 m, 4.VII.1996: paratypes 1 ♂, CL 36.0 mm, 2 ♀♀, CL 33.1, 49.5 mm (MNHN-Na 13459).

ETYMOLOGY. — The specific name *gelasinus* is Latin for "dimple" used as a nominative in apposition. The

English word "dimple" (French "*fossette*") is a small natural dent or crease in the flesh, especially on the cheek or chin, or else a slight depression in any surface, and refers in this species to the dimple-like hollow on each side of the rostral base.

DISTRIBUTION. — Known only from the South Indian Ocean, near Saint Paul and Amsterdam Islands, at depths of 310-905 m.

SIZE. — The complete male selected as the holotype is CL 35.2 mm. The females are CL 22.0-49.5 mm. No ovigerous females are available, but the female of CL 33.1 mm shows many ovarian eggs through the carapace.

DIAGNOSIS

Shell firm. Rostrum continuous from dorsal margin of carapace, not reaching anterior margin of carapace. Carapace dorsally carinated; a distinct hollow at each side of rostral base; branchiostegal sinus small. All abdominal segments without terminal spine; first segment dorsally rounded; second to sixth segments dorsally carinated. Telson slightly shorter than sixth segment; posterior margin deeply notched, with more than six pairs of spines. First pereopod with one to three spines on merus; ischium unarmed; basis unarmed, posterodistal end rectangular with setae but sometimes acutely pointed; finger slightly shorter than palm. Second pereopod with ten to twelve spines on posterior margin of merus; unarmed on ischium; unarmed on basis excluding posterodistal spine; finger longer than palm. Ischium of third pereopod without spinules on posterior margin. Pleurobranch on eighth thoracic segment well-developed, as large as arthrobranch on sixth segment. Male holotype 35.2 mm in CL and largest female 49.5 mm in CL.

DESCRIPTION

Large pasiphaeid (Fig. 1). Rostrum triangular in lateral view, but posterior (or upper) margin smoothly continuous with dorsal margin of carapace, anterior (or lower) margin nearly or obliquely vertical with slight convexity along entire margin, apex acute, pointed forward nearly reaching anterior margin of carapace (Fig. 2A). Carapace distinctly carinated on dorsal margin from posterior margin of rostrum to posterior

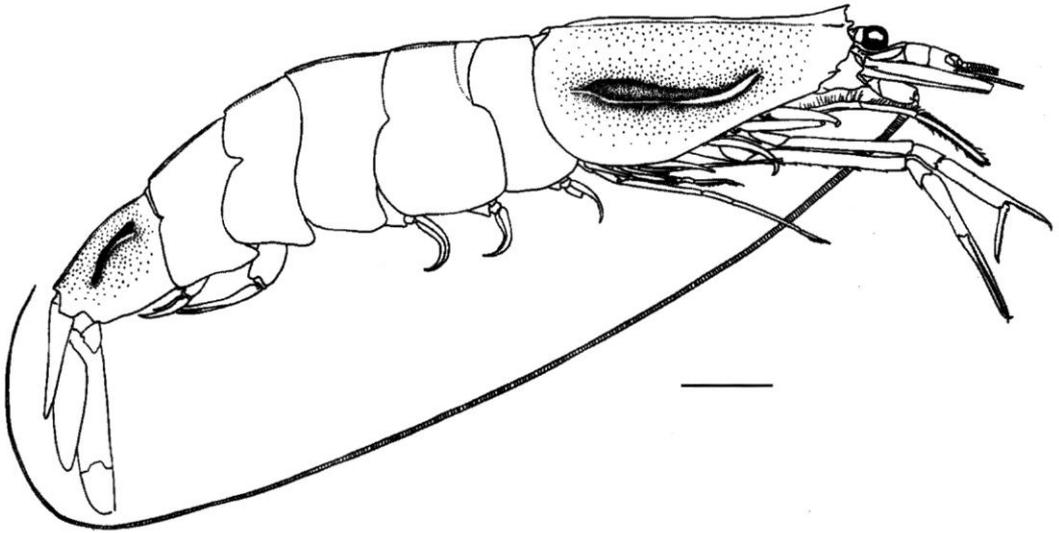


FIG. 1. — *Pasiphaea gelasinus* n.sp. Holotype ♂, CL 35.2 mm. Scale bar: 10 mm.

1/4-1/5 of carapace; distinct hepatic ridge continuous backward with branchiocardiac ridge, but ill-defined posteriorly; shallowly depressed around rostral base and with a distinct hollow laterally along each side of rostral base (Fig. 2A, B). Branchiostegal spine arising just inside anterolateral margin of carapace, not supported by carina; apex overreaching anterior margin (Fig. 2A). Branchiostegal sinus small but distinct (Fig. 2A).

Only three specimens including holotype with distal part of abdomen. First abdominal segment rounded dorsally. Second to fifth segments with distinct dorsal carina (Fig. 2C). Sixth segment compressed, 1.3-1.4 times as long as fifth segment and about 1.3-1.5 times as long as deep (Fig. 2D); dorsal margin sharply carinated on anterior two thirds, and flattened on posterior third; from lateral view, posterior end somewhat produced posteriorly and dorsal margin before posterior end slightly depressed (Fig. 2D). Telson 0.8-0.9 times as long as sixth segment, dorsally grooved for entire length (Fig. 2E); distal margin deeply forked, distal end not complete in all specimens, but at least ten spines recognizable on one side in one specimen (Fig. 2F).

Eye well-developed; cornea larger than eyestalk; from dorsal view, cornea and eyestalk obliquely divided into two equal parts (Fig. 2G). Stylo-

cerite nearly reaching end of first antennular segment; upper distal end small and spiniform, directed obliquely upward (Fig. 2A). Antennal scale 3.9-4.0 times as long as wide (Fig. 2H), and as long as or slightly longer (1.0-1.1) than first chela and a little shorter (0.85-0.95) than second chela (Fig. 1); basicerite with medium-sized spine on lower distal corner (Fig. 2A). Mouthparts of typical shape for genus (Fig. 3A-G). Endopod of first maxilliped small process with single seta (Fig. 3E).

Posterodistal corner of basis of first pereopod rectangular with seta, not forming typical spine but sometimes ending in acute point; ischium unarmed; merus with one to three spines on distal half of posterior margin; chela of typical shape, finger shorter (46-47% of chela) than palm; series of more than ten spinules on lower mesial margin of palm to base of immovable finger (Fig. 3H). Basis of second pereopod ending in distinct spine, unarmed on posterior margin; ischium unarmed on posterior margin; merus with seven to twelve spines on posterior margin; palm shorter (39-43% of chela) than fingers and as long as or slightly shorter than that of first (Fig. 3I). No spinules on ischium of third pereopod (Fig. 3J). Fourth and fifth pereopods of typical shape for genus (Fig. 3K, L).

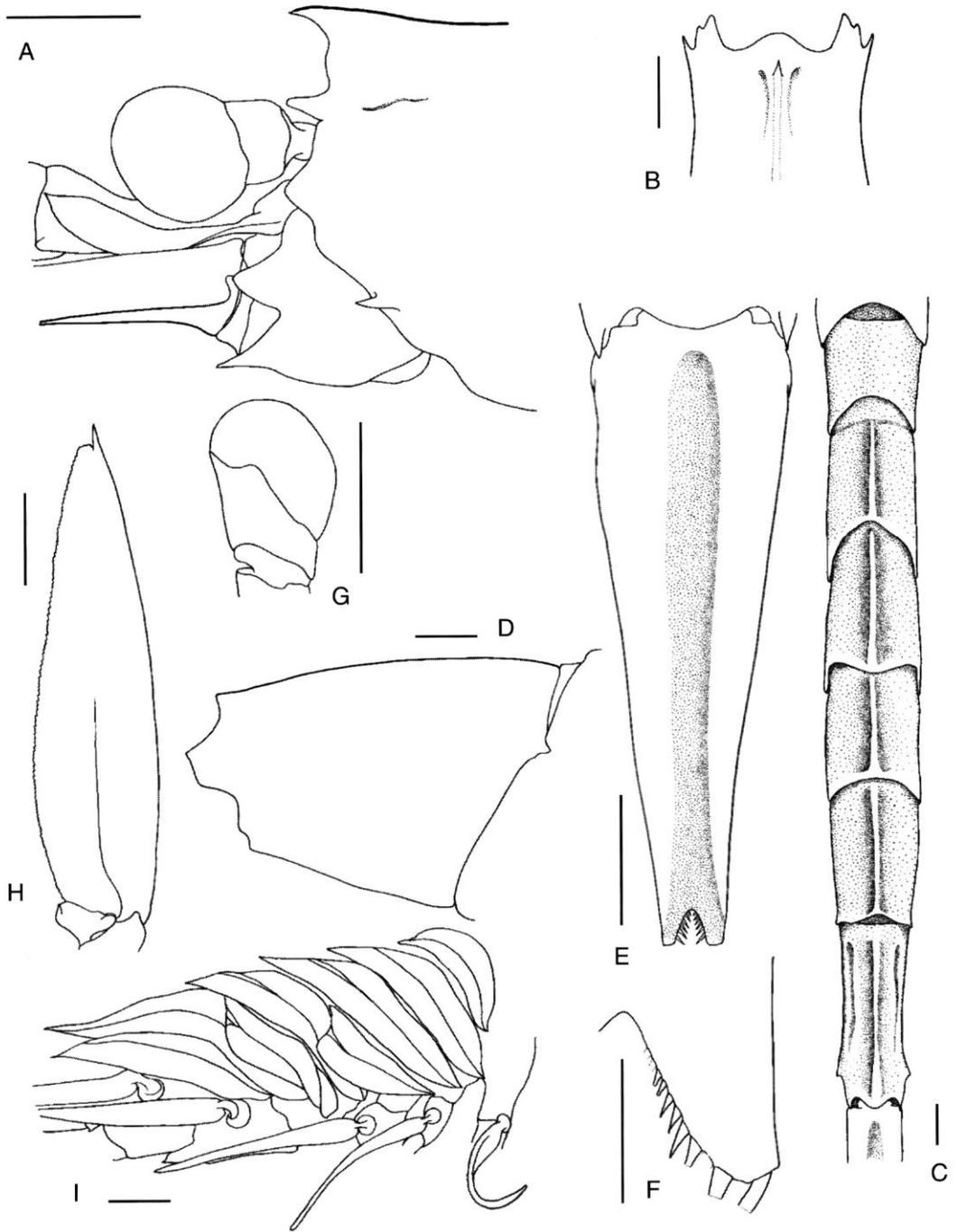


FIG. 2. — *Pasiphaea gelasinus* n.sp; **A, F**, paratype ♀, CL 33.1 mm; **B-E, G**, holotype ♂, CL 35.2 mm; **H**, paratype ♂, 32.1 mm; **I**, paratype ♀, 34.0 mm; **A**, anterior part of body in lateral view; **B**, anterior part of carapace in dorsal view; **C**, abdomen in dorsal view; **D**, sixth abdominal segment in lateral view; **E**, telson in dorsal view; **F**, telson end in dorsal view; **G**, eye in dorsal view; **H**, antennal scale in dorsal view; **I**, left gill chamber, from left to right first to fifth pereopods. Scale bars: A-E, G-I, 3 mm; F, 1 mm.

Endopod of male first pleopod composed of two lobes, mesial lobe small, with many retinaculæ in central part; outer lobe large, surrounded by many long plumose setae (Fig. 3M). Endopod of male second pleopod of typical shape for genus; appendix masculina with several long setae, not reaching end of appendix interna (Fig. 3N).

Branchial formula as follows :

	Maxillipeds		
	First	Second	Third
Pleurobranchs	—	—	—
Arthrobranchs	—	—	—
Podobranchs	—	—	—
Epipods	—	—	—
Exopods	—	—	1

	Pereopods				
	First	Second	Third	Fourth	Fifth
Pleurobranchs	1	1	1	1	1
Arthrobranchs	1	1	1	—	—
Podobranchs	—	—	—	—	—
Epipods	—	—	—	—	—
Exopods	1	1	1	1	1

REMARKS

The more than sixty species in the genus *Pasiphaea* Savigny, 1816 (Burukovsky 1996) can be divided into a number of groups of species based on characters of the telson, carapace, abdomen and first two pereopods. The present new species belongs to a species group which is characterized by a deeply forked telson end, by a dorsally carinated carapace and abdomen, and by the armed meri of the first and second pereopods. The distal margin of the telson must be clearly notched, not just weakly concave. The carapace carina may not necessarily extend all the way from the rostral blade to the posterior dorsal margin of the carapace but it must extend posteriorly from the rostrum along a considerable proportion of the dorsal surface. The carapace dorsal carination may not necessarily be sharp and blade-like, it may be somewhat rounded, but it must appear as a distinct dorsal carination. All abdominal segments need not be carinated but at least most of the third, the fourth, the fifth and

at least the anterior part of the sixth abdominal segments must be carinated. Once again the abdominal dorsal segmental carination need not all be sharp and blade-like, but the segments must be clearly carinated. The sharpness of the carapace and abdominal dorsal carination, if present, in the genus *Pasiphaea* appears, at least in some species, to be related to size, age, and position in molt cycle of the individual specimen. The number of meral spines on the first and second pereopods varies considerably with growth or size, but the presence or absence, many or a few in number, and their position, if present, are good specific characters.

The present group in the genus *Pasiphaea* includes the following twelve nominate species listed in alphabetical order:

- P. acutifrons* Bate, 1888;
P. alcocki (Wood Mason, 1891) in Wood Mason & Alcock (1891);
P. balssi Burukovsky et Romensky, 1987;
P. barnardi Yaldwyn, 1971 (synonyms *P. meiringnaudei* Kensley, 1977; *P. berentsae* Kensley et al., 1987);
P. faxoni Rathbun, 1902;
P. grandicula Burukovsky, 1976;
P. korzuni Burukovsky, 1995;
P. multidentata Esmark, 1866;
P. pacifica Rathbun, 1902;
P. rathbunae (Stebbing, 1914);
P. sinensis Hayashi et Miyake, 1971;
P. tarda Krøyer, 1845 (synonym *P. principalis* Sund, 1913).

Within this group, two species can be immediately separated from *P. gelasinus* as follows: in *P. alcocki*, the first to fifth segments of abdomen are dorsally smooth and only the sixth segment is dorsally carinated (Wood Mason 1893); in *P. pacifica*, the branchiostegal spine is placed on the side of the carapace, more or less above the branchiostegal sinus, well inside the anterolateral margin of the carapace and not extending anywhere near the anterolateral margin, and the merus of the first pereopod is usually unarmed but up to four spines are present on some specimens (Rathbun 1902; 1904; Butler 1980). Seven further species of this group can be

separated from *P. gelasinus* as their second pereopods are spined on the basis and often on the ischium, as well as on the merus: in *P. balsi* the merus/ischium/basis spine formula for the second pereopod is 16-19/1-2/10-16 (rostrum extending well beyond front of carapace) (Burukovsky & Romensky 1987); *P. barnardi* second pereopod spine formula, 7-21/0-2/1-7, though some small specimens may have one or both second pereopod bases unarmed (rostrum extends to just beyond front of carapace) (Yaldwyn 1971; Burukovsky 1978; Kensley 1977 as *P. meiringnaudei*; Kensley *et al.* 1987 as *P. berentsae*); *P. grandicula* second pereopod spine formula, 11-44/2-5/6-41, number of spines increasing with size (rostrum extending beyond front of carapace) (Burukovsky 1976); *P. multi-dentata* second pereopod spine formula, 9-37/0-3/4-16 (rostrum narrow and acute, reaching beyond front of carapace) (Esmark 1866; Sivertsen & Holthuis 1956; Zariquiey 1957, 1968); *P. rathbunae* second pereopod spine formula, 7-17/2/3-8 (branchiostegal spine arising from margin of carapace posterior to branchiostegal sinus) (Stebbing 1914; Hale 1941); *P. tarda* second pereopod spine formula, 12-22/0-1/1-9 (rostrum extending well beyond front of carapace and in mature specimens with a characteristic convex bulge on lower border of rostrum more or less above front of carapace) (Krøyer 1845; Sund 1913 as *P. principalis*; Sivertsen & Holthuis 1956; Butler 1980; Hayashi 1990).

P. gelasinus is similar to the remaining four species of this group in having the ischium and basis of the first and second pereopods unarmed. *P. gelasinus* has an acute rostrum, not extending beyond the front of the carapace, with a distinctive convexity on the nearly vertical lower margin of the rostrum in lateral view. *P. acutifrons*, *P. faxoni* and *P. korzuni* have rather similar rostral profiles, acute, usually not extending beyond front of carapace but without a nearly vertical lower margin with or without a distinctive convexity. *P. sinensis* has a rostral profile rather different from that of *P. gelasinus*, in having the lower margin with a convexity on midlength, extending beyond rostral apex and usually with a small concavity at base of lower margin.

P. gelasinus has a distinct hollow laterally on the

carapace at either side of the rostral base (the "dimple" of its specific name). Neither *P. acutifrons*, *P. faxoni*, *P. korzuni* nor *P. sinensis* show this feature and, as far as we are aware, this feature is unique to *P. gelasinus* among described species of the genus *Pasiphaea*, though a similar hollow may be shown in figures of *P. diaphana* Burukovsky *et Romensky*, 1980 (Burukovsky 1993, fig. 2.1, 2.3). Such a hollow on the carapace is not mentioned in the original 1980 description of *P. diaphana*, nor is it shown in the earlier figures of this species published by Burukovsky & Romensky (1979, figs 1, 2) under the name *Pasiphaea flagellata* non Rathbun. *P. diaphana* belongs to the *Pasiphaea* species group characterized by a distally truncate telson, a non-carinated carapace and non-carinated abdominal segments, but with meri of first and second pereopods armed.

P. gelasinus has the merus of the first pereopod with one to three spines, and the merus of the second pereopod with seven to twelve spines. The four species of this group discussed in the last two paragraphs have first and second pereopod meral spines (based on published and unpublished information available) compared to those of *P. gelasinus* as follows:

	First pereopod Meral spines	Second pereopod Meral spines
<i>P. gelasinus</i>	1-3	7-12
<i>P. acutifrons</i>	1-8	10-32
<i>P. faxoni</i>	3-6	9-18
<i>P. korzuni</i>	1-5	11-20
<i>P. sinensis</i>	6-12	19-25

The closest species to *P. gelasinus* in this group would appear to be *P. sinensis* at nearly the same size, and with the abdomen also carinated on second to fifth, and anterior two thirds of sixth, segments. The lack of carapace hollows on either side of the rostrum, the dissimilar rostral profile, and the higher meral spine counts on both first and second pereopods in *P. sinensis* would appear to distinguish these two species on careful examination.

Although missing the posterior part of the abdomen, the smallest specimen of *P. gelasinus*

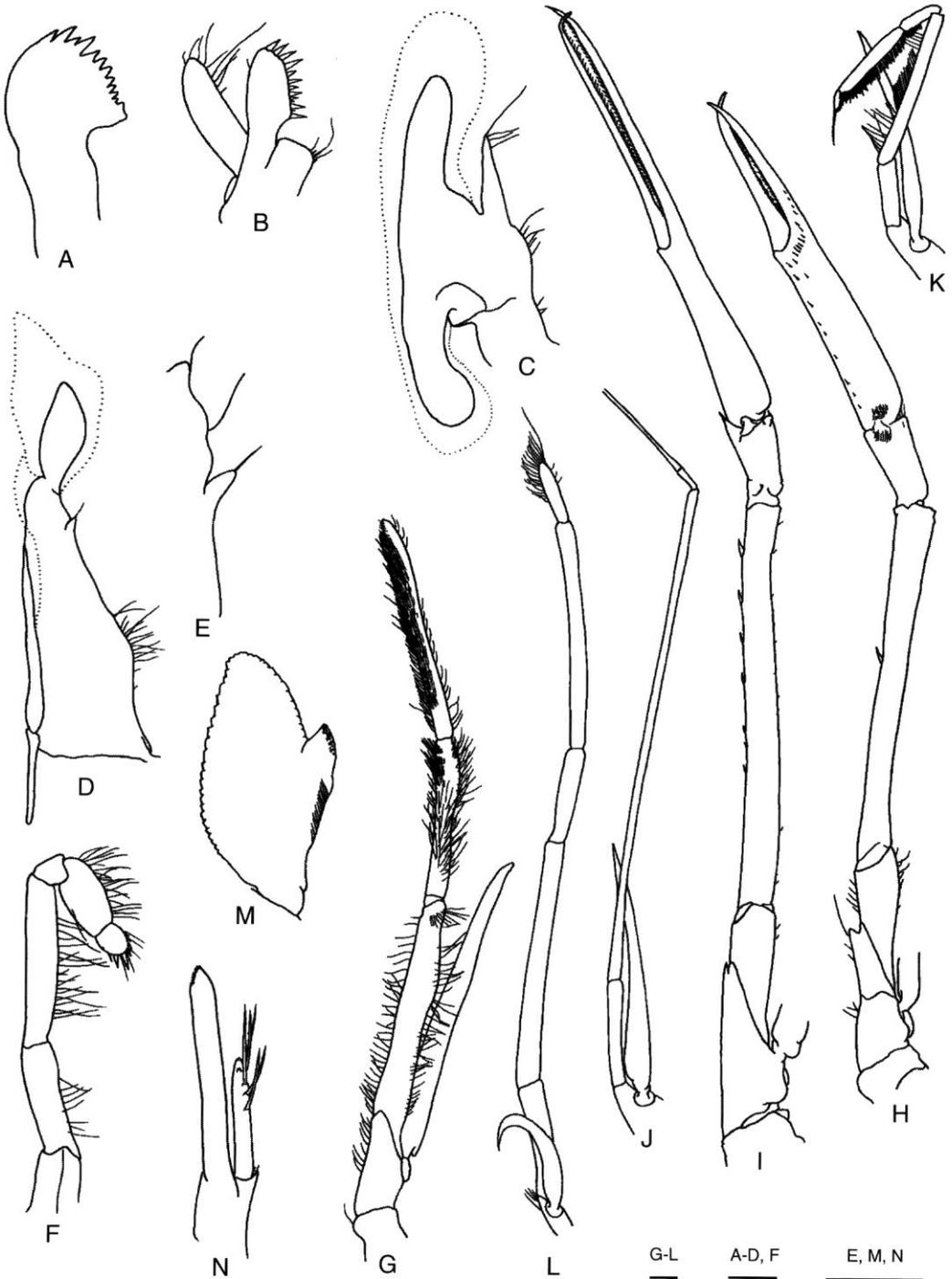


FIG. 3. — *Pasiphaea gelasinus* n.sp.; **A-I, M-N**, paratype ♂, CL 32.1 mm; **J-L**, paratype ♀, CL 34.0 mm; **A**, mandible; **B**, first maxilla; **C**, second maxilla; **D**, first maxilliped; **E**, end of first maxilliped; **F**, second maxilliped; **G**, third maxilliped, mesial view; **H**, first pereopod, mesial view; **I**, second pereopod, mesial view; **J**, third pereopod, outer view; **K**, fourth pereopod, outer view; **L**, fifth pereopod, outer view; **M**, end of first pleopod; **N**, appendices interna and masculina. Scale bars: 1 mm.

examined differs from the other larger specimens in having a slightly different shape and proportion; the dorsal margins of the remaining first and second segments are smooth with no trace of a carina, the eyes are comparatively longer as are the fingers of the second pereopod. These differences are probably due to the immaturity of the specimen.

The authors are aware of some giant specimens of *Pasiphaea* with CL up to 85 mm from the Tasman Sea, from off eastern Australia and from southern waters of Western Australia, under study in Japan and New Zealand, that are very similar in many features to *P. gelasinus*, and may or may not prove to be conspecific. The large specimens at least have a deep and anteriorly open furrow on the carapace each side of the rostrum, a carinated carapace and abdomen, and a distally notched telson. The specific status of these specimens (more than one species may be involved) is as yet undecided.

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