

A new species of hermit crab of the *teevana* group of *Pylopaguropsis* (Decapoda: Anomura: Paguridae) from the western Pacific, collected during the PANGLAO Expedition

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Abstract

Pylopaguropsis rahayuae sp. nov. is described and illustrated based on specimens collected from the tropical western Pacific during the PANGLAO Expedition, Philippines, in 2004. The new species belongs to the *teevana* group of *Pylopaguropsis* based on the general morphological similarity between right and left third pereopods.

Key words: hermit crab, *Pylopaguropsis*, *teevana* group, Philippines, PANGLAO.

Introduction

McLaughlin and Haig (1989) reviewed the pagurid genus *Pylopaguropsis* Alcock, 1905, and they recognized eleven species worldwide. Subsequently, in his review of *Pylopaguropsis* from Japanese waters, Asakura (2000) described two additional species from tropical Japan. Recently, three species were described from the western Pacific (Asakura and Paulay, 2003; Komai and Osawa, 2004; Osawa and Okuno, 2007).

McLaughlin and Haig (1989) divided *Pylopaguropsis* into the *magnimanus* group and *teevana* group based on morphology of the third pereopods. The *magnimanus* group includes species in which the third pereopods are morphologically dissimilar; the right dactyl and propodus are broader and more elongate, the dorsodistal margins are prominently angular, and the lateral face of the propodus is flattened or with one to three deep longitudinal sulci. In contrast, the *teevana* group is characterized by the morphologically similar third pereopods and includes *Pylopaguropsis teevana* (Boone, 1932), *P. pustulosa* McLaughlin and Haig, 1989, *P. garciai* McLaughlin and Haig, 1989, *P. fimbriata* McLaughlin and Haig, 1989, *P. laevispinosa* McLaughlin and Haig, 1989, *P. furusei* Asakura, 2000, *P. granulata* Asakura, 2000, *P. vicina* Ko-

mai and Osawa, 2004, and *P. bellula* Osawa and Okuno, 2007.

Through the courtesy of Drs. Peter K.L. Ng (Raffles Museum of Biodiversity Research, National University of Singapore) and Dwi Listyo Rahayu (Indonesian Institute of Science), I examined many specimens of *Pylopaguropsis* collected during the PANGLAO Expedition (Panglao Marine Research Project 2004) to Panglao Island and other neighboring islands, Bohol, Philippines, in 2004 (see the project web-site for details: www.panglao-hotspot.org/Templates/new). Among those specimens, I found one species of the *teevana* group of *Pylopaguropsis* new to science, which is described herein as *P. rahayuae* sp. nov.

The holotype of the new species is deposited in the Carcinology Section, Zoology Division, National Museum of the Philippines, with the code NMCR. The paratypes are deposited at Raffles Museum of Biodiversity Research, Department of Biological Sciences, Faculty of Science, The National University of Singapore, with the code ZRC. Abbreviations used are: SL, shield length as measured from the tip of the rostrum to the posterior margin of the shield; stn, station. The terminology used herein generally follows McLaughlin (1974) and Asakura (2000), with that for posterior carapace following McLaughlin (2000).

Systematics

Pylopaguropsis rabayuae sp. nov. (Figs. 1-4)

Material examined

Holotype: male, SL = 5.0 mm, PANGLAO Stn. R17: Black Forest, Balicasag Island, 3-15 m, edge of reef platform and slope, 9°31.1'N, 123°41.3'E, 4 June 2004, NMCR No. 27019.

Paratypes: 1 male, SL = 4.6 mm, PANGLAO Stn. B6: Black Forest, Balicasag Island, 12-14 m, coral patches, 9°31.1'N, 123°41.3'E, 4 June 2004, ZRC 2007.0006; 1 male, SL = 4.4 mm, PANGLAO Stn. B41: Balicasag Island, 17-19 m, floor of large cave, 9°30.9'N, 123°40.8'E, 4 July 2004, ZRC 2007.0007; 1 male, SL = 4.0 mm, 1 female, SL = 3.7 mm, PANGLAO Stn. B39: Pontod Lagoon 1, Panglao Island, 17-25 m, reef wall with small caves, 9°32.8'N, 123°42.1'E, 2 July 2004, ZRC 2007.0008; 1 male, SL = 3.2 mm, 1 female, SL = 3.6 mm, PANGLAO Stn. B7: Catarman, Panglao Island, 4-30 m, reef slope with caves, 9°35.9'N, 123°51.8'E, 5 June 2004, ZRC 2007.0009.

Description

Shield (Fig. 1A) as long as or very slightly longer than broad; anterior margin between rostrum and lateral projections concave; anterolateral margins sloping; lateral margins convex; posterior margin truncate; dorsal surface slightly convex, with scattered tufts of short setae. Rostrum well developed, triangular, considerably exceeding lateral projections. Lateral projections triangular, each with or without terminal spinule. Posterior carapace lateral lobes very small, well-calcified, unarmed. Branchiostegites not calcified; anterior margins unarmed, produced, each with fringe of setae.

Ocular peduncles (Fig. 1A) moderately long, 0.8-0.9 length of shield; inflated basally; with a few setae dorsomesially. Corneas slightly dilated. Ocular acicles (Fig. 1A) elongate triangular, simple, acute.

Antennular peduncles (Fig. 1A) moderately short, when fully extended reaching or slightly overreaching basal portions of corneas; ultimate

and penultimate segments unarmed; basal segment with acute lateral spine.

Antennal peduncles (Figs. 1A, C) moderately long, when fully extended slightly shorter than ocular peduncles; fifth segment with tufts of setae mesially; fourth segment with few scattered setae; third segment with sharp spine at ventrodistal margin; second segment with dorsolateral distal angle produced, terminating in strong single or bifid spine, dorsomesial distal angle with sharp spine; first segment with ventrodistal margin produced, with single strong spine. Antennal acicles moderately long, strongly arcuate, each terminating in acute spine; dorsomesial margins with rows of moderately long setae. Antennal flagella with 2-4 moderately long setae on every 2 or 3 articles, interspersed by short setae.

Third maxilliped (Fig. 1D) with carpus and merus unarmed; ischium (Fig. 1E) with well-developed crista dentata and strong accessory tooth; basis (Fig. 1E) with 1-4 small corneous teeth.

Sternite of third maxillipeds with spine on either side of median suture or unarmed.

Right cheliped (Fig. 2) sparsely setose, with chela bent downward; similar in males and females. Dactyl terminating in small corneous claw; dorsal and mesial surfaces covered with numerous small tubercles; cutting edge with 1 or 2 large and few small calcareous teeth and, on distal 0.3-0.4, several tiny corneous and calcareous teeth. Fixed finger terminating in small, bifid, corneous claw, but sometimes worn off; cutting edge with 1 or 2 large calcareous teeth, sometimes a few calcareous teeth of various sizes, and, on distal 0.4-0.5, several very small calcareous teeth. Dorsolateral margin of fixed finger and palm armed with a row of strong spines and often a row of long, plumose setae. Palm with dorsal surface bearing numerous tubercles or blunt-tipped spines of various sizes, sometimes in longitudinal rows, in particular on or near midline, with some tufts of long, plumose setae proximally, dorsomesial margin angular, armed with variously-sized tubercles or blunt-tipped spines; mesial face with numerous tubercles or blunt-tipped spines, larger dorsally; lateral face with scattered small tubercles; ventral surface tuberculate. Carpus with dorsal surface bearing scattered tubercles and few distal strong spines, dorsomesial margin with row of strong spines, dorsolateral margin not delimited; lateral face with scattered tubercles; mesial and ventral surfaces tuberculate. Merus with dorsal margin

unarmed; ventral surface tuberculate, ventrolateral margin with few sharp spines, ventromesial margin armed with spines or tubercles and ventrolateral distal margin with row of spines. Ischium unarmed.

Left cheliped (Fig. 3A-D) slender, moderately setose. Dactyl terminating in strong corneous claw; dorsal and mesial surfaces with scattered tubercles, dorsomesial margin with row of spines or tubercles; distal half of cutting edge with row of

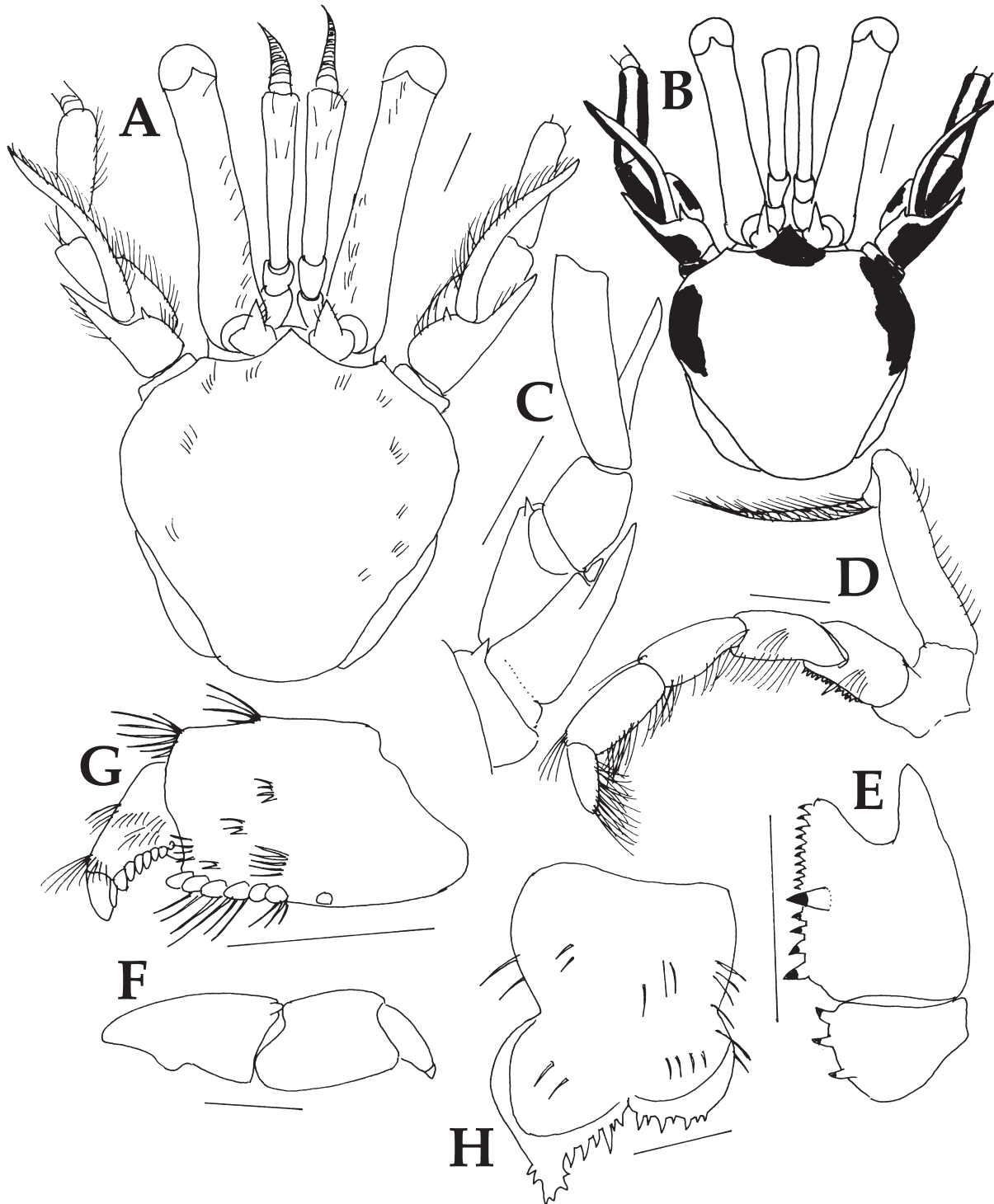


Figure 1. *Pylopaguropsis rabayuae*, sp. nov.: holotype, male, SL = 5.0 mm, Philippines, NMCR No. 27019. Shield and cephalic appendages: A, dorsal; B, dorsal, color pattern, setae omitted; C, left antennal peduncle, lateral, setae omitted. Left third maxilliped: D, dorsal; E, ischium and basis, setae omitted. Left fourth pereopod: F, mesial, setae omitted; G, chela, lateral. Telson: H, dorsal. Scales equal 1 mm.

small corneous and calcareous teeth. Dorsolateral margin of fixed finger and palm armed with a row of spines. Fixed finger terminating in strong, bifid, corneous claw; overlapping terminal claw of dac-

tyl; dorsal surface tuberculate; distal half of cutting edge with a row of small corneous teeth. Palm with dorsal surface bearing irregular 3-5 rows of strong spines; lateral surface tuberculate. Carpus with

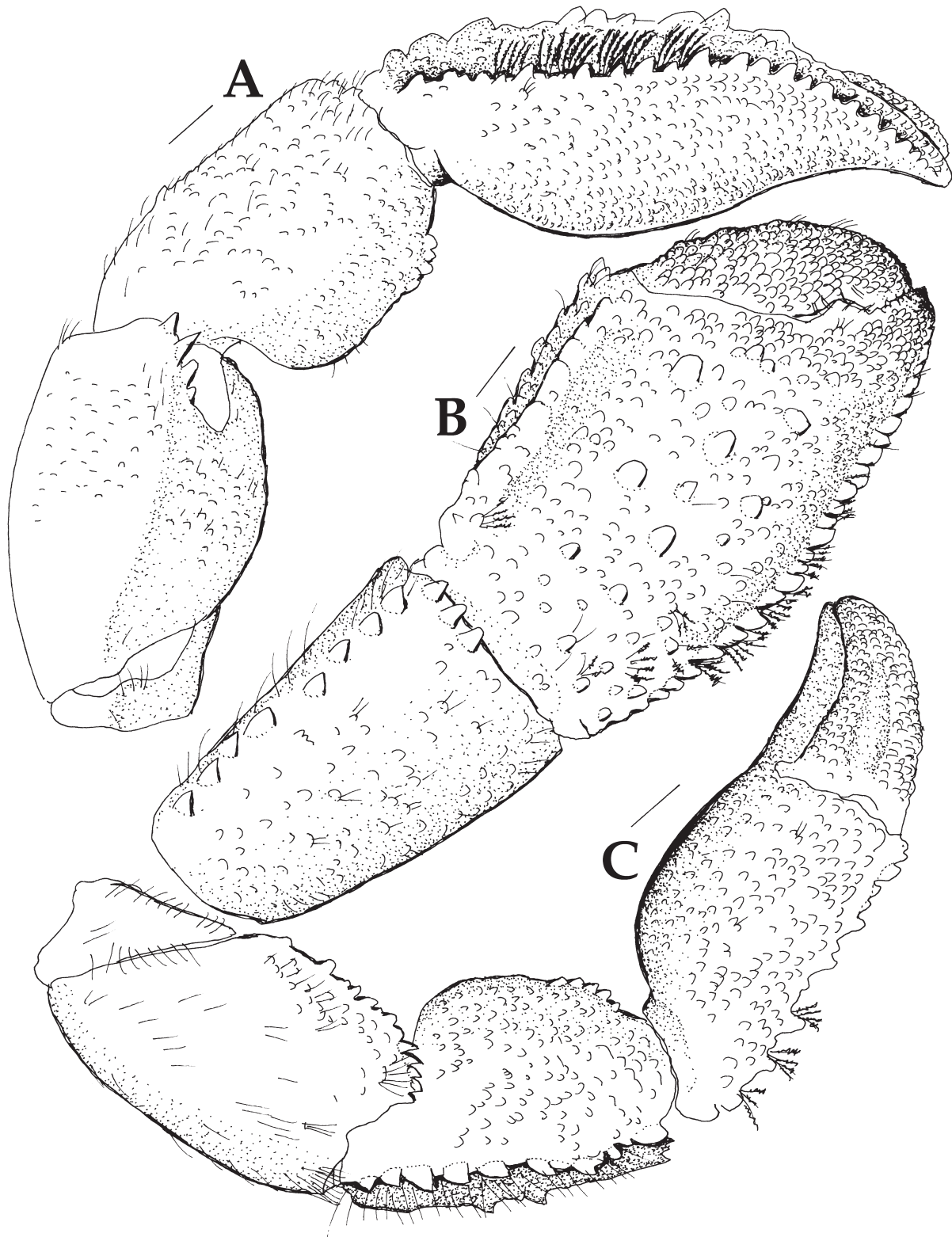


Figure 2. *Pylopaguropsis rahayuae*, sp. nov.: holotype, male, SL = 5.0 mm, Philippines, NMCR No. 27019. Right cheliped: A, lateral; B, dorsal; C, mesial. Scales equal 1 mm.

dorsomesial and dorsolateral margins each with row of strong spines and additional strong spine at dorsolateral distal angle. Merus with ventrolateral margin bearing row of strong spines; ventromesial margin with row of tubercles or spines. Ischium unarmed.

Second pereopods (Fig. 4A-D) generally similar from left to right; moderately setose. Dactyls 1.2-1.4 (left) or 1.1-1.3 (right) lengths of propodi; each terminating in strong, elongate corneous claw; ventral margins each with a row of corneous spines; mesial faces each with a dorsal row of

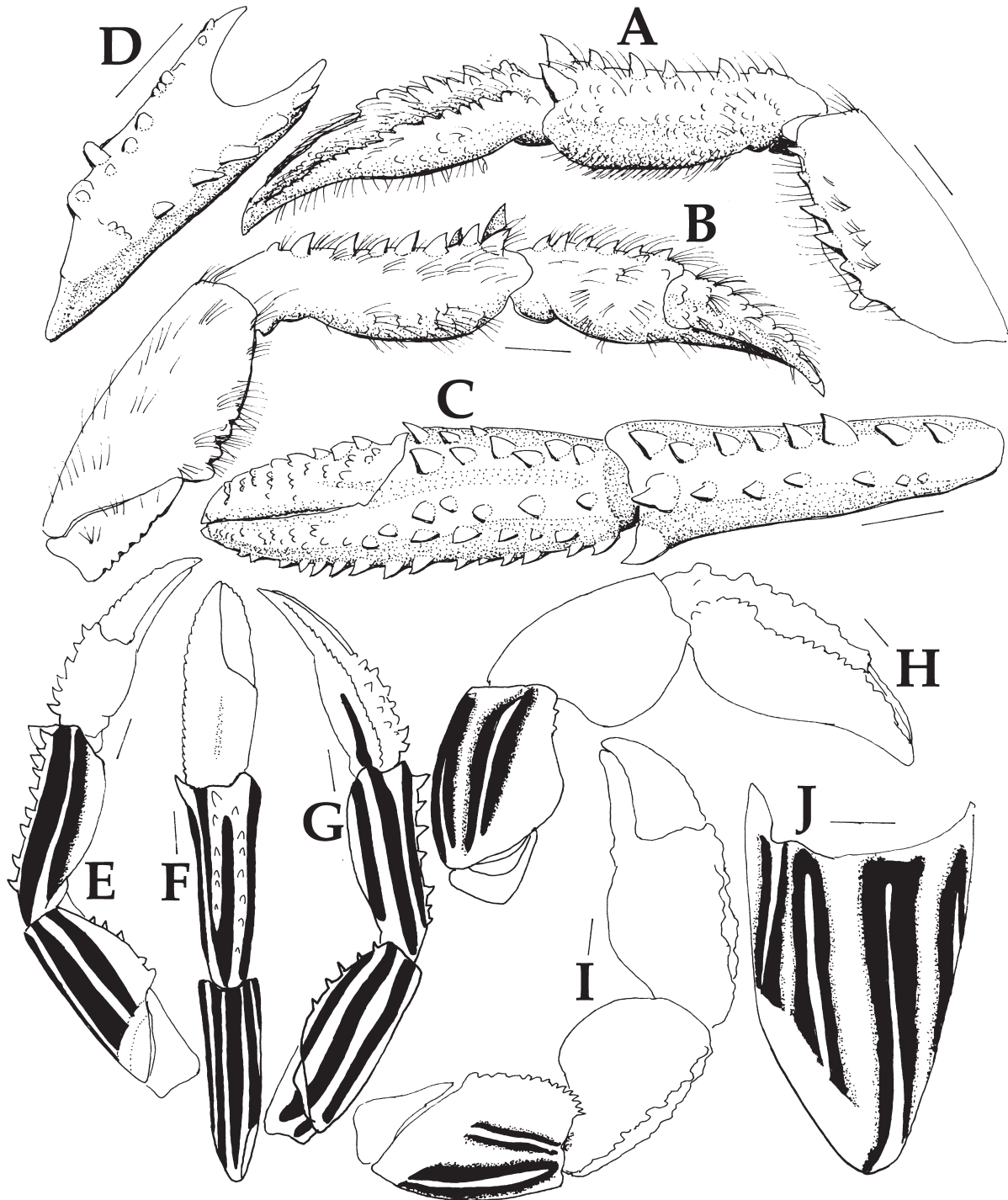


Figure 3. *Pylopaguropsis rabayuae*, sp. nov.: holotype, male, SL = 5.0 mm, Philippines, NMCR No. 27019. Left cheliped: A, lateral; B, mesial; C, chela and carpus, dorsal, setae omitted; D, merus, ventral, setae omitted. Color pattern of left cheliped (setae omitted); E, mesial; F, dorsal; G, lateral. Color pattern of right cheliped (setae omitted); H, lateral; I, mesial; J, merus, dorsal. Scales equal 1 mm.

corneous spines and sometimes 1 or 2 additional small corneous spines proximally. Propodi 1.6-1.8 (left) or 1.6-1.7 (right) lengths of carpi; ventro-distal margins each with 1 or 2 strong corneous

spines; ventral margins each with several widely-spaced corneous spinules. Carpi 0.5-0.6 lengths of meri; dorsal margins each with row of very strong spines. Meri unarmed.

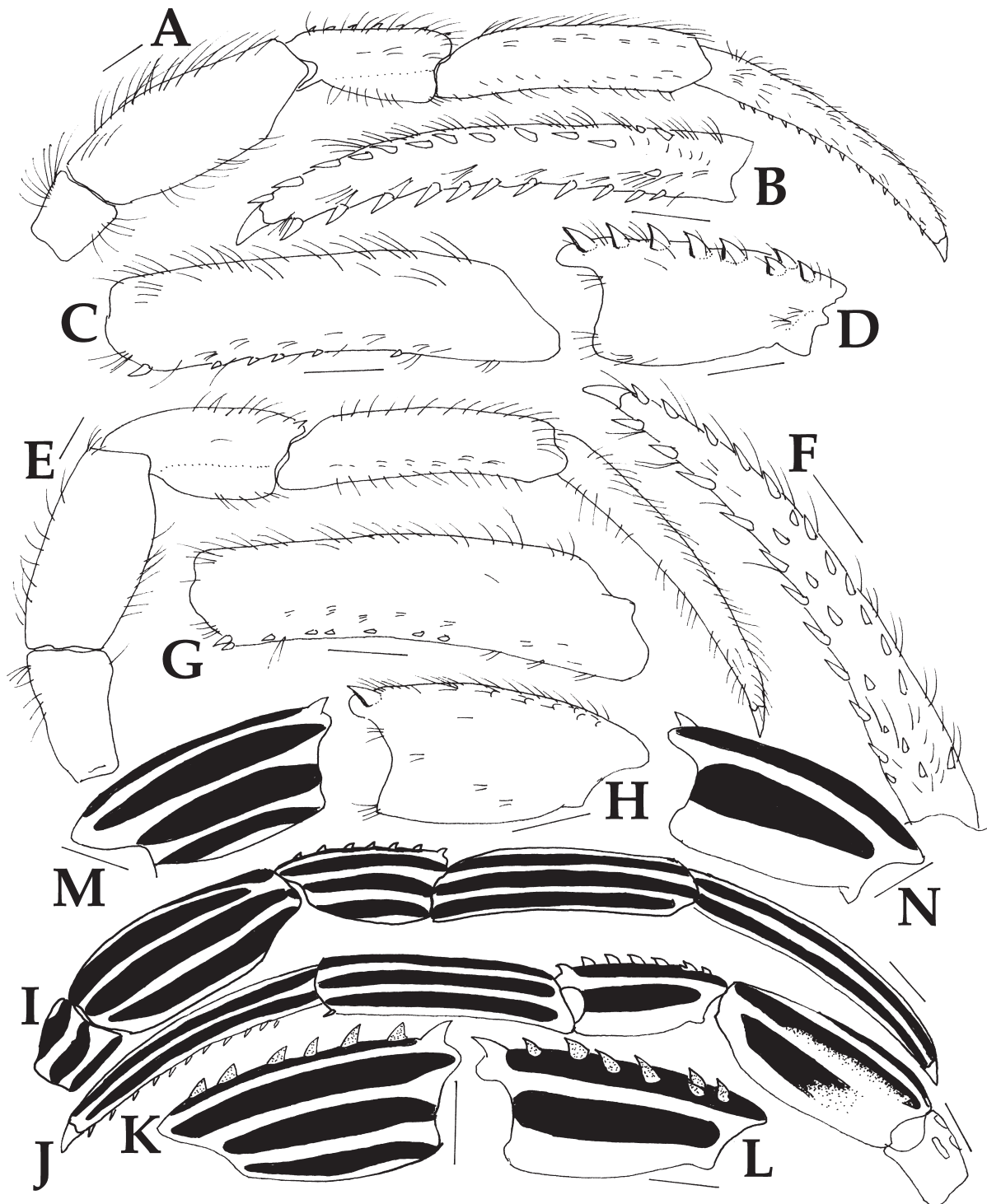


Figure 4. *Pylopaguropsis rahayuae*, sp. nov.: holotype, male, SL = 5.0 mm, Philippines, NMCR No. 27019. Right second pereopod: A, lateral; B, dactyl, mesial; C, propodus, mesial; D, carpus, mesial. Right third pereopod: E, lateral; F, dactyl, mesial; G, propodus, mesial; H, carpus, mesial. Color pattern of right second pereopod (setae omitted): I, lateral; J, mesial; K, carpus, lateral; L, carpus, mesial. Color pattern of right third pereopod (setae omitted): M, carpus, lateral; N, carpus, mesial. Scales equal 1 mm.

Third pereopods (Fig. 4E-H) generally similar from left to right; moderately setose. Dactyls 1.4-1.6 (left) or 1.2-1.4 (right) lengths of propodi; each terminating in strong, elongate corneous claw; ventral margins each with a row of corneous spines; mesial faces each with dorsal and medial rows of corneous spines. Propodi 1.4-1.6 (left) or 1.5-1.7 (right) lengths of carpi; ventrodiscal margins each with 1 or 2 strong corneous spines; ventral margins each with several widely-spaced corneous spinules. Carpi 0.6-0.8 lengths of meri; dorsal surfaces each with acute distal spine and row of spinules or tiny tubercles on proximal half. Meri unarmed.

Sternite of third pereopods with subsemicircular anterior lobe.

Fourth pereopod (Fig. 1F-G) with dactyl terminating in strong corneous claw, ventral margin with a row of corneous spines; propodal rasp of single row of corneous scales; carpus with blunt-tipped dorsodistal spine mesially.

Fifth pereopod chelate; dactyl and propodus with well-developed rasps.

Pleon dextrally twisted. Female with paired first pleopods fringed with setae; left second to fourth each with exopod slightly longer than endopod, fringed with long, finely-plumose setae, endopod and protopod with few tufts of setae; left fifth with elongate endopod fringed with long, finely-plumose setae and short exopod with setae laterally. Male with left third to fifth pleopods, each with elongate endopod and short exopod fringed with setae.

Tergite of first pleonal somite small, chitinous, unarmed, fringed with setae dorsolaterally; second to fifth membranous; sixth well calcified, subrectangular, unarmed, divided into anterior and posterior lobes by shallow transverse groove.

Uropods strongly asymmetrical, left distinctly larger than right; rasps of exopods and endopods well developed.

Telson (Fig. 1H) with lateral constriction; posterior lobes asymmetrical, left distinctly larger than right; partially calcified marginally; terminal margin of left strongly oblique, right slightly oblique or horizontal, each with row of spines.

Coloration in preservative (in alcohol for 2 years)

Shield (Fig. 1B) cream, with orange areas laterally and rostral area. Antennules, ocular pe-

duncles, and ocular acicles cream. Antennas with orange stripes on lateral and mesial margins of fourth and fifth segments and lateral margin of acicle; lateral halves of first and second segments orange; other areas cream.

Chelipeds (Figs. 3E-J) and ambulatory pereopods (Figs. 4H-N) with orange stripes on cream-colored background. Right cheliped with merus bearing 2, 1, and 1 longitudinal red-white-red patterns on mesial, dorsal and lateral faces, respectively. Left cheliped with palm bearing short orange stripe (sometimes unclear) on ventrolateral face; carpus with 2, 1, and 3 orange stripes on mesial, dorsal, and lateral faces, respectively; merus with 2, 1, and 2 orange stripes on mesial, dorsal, and lateral faces, respectively. Second and third pereopods with dactyls each bearing 2 stripes on both lateral and mesial faces; propodi each with 3 stripes on both lateral and mesial faces; carpi each with 3, 1, and 1 stripes on lateral, dorsal, and mesial faces, respectively; meri each with 3, 1, and 2 stripes on lateral, dorsal, and mesial faces, respectively.

Etymology

This species is named for Dr. Dwi Listyo Rahayu in recognition of her dedication to the study of hermit crab taxonomy.

Remarks

The new species, *P. rahayuae* n. sp., is easily separated from all other members of the *teevana* group of *Pylopaguropsis*, except for *P. granulata*, in having a row of strong calcareous spines on the entire dorsal surfaces of the second pereopodal carpi. *Pylopaguropsis granulata* similarly has a row of strong spines on the entire surface, but in the other species, the same surfaces are unarmed, or with only a few spinules or spines and/or tiny tubercles only on the proximal half of the dorsal face. Distinction between *P. rahayuae* and *P. granulata* is easy, as *P. rahayuae* has the following characters: the dorsolateral margin of the palm of the right cheliped is armed with a row of strong spines; dorsolateral margin of the carpus of the right cheliped is not angular and unarmed; the dorsolateral margin of the palm of the left cheliped is armed with a row of strong spines; dorsal faces of the propodi of the ambulatory legs are unarmed; the posterior lobes of the telson have

Key to the species of “teevana” group of *Pylopaguropsis*

1. Palm of right cheliped fringed with dense long setae *P. fimbriata*
1. Palm of right cheliped not fringed with dense long setae 2
2. Carpi of dorsal margins of second pereopods each with row of strong spines..... 3
2. Carpi of dorsal margins of second pereopods without row of strong spines 4
3. Right cheliped with dorsolateral margin of palm armed with row of strong spines, dorsolateral margin of carpus not angular and unarmed; posterior lobes of telson with many spines on terminal margins.....
..... *P. rahayuuae* new species
3. Right cheliped with dorsolateral margin of palm only granular, dorsolateral margin of carpus angular and armed with row of strong spines; posterior lobes of telson with unarmed or nearly so terminal margins..... *P. granulata*
4. Propodal rasp of fourth pereopod with two rows of corneous scales *P. pustulosa*
4. Propodal rasp of fourth pereopod with single row of corneous scales..... 5
5. Right chela with ventral surface strongly excavated in lateral half *P. teevana*
5. Right chela with ventral surface not strongly excavated in lateral half..... 6
6. Mesial faces of third pereopod dactyls each with row of strong corneous spines on midline in addition to row of strong corneous spines on ventral margin and on dorsal face 7
6. Mesial faces of third pereopod dactyls without row of strong corneous spines on midline and only with row of strong corneous spines on ventral margin and on dorsal face 9
7. Dorsal face of left chela armed with many spines..... 8
7. Dorsal face of left chela unarmed *P. garciai*
8. Ventral margins of third pereopod propodi each armed with row of 8-14 strong corneous spines (except for ventrodiscal spine) *P. furusei*
8. Ventral margins of third pereopod propodi unarmed (except for ventrodiscal spine) *P. laevispinosa*
9. Telson with terminal margin of left posterior lobe bearing 1-5 spines. Second and third pereopods with colored stripes..... *P. vicina*
9. Telson with terminal margin of left posterior lobe bearing more than 10 spines. Second and third pereopods without colored stripes *P. bellula*

many spines on the terminal margins. In contrast, *P. granulata* has the following characters: the dorsolateral margin of the palm of the right cheliped is only granular; dorsolateral margin of the carpus of the right cheliped is angular and armed with a row of strong spines; the dorsolateral margin of the palm of the left cheliped is unarmed; dorsal faces of the propodi of the ambulatory legs are armed with large protuberances; the posterior lobes of the telson have nearly unarmed horizontal terminal margins. Color patterns are also different between the two species: the ocular peduncles have no stripes in *P. rahayuuae* but have red stripes in *P. granulata*; the mesial faces of the propodi and carpi of the second and third pereopods have longitudinal stripes in *P. rahayuuae*, but the same surfaces in *P. granulata* have irregular patterns of mottled red and white.

Distribution

Currently known only from the Philippines: depth 4-30 m.

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