Malayopotamon antonii, a new freshwater crab from Menoreh karst, Central Java, Indonesia (Decapoda: Brachyura: Potamidae)

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Abstract. A new species of freshwater potamid crab, Malayopotamon antonii, is described from Menoreh karst range in Central Java Province, Indonesia. This new species resembles the two strongly granulated Malayopotamon species from Java — M. granulatum and M. lipkei. However, this new species can easily be distinguished by possessing less prominent and fewer granules on the anterolateral region of the carapace, and the male first gonopod is differently structured. This paper increases the number of the species of Malayopotamon, to 13; and is the fourth species in Java as well as the eastern-most species of Malayopotamon.

Key words. Malayopotamon, Indonesia, Java, taxonomy, new species, karst

INTRODUCTION

Malayopotamon Bott, 1968 (Potamidae) was established as a subgenus of Isolapotamon Bott, 1968 with three species and two subspecies. Later, the subgenus was treated as a separate genus (Bott, 1970). Ng & Tan (1999) revised the genus and recognised 10 species. Currently, the genus contains 12 species from Java and Sumatra (Ng et al., 2008; Wowor & Tan, 2010; Ng, 2014). So far, only three species are known from Java, viz. M. granulatum (de Man, 1892), M. javanense (Bott, 1968), and M. lipkei Wowor & Tan, 2010.

The Research Center for Biology, Indonesian Institute of Sciences (LIPI), has been conducting karst biodiversity monitoring program in Java since 2005, but the aquatic team joined this program only in 2006. In 2009, during a trip to the Menoreh karst range in Kaligesing District, Purworejo Regency, Central Java Province, the team collected specimens of a new Malayopotamon from two caves. More specimens were subsequently obtained.

MATERIAL AND METHODS

Material examined is deposited in the Museum Zoologicum Bogoriense (MZB), Cibinong, Bogor, Indonesia; and the Zoological Reference Collection (ZRC) of the Lee Kong Chian Natural History Museum (formerly Raffles Museum of Biodiversity Research), National University of Singapore.

Malayopotamon Bott, 1968

Malayopotamon antonii, new species

(Figs. 1A, 2, 3)

Material examined. Central Java Province, Purworejo Regency, Kaligesing District: holotype: male (45.1 × 36.6 mm) (MZB Cru 4964), Desa Tlogoguwo, Gua Sikantong, 7°44'21.0"E 110°07'01.5"E, 674 m asl, coll. R.K. Hadiaty & Wahyudin, 25 June 2009. Paratypes: 1 male (34.8 × 29.0 mm), 1 female (31.9 × 27.0 mm) (MZB Cru 4965), Desa Tlogoguwo, Dusun Somoroto, S. Kotak, 7°44'39.4"S 110°06'57.7"E, 618 m asl, coll. D. Wowor et al., 23 July 2016.
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Fig. 1. A, Malayopotamon antonii, new species, holotype male (45.1 x 36.6 mm) (MZB Cn 4964); B, M. granulatum, male (56.1 x 47.5 mm) (MZB Cn 2906); C, M. batak, holotype male (41.8 x 33.0 mm) (MZB Cn 2902). A–D, overall dorsal view.
Fig. 2. Malayopotamon antonii, new species. A–D, holotype male (45.1 × 36.6 mm) (MZB Cru 4964); E, paratype female (31.9 × 27.0 mm) (MZB Cru 4965); A, frontal view of cephalothorax; B, left third maxilliped; C, outer view of right and left chelae; D, posterior thoracic sternum, telson and pleonal somites 1–6; E, sternopleonal cavity showing vulvae.

2016; 1 male (30.2 × 25.6 mm) (ZRC 2019.0533), Desa Donorejo, Dusun Katerban, S. Katerban, 7°45’50.5”S 110°06’16.9”E, 707 m asl, coll. D. Wowor et al., 25 July 2016. Others: 1 female (32.9 × 26.8 mm, exoskeleton only) (MZB Cru 4966), Desa Tlogoguwono, Dusun Somoro, Gua Anjani, 7°43’53.4”S 111°06’56.4”E, 671 m asl, coll. R.K. Hadiyat & Wahyudin, 25 June 2009. Special Region of Yogyakarta Province, Kulon Progo Regency, Girimulyo District: 1 juvenile (8.87 × 7.59 mm), 1 female (21.24 × 17.63 mm, exoskeleton only) (MZB Cru 4967), Desa Jatimulyo, Dusun Beteng, Kampung Tedungan, S. Kaligede, 7°45’30.0”S 110°08’25.2”E, 398 m asl, coll. D. Wowor et al., 10 August 2018.

**Diagnosis.** Carapace subquadrate; branchial, gastric regions slightly convex, not distinctly inflated; cardiac, intestinal regions flat; frontal region with numerous low granules; anterolateral margins convex, serrated, serrae distinct; anterior of anterolateral region with several granules, posterior of anterolateral region with short distinct low striae, most of branchial region almost smooth; lateral region with short distinct low striae; epibranchial, mesogastric, urogastric, cardiac, intestinal regions almost smooth, orbital region almost smooth (Fig. 1A); epigastric cristae not clearly demarcated, area with mix of granules and rows of transverse striae; postorbital cristae distinct with sharp crest, demarcated by a distinct granulated stria; external orbital tooth broadly triangular, outer margin convex posteriorly, slightly serrated, twice length of inner margin; separated from epibranchial tooth by small notch; confluent with supraorbital margin; epibranchial tooth small but distinct, sharp, clearly demarcated from external orbital tooth, not contiguous with postorbital cristae; male thoracic sternum relatively narrow transversely; abdominal somites 1 and 2, 2 and 3 separated by deep groove medially; G1 terminal segment about one-third length of subterminal segment, straight, distal subquadrilateral, angle of anteromedial margin with numerous filiform structures, subterminal inner margin sinuous, distal outer margin with gentle hump (Fig. 3A, B).

**Description of male holotype.** Carapace subquadrate, anterior half wider than posterior half, smooth except for frontal and branchial regions with granules; branchial, gastric regions slightly convex, not distinctly inflated (Fig. 1A). Frontal region with numerous low granules, anterior of anterolateral regions with several granules, posterior of anterolateral or epibranchial regions with short distinct low striae, posterolateral regions with short very low striae, barely visible; rest of branchial regions smooth; mesogastric, metagastric, urogastric, cardiac, intestinal regions almost smooth, epigastric regions with indistinct short oval granules anteriorly, almost smooth posteriorly; orbital region almost smooth; sub-hepatic and sub-orbital regions with low granulated striae, pterygostomial regions smooth. Epigastric cristae not clearly demarcated, area with mix of granules and rows of transverse striae, medially separated by distinct V-shaped furrow, not confluent with postorbital cristae; postorbital cristae distinct with sharp crest, demarcated by a distinct granulated stria; external orbital tooth broadly triangular, outer margin convex posteriorly, slightly serrated, twice length of inner margin; separated from epibranchial tooth by small notch; confluent with supraorbital margin (Fig. 1A). Epibranchial tooth small, distinct, triangular, clearly demarcated from external orbital tooth, not contiguous with postorbital cristae. Anterolateral margins convex, serrated, striae distinct. Posterolateral margins straight, converging towards slightly concave posterior carapace margin. Orbits subovate; eye filling up most of orbital space; eye short, peduncle stout; cornea large, pigmented (Fig. 2A). Supraorbital margins distinctly concave at inner margin, entire, lined with round granules. Suborbital margins concave, complete, lined with round granules. Posterior margin of epistome slightly sinuous, with distinct narrow triangular median tooth, lateral margins with small submedian fissure.
Third maxilliped covering most of buccal cavity when closed; ischium subrectangular with distinct median groove, subparallel to inner margin; merus quadrate with anterior margin projected medially, anteroexternal angle rounded, wider than long, surface slightly rugose; exopod relatively slender with prominent anterointernal margin tooth, reaching to middle of merus, with well-developed flagellum, about half length of exopod (Fig. 2B).

Cheliped slightly asymmetrical, stout, outer surface covered with low tubercles, especially on upper parts with larger tubercles (Fig. 2C); fingers gently curved, as long as palm; posterodorsal margin of dactylus serrated, outer surface with 2 long rows lined with pits, outer surface of pollex with 2 long rows lined with pits, cutting edges of both fingers with various sizes of teeth; carpus with sharp spine on inner margin, a low baso spiniform tubercule present below spine, outer surface distinctly rugose, granulated; merus with 2 rows of sharp tubercules, upper margin with progressively larger tubercules with subdistal margin subspiniform, outer surface of merus covered with low transverse striae; anterior margin of ischium with prominent sharp tubercules; basal smooth.

Ambulatory legs relatively long, second pair longest, last pair shortest. Outer surface of merus rugose, dorsal margin lightly serrated, subdistal angle distinct without distal tooth; carpus rugose, dorsal ridged, outer surface of ambulatory legs 1 to 3 with distinct submedian ridge; propodus rugose, both dorsal and ventral ridges lined with small sharp spines; dactylus lightly curved, quadrate in cross section, row of packs of short stiff setae on dorsal margin, margins with short sharp spines, tip corneous.

Thoracic sternum relatively narrow transversely, surface pitted but smooth with lateral margins setose (Fig. 2D). Sternites 1, 2 completely fused to form distinct triangular plate, lateral margin distinctly convex, separated from sternite 3 by deep, sinuous, complete suture but median part shallow; sternites 3, 4 otherwise completely fused. Male abdominal locking tubercle low, rounded, on median part of sternite 5.

Abdomen triangular, all somites and telson free, surface pitted but smooth (Fig. 2D); telson triangular with rounded tip, lateral margins lightly concave; somites 3–6 trapezoidal, gradually convergent, lateral margin setose; somite 6 with length more than half width, lateral margins straight; somites 1, 2 subrectangular, wide, sinuous medi ally, reaching to bases of coxae of fourth ambulatory legs; somites 1 and 2, 2 and 3 separated by deep, sinuous groove medially; sternite 8 not visible when abdomen closed.

G1 very stout (Fig. 3A, B); terminal segment straight, about one-third subterminal, distal part truncated, slightly wider than neck, angle of anteromedial margin ornamented with numerous filiform structures; subterminal segment with sinuous inner margin, about one-third distal outer margin with gentle hump, proximal almost straight, lined with few long scattered stiff setae. G2 relatively long, subequal to length of G1, distal segment about half length of basal segment (Fig. 3C).

Females. The adult female carapace is relatively broader and more quadrate in general shape. The pleon is longitudinally ovate and covers most of the thoracic sternum except for the lateral edges. The gonopore is crescent-shaped, positioned between about posterior half of sternite 5 and anterior half of sternite 6, directed obliquely inwards towards the median line of the sternum, relatively large opening, closely separated and without sternal cover (Fig. 2E).

Etymology. Malayopotamon antonii is dedicated to late Dr. Anthony J. Whitten, a close friend and a prominent ecologist. He spent almost his adult life on biodiversity work in Southeast Asia and he put in a special effort on karst and cave conservation. During his many field works and visits in Indonesia, he collected many crustacean specimens for the author, for which she is very grateful. Tony, this was how we addressed him; he started his career in Indonesia and kept working for Indonesia up to his last day. The name is derived from his Latin first name, Antonius.

Remarks. Following to Ng & Tan (1999), Malayopotamon can be divided into two species groups based on the morphological character of the carapace. The members of the first group have strongly rugose and granular branchial, gastric, orbital, and frontal regions, viz. M. batak Ng & Wowor, 1991 (Sumatra), M. granulatum (de Man, 1892) (Java), and M. lipkei Wowor & Tan, 2010 (Java) (see Wowor & Tan, 2010). The surface of the carapace regions of the second group is almost smooth except for the branchial region which has a few tubercules and striae and the members are M. brevimarginatum (de Man, 1892) (Sumatra), M. gestroi (Nobili, 1900) (Sumatra), M. granulosum (Balss, 1937) (Sumatra), M. javanense (Bott, 1968) (Java), M. similis Ng & Tan, 1999 (Sumatra), M. sumatrense (Miers, 1880) (Sumatra), M. tobaense (Bott, 1968) (Sumatra), M. turgeo Ng & Tan, 1999 (Sumatra), and M. weh Ng, 2014 (Sumatra) (see Ng & Tan, 1999; Ng, 2014).

In the granulated carapace, Malayapotamon antonii, new species, belongs to the first group of species. The carapace, however, has fewer granules and is slightly less rugose compared to the other three species in this group. The most rugose and granulated carapace belongs to M. lipkei, followed by M. batak and M. granulatum (Fig. 1A–D). The outer margin of the external orbital angle of M. antonii is convex, while the outer margin of the external orbital margin of M. batak, M. granulatum, and M. lipkei is straight.

Although the G1 of M. antonii and M. batak are both straight, the G1 of M. antonii is proportionately stouter and the anteromedial margin of the terminal segment is ornamented with numerous filiform structures while that of M. batak is tubular without any distal structures (see Ng & Wowor, 1991: 168, fig. 1B–E; Ng & Tan, 1999: 214, fig. 2a, b). The G1 of M. antonii is similar to those of M. granulatum and M. lipkei, with anterior margin of the terminal segment of the G1 ornamented with numerous filiform structures. Although the
terminal segment of the G1 of *M. antonii* and *M. granulatum* are straight, they can be separated by the shape and the distribution of the filiform structures at the anterior margin of the terminal segment. In *M. antonii*, the distal part of the anterior margin is truncated and the filiform structures are only present at the angle of the anteromedial margin, while the distal margin is subquadrilateral and the filiform structures are distributed evenly along the whole anterior margin in *M. granulatum* (see Wowor & Tan, 2010: 729, fig. 1D, E). While the terminal segment of the G1 of *M. antonii* is straight and the anterior margin truncated with the filiform structures at the anteromedial angle, that of *M. lipkei* is bent inwards at about 30° from the longitudinal axis, the anterior margin is subquadrilateral with the filiform structures distributed evenly (Wowor & Tan, 2010: 729, fig. 1A, B). The outer margin of the subterminal segment of the G1 of *M. antonii* has a gentle hump while those of *M. granulatum* and *M. lipkei* are smooth and entire.

*Malayopotamon antonii* is the fourth species of *Malayopotamon* known from Java. Two species are present in western Java, i.e., *M. granulatum* and *M. javanense*, while *M. lipkei* and *M. antonii* are found in central Java. This new species marks the most eastern range of *Malayopotamon* and the first record of this genus from a karst area in Java.

**Notes on habitat.** Moderate to fast current streams with stones and rocks substrate. *Malayopotamon antonii* inhabits surface streams and caves in limestone area between 390 to 710 m asl, and can be considered to be part of the stygoxene fauna.

**Life colouration.** Overall, the life colour of the crab is brownish-maroon.

**Distribution.** Found only in Menoreh karst range (Fig. 4), spreading from Kaligesing district in Central Java Province as far as Girimulyo (the most west) district in Special Region of Yogyakarta Province.

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**LITERATURE CITED**


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