

On two new species of brachyuran crabs from shallow waters off Timika in Papua, eastern Indonesia (Crustacea: Brachyura: Epialtidae: *Doclea* Leach, 1815, and Galenidae: *Parapanope* De Man, 1895)

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Abstract. Two new species of brachyuran crabs from the Indonesian part of the Arafura Sea are described. *Doclea gemas*, new species, of the family Epialtidae, is morphologically similar to *D. ovis* and *D. canalifera* but is distinguished by the unique shape of the male first gonopod that has the distal part prominently bifurcated, with one projection long and pointed, and the other short and rounded. *Parapanope gesangi*, new species, of the family Galenidae, differs from congeners by the shape of the carapace, presence of four longitudinal ridges of small tubercles on the surface of the palm of the chelipeds and the shape of the male first gonopod, which is slender and sinuous with the tip curved upwards. These are also the first records of *Doclea* and *Parapanope* in the Sahul Shelf, as these genera were previously unrecorded from the Moluccas and east of the Philippines, respectively. The two new species are described, illustrated, compared with congeners, and new keys for both genera are provided.

Key words. Decapoda, Majoidea, Pilumnoidea, *Doclea gemas*, *Parapanope gesangi*, taxonomy, shallow water, Arafura Sea

INTRODUCTION

In the last 25 years, the brachyuran crabs from the Arafura Sea off Timika in Papua, Indonesia, have received sustained scientific attention. Ninety-eight species have been reported, of which one genus and 21 species were new to science (Rahayu & Takeda, 2000; Ng & Rahayu, 2002, 2020, 2022; Rahayu & Davie, 2002, 2006; Rahayu & Ng, 2003a, b, 2004, 2005, 2014, 2019, 2021, 2024; Rahayu & Setyadi, 2009; Rahayu & Nugroho, 2012; Li et al., 2018). Despite these extensive studies, new species are still being discovered, mainly because of the continuing monitoring program performed by the Environmental Department of PT Freeport Indonesia. During our study of the material obtained by the Freeport monitoring program between 2021–2025, we found two more new species of Brachyura: *Doclea gemas*, new species (family Epialtidae) and *Parapanope gesangi*, new species (family Galenidae). These new species are hereby described and figured in detail.

MATERIAL AND METHODS

The materials examined in this study are deposited in the Directorate of Scientific Collection Management, National Research and Innovation Agency (BRIN), Cibinong, Indonesia (MZB), and the Zoological Reference Collection of the Lee Kong Chian Natural History Museum, National University of Singapore (ZRC). The descriptive terminology follows Chen & Ng (2004), Davie et al. (2015), and Ng & Guinot (2021). Measurements provided (in millimetres) are of the maximum carapace width and length (including spines), respectively. Abbreviations used are coll. for collected by; G1 and G2 for male first and second gonopod, respectively. All the Indonesian specimens were collected by Agung Darmawan and the coastal team of Environmental Department PT Freeport Indonesia in Timika, Papua, Indonesia.

TAXONOMY

Superfamily Majoidea Samouelle, 1819

Family Epialtidae MacLeay, 1838

Subfamily Pisinae Dana, 1851

Genus *Doclea* Leach, 1815

Type species. *Doclea rissoni* Leach, 1815, by monotypy.

Remarks. The Indo-West Pacific majoid genus *Doclea* Leach, 1815 is very well-studied with 11 recognised species

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(see Ng et al., 2008; Poore & Ahyong, 2023): *D. aduncus* Wagner, 1986; *D. alcocki* Laurie, 1906; *D. armata* De Haan, 1839 (= *D. tetraptera* Walker, 1887; *D. calcitrata* White, 1847); *D. brachyrhynchus* Bleeker, 1856; *D. canalifera* Stimpson, 1857 (= *D. japonica* Ortmann, 1893); *D. canaliformis* Ow-Yang, in Lovett, 1981 (= *D. simeti* Griffin & Tranter, 1986; *D. johnsoni* Ow-Yang, in Lovett, 1981); *D. macracanthus* Bleeker, 1856 (= *D. microchir* Bleeker, 1856); *D. muricata* (Herbst, 1788) (= *Inachus hybridus* Fabricius, 1798; *D. hybridoides* Bleeker, 1856); *D. ovis* (Fabricius, 1787); *D. rissoni* Leach, 1815 (= *D. gracilipes* Stimpson, 1857; *D. andersoni* De Man, 1887; *D. sebae* Bleeker, 1856; *D. sinensis* Dai, 1981); and *D. unidentata* Chen & Ng, 2004. The genus is recognisable by the globular carapace, covered by short dense pile, armed with short or long spines, the long or short rostrum is bifid, the anterolateral margin of the carapace has four spines, and the ambulatory legs are long and covered with short setae. As most of the species occur in shallow-water and are commonly encountered in coastal waters, there has been much confusion with names. Wagner (1986) clarified the taxonomy of many of the species, with Loh & Ng (1999) and Chen & Ng (2004) resolving the outstanding problems with some of the largest species that show marked ontogenetic changes.

Wagner (1986) gave a key to the 10 species known in the genus *Doclea*. Loh & Ng (1999) showed that *D. johnsoni* Ow-Yang, in Lovett, 1981 was just a junior synonym of *D. canaliformis* Ow-Yang, in Lovett, 1981; and Ng & Chen (2004) subsequently described *D. unidentata* from southern China. A new updated key to *Doclea* is here appended for the 12 species now recognised.

Key to species of *Doclea* Leach, 1815

1. Upper orbital margin unarmed, without spinules. Male thoracic sternite 4 with spines or tubercles.....2
 - Upper orbital margin with spinules. Male thoracic sternite 4 with keeled ridge.....9
2. Rostrum long, reaching beyond spines of epistome on anterolateral angle of buccal frame.....3
 - Rostrum short, seldom reaching beyond spines of epistome on anterolateral angle of buccal frame.....10
3. Carapace dorsal surface with 6 or 7 median tubercles or spines, of which only 1 is on intestinal region.....4
 - Carapace dorsal surface with 8 or 9 median tubercles or spines, of which 2 are on intestinal region.....7
4. No pterygostomial canal visible. First ambulatory legs up to 4 times as long as carapace; pubescence on ambulatory legs reaching to proximal part of propodus. G1 smooth, almost straight, distal appendage abruptly narrowed, angular medially with pointed tip.*Doclea rissoni* Leach, 1815 (Sri Lanka, eastern India, Myanmar, Thailand, Malaysia, Singapore, Vietnam, southern China, Indonesia: Java)
 - Distinct longitudinal pterygostomial canal present. First ambulatory leg up to 2.5 times as long as carapace; pubescence on ambulatory legs reaching to proximal part of dactylus. G1 stout, bent, when mature, setose for greater part of length...5
5. G1 long, stout, bent, setose on basal two-thirds; distal part with strong contortion, distal portion after contortion long, slender, with small slender lobe basally. Vulva with narrow slit-like opening, directed mesially.*Doclea ovis* (Fabricius, 1787) (Mauritius, India, Sri Lanka, Myanmar, Thailand,

- Malaysia, Singapore, Vietnam, Philippines, southern China?, Indonesia: Java, Borneo)
- G1 long, stout, relatively less bent, less setose on basal two-thirds; distal part not contorted, distal portion distinctly bifurcate, without small lobe basally. Vulva (for *D. canalifera*) with circular opening, directed laterally outwards. 6
 6. G1 distal portion separated into 2 finger-like processes, subequal in length with blunt tip in subadults, subequal in adults.....*Doclea canalifera* Stimpson, 1857 (southern China, Taiwan, Japan, Vietnam?)
 - G1 distal portion separated into 2 branches, one branch long, flattened with pointed tip, the other branch shorter, rounded with blunt tip.*D. gemas*, new species (Arafura Sea: Papua, Indonesia)
 7. Carapace with first intestinal spine placed dorsally on base of second intestinal spine. Ambulatory legs quadrangular in cross section because of 4 longitudinal rows of dense, long setae along margins. Palm of cheliped prominently keeled along dorsal and ventral margins.....*Doclea armata* De Haan, 1839 (Sri Lanka, eastern India, Myanmar, Thailand, Singapore, Malaysia, Philippines, Indonesia: Java, Borneo, Sulawesi)
 - Carapace with two intestinal spines distinctly separate. Ambulatory legs cylindrical, without 4 longitudinal rows of dense, long setae. Dorsal and ventral margins of palm of cheliped not keeled.....8
 8. Carapace dorsal surface with only 1 hepatic tubercle; longitudinal pterygostomial canal absent. Male and female pleonal somites 4–6 fused.....*Doclea muricata* (Herbst, 1788) (Indian Ocean, Indonesia: Sumatra, Java, Moluccas)
 - Carapace dorsal surface with 2 or 3 hepatic tubercles; longitudinal pterygostomial canal present. All male and female pleonal somites free.*Doclea canaliformis* Ow-Yang, in Lovett, 1981 (Malaysia, Singapore, southern China, Indonesia: Java.)
 9. Carapace subpyriform; metabranchial region with 1 tubercle; no longitudinal pterygostomial canal present. Dense pubescence of ambulatory legs reaches to distal part of propodus. All male and female pleonal somites free. G1 with distal part falcate, flat. Vulva on anterior side of prominence*Doclea alcocki* Laurie, 1906 (Sri Lanka, Thailand)
 - Carapace globular; no metabranchial tubercle present; longitudinal pterygostomial canal present. Dense pubescence of ambulatory legs reaches to distal part of carpus. All male pleonal somites free; female pleonal somites 4–6 fused. G1 distal part strongly curved. vulva on posterior side of prominence..*Doclea aduncus* Wagner, 1986 (Pakistan)
 10. Rostrum very short, composed of one triangular lobe; intestinal region with 1 large posteriorly directed spine.*Doclea unidentata* Chen & Ng, 2004 (Beibu Bay: southern China)
 - Rostrum short, bifid; intestinal region with 2 large spines..11
 11. Carapace protogastric region with 3 tubercles; branchial region with 5 tubercles. Pubescence on ambulatory legs extending to proximal part of propodus. All male and female pleonal somites free.*Doclea brachyrhynchus* Bleeker, 1856 (Indonesia: Sumatra, Moluccas?)
 - Carapace protogastric region with 2 tubercles; branchial region with 2 tubercles. Pubescence on the ambulatory legs extending to proximal part of dactylus. Male and female pleonal somites 3–6 fused.*Doclea macracanthus* Bleeker, 1856 (Indonesia: Sumatra, Java, Moluccas?)

Doclea gemas, new species (Figs. 1, 2, 5A–E)

Material examined. Holotype: male (41.8 × 46.7 mm) (MZB Cru 7418), station T5, 4°52'21.19"S 136°00'02.10"E,

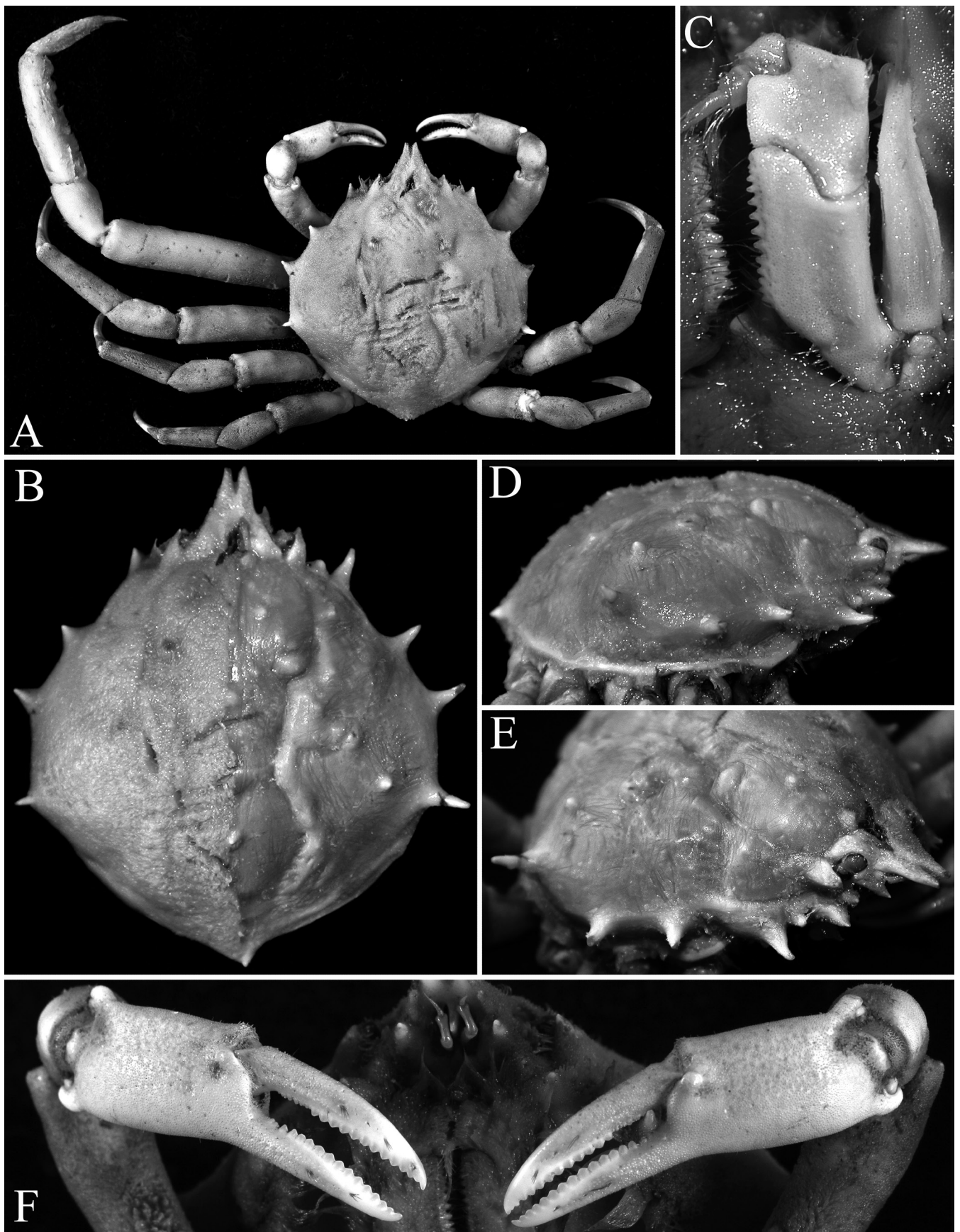


Fig. 1. *Doclea gemas*, new species, holotype, male (41.8 × 46.7 mm) (MZB Cru 7418), Indonesian Papua. A, dorsal habitus; B, carapace (right side denuded), dorsal view; C, left third maxilliped (denuded), external view; D, carapace, right lateral view; E, right dorso-lateral view, showing small tubercle between prominent pterygostomial spine (denuded); F, chelae, external view.

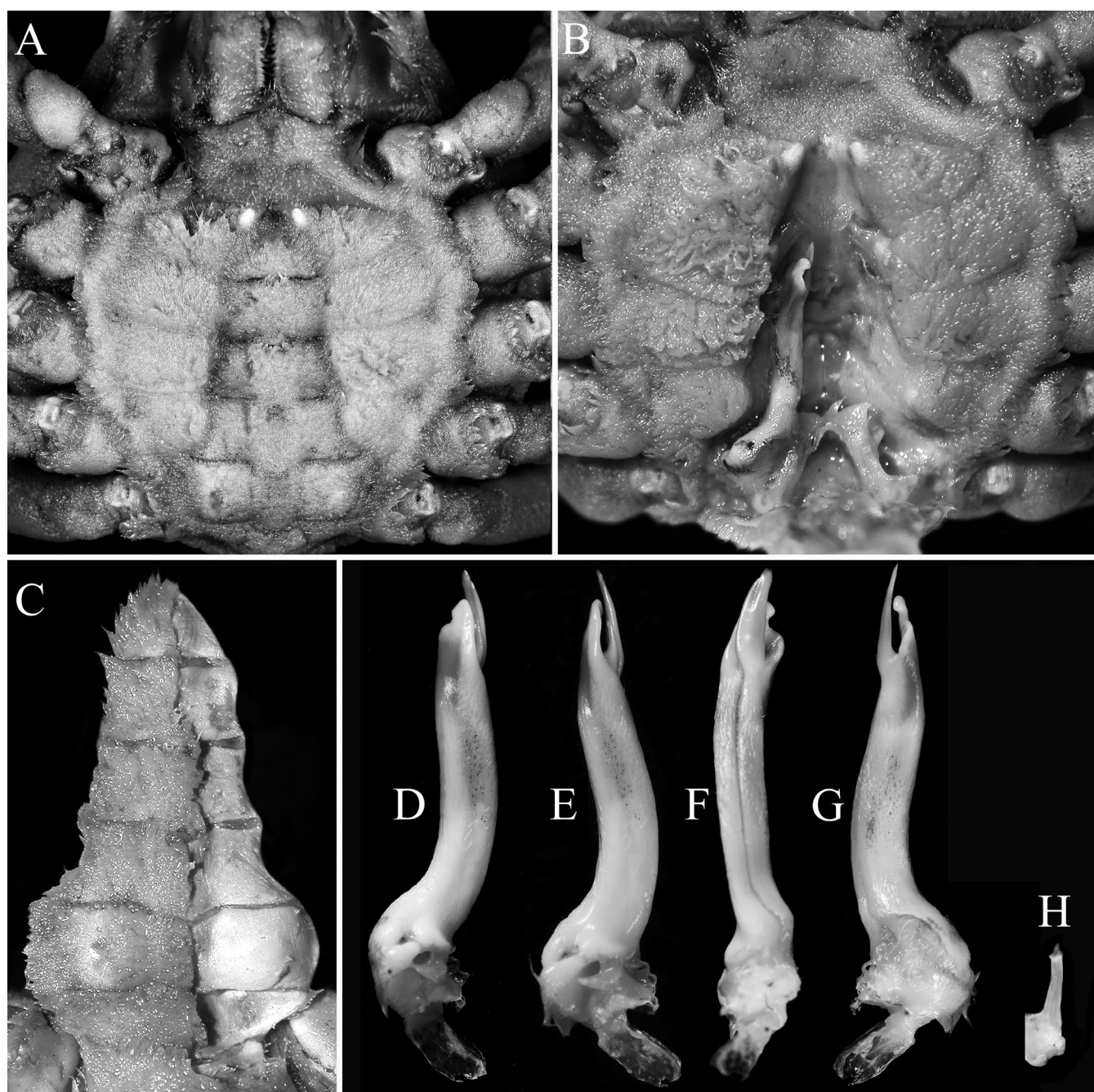


Fig. 2. *Doclea gemas*, new species, holotype, male (41.8 × 46.7 mm) (MZB Cru 7418), Indonesian Papua. A, cephalothorax ventral view, showing pleon; B, thoracic sternum, sternopleonal cavity and right G1, ventral view; C, pleon and telson (right side denuded), external view; D–G, male left G1 (various views, from ventral to dorsal views); H, male left G2. D–H photographed to same scale.

Arafura Sea, Timika, Indonesian Papua, Indonesia, 3–4 m, coll. 5 November 2024.

Comparative material. *Doclea canalifera* Stimpson, 1857. Neotype, male (56.0 × 49.8 mm) (ZRC 1999.0447), Guangdong, Nanao Island, Qianjiang Fishport, China, coll. Y.X. Cai & N.K. Ng, 12 November 1998. 1 male (56.5 × 62.5 mm) (ZRC 2000.0929), Si Racha Fishport, Chonburi province, Gulf of Thailand, coll. P.K.L. Ng et al., 2 February 2000. *Doclea ovis* (Fabricius, 1787): 3 males (34.4 × 40.0 mm, 30.0 × 36.4 mm, 36.4 × 42.0 mm) (ZRC1981.9.2.36–40), off East Coast Park lagoon, Singapore, coll. P.K.L. Ng, March 1981.

Etymology. The species name is derived from the Indonesian word “gemas” for cute and cuddly, alluding to the round and densely pubescent carapace. It is used as a Latin noun in apposition.

Diagnosis. Carapace rounded, dorsal surface covered with short, very dense pubescence; rostrum bifid, moderately long, median line of rostrum grooved (Fig. 1A, B); orbital margin separated from preorbital spine by narrow V-shaped slit (Fig. 1B), infraorbital spine small (Fig. 1D); small tubercle between prominent pterygostomial spine (Fig. 1D, E) and prehepatic spines (Fig. 1B); basal antennal article with strong spine (Fig. 3E); epigastric region with 2 median low, rounded granules arranged close to each other (Fig. 3A,

B); mesogastric region with 2 rounded granules (Fig. 1A, B); protogastric region with 4 obliquely arranged rounded granules, outer- and posteriormost one largest (Fig. 1A, B); metagastric region with large sharp tubercle; urogastric region with 1 prominent granule; cardiac region with 1 large granule; 1 strong intestinal spine (Fig. 1A–C); anterolateral margin with 1 prehepatic spine followed by 3 strong spines, last spine strongest (Fig. 1B–E). Third maxilliped narrow, covering buccal cavity, ischium longer than merus, mesial margin with row of strong spines (Fig. 1C). Chelipeds slender, merus, carpus, palm ca. 1.4 times as long as broad, fingers slightly longer than palm; cutting margins with small teeth (Fig. 1A, F). Ambulatory legs long, slender, covered with pile; first ambulatory leg substantially longer than second pair, fourth legs shortest (Fig. 1A). Pleon narrow, with 6 clearly separated somites and telson (Fig. 2A, C). G1 bifurcate (Figs. 2D–G, 5A–E), one projection long, flattened with pointed tip from mesial view with another projection shorter, rounded, with blunt tip (Figs. 2D–G, 5A–E). Female unknown.

Remarks. Among the species of *Doclea* that have a bifid rostrum and short intestinal spine, *D. gemas*, new species, most closely resembles *D. canalifera* and *D. ovis*. These three species have a rounded carapace with the pubescence particularly dense, prominent anterolateral teeth, and the G1 stout but with a long, slender tip. As discussed at length by Chen & Ng (2004), *D. canalifera* and *D. ovis* can only be separated by the form of the G1 and vulva; no females are, however, yet known for *D. gemas*. The G1 of *D. gemas*, new species, however, has a very distinctive shape and structure: it is relatively short and stout, the distal part is clearly bifurcate, with one projection long, flattened and pointed (Figs. 2D–G, 5A–E) whereas the other is shorter, rounded and the tip is blunt (Figs. 2D–G, 5A–E). The G1 of *D. canalifera* is stout, the distal part is bifurcate, with the lobes finger-like and similarly sized or subequal in size (Chen & Ng, 2004: fig. 3). Conversely, the G1 in *D. ovis* is stout, the tip is slender and elongate, with a small and short lobe on the basal area (Chen & Ng, 2004: figs. 5A, C, D). Although *D. canalifera* and *D. ovis* have relatively wide distributions from the Indian Ocean through to Malaysia, Singapore, Indonesian Java, Thailand, the Philippines, Vietnam, China, Japan, and Korea, but they are not known east of Borneo and the Philippines. The presence of a separate allied species, *D. gemas*, new species, in the Arafura Sea, is thus noteworthy.

Superfamily Pilumnoidea Samouelle, 1819

Family Galenidae Alcock, 1898

Subfamily Parapanopinae Števíć, 2005

Genus *Parapanope* De Man, 1895

Type species. *Parapanope eugora* De Man, 1895, by monotypy.

Remarks. The pilumnoid genus *Parapanope* De Man, 1895 is characterized by a hexagonal carapace with bilobed front,

four lobiform teeth on the anterolateral margin, the presence of rounded tubercles forming longitudinal ridges on the cheliped palm and carpus, and a strongly sinuous G1 with a short, sigmoid G2. The genus was most recently revised by Ng & Guinot (2021), who recognised eight species: *P. euagora* De Man, 1895, *P. pagenstecheri* (Neumann, 1878), *P. hextii* (Alcock, 1898), *P. hexacarapas* Garth & Kim, 1983, *P. serenei* Guinot & Ng in Guinot, 1985, *P. siamensis* Guinot, 1985, *P. orientalis* Ng & Guinot, 2021, and *P. parva* Ng & Guinot, 2021, all distributed in the Indo-West Pacific region. No species, however, has previously been recorded east of Panay in the Philippines (ca. 122°E). *Parapanope gesangi*, new species, from the Arafura Sea is now the most easterly known member of the genus. A new key, amended from Ng & Guinot (2021), is provided here for all nine species of *Parapanope* now known.

Key to species of *Parapanope* De Man, 1895

1. Regions on carapace clearly demarcated; epibranchial and metabranchial regions clearly demarcated, distinctly covered with distinct small granules or ridges; meta-mesobranchial ridge prominent, distinctly granular 2
- Regions on carapace weakly demarcated; epibranchial and metabranchial regions visible but only with low granules, appearing almost smooth; meta-mesobranchial ridge low, weakly granular 7
2. Carapace frontal margin distinctly produced anteriorly in adult with margin distinctly concave 3
- Carapace frontal margin not prominently produced anteriorly in adult, with margin slightly concave to straight 5
3. Carapace distinctly wider than long, posterolateral margin slightly concave to straight or slightly convex. Cheliped carpus outer margin with flange but never dentiform or produced. ...
...*Parapanope euagora* De Man, 1895 (Singapore, Malaysia; Penang, Indonesia; Java Sea)
- Carapace quadrate to subquadrate, posterolateral margin otherwise. Cheliped carpus outer margin with distinct tooth ..
..... 4
4. Carapace subquadrate, posterolateral margin distinctly concave. Cheliped palm smooth or with scattered granules and short setae; outer margin of carpus with prominent tooth or lobe ...
...*Parapanope serenei* Guinot & Ng in Guinot, 1985 (eastern India, Sri Lanka)
- Carapace subquadrate, posterolateral margin straight. Cheliped palm with 3 or 4 longitudinal rows of granules and short setae; outer margin of carpus with prominent tooth and scattered granules.....*Parapanope gesangi*, new species (Indonesia: Arafura Sea, Timika, Papua)
5. Carapace of adult with epibranchial tooth lacinate, with low anterior lobe or tooth.*Parapanope hextii* (Alcock, 1898) (eastern India, Nicobars, Malaysia: Penang and Selangor; Singapore, Brunei)
- Carapace of adult with epibranchial tooth dentiform, without anterior lobe or tooth. 6
6. Carapace frontal margin distinctly concave; posterolateral margin usually distinctly concave; gastric region distinctly convex.....*Parapanope orientalis* Ng & Guinot, 2021 (China, Korea, Japan)
- Carapace frontal margin slightly concave; posterolateral margin almost straight to slightly concave; gastric region gently convex.....*Parapanope pagenstecheri* (Neumann, 1878) (western India)

7. Dorsal surface of carapace, especially gastric regions, distinctly swollen, convex. *Parapanope siamensis* Guinot, 1985 (eastern Thailand, southern China)
- Dorsal surface of carapace, especially gastric regions, distinctly lower, gently convex. 8
8. Carapace anterolateral teeth (including epibranchial tooth) all low, lobiform. *Parapanope hexacarapas* Garth & Kim, 1983 (Philippines: Panay, Palawan)
- Carapace anterolateral teeth distinctly produced, dentiform, including epibranchial tooth often elongate. *Parapanope parva* Ng & Guinot, 2021 (Malaysia: Penang)

***Parapanope gesangi*, new species**

(Figs. 3, 4, 5F–I)

Material examined. Holotype: male (10.1 × 7.8 mm) (MZB Cru 7416), station K1, 4 m, 4°49'19.67"S 136°35'06.14"E, coll. 19 October 2022. Paratypes: 1 female (9.2 × 7.2 mm) (MZB Cru 7417), 2 ovigerous females (10.2 × 7.7 mm, 9.6 × 7.4 mm) (ZRC 2025.0013), same data as holotype; 1 male (9.1 × 7.3 mm) (ZRC 2025.0011), station T5, 4°55'04.64"S 136°42'16.25"E, 3–4 m, coll. 18 October 2022; 1 male (9.6 × 7.7 mm) (ZRC 2025.0012), station T5, 4°55'04.64"S 136°42'16.25"E, 3–4 m, coll. 21 February 2023; 1 male (9.8 × 7.6 mm) (ZRC 2025.0011), station OT5, 5°06'33.91"S 131°14'32.97"E, 4 m, coll. 11 September 2025; 1 ovigerous female (9.2 × 7.1 mm) (ZRC 2025.2036), station EM 770, 4°58.045'S 137°7.418'E, 3.5–9.0 m, coll. 6 April 2021. All from Timika, Arafura Sea, Indonesian Papua, Indonesia.

Comparative material. *Parapanope eugora* De Man, 1895, neotype, male (22.8 × 15.8 mm) (ZRC 19.9.1983) [holotype of *P. singaporensis* Guinot & Ng, in Guinot, 1985], East Coast Park, Singapore, coll. P.K.L. Ng, March 1981; *Parapanope hextii* (Alcock, 1898), 1 male (11.2 × 7.4 mm) (ZRC 2016.111), station DR 340, between Tekong East and Pengerang, Singapore, 01°23.914'N 104°05.353'E – 01°24.141'N 104°05.400'E, coll. Comprehensive Marine Biodiversity Survey, 25 March 2014; 1 ovigerous female (9.0 × 6.0 mm) (ZRC 2017.826), Pantai Muara, Brunei, coll. D.W. Lane, 7 December 2002.

Etymology. This species is named after Dr. Gesang Setyadi, Vice President Environmental of PT Freeport Indonesia, for his support in the ecology monitoring program.

Diagnosis. Carapace 1.2–1.3 times as broad as long, front clearly bilobed, prominently produced anteriorly, with deep median fissure; each lobe with distinctly concave margin (Fig. 3A–C); dorsal surface with postfrontal, epi- and protogastric, cardiac, epi- and metabranchial regions well delineated; gastric regions gently convex in frontal view; surface of regions with numerous small rounded granules; oblique meso-metabranial ridge strong, lined with distinct granules, short striae, subparallel with posterolateral margin (Figs. 3A, 4A–C). Carapace anterolateral margin with 4 distinct lobiform teeth, margin smooth, lines with short setae: first tooth (external orbital tooth) broadest with gently concave margin; second and third teeth broad, separated by relatively broad fissures or clefts; fourth tooth dentiform (Figs. 3A, 4A–C). Carapace posterolateral margin straight or gently

convex, lined with short setae (Figs. 3A, 4A–C). Chelipeds outer surfaces mostly with small granules forming rounded nodules; outer surface of carpus with distinct low rounded nodules of different sizes; dorsal margin of palm with row of 3 blunt or rounded nodules of granules; rest of palm with 3 or 4 ridges of several rounded small tubercles; fingers stout, distally curved, outer surface with granules (Fig. 3E, F). Ambulatory legs with dorsal margins distinctly tomentose but not completely obscuring margins, ventral margin with long setae. Male pleon narrow, somite 5 and 6 quadrate or slightly wider than long, telson triangular, with rounded tip, as long as wide (Figs. 3D, 5I). G1 sinuous, tip distinctly upcurved, dorsal margin with 2 or 3 long spines subdistally; dorsal margin with submedian row of short spines ventrally visible (Figs. 4F–H, 5F, G). G2 short, sigmoid (Fig. 5H). Female pleon broad (Fig. 4D); vulva elliptical with small operculum (Fig. 4E).

Remarks. Adult specimens of *Parapanope gesangi*, new species, are relatively small compared to its congeners, with the carapace width of the material examined not exceeding 10.2 mm. The small ovigerous female of *P. gesangi*, new species, measures only 9.2 mm in carapace width (ZRC 2025.2036), and in this aspect, it is comparable to *P. hexacarapas* from the Philippines, in which the ovigerous female measured only 8.7 mm in carapace width (cf. Guinot, 1985; Ng & Guinot, 2021). These two species are also similar in having more squarish carapace, but the armatures of their anterolateral teeth differ. In *P. gesangi*, new species, the external orbital tooth is low, the second and third teeth are broad and sharp, and the epibranchial tooth is small and sharp (Figs. 3A, 4A–C), whereas in *P. hexacarapas*, the external orbital tooth, second and third teeth are broad and low, and the epibranchial tooth is low and not sharp (Garth & Kim, 1983: fig. 4a; Guinot, 1985: pl. 3 fig. 2). The G1 of *P. gesangi*, new species, is also relatively stouter, more sinuous with the tip upturned (Figs. 4F–H, 5A, B) compared to that of *P. hexacarapas* which is relatively longer and more slender, with the tip hooked ventrally (cf. Garth & Kim, 1983: 681, fig. 4b).

All other species of *Parapanope* have a wider and more pronouncedly hexagonal carapaces. *Parapanope eugora* differs from the new species in having broad, lacinate teeth on the anterolateral margin of the carapace, with the posterolateral margin strongly oblique (Ng & Guinot, 2021: figs. 1A, D–G, 2), and the outer surface of the cheliped palm almost smooth with the tubercles forming only one ridge on the upper margin (Ng & Guinot, 2021: fig. 3G–P) (versus the anterolateral margin of the carapace with broad and sharp teeth on the anterolateral margin, with the posterolateral margin less oblique, and the outer surface of the cheliped palm with three or four ridges of rounded tubercles in *P. gesangi*, new species; Figs. 3A, E, F, 4A–C). Although *P. hextii* is also relatively small-sized and the carapace is also somewhat more squarish, it is easily recognized by the less produced front of the carapace with shallow fissure medially and the margin being only gently concave, the form of the epibranchial tooth which is acutely triangular and directed laterally, lacinate, and may be entire or often with a small

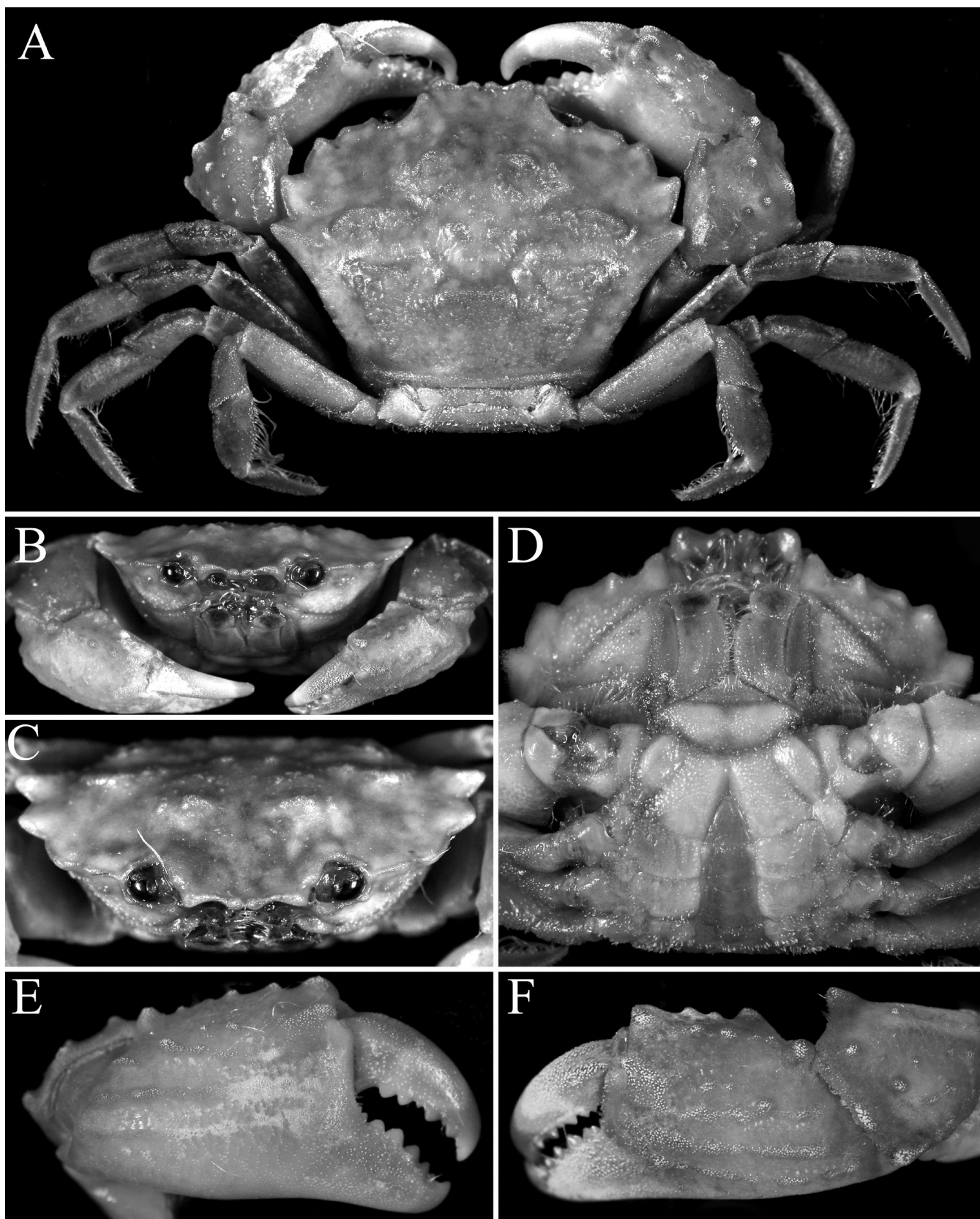


Fig. 3. *Parapanope gesangi*, new species, holotype, male (10.1 × 7.8 mm) (MZB Cru 7416), Indonesian Papua. A, dorsal habitus; B, frontal view of cephalothorax and chelipeds; C, fronto-dorsal view of cephalothorax; D, ventral view of cephalothorax showing third maxillipeds, thoracic sternum and pleon; E, right chela, external view; F, left chela and carpus, external view.

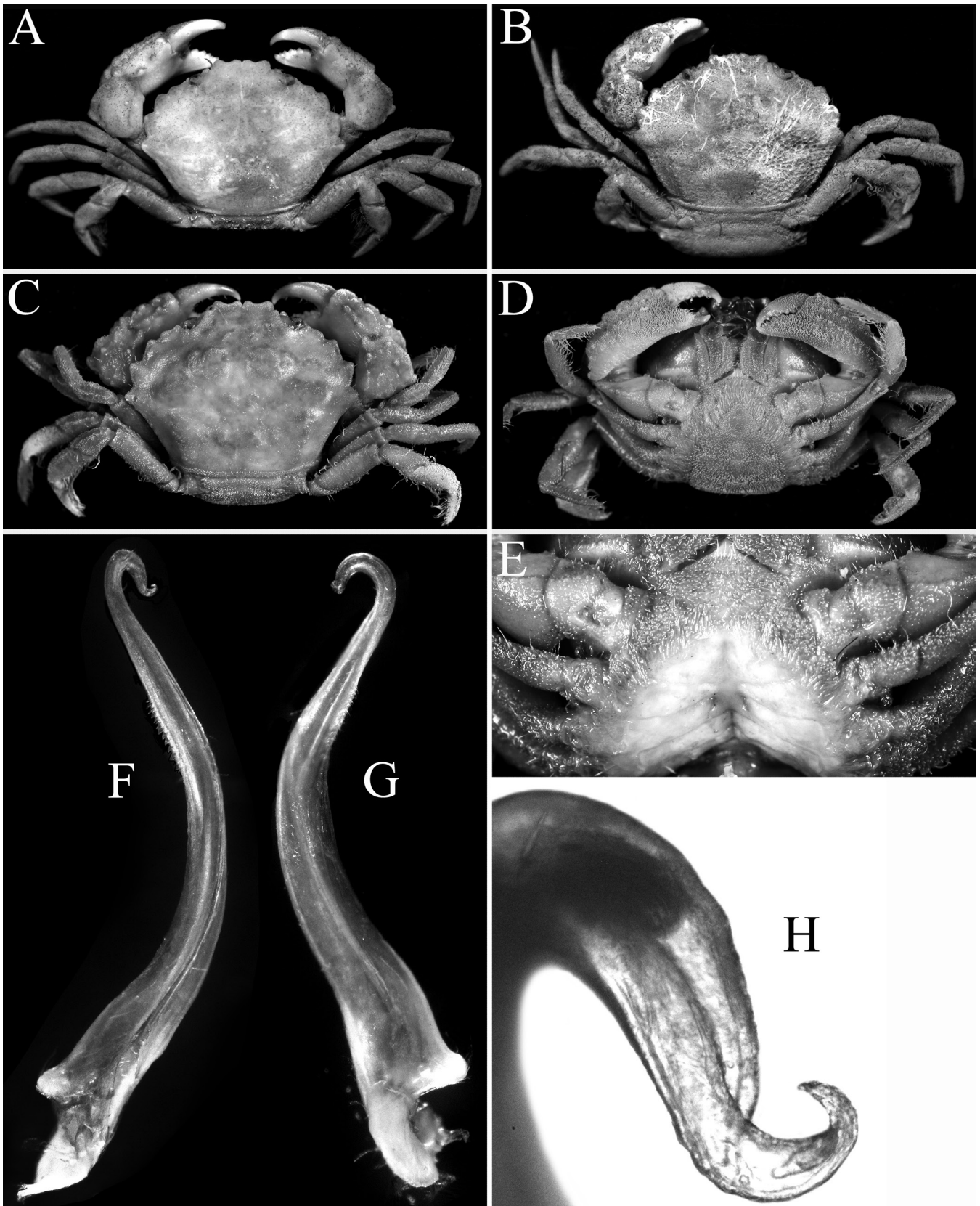


Fig. 4. *Parapanope gesangi*, new species. A, paratype, male (9.1 × 7.3 mm) (ZRC 2025.0011); B, paratype, ovigerous female (9.2 × 7.1 mm) (ZRC 2025.2036), habitus, dorsal view showing bryozoan on the carapace; C, D, E, paratype, female (9.2 × 7.2 mm) (MZB Cru 7417); F–H, holotype, male (10.1 × 7.8 mm) (MZB Cru 7416). A, C, habitus, dorsal view; D, habitus, ventral view showing pleon; E, sternopleonal cavity and vulvae; F, left G1 (ventral view); G, left G1 (dorsal view); H, tip of left G1 (ventral view).

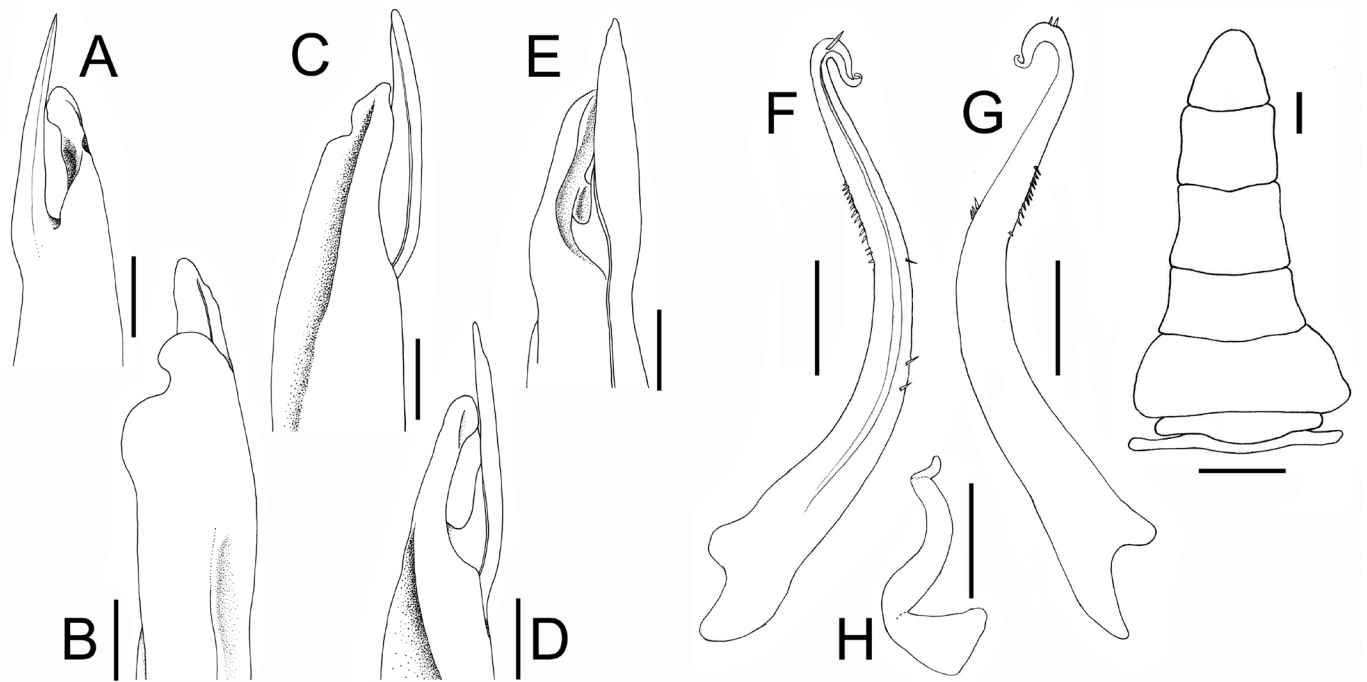


Fig. 5. A–E, *Doclea gemas*, new species, holotype, male (41.8 × 46.7 mm) (MZB Cru 7418), Indonesian Papua; F–I, *Parapanope gesangi*, new species, holotype, male (10.1 × 7.8 mm) (MZB Cru 7416), Indonesian Papua. A, C, distal part of left G1 (subventral view); B, distal part of left G1 (ventral view); D, distal part of left G1 (dorsal view); E, distal part of left G1 (subdorsal view); F, left G1 (ventral view); G, left G1 (dorsal view); H, left G2 (tip bent), (ventral view); I, male pleon (ventral view). Scale bars: A–E = 1.0 mm; F–H = 0.5 mm; I = 1.0 mm

accessory proximal tooth or lobe (Ng & Guinot, 2021: figs. 5, 6) (versus front strongly produced with broad, deep fissure medially and distinctly more concave margin, epibranchial tooth small, acutely triangular, directed laterally, entire, in *P. gesangi*, new species; Figs. 3A, 4A–C). Compared to *P. pagenstecheri*, the G1 of the latter species is less sinuous with a slightly curved, blunt, tip (Guinot, 1985: fig. 13A, B), while in *P. gesangi*, new species, it is distinctly more sinuous with the tip strongly bent and curving upwards (Figs. 4F–H, 5F, G). In *P. serenei*, the carapace is more squarish but proportionately broader compared to *P. gesangi*, new species, the chelipeds and ambulatory legs tomentose (cf. Guinot, 1985: 693) (versus without tomentum in *P. gesangi*, new species; Fig. 3A, E, F), and the tip of the G1 is curved with a long pointed tip (Guinot, 1985: fig. 4) (versus strongly curved, with the tip curved upwards in *P. gesangi*, new species; Fig. 4H). The shape of the G1 of *P. gesangi* resembles that of *P. siamensis*, but the carapace of the latter species is proportionally much broader with four granulated anterolateral teeth, and a smooth outer surface of the palm (Guinot, 1985: fig. 9A, B) (versus carapace more squarish and the palm with three or four longitudinal ridges of rounded granules on the outer surface in *P. gesangi*, new species; Fig. 3A, E, F). *Parapanope orientalis* and *P. parva* differ in having smooth carapace and chelipeds, and a proportionately longer and more slender G1 with a curved tip (Ng & Guinot, 2021: fig. 15G–L, Q–S).

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