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The Identity of *Homoioplax haswelli* (Miers, 1884) (Crustacea: Decapoda: Brachyura)

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The brachyuran crab *Pseudorhombila haswelli* Miers, 1884, described on the basis of two juveniles from the Arafura Sea, is a poorly known species of uncertain systematic position. It was made the type and only species of *Homoioplax* Rathbun, 1914, and assigned to the Prionoplacinae (Goneplacidae). Subsequent revisions of the goneplacids showed Prionoplacinae to be a junior synonym of Eucratopsinae Stimpson, 1871, as a member of the Panopeidae Ortmann, 1893, but no one has re-evaluated the position of *Homoioplax*. As a result, *Homoioplax* has remained in the Panopeidae as the only Indo-West Pacific representative of the family. This study assesses the systematic status of *Homoioplax haswelli* based on a re-examination of the type and other material of the species. *Homoioplax haswelli* is here attributed to *Carcinoplax* H. Milne Edwards, 1852 (Goneplacidae), justifying the recognition of the species described by Miers as *C. haswelli*. Moreover, *Carcinoplax haswelli* is shown to be a senior synonym of *C. sinica* Chen, 1984, described from the South China Sea. Therefore, *C. haswelli* is now known to range from southern Taiwan and the Philippines, through the South China Sea, northern Vietnam, the eastern waters of Singapore to the Madura Straits in eastern Java and Arafura Sea, northern Australia, at 25–187 m, but usually less than 100 m depth.

Key words: *Pseudorhombila haswelli*, *Carcinoplax*, New combination, Senior synonym, *C. sinica*, New distribution, Goneplacidae.

BACKGROUND

The Panopeidae Ortmann, 1893, is a wholly American and Atlantic brachyuran family, with the exception of *Homoioplax haswelli* (Miers, 1884), a taxon first described from the Arafura Sea, north of Australia. The species was subsequently reliably reported only from off the Kei Islands (Tesch 1918), and off northwestern Australia (Poore et al. 2008). *Homoioplax* Rathbun, 1914, was established and assigned to the Prionoplacinae Alcock, 1900 in the Goneplacidae MacLeay, 1838, because the male pleon did not fully reach the bases of the ambulatory legs (Rathbun 1914: 146). Prionoplacinae was subsequently shown to be a junior synonym of Eucratopsinae Stimpson, 1871, and eventually placed in the Panopeidae Ortmann, 1893 (Guinot 1969a 1971 1978), but the position of *Homoioplax* was not re-evaluated. As a result, *Homoioplax* has remained in the Panopeidae as the only Indo-West Pacific representative of the family.

To date, no one has re-examined the types of *H. haswelli* to clarify its identity and systematic position. Consequently, this study examined the juvenile syntypes of *H. haswelli* in detail with a view to revising its systematics.

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MATERIALS AND METHODS

Specimens examined are deposited in The Natural History Museum, London, U.K. (NHM); Muséum national d'Histoire naturelle, Paris, France (MNHN); Museum Victoria, Melbourne (NMV); and Zoological Reference Collection of the Lee Kong Chian Natural History Museum, National University of Singapore (ZRC). Measurements (in millimetres) of the material examined are of the maximum carapace width (including teeth) and length, respectively. The following abbreviations are used: G1 = first male gonopod; G2 = second male gonopod; P2–P5 = pereiopods 2–5 (ambulatory legs 1–4), juv. = juvenile and stn = station. The terminology used follows Ng et al. (2008) and Davie et al. (2015).

RESULTS

TAXONOMY

Family Goneplacidae MacLeay, 1838
Genus *Carcinoplax* H. Milne Edwards, 1852

Carcinoplax haswelli (Miers, 1884) comb. nov.
(Figs. 1–5)

Pseudorhombila vestita var. *sexdentata* — Miers, 1884: 184, 240, pl. 24, fig. B.

Pseudorhombila haswelli Miers 1884: 241.

Homoioplax haswelli — Rathbun 1914: 146; Tesch 1918: 190, pl. 10, fig. 1; Serène 1968: 91; Davie 2002: 374; Ng et al. 2008: 189; Poore et al. 2008: 73.

Carcinoplax sinica Chen, 1984: 190, text-fig. 2, pl. 1, figs. 6, 10; Chen 1998: 266; fig. 3; Dai et al. 1986: 366, text-figs 190-2–190-4, pl. 53, fig. 5; Guinot 1989: 285, figs. 12–14, pl. 5; Dai and Yang 1991: 395, text-figs. 190-2–190-4, pl. 53, fig. 5; Hsueh and Huang 2002: 119 126, figs. 8D, 11; Castro 2007: 640; Ng et al. 2008: 189; Ng and Mitra 2019: 2, figs. 4, 5, 6E–H, 7D–F, K, L, 8K–N.

Non *Pilumnoplax vestita* var. *sexdentata* — Miers 1886: xxxi, xxxvii, 229. [= *Entricoplax vestita* (De Haan, 1833)]

Non *Homoioplax haswelli* — Sakai 1939: 566, pl. 102, fig. 2; Sakai 1940: 42; Miyake 1961: 74; 1991: 220; Miyake et al. 1962: 130; Sakai 1976: 540, text-fig, 287; Kikuchi and Miyake 1978: 42 [= *Carcinoplax inaequalis* (Yokoya, 1933)].

Type material examined: Lectotype (here designated): male (10.2 × 7.3 mm) (NHM 1882.7), stn No. 160, Arafura Sea, Australia, 58.5–65.8 m, coll. HMS *Alert*, October 1881. Paralectotype: female (9.0 × 6.6 mm) (NHM 1882.7), same data as lectotype.

Other material examined: 1 male (17.2 × 12.4 mm), 2 females (16.8 × 12.2 mm, 16.5 × 12.0 mm) (MNHN-IU-2017-9590), stn 2, ca. 20 km northeast of Lubang Island, Western Philippines, 187 m, 14°02.8'N 120°18.8'E, coll. MUSORSTOM 1 Expedition, 19 March 1976. 1 female (40.9 × 27.7 mm) (MNHN-IU-2014-11510), stn 6269, South China Sea, 31 m, coll. H. Chen, 13 May 1960; 1 male (31.7 × 20.9 mm) (ZRC 2011.0607), stn 6215, sand-mud substrate, Gulf of Tonkin, South China Sea, 48 m, China-Vietnam Cooperative Expedition of Comprehensive Oceanographic Investigation on Beibu Gulf (Gulf of Tonkin) 1959–1960, trawl, coll. 18 April 1960; 1 juvenile female (30.2 × 19.3 mm) (ZRC 2011.0609), stn 6234, muddy-sand substrate, Gulf of Tonkin, South China Sea, 30 m, China-Vietnam Co-operative Expedition of Comprehensive Oceanographic Investigation on Beibu Gulf (Gulf of Tonkin) 1959–1960, trawl, coll. 21 April 1960; 1 male (28.5 × 19.5 mm) (ZRC 1984.5693), near Horsburg Lighthouse, about 241.4 km off Singapore, South China Sea, coll. trawlers, H. Huat, 28 August 1983; 2 females (35.9 × 25.6 mm, 30.6 × 21.0 mm) (ZRC 1984.6312–6313), about 48.3 km from Horsburg Lighthouse, South China Sea, off Singapore, coll. trawlers, H. Huat, 10 September 1983; 1 male (35.2 × 23.4 mm), 1 female (42.8 × 29.2 mm) (ZRC 1984.7842–7843), Horsburg Lighthouse, South China Sea, near Singapore, coll. trawlers, H. Huat, 26 November 1982 and 15 December 1982; 1 male (34.6 × 25.0 mm) (ZRC 1984.6314), near Horsburg Lighthouse, about 241.4 km off Singapore, South China Sea, coll. trawlers, H. Huat, 28 August 1983; 1 female (44.0 × 29.3 mm) (ZRC 2001.0136), Tungkang, Kaohsiung County, southwestern Taiwan, coll. L.-S. Huang, 4 August 1996; 1 male (16.3 × 12.2 mm) (NMV J55673), off Ningaloo North, 21°54'4"S 113°49'12"E to 21°59'03"S 113°49'12"E, 170–177 m, RV Southern Surveyor SS10/2005/152, coll. G. Poore, 10 December 2005.

Comparative material: *Carcinoplax longimanus* (De Haan, 1833): 1 male (24.7 × 19.4 mm) (MNHN-IU-2014-11510), stn CP63, Tanimbar Island, Moluccas, 8°00'S 132°58'E, 214–215 m, Moluccas, Indonesia, coll. KARUBAR Expedition, N.O. Baruna Jaya 1, 1 November 1991; 2 males, 1 female, 1 large chela, 2 juvenile males (10.9 × 8.4 mm, 14.1 × 10.5 mm), 3 juv. females (12.9 × 9.8 mm, 13.6 × 10.5 mm, 15.0 × 10.9 mm) (ZRC 2019.1691), stn CP37, substrate fine mud with pieces of small branches, south of Cilacap, Java, Indonesia, 8°07.462'S 109°05.639'E – 8°07.864'S 109°06.470'E, 163–166 m, beam trawl, coll. SJADES 2018, 30 March 2018; 3 males (smallest 20.6 × 15.0 mm) (ZRC 1999.772), Dasi, Ilan County, Taiwan, coll. P.K.L. Ng and K. Lim, May 1999. *Carcinoplax purpurea* Rathbun, 1914: 2 males (8.5 × 6.7 mm, 13.3 × 10.3 mm), 1 female (20.0 × 15.0 mm) (ZRC 2006.187), stn CP 2377, Dipolog Bay, 8°40.6'N, 123°20.3'E, 85–88 m, Bohol/Sulu seas, Philippines, coll. PANGLAO

2005 Deep-Sea Cruise, M/V DA-BFAR, 28 May 2005; 1 male (16.9 × 13.3 mm) (ZRC 2001.18), Dasi, Ilan County, Taiwan, coll. K.-X. Li, 6 November 2000. See Ng and Mitra (2019) for additional comparative material of *C. purpurea* and *C. mistio* Ng & Mitra, 2019.

Diagnosis: Carapace transversely hexagonal, width 1.34–1.56 times length; dorsal surface gently convex, smooth, lateral surfaces with densely packed low, rounded granules, more prominent in adults; epigastric region low but visible; postorbital regions not clearly demarcated; frontal margin lamellar, truncate, bilobed with small median notch, supraorbital lobe low, not easily discernible, demarcated by groove, but not distinctly projecting laterally; anterolateral margin with first tooth low not spiniform, second tooth spiniform, long, acute, sharp, curving gently obliquely anteriorly; posterolateral margin gradually converging posteriorly or subparallel; posterior margin of epistome with prominent but low triangular median projection, separated from lateral lobe by obtuse cleft. Third maxilliped merus with anteroexternal margin auriculiform. Cheliped with dorsal margin of palm

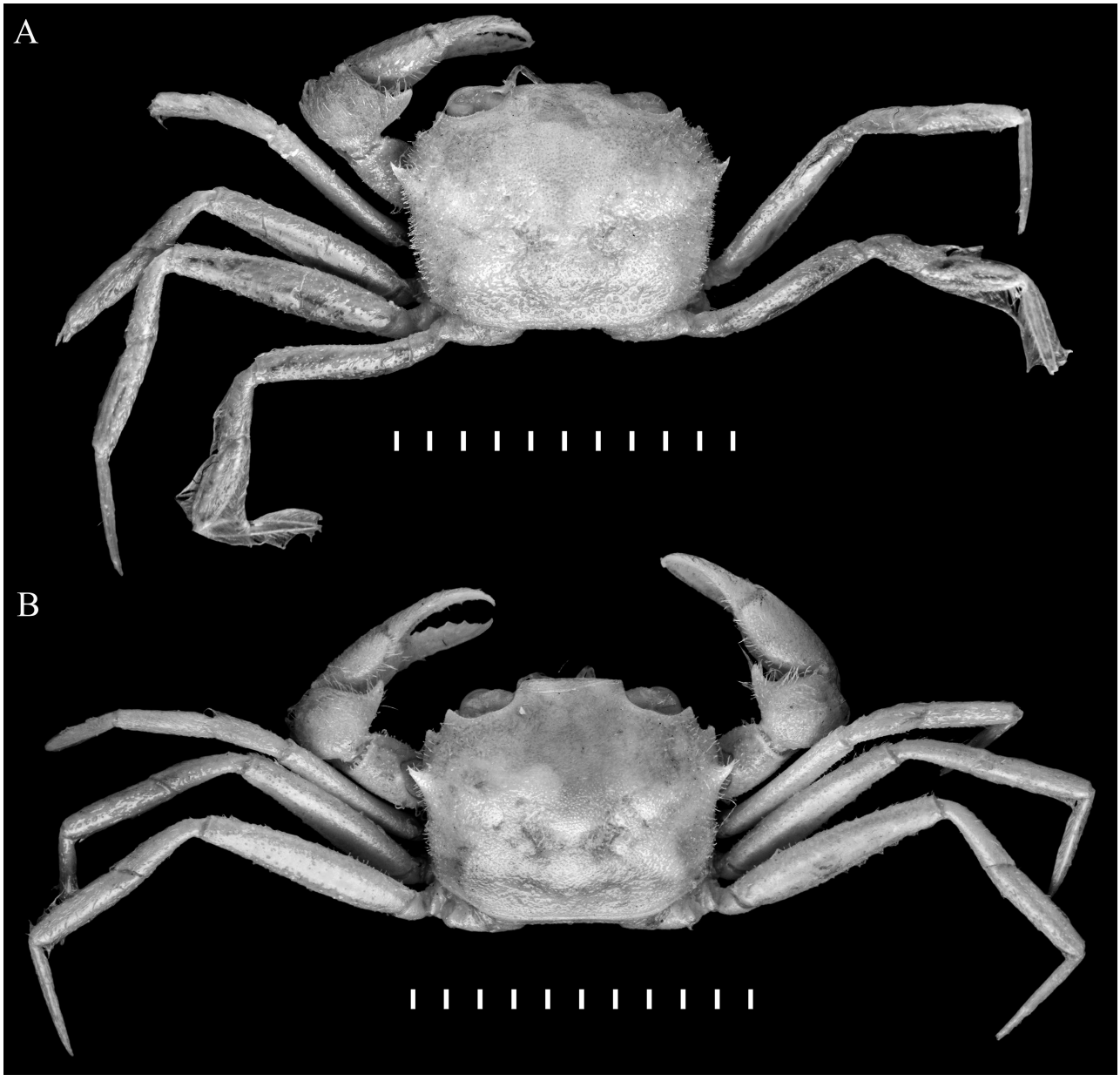

Fig. 1. Overall dorsal view. *Carcinoplax haswelli* (Miers, 1884) comb. nov. A, lectotype male (10.2 × 7.3 mm) (NHM 1882.7); B, paralectotype female (9.0 × 6.6 mm) (NHM 1882.7). Taken by Kevin Webb, NHM Photo Unit. Scale bar in millimetres.

rounded, smooth; carpus mesial margin with prominent, low rounded tooth, lateral margin with small spine; merus elongate with low rounded tooth on distal one-third of dorsal margin. Ambulatory legs (P2–P5) slender, long. Thoracic sternum surface covered with numerous small, rounded, densely packed granules; sternopleonal cavity extending to about two-thirds length of sternite 4, reaching imaginary line connecting proximal part of coxae of chelipeds. Male pleon triangular, transversely broad in adults, somite 6 transversely rectangular, width 1.85 times length, lateral margins gently convex. Telson triangular with distinctly concave lateral margins. Adult G1 relatively slender, distal two-thirds with mesial margin gently concave; distal part slightly flared, laterally flattened, subtruncate; G2 longer than G1, distal article flagelliform, about three-quarters length of basal segment; vulvae ovate, large, level with surface of sternum.

Remarks: *Homoioplax* Rathbun, 1914, is here considered to be a junior subjective synonym of *Carcinoplax* H. Milne Edwards, 1852. Rathbun (1914) argued for a separate genus because of the slightly

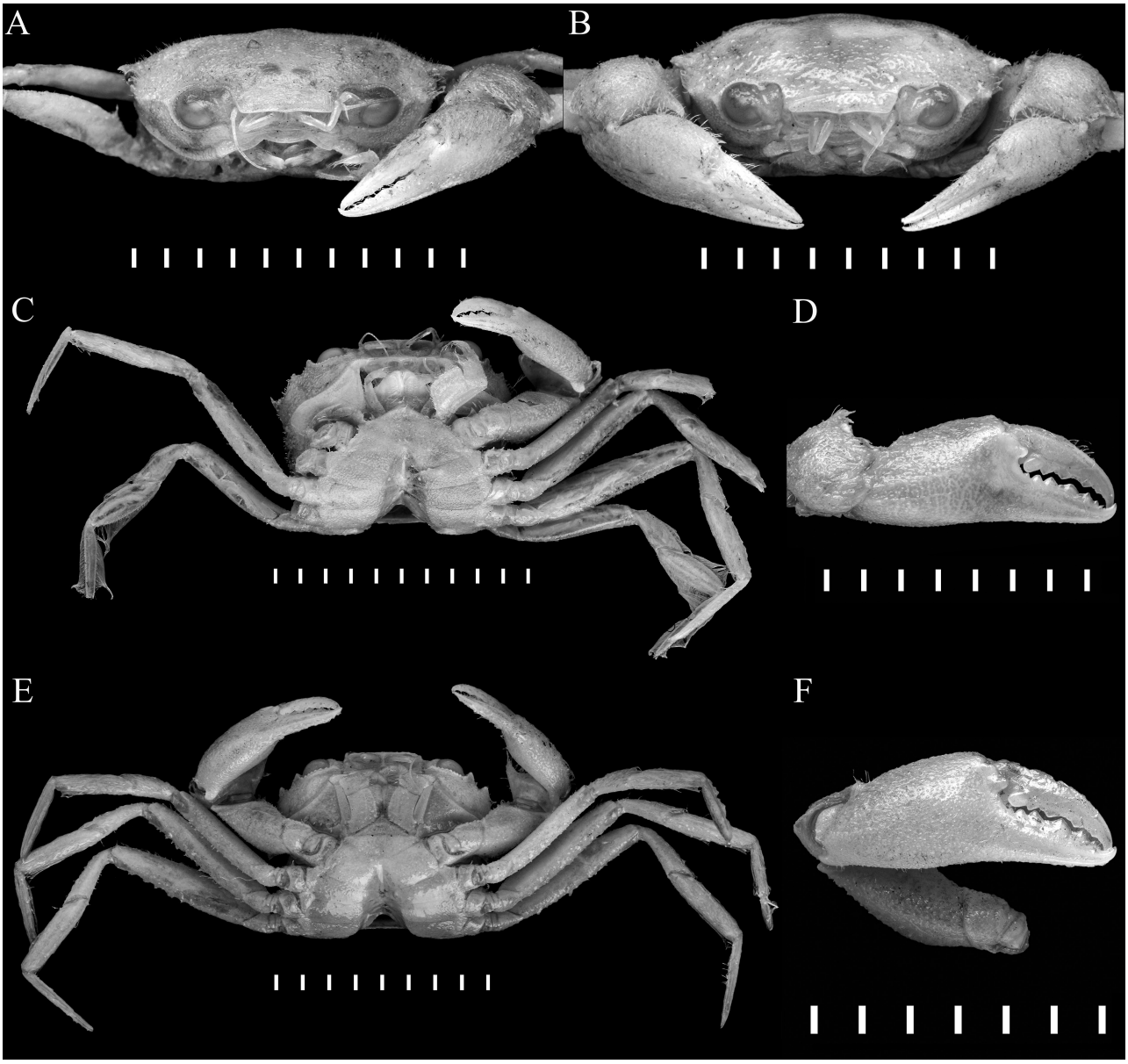

Fig. 2. *Carcinoplax haswelli* (Miers, 1884) comb. nov. A, C, D, lectotype male (10.2 × 7.3 mm) (NHM 1882.7); B, E, F, paralectotype female (9.0 × 6.6 mm) (NHM 1882.7). A, B, frontal view of cephalothorax; C, E, ventral view of cephalothorax; D, F, outer view of left chela. Taken by Kevin Webb, NHM Photo Unit. Scale bar in millimetres.

narrower male pleon, notably somite 3 of *H. haswelli* that does not cover the part of the sternum next to the P5 coxa. It is not possible, however, to confirm this character because Miers (1884) did not figure the male pleon and this structure is now missing from the type specimen. A good series of juvenile *C. longimanus*, *C. purpurea* Rathbun, 1914, and *C. sinica* Chen, 1984, however, was examined for this study including specimens similar in size to the types of *H. haswelli*. In juvenile *Carcinoplax*, the lateral edge of male pleonal somite 3 does not reach the base of the P5 coxa, leaving a small gap (Figs. 4G, 6F, 8D). In juveniles and adults, the edge of pleonal somite 3 almost reaches or partly overlaps the coxa (Figs. 4H, 7C). In juvenile females, the pleon is triangular overall with somite 3 transversely narrower, leaving a wide area of the sternum exposed (Fig. 4F). As such, the primary diagnostic character for *Homoioplax* is size-related and typical of juvenile *Carcinoplax* at a similar stage. In all other characters, *Homoioplax* corresponds to *Carcinoplax*; the two genera are herein considered synonymous.

Determining which of the two juvenile NHM

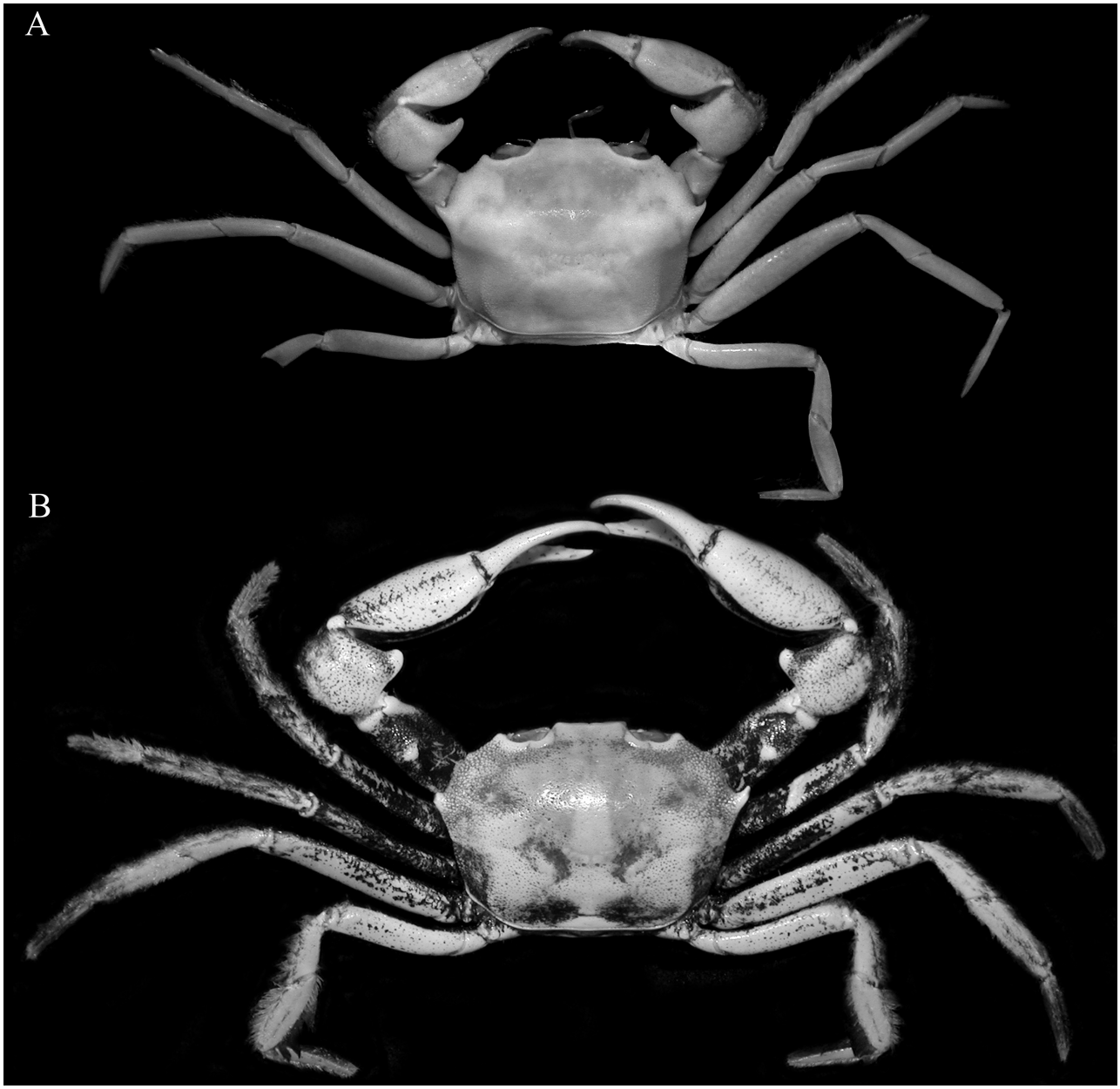

Fig. 3. Overall dorsal view. *Carcinoplax haswelli* (Miers, 1884) comb. nov. A, female (16.5 × 12.0 mm) (MNHN-IU-2017-9590), Philippines; B, male (28.5 × 19.5 mm) (ZRC 1984.5693), South China Sea.

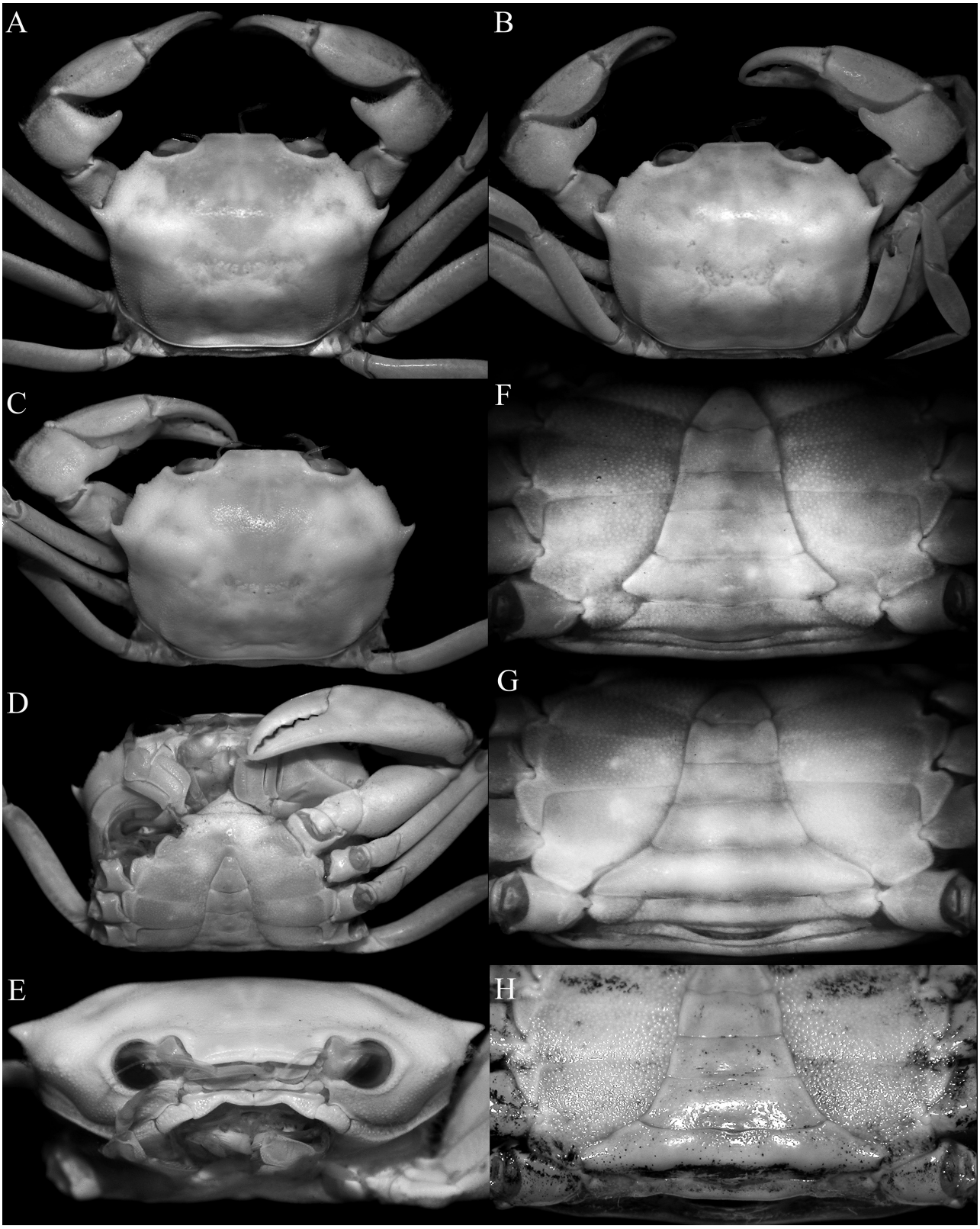

Fig. 4. *Carcinoplax haswelli* (Miers, 1884) comb. nov. A, F, female (16.5 × 12.0 mm) (MNHN-IU-2017-9590), Philippines; B, female (16.8 × 12.2 mm) (MNHN-IU-2017-9590), Philippines; C, D, E, G, male (17.2 × 12.4 mm) (MNHN-IU-2017-9590), Philippines; H, male (28.5 × 19.5 mm) (ZRC 1984.5693), South China Sea. A–C, dorsal view of carapace; D, ventral view of cephalothorax; E, frontal view of cephalothorax; F–H, posterior thoracic sternum and pleon.

type specimens of *Pseudorhombila vestita* var. *haswelli* Miers, 1884 was figured by Miers (1884: pl. 24, fig. B) proved relatively straight forward even though both are now without a pleon. Enigmatically, Miers (1884: 241) referred to these two specimens as, "one male and the other sterile". One specimen was clearly recognised as a male by its possession of gonopods, or "verges" fide Miers (1884: 241). The base of the P5 coxa of both type specimens was examined and one was found to possess a tiny translucent papilla, which is the penis, i.e., it is a male. The other specimen, lacking the penis, would correspond to the "sterile", specimen, and is determined here to be a juvenile female. The absence of gonopods together with a presumably narrow, juvenile pleon explains the uncertainty by Miers about the sex of the specimen. The carapace of the male is the larger (10.2 × 7.3 mm) and agrees better with the specimen figured by Miers (1884: pl. 24, fig. B). Furthermore, the right cheliped, although not shown in figure 1A, is detached but still extant. In the smaller female (9.0 × 6.6 mm), the right cheliped is larger and more swollen (Fig. 1B) than that figured by Miers. The male is here designated the lectotype in order to stabilize the taxonomy of this species, which is now referred to as *Carcinoplax haswelli* comb. nov.

The pleonal morphology of the juvenile specimens of *C. haswelli* comb. nov. is of interest. In the juvenile specimens identified as "*C. sinica*" from the Philippines (MNHN-IU-2017-9590), the pleon is triangular and male-like. Guinot (1989: 285) recorded all three as males, but only one is male, the other two being juvenile females. In comparison to that of the male, the pleon in the juvenile females is more acutely triangular with somite 3 narrower, exposing more of the adjacent thoracic sternum (Fig. 4F), the peg on sternite 5 for the pleonal locking mechanism is distinct, the vulvae are not visible but the pleopods are distinct although not setose. In the juvenile male, the pleon is wider and more obtusely triangular with somite 3 wide and reaching almost to the coxa of the walking legs (Fig. 4G), the peg on sternite 5 for the pleonal locking mechanism is visible, the G1 is visible but still soft and not well developed, but the penis is distinct, being present as a tube extending from the gonopore on the condyle of the P5 coxa and resting on a groove reaching to the base of the G1. The two type specimens

Fig. 5. *Carcinoplax haswelli* (Miers, 1884) comb. nov., male (16.3 × 12.2 mm) (NMV J55673), Western Australia. A, carapace, dorsal view; B, cephalothorax, ventral view; C, cephalothorax, anterior view; D, right chela, outer view.

of *C. haswelli* comb. nov. are juveniles, complicating taxonomic determination, more so because many species of *Carcinoplax* undergo substantial ontogenetic changes, with changes in carapace shape and reduction of armature, and changes in relative pereiopod length and proportions with increasing body size, for instance (see Guinot 1989). Several features present in the types of *C. haswelli* comb. nov., however, allow significant narrowing of closely related or conspecific species of *Carcinoplax*: the carapace is transversely rectangular to subhexagonal, with the posterolateral margins subparallel; the anterolateral margin has the first tooth low, with the second tooth acute and curved; the outer surface of the carpus of the cheliped has a short spine; the spine on the inner angle of the carpus of the cheliped is dorsoventrally flattened, gently curved with the tip bluntly rounded, rather than acutely sharp; and the fingers of the chelipeds are not pigmented brown or black. The combination of these features place *C. haswelli* comb. nov. within in a small group of species of *Carcinoplax*, each of which generally occupies mid to outer shelf depths: *C. purpurea* (17–180 m), *C. sinica* (25–187 m) and *C. mistio* Ng & Mitra, 2019 (13–49 m) (Chen 1984; Guinot 1989; Castro 2007; Ng and Mitra 2019).

In describing *C. sinica*, Chen (1984: 192, 201) examined a large series of specimens spanning a wide size range of this species as well as *C. purpurea*. Chen separated the two species mainly by the shape of the carapace, shape and strength of the last anterolateral spine and colour pattern of freshly collected specimens. Guinot (1989: 287) further refined the taxonomy of *C. sinica*, distinguishing it from *C. purpurea* by characters of the degree of inflation of the carapace and anterolateral armature, as well as colour in life, although the characters are best observed in adult specimens. Castro (2007) followed the assessment of Guinot in his revision of the genus. Ng and Mitra (2019) showed that specimens of *C. sinica* reported from the Persian Gulf (Guinot 1989; Castro 2007; Naderloo 2017) belonged to a new species, *C. mistio*, and provided additional characters to separate the three species. *Carcinoplax mistio* is excluded from our detailed comparisons because it is known only from adults and because it is a northern Indian Ocean species, ranging from the western Bay of Bengal to the Persian Gulf (Stephensen 1946; Guinot 1989; Naderloo 2017; Ng and Mitra 2019), which is well outside of the range of *C. sinica*, *C. purpurea* and *C. haswelli* comb. nov., each of which are western Pacific or southwestern Indian Ocean species occurring to the east of Singapore (Miers 1884; Chen 1984; Guinot 1989; Castro 2007; Ng and Mitra 2019).

Given that the types of *C. haswelli* comb. nov. are juveniles, comparisons with allied taxa are best accomplished with specimens at a similar stage of development. Only adults of *C. mistio* are known, but fortunately, series of *C. purpurea* and *C. sinica*, including juveniles, were available for study. Comparisons show that *C. haswelli* comb. nov. and *C. sinica* are indistinguishable, but readily separated from *C. purpurea*. The carapace of juvenile *P. haswelli* comb. nov. and *C. sinica* is more transversely rectangular in shape (Figs. 1A, B, 3A, 4A–C, 5A, B) than the more narrowly quadrate form in *C. purpurea*, Fig. 6A, B); the last anterolateral spine is prominent, directed obliquely outwards at an angle of about 45° to the longitudinal and is usually gently curved but sometimes almost straight (Figs. 1A, B, 3A, 4A–C) (versus spine distinctly shorter, and curved more anteriorly at an angle of about 30° to the longitudinal in *C. purpurea*, Fig. 6A, B); and the supraorbital lobe is very low to almost undiscernible in juveniles (Figs. 1A, B, 3A, 4A–C), becoming more obvious in adults only because the fissure demarcating it is more pronounced but the lobe is still low (Fig. 3B) (versus there is a small but visible lateral lobe just behind the front, corresponding to a supraorbital tooth, low in juveniles in *C. purpurea*, Fig. 6A, C; but more distinct in larger specimens, Fig. 6B). These differences are also evident in the excellent figures of the juvenile specimens of *C. purpurea* and *C. sinica* by Chen (1984: figs. 1.1–4, 2.1–4). The differences in carapace shape also correlate with differences in the width to length proportions; in *C. purpurea*, the carapace is proportionally narrower, with a width to length ratio of 1.27–1.32 compared to 1.34–1.56 in *C. sinica*, and 1.40 and 1.36 for the two types of *C. haswelli* comb. nov. The variation in *C. haswelli* relates mainly to the strength of the last anterolateral tooth. In addition, the median part of the posterior margin of the epistome is often also proportionately slightly narrower and more produced in frontal view in *P. haswelli* and *C. sinica* (Figs. 2A, B, 4E, 5C) than in *C. purpurea* (versus proportionately wider and straighter, Fig. 6D). Altogether, we could find no features to distinguish *C. haswelli* comb. nov. from *C. sinica*. Therefore, on the basis of the available evidence, *C. haswelli* comb. nov. (Miers, 1884) is regarded as a senior subjective synonym of *C. sinica* Chen, 1984.

Castro (2007: 640) recorded a specimen of "*C. sinica*" from the Tanimbar Islands, Moluccas, eastern Indonesia, at 215 m depth (MNHN-IU-2014-11510). This specimen, re-examined here, is considered to be a juvenile male of *C. longimanus* (Fig. 7). In juvenile *C. longimanus* the first anterolateral tooth of the carapace is low, the second tooth is acute and straight or slightly curved at an angle of about 45°, the outer surface of the carpus of the cheliped has a short spine, and the spine on the inner angle of the carpus of the cheliped is dorsoventrally flattened (Figs. 7A, 8A, 9). The inner

Fig. 6. *Carcinoplax purpurea* Rathbun, 1914. A, C–F: male (8.5 × 6.7 mm) (ZRC 2006.187), Philippines; B, male (16.9 × 13.3 mm) (ZRC 2001.18), Taiwan.

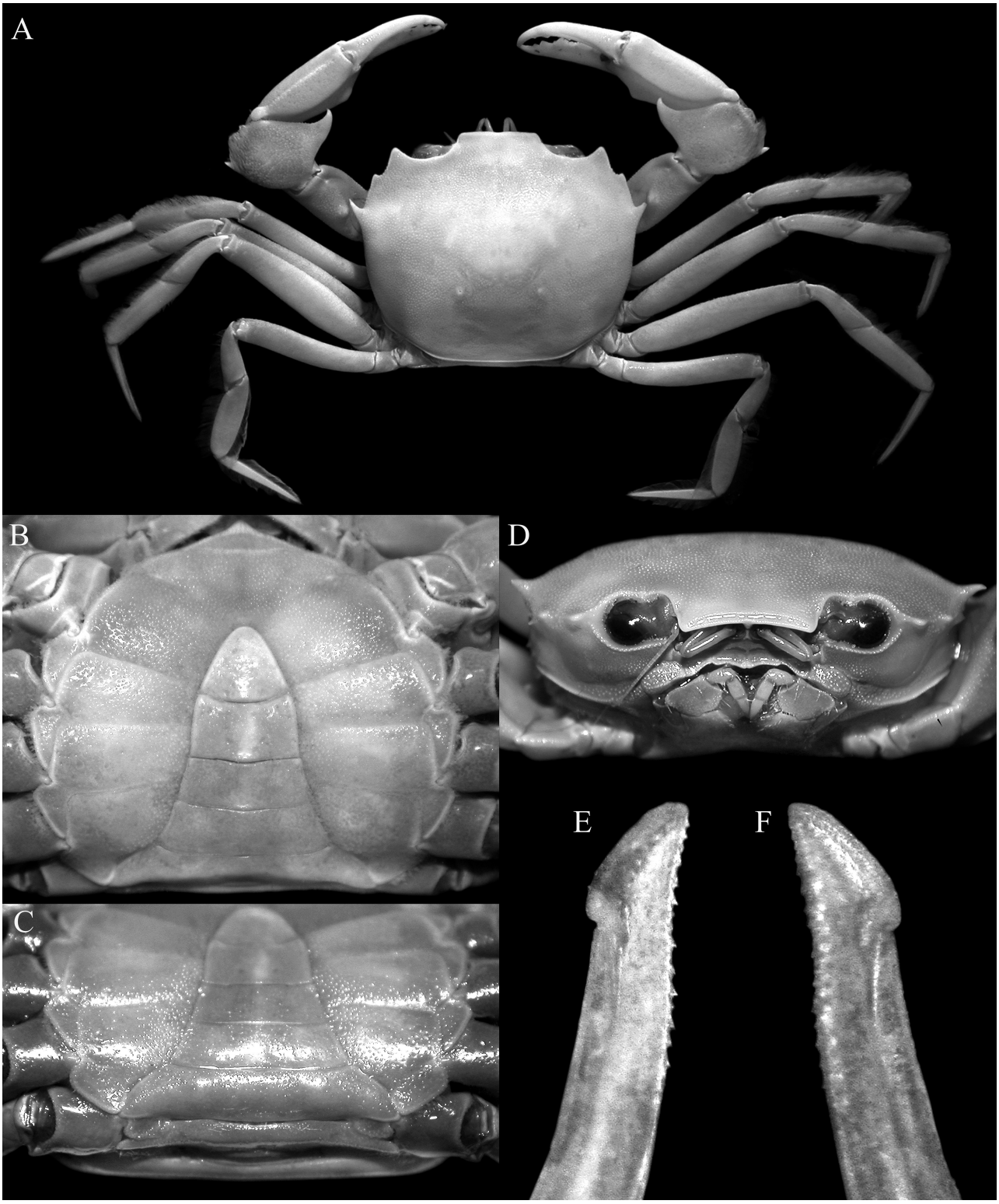

Fig. 7. *Carcinoplax longimanus* (De Haan, 1833), male (24.7 × 19.4 mm) (MNHN-IU-2014-11510), Tanimbar Island. A, dorsal habitus; B, cephalothorax, ventral view; C, posterior thoracic sternum and pleon; D, cephalothorax, anterior view; E, distal part of left G1, ventral view; F, distal part of left G1, dorsal view.

carpal spine of the cheliped of *C. longimanus* is usually sharp and more strongly curved than in *C. purpurea*, *C. sinica* or *C. mistio*, with the tip sharp and turned outwards (Figs. 7A, 8A, 9). In addition, even in juvenile specimens of *C. longimanus*, the carapace is more trapezoidal, with the posterolateral margin distinctly converging posteriorly (Figs. 7A, 8A, 9). The form of the posterior margin of the epistome is also quite different, even in small specimens; in *C. purpurea*, *C. sinica* and *C. mistio*, the median lobe is separated

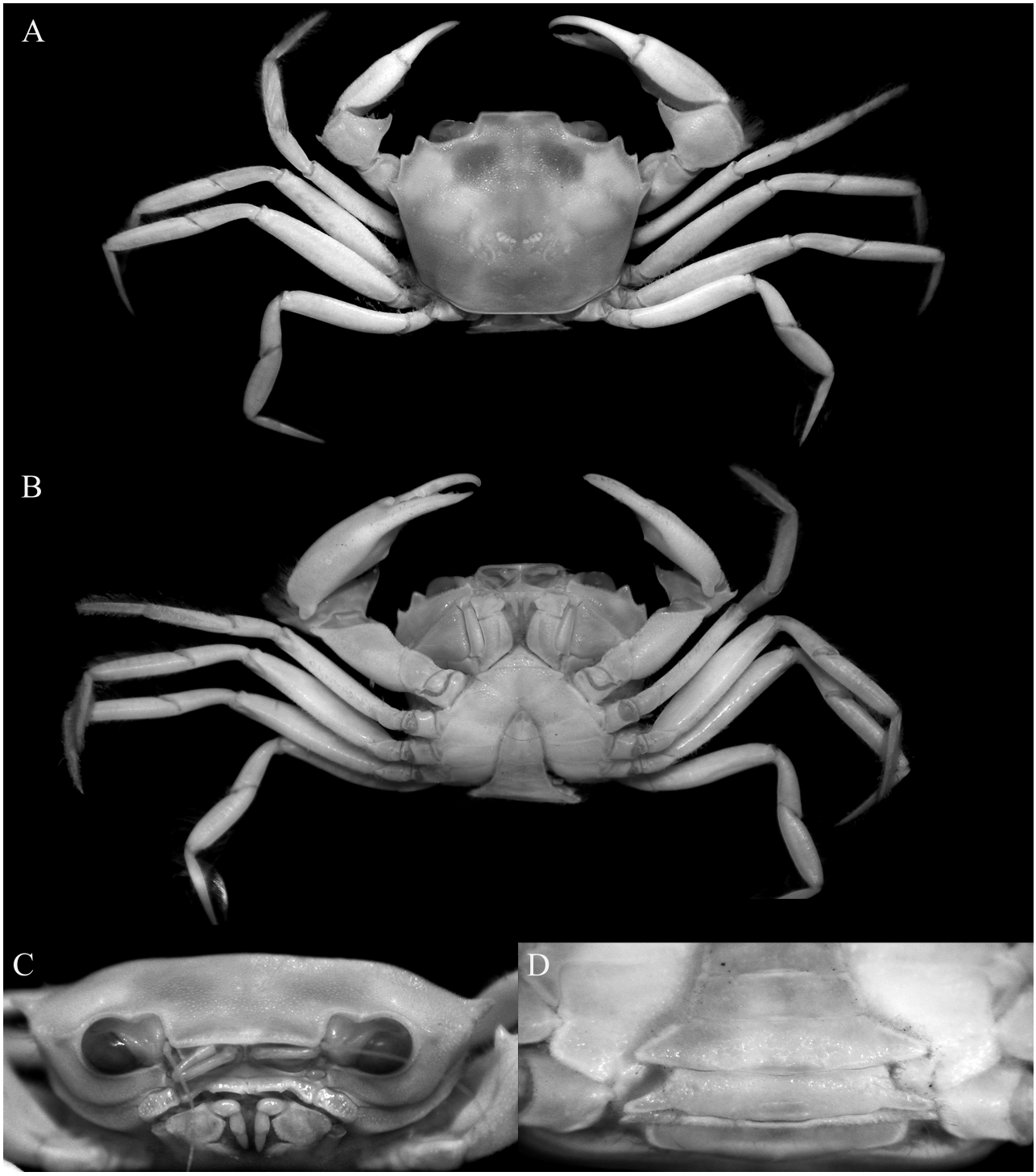

Fig. 8. *Carcinoplax longimanus* (De Haan, 1833), A, male (10.9 × 8.4 mm) (ZRC 2019.1691), Java. A, overall dorsal view; B, ventral view of cephalothorax; C, frontal view of cephalothorax; D, posterior thoracic sternum and pleon.

from the lateral lobes by an obtuse cleft (Figs. 4E, 5C, 6D) but in *C. longimanus*, the median lobe is also demarcated from the lateral parts by a distinctly more acute cleft (Figs. 7D, 8C). As such, *C. longimanus*, even as a juvenile, is significantly different from *C. haswelli* comb. nov.

With the record of *C. sinica* by Castro (2007) from the Tanimbar Islands corrected to *C. longimanus*, remaining published records of *C. sinica* do not extend south of eastern Singapore (Ng and Mitra 2019). Nevertheless, with the synonymy of *C. sinica* and *C. haswelli* comb. nov., the range of latter is now known

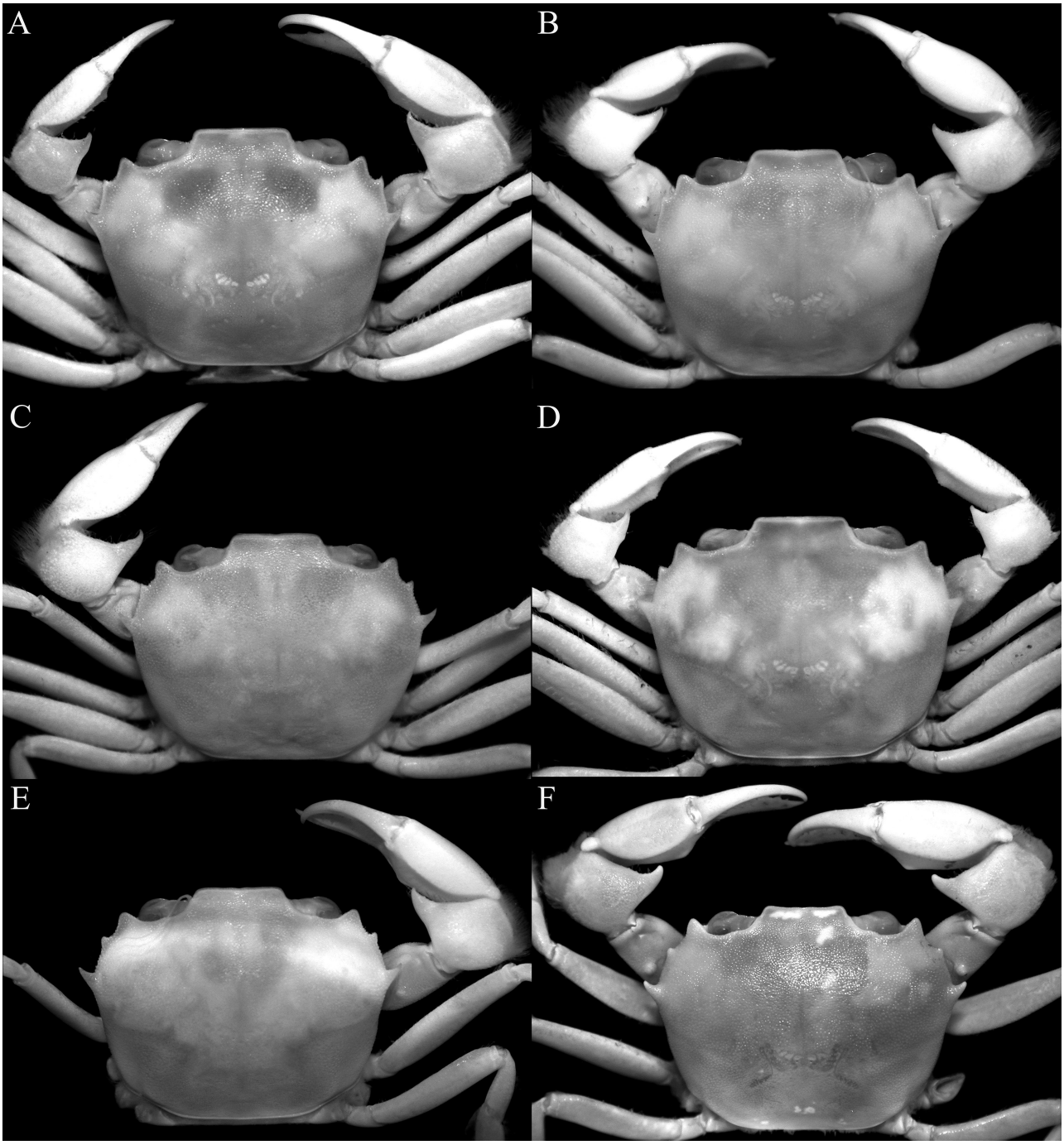

Fig. 9. Carapace, dorsal view. *Carcinoplax longimanus* (De Haan, 1833). A, male (10.9 × 8.4 mm) (ZRC 2019.1691), Java; B, female (12.9 × 9.8 mm) (ZRC 2019.1691), Java; C, female (13.6 × 10.5 mm) (ZRC 2019.1691), Java; D, male (14.1 × 10.5 mm) (ZRC 2019.1691), Java; E, female (15.0 × 10.9 mm) (ZRC 2019.1691), Java; F, male (20.6 × 15.0 mm) (ZRC 1999.772), Taiwan.

to extend from southern Taiwan and the Philippines, through the South China Sea, northern Vietnam, the eastern waters of Singapore to the Madura Straits in eastern Java and from northern Australia between Ningaloo Reef and the Arafura Sea; 25–187 m, usually less than 100 m (Miers 1884; Tesch 1918; Chen 1984; Guinot 1989; Castro 2007; Poore et al. 2008; Ng and Mitra 2019). Most records of *C. sinica* are from the central South China Sea, with only scattered records from peripheral and more southern localities. In particular, the paucity of records in the southern Indo-Malayan archipelago probably reflects limited sampling effort at mid to outer shelf depths.

Across northern Australia, southern Papua New Guinea and in the vicinity of the type locality of *C. haswelli* comb. nov., two other species of *Carcinoplax* are known: *C. longimanus* and *C. purpurea* (cf. Guinot 1989; Castro 2007; unpublished data). Both of these species are readily distinguished from *C. haswelli* comb. nov. by features discussed earlier. Two other species, previously placed in *Carcinoplax*, have also been reported: *Pycnoplax bispinosa* (Rathbun, 1914) and *Menoplax longispinosa* (Chen, 1984) (Guinot 1989; Castro 2007; Farrelly and Ahyong 2019). The latter two species, having an extremely sharp inner carpal spine of the chelipeds, are unlikely to be mistaken for *C. haswelli* comb. nov. which has a blunt, inner carpal lobe.

DISCUSSION

Miers (1884: 240) referred two small male specimens from the Arafura Sea, Australia, to "*Pseudorhombila vestita* (De Haan), var. *sexdentata*, Haswell," and provided measurements for one male (10.0 × 8.0 mm), but not for the other specimen, which he referred to as "sterile." Miers, however, doubted his identification of the two specimens, commenting that "Haswell's types were from Holborn Island, Port Denison (20 fms.; ca. 37 m). As, in his brief description, he does not mention the pubescence of the carapace, and as his specimens differ in coloration, it is possible that ours are distinct; and if so, I would propose to designate them *P. haswelli*" (Miers 1884: 241). While his use of the variety name is provisional, it is nevertheless available under the zoological code (ICZN 1999).

Miers (1886: 229) subsequently recorded *Pilumnoplax vestita sexdentata* from Japan but he observed that "Whether or not this species be identical with the very briefly-described *Eucrate sexdentatus*, Haswell, must remain uncertain. Haswell's types were from the North-Eastern Coast of Australia (Port Denison, 20 fathoms). The *Challenger* specimens certainly belong to the same species as those from the Arafura Sea, referred to in my Report on the Crustacea of H.M.S. "Alert," as *Pseudorhombila vestita*, var. *sexdentata* (Haswell)."

Cancer (*Curtonotus*) *vestita* De Haan 1835 is a valid goneplacid species, now placed in *Entricoplax* Castro, 2007 (Castro 2007: 654). *Eucrate sexdentata* Haswell, 1881, is a valid species of euryplacid, retained in *Eucrate* De Haan, 1835 (see Castro and Ng 2010: 35). *Homoioplax haswelli* should also not be confused with *Eucrate haswelli* Campbell, 1969, which is a junior subjective synonym of *Trissoplax dentata* (Stimpson, 1858) (cf. Castro and Ng 2010: 98). Castro (2007: 656) examined the juvenile female specimen of "*Pilumnoplax vestita* var. *sexdentata*" of Miers (1886) from Japan and redetermined it as *Entricoplax vestita* (De Haan, 1835) s. str.

Rathbun (1914: 146) established a new genus, *Homoioplax*, for "*Pseudorhombila haswelli* Miers" although apparently without examining specimens, diagnosing it only in a brief comment: "Differs from *Carcinoplax* Milne Edwards only in having the third segment of the male abdomen too narrow at its base to cover the sternum between the last pair of legs, a character which distinguishes the subfamily Prionoplacinae from the Carcinoplacinae. The first segment and the proximal portion of the second segment of the abdomen in *Homoioplax* do cover the sternum, as in *C. longimanus*." What Miers (1884: 240–241) stated for this character was brief: "All of the postabdominal segments are distinct; the second and third segments, although laterally produced, do not reach quite to the bases of the fifth ambulatory legs." How Rathbun (1914) knew the extent of the coverage of the sternum by the pleon in the "*Alert*" material is unknown.

Tesch (1918: 190) summarised what was known about the Prionoplacinae and observed that *Homoioplax* was the only non-American genus in the group, although he also reported two new "prionoplacines" from Southeast Asia: *Speocarcinus celebensis* and *Lophoplax bicristata*. Both new taxa of Tesch (1918) are now assigned to the Pilumnidae (see Ng 1987), with *Speocarcinus celebensis* Tesch, 1918, moved to *Bossacarcinus* Števčić, 2011. Tesch (1918: 191) reported a small male (7.0 × 5.2 mm) of *Homoioplax haswelli* from the Madura Strait in eastern Java. His record appears to be correct, agreeing in all the essential characters with the types except that the tip of the carpus of the cheliped is sharp rather than rounded, if the figure is accurate (Tesch 1918: pl. 10, fig. 1a). His specimen, however, is a small juvenile. Balss (1922) followed Miers (1886) and listed the species from Japan as *Homoioplax*.

Sakai (1939 1940 1976) regarded *Pilumnoplax*

inaequalis Yokoya, 1933, from off Shikoku, Japan, as a junior synonym of *Homoioplax haswelli*. This was then followed by subsequent Japanese workers (see synonymy). Guinot (1969b: 526) was the first to question the synonymy of *Pilumnoplax inaequalis* with *Homoioplax haswelli* and argued they were different taxa, with the former being a species of *Carcinoplax* (see also Guinot, 1989; Castro, 2007). She also commented that specimens identified as "*H. inaequalis*" from Japan were actually *C. longimanus* (De Haan, 1833) (Guinot 1969b: 526). Sakai (1976) also included *C. surugensis* Rathbun, 1932 (as a senior synonym of *C. inaequalis*) in the synonymy of *H. haswelli*. This, however, has since been revised and *C. surugensis*, now assigned to *Pycnoplax* by Castro (2007), and *C. inaequalis* are now regarded as distinct species (Guinot 1969b, 1989; Castro 2007). The specimen recorded by Poore et al. (2008) as *H. haswelli* from Western Australia (Fig. 5), examined in this study, agrees in all respects with *C. sinica* from the South China Sea, including the blunt, subtruncate apex of the G1.

Prionoplacinae Alcock, 1900 was shown to be a junior synonym of Eucratopsinae Stimpson, 1871, and was assigned to the Panopeidae (Guinot 1969a 1971 1978). Interestingly, however, Guinot (1971), in her synopsis of the Panopeidae, did not treat *Homoioplax*. Davie (2002: 374) adopted the same classification of Rathbun (1914), Tesch (1918), Sakai (1976) and Guinot (1971, 1978), and retained *H. haswelli* in the Eucratopsinae (Panopeidae). This was followed by Ng et al. (2008).

Despite the many misidentifications associated with *H. haswelli* over so many decades, surprisingly, the types have not been re-studied to re-evaluate the taxonomy, especially since it is the only Western Pacific species currently assigned to the Panopeidae.

CONCLUSIONS

Pseudorhombila haswelli described from the Arafura Sea by Miers (1884) was assigned to *Homoioplax* (Prionoplacinae, Goneplacidae) by Rathbun (1914). Although Guinot (1978) showed Prionoplacinae to be a junior synonym of Eucratopsinae Stimpson, 1871, and transferred the subfamily to the Panopeidae Ortmann, 1893, the position of *H. haswelli* was not reassessed and it remained in Panopeidae. In the present study, *Homoioplax haswelli* was redescribed based on type and other material, and shown to be conspecific with *Carcinoplax sinica*, described from the South China Sea by Chen (1984). As a result, *Homoiopolax* is a junior synonym of *Carcinoplax*, and properly belongs in Goneplacidae, but *C. haswelli* comb. nov. has priority over *C. sinica*. *Carcinoplax haswelli* is now known to range from Taiwan to the South China Sea and northern Australia.

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