

On two species of mangrove Leucosiidae from Irian Jaya, Indonesia, with notes on *Philyra malefactrix* (Kemp, 1915) (Decapoda: Brachyura)

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Abstract. –Two species of leucosiid crabs, *Philyra nishihirai* Takeda & Nakasone, 1991, and *P. bicornis*, new species, are reported from mangroves near the mouth of Kamora River in the southeast coast of Irian Jaya, Indonesia. *Philyra nishihirai* is recorded for the first time since its original description. *Philyra bicornis* resembles *P. malefactrix* (Kemp, 1915) but differs in that the posterolateral angle of the carapace is strongly projected and the male first pleopod is long, straight and tapering at the tip. The taxonomy of *Philyra malefactrix* (Kemp, 1915) is also discussed, and *Philyra minuta* Chen & Türkay, 2001, is here synonymised with *P. malefactrix*.

Introduction

Despite the high diversity of leucosiid crabs in the Indo-West Pacific, there are few records of them from mangroves. Thus far, only the following species have been reported from mangroves or associated habitats: *Philyra malefactrix* (Kemp, 1915), *P. taekoeae* Takeda, 1972, *P. iriomotensis* Sakai, 1983, *P. nishihirai* Takeda & Nakasone, 1991, *P. minuta* Chen & Türkay, 2001, and *Praosia punctata* Tan & Ng, 1993. In this paper, we describe a new species, *Philyra bicornis*, from mangroves in the southwest coast of Irian Jaya, Indonesia, as well as substantially extend the range of *P. nishihirai*. As *Philyra bicornis* is close to *P. malefactrix* (Kemp, 1915), comparisons were made with this species, and in the process, several prob-

lems with the taxonomy of *P. malefactrix* were identified. As a result, the taxonomy of *P. malefactrix* is revised on the basis of the types and fresh specimens, and *P. minuta* Chen & Türkay, 2001, is synonymised with it.

The genus *Philyra* Leach, 1817 (type species *Leucosia globus* Fabricius, 1775, designation by H. Milne Edwards, 1837) is one of the largest in the Leucosiidae, with 43 recognised species (P. K. L. Ng, unpublished compiled data). The characters separating *Philyra* from the closely allied *Ebalia* Leach, 1817, are not always reliable, and the generic status of many species in these genera are still unclear (see Takeda & Nakasone, 1991; Tan, 1995; Chen & Türkay, 2001; P. K. L. Ng, unpublished data). Nevertheless, species that have a well developed subhepatic facet and the epistome visible from the dorsal view are currently placed in *Philyra* rather than *Ebalia* (see Chen & Türkay, 2001: 254).

The abbreviations G1 and G2 are used for the male first and second pleopods respectively. Measurements provided are of the carapace width and length respectively. Specimens examined are deposited in the Research Center for Oceanography (RCO), Indonesian Institute of Sciences, Jakarta, Indonesia; Museum Zoologicum Bogoriense (MZB), Cibinong, Indonesia; The Natural History Museum (ex British Museum of Natural History, BMNH), London; and Zoological Reference Collection (ZRC) of the Raffles Museum, National University of Singapore.

Taxonomy

Philyra nishihirai Takeda & Nakasone,
1991

(Figs. 1a, 2, 3)

Philyra nishihirai Takeda & Nakasone,
1991: 21, Fig. 2.

Material examined. –1 male (6.0 by 5.4 mm) (RCO), sandy-mud substrate in man-

grove near river mouth, Kamora, Irian Jaya, Indonesia, coll. A. Pratiwi, 29 June 2001; 2 ovigerous females (7.4 by 6.5 mm, 7.4 by 6.6 mm) (RCO), 1 ovigerous female (7.0 by 6.5 mm) (MZB), 1 female (5.5 by 4.6 mm) (ZRC), sandy-mud substrate in mangrove near river mouth, Kamora, Irian Jaya, Indonesia, coll. A. Pratiwi, 10 July 2001; 1 male (5.5 by 5.1 mm) (RCO), sandy-mud substrate in mangrove near river mouth, Kamora, Irian Jaya, Indonesia, coll. A.

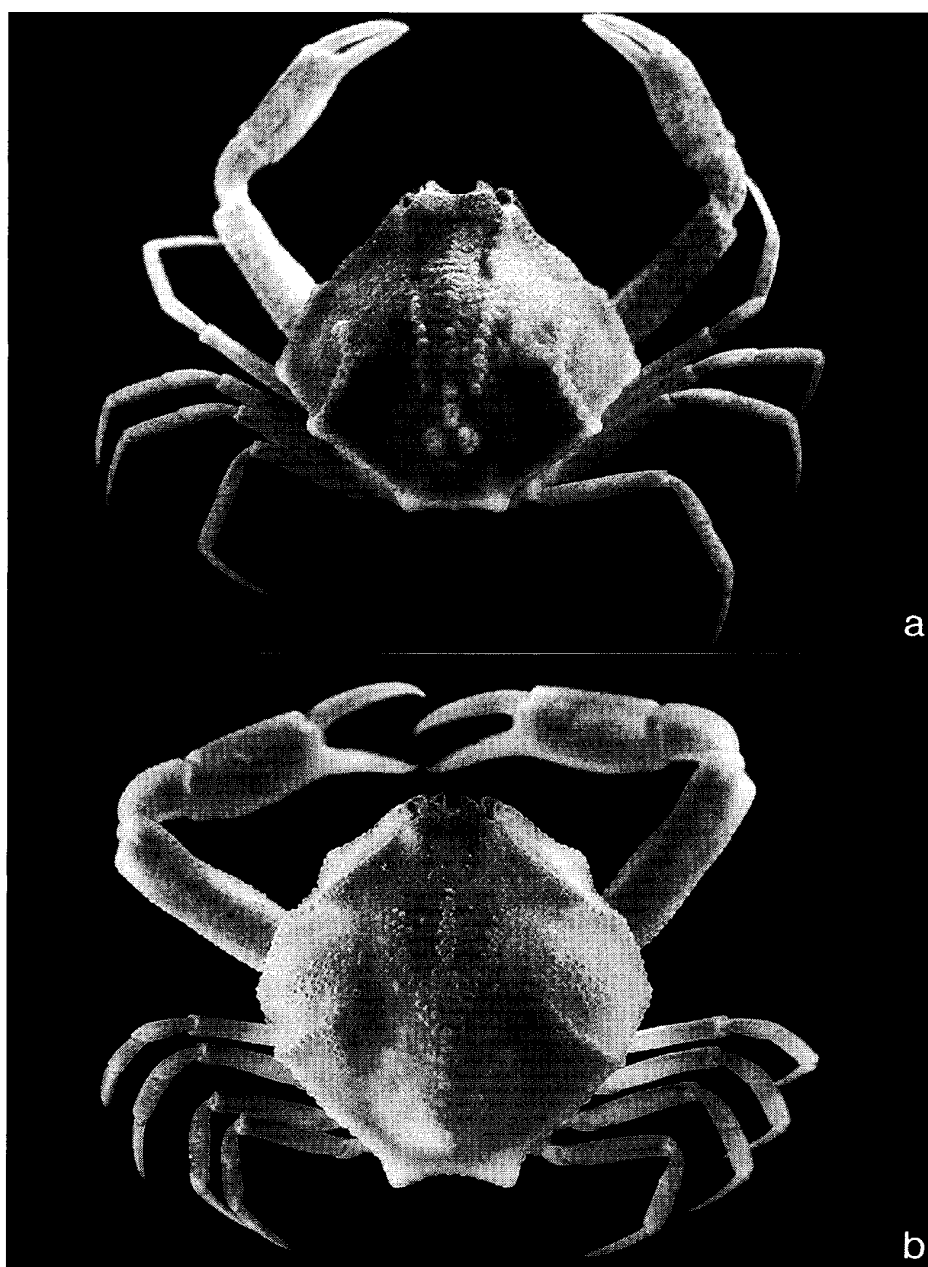


Fig. 1. a, *Philyra nishihirai* Takeda & Nakasone, 1991. a. male (6.3 by 5.9 mm) (ZRC), b. *Philyra bicornis*, new species, male holotype (7.1 by 6.5 mm) (MZB).

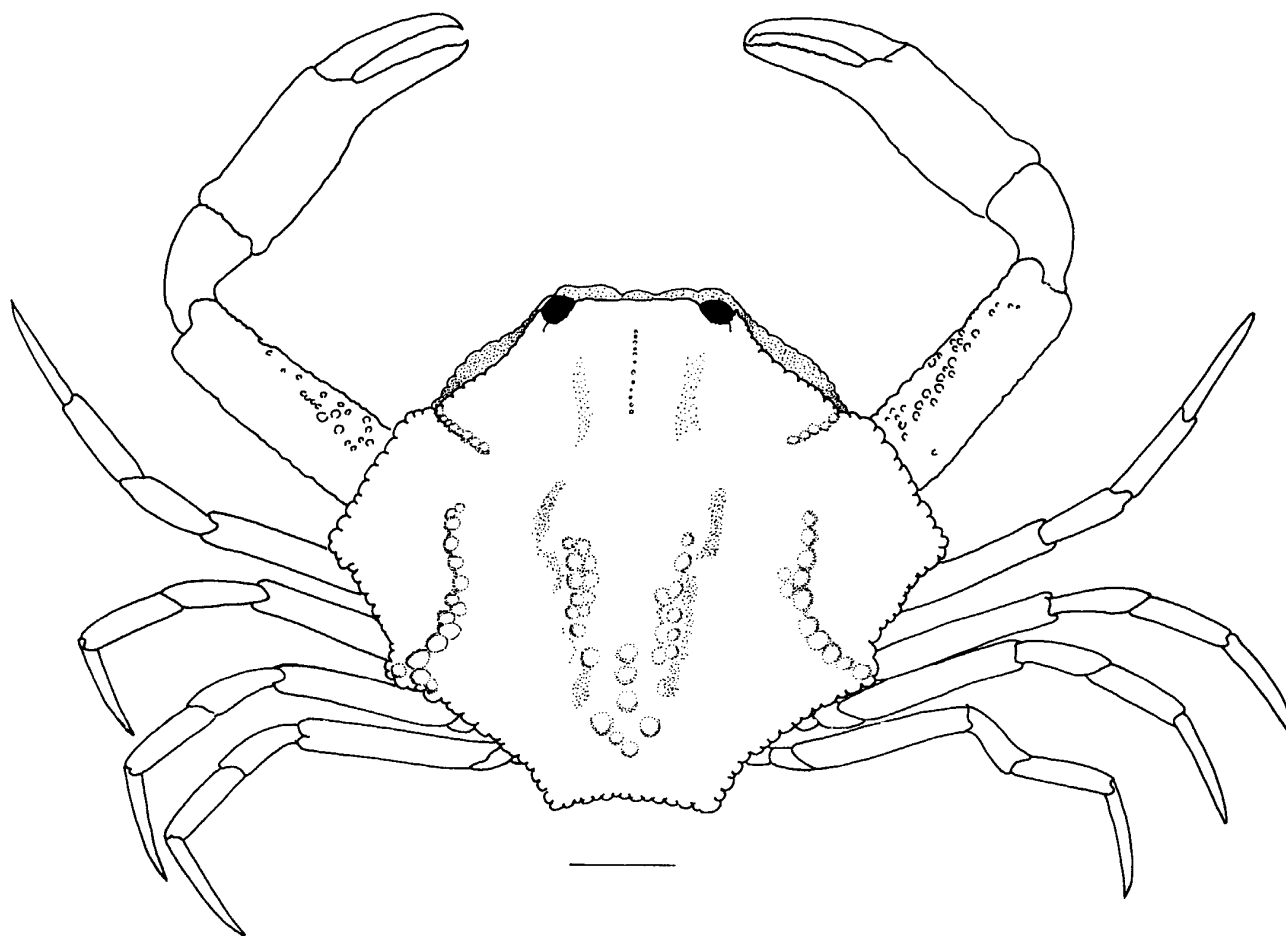


Fig. 2. *Philyra nishihirai* Takeda & Nakasone, 1991. Male (6.0 by 5.4 mm) (MZB). Scale = 1.0 mm.

Pratiwi, 13 July 2001; 1 male (6.3 by 5.9 mm) (ZRC), 1 ovigerous female (7.6 by 7.0 mm) (RCO), 1 female (5.3 by 4.4 mm) (ZRC), 1 female (5.7 by 4.9 mm) (MZB), sandy-mud substrate in mangrove near river mouth, Kamora, Irian Jaya, Indonesia, coll. I. Ermayanti, 22 September 2001.

Remarks. –The present specimens from Irian Jaya (Figs. 1a, 2, 3) agree well with the figures and descriptions of this species by Takeda & Nakasone (1991) from Okinawa, even though they are some distance away,

the present record being a substantial range extension. The taxonomy of this species has been discussed in depth by Takeda & Nakasone (1991), who described it on the basis of one male and one female. The present series of specimens indicate that the form of the anterolateral margin does not vary very much, with the lobes always denticulate (Fig. 1a, 2). None of them have the anterolateral lobes as low as that of the female paratype (Takeda & Nakasone, 1991: Fig. 2B). Overall figures (carapace with legs), as well as figures of the female

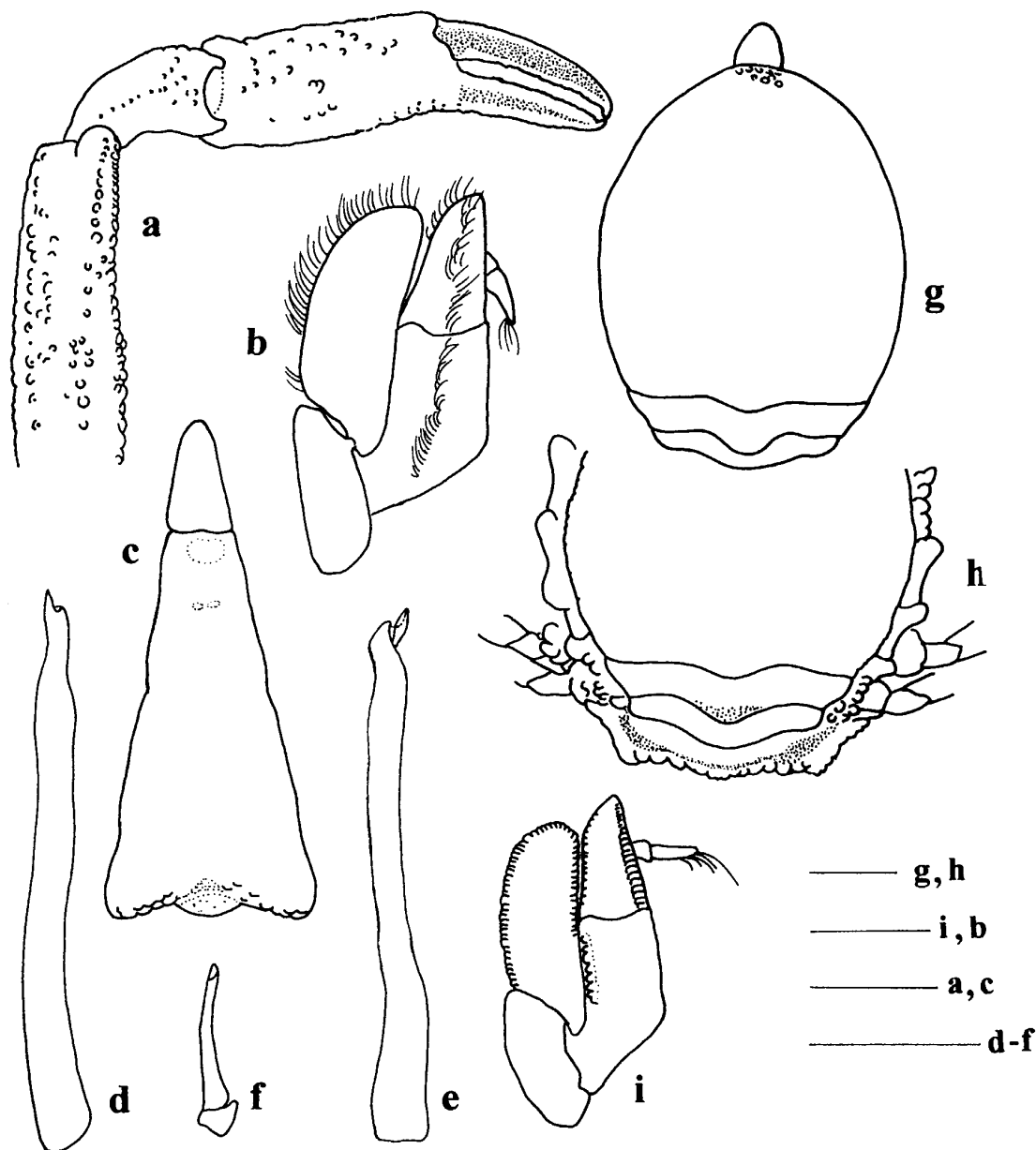


Fig. 3. *Philyra nishihirai* Takeda & Nakasone, 1991. a, c-f, male (6.0 by 5.4 mm) (MZB); b, g, h, ovigerous female (7.0 by 6.5 mm) (MZB). a. male left cheliped, b. female third maxilliped, dorsal view, c. male abdomen, d, e. male G1, f. male G2, i. male third maxilliped, dorsal view, g. female abdomen, h. ventral view of female posterior margin of carapace. Scales = 1.0 mm.

abdomen and G2 are provided for the first time.

***Philyra bicornis*, new species**
(Figs. 1b, 4, 5)

Material examined. –Holotype: male (7.1 by 6.5 mm) (MZB), mud substrate in mangroves, near river mouth, Kamora, Irian Jaya, Indonesia, coll. D. L. Rahayu, 16

October 2000. Paratypes: 1 male (7.7 by 7.5 mm) (ZRC), 1 male (7.1 by 6.5 mm) (RCO), 1 ovigerous female (7.2 by 7.0 mm) (RCO), 1 ovigerous female (7.4 by 7.0 mm) (ZRC), same data as holotype.

Etymology. –The name alludes to the projecting corners of the posterior carapace margin of the species. The name is used as a

noun in apposition.

Description (males). –Carapace slightly broader than long, dorsal surface strongly convex, anterolateral, posterolateral and posterior margins rimmed by obtuse tubercles, lateral angle obtuse, posterolateral margin sinuous; dorsal surface minutely granular, with numerous large punctae which extend to ventral surface, regions indistinct. Cardiac, branchial and intestinal regions elevated, with large granules; large granules on cardiac region extend anteriorly to form 3 granular ridges on gastric region, median keel with small tubercles; intestinal elevation bearing large and small granules confluent with elevation on cardiac region; elevation on branchial region with large granules, joined by oblique ridge at distal quarter. Large, shallow concavity between hepatic and anterolateral margins. Front nearly straight or slightly concave medially; hepatic region excavated to form broad, shallow depression; floor of sinus with median obtuse angle; upper margin of sinus not confluent with lower margin at outer portion; pterygostomial region with scattered tubercles, not swollen. Posterior margin concave with posterolateral angles produced. Antennules fold transversely, antennular fossa rectangular, external angle rounded. Basal segment of antennae embedded, flagellum excluded from orbit. Eye and orbit small, eye retracts along orbital groove.

Merus of third maxilliped with pointed apex, 0.8 times length of ischium along inner margin, outer margin scarcely setose, outer surface with row of minute tubercles; ischium 2.5 times longer than wide, outer surface with 3 rows of tubercles, largest tubercles adjacent to outer edge. Exopod much longer than wide, about twice length of merus, long setae on outer edge, outer surface with scattered tubercles; basis expanded, more than half length of exopod; carpus, propodus and dactylus not visible in external view when reposed, articulating on inner surface of merus at about one-fifth distance from apex. Outer and inner edges of merus, ischium

and exopod denticulated, with tufts of setae.

Chelipeds about 1.5 times length of carapace width. Anterior and posterior margin of merus tuberculated, outer surface covered with large and small tubercles on proximal half. Carpus about one-third length of merus, outer surface with rows of tubercles along upper and lower margins. Palm slightly longer than dactylus, outer surface smooth or with scattered flattened tubercles, upper and lower margins with dense tubercles. Cutting edges of fingers with blunt denticles, tip of fixed finger hooked. Outer surface of dactylus with 2 longitudinal ridges, outer surface of fixed finger with shallow longitudinal groove.

Ambulatory legs subcylindrical; lengths decreasing gradually from first to last pair, glabrous, upper and lower margins of meri, carpi and propodi serrated.

Male abdomen with 3 articulating segments (including telson), narrow; segments 1 and telson free, segments 2 to 6 fused, immovable, sutures indistinct. Segment 2 with scattered tubercles, suture between segment 5 and 6 visible as notch on either side of abdomen; telson short, apex rounded, ending close to lower edge of buccal cavern. Thoracic sternum with large tubercles, sternites interrupted, suture between sternites 1 and 2 indistinct, visible only laterally.

G1 long, slender, straight along most of length, tapering at tip, tuft of setae at distal one-sixth. G2 0.2 length of G1, straight, with spear-shaped structure distally, expanded proximally, tuft of setae on inner side.

Description (females). –Similar to males except: posterolateral margin of carapace relatively less produced; outer surface of merus and ischium of third maxilliped with longitudinal row of dense setae medially, margins of ischium, merus and exopod with tuft of setae, row of large tubercles near outer margin of ischium; abdomen strongly domed, highly punctate, covering most of thoracic sternites; segments 3-6 fused, sutures indistinct, segment 1, 2, 3 and 6 with large tubercles.

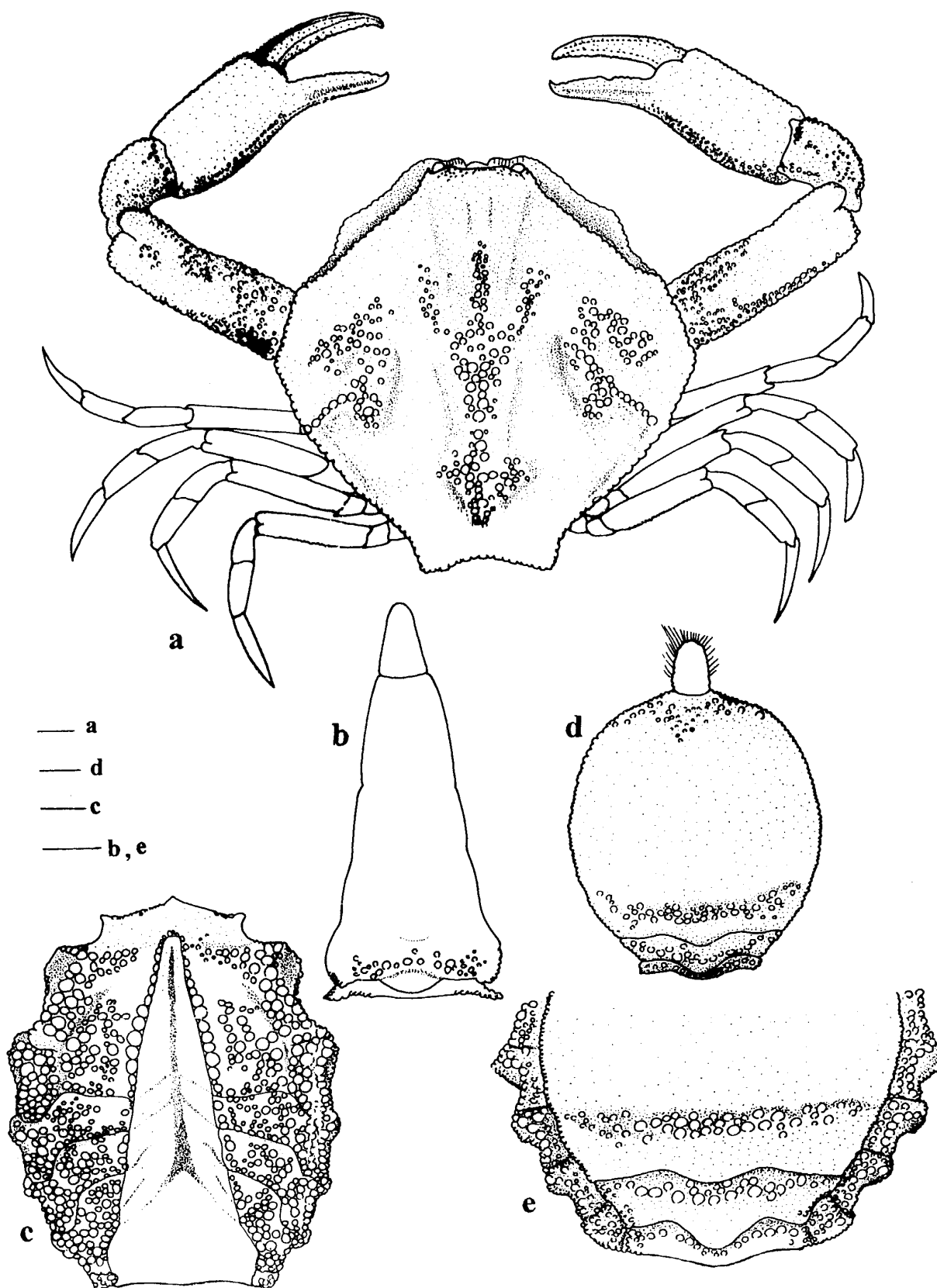


Fig. 4. *Philyra bicornis*, new species. a-c, male holotype (7.1 by 6.5 mm) (MZB); d, e, ovigerous female (7.4 by 7.0 mm) (ZRC). a. carapace, b. abdomen, c. sternal plastron, d. abdomen, e. ventral view of posterior margin of carapace. Scales = 1.0 mm.

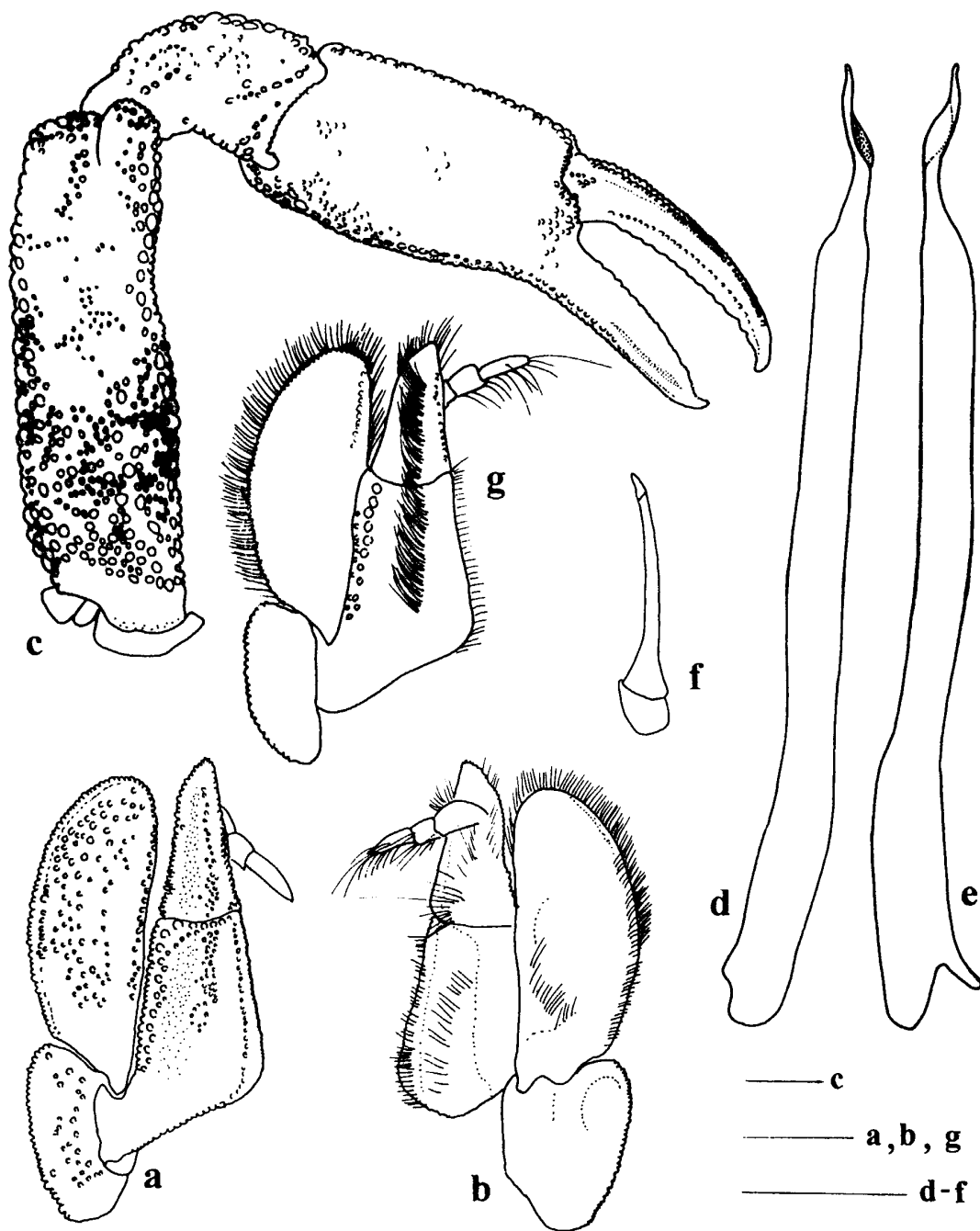


Fig. 5. *Philyra bicornis*, new species. a-f, male holotype (7.1 by 6.5 mm) (MZB); g, ovigerous female (7.4 by 7.0 mm) (ZRC). a. third maxilliped, dorsal view, b. third maxilliped, ventral view, c. left cheliped, d, e, G1, f, G2, g. third maxilliped, dorsal view. Scales = 1.0 mm.

Remarks. –In the form of the carapace, the new species is most similar to *P. malefatrix* (Kemp, 1915). Compared to *P. malefatrix*, however, *P. bicornis* has the posterolateral angle of the carapace prominently produced into a triangular projection, and the G1 is relatively slender, with the distal part straight and the tip sharply tapering. In these characters, *P. bicornis* also differs from the allied *P. scabra* (Dai, Yang, Song and Chen, 1986).

***Philyra malefatrix* (Kemp, 1915)**
(Figs. 6, 7)

Ebalia malefatrix Kemp, 1915: 209, Fig. 1a-c, Pl. 12 fig. 1; Dai et al., 1986: 55, Pl. 6(6), Fig. 28(1-2); Kazmi & Tirmizi, 1990: 22, Fig. 3; Dai & Yang, 1991: 62, Pl. 6(6), Figs. 28(1-2); Tan & Ng, 1994: 79, 83.

Philyra minuta Chen & Türkay, 2001: 26, Fig. 8; Chen & Sun, 2002: 392, Fig. 176.

Material examined. –Lectotype (herein selected): male, 8.9 by 8.4 mm (BMNH 1919.11.1.81), Chilka Lake, Orissa, India, coll. S. Kemp. Paralectotypes: 1 male (6.8 by 6.5 mm), 2 females (5.6 by 5.3 mm, 7.8 by 7.5 mm) (BMNH 1919.11.1.82-84), same data as lectotype. Holotype of *Philyra minuta* Chen & Türkay, 2001: male (7.0 by 6.5 mm) (Institute of Oceanology, Qingdao, China, catalogue number IOCAS 816), Teilougang, east of Sanya, Hainan, China, coll. 26 November 1990. Other specimens: 1 male (7.9 by 7.5 mm) (ZRC 1995.532), East Coast, Singapore, dredge, coll. D. Vandenspiegel & D. Lane, 1995; 1 male (6.2 by 5.9 mm), 3 females (5.7 by 5.5 mm, 4.5 by 4.4 mm, 4.1 by 4.0 mm) (ZRC 1995.432), Sungei Buloh mangroves, Singapore, coll. P. K. L. Ng, 22 March 1994; 2 males, 8 females (ZRC 1995.531), Sungei Buloh mangroves, Singapore, coll. P. K. L. Ng, March 1991; 1 male, 1 female (ZRC 1999.31), Sungei Buloh mangroves, Singapore, coll. C. T. N. Chuang, 16 January 1992; 1 male (carapace damaged) (ZRC 1999.1169), Lim Chu Kang

mangroves, Singapore, coll. P. K. L. Ng, April 1995; 1 male (ZRC 1990.8410), Kallang Basin, Singapore, coll. 28 February 1981; 5 males, 4 females (ZRC), Sepang mangroves, Negeri Sembilan, Peninsular Malaysia, coll. 24 January 1998.

Remarks. –The identities of *Philyra malefatrix* (Kemp, 1915) (originally in *Ebalia*, type locality: Chilka Lake, India) and *P. minuta* Chen & Türkay, 2001 (type locality: Hainan Island, China), require comment. Although Chen & Türkay (2001) did not examine any specimens of *P. malefatrix* s. str., they distinguished *P. minuta* from *P. malefatrix* using six characters, presumably on the basis of Kemp's (1915) description and figures. They describe the carapace of *P. malefatrix* as proportionally narrower than that of *P. minuta* (as long as broad vs. broader than long); the cheliped as proportionally shorter (cheliped length to carapace length ratio 1.28) and having a single simple tooth proximally on the ventral margin of the palm (in *P. minuta*, the cheliped length to carapace length ratio is 1.38 and the margin of the palm has a row of granules in addition to the proximal tooth); the merus of the third maxilliped is proportionally longer (merus nearly as long as ischium in *P. malefatrix* vs. merus distinctly shorter than ischium in *P. minuta*); the female telson is proportionally wider in *P. minuta* (broader than long vs. as broad as long); and the ambulatory legs are less densely setose. Consequently, they referred previous records of *E. malefatrix* by Dai et al. (1986), Kazmi & Tirmizi (1990) and Dai & Yang (1991) from Pakistan and China to *P. minuta*.

We examined the syntypes and a good series of specimens of *P. malefatrix* in the BMNH and ZRC respectively, as well as the holotype of *E. minuta*, and all the characters listed by Chen & Türkay (2001) to differentiate the two taxa unfortunately do not work. The carapace proportions are not a reliable character as the size of the lateral lobes varies, with smaller specimens having lower



Fig. 6. *Philyra malefactrix* (Kemp, 1915). Male lectotype, 8.9 by 8.4 mm (BMNH 1919.11.1.81). a. overall view, b. dorsal view of carapace.

lobes which tend to be more rounded; and the specimens on hand have carapace width to length proportions varying between 1.0 and 1.1. The proportions of the female telson varies with size, being more semicircular in shape and the base relatively wider in larger specimens. Contrary to Chen & Türkay (2001), the margin of the palm of the examined specimens (including the types) actually does possess a row of granules in front of the proximal tooth. Larger male specimens we have examined also usually have slightly more elongate chelae, as is typical for many

leucosiids. The setation on the ambulatory legs varies too much to be a useful character, varying from very sparse to distinctly setose. Kemp (1915) did not figure the third maxilliped of *P. malefactrix*, but commented that "In the external maxillipedes merus, which is pointed distally, is nearly as long as the ischium ...". The third maxillipeds of the type specimens of *P. malefactrix* agree very well with the other specimens examined here as well as those figured by Kazmi & Tirmizi (1990) (Pakistan), and Dai et al. (1986) and Dai & Yang (1991) (China), i.e.

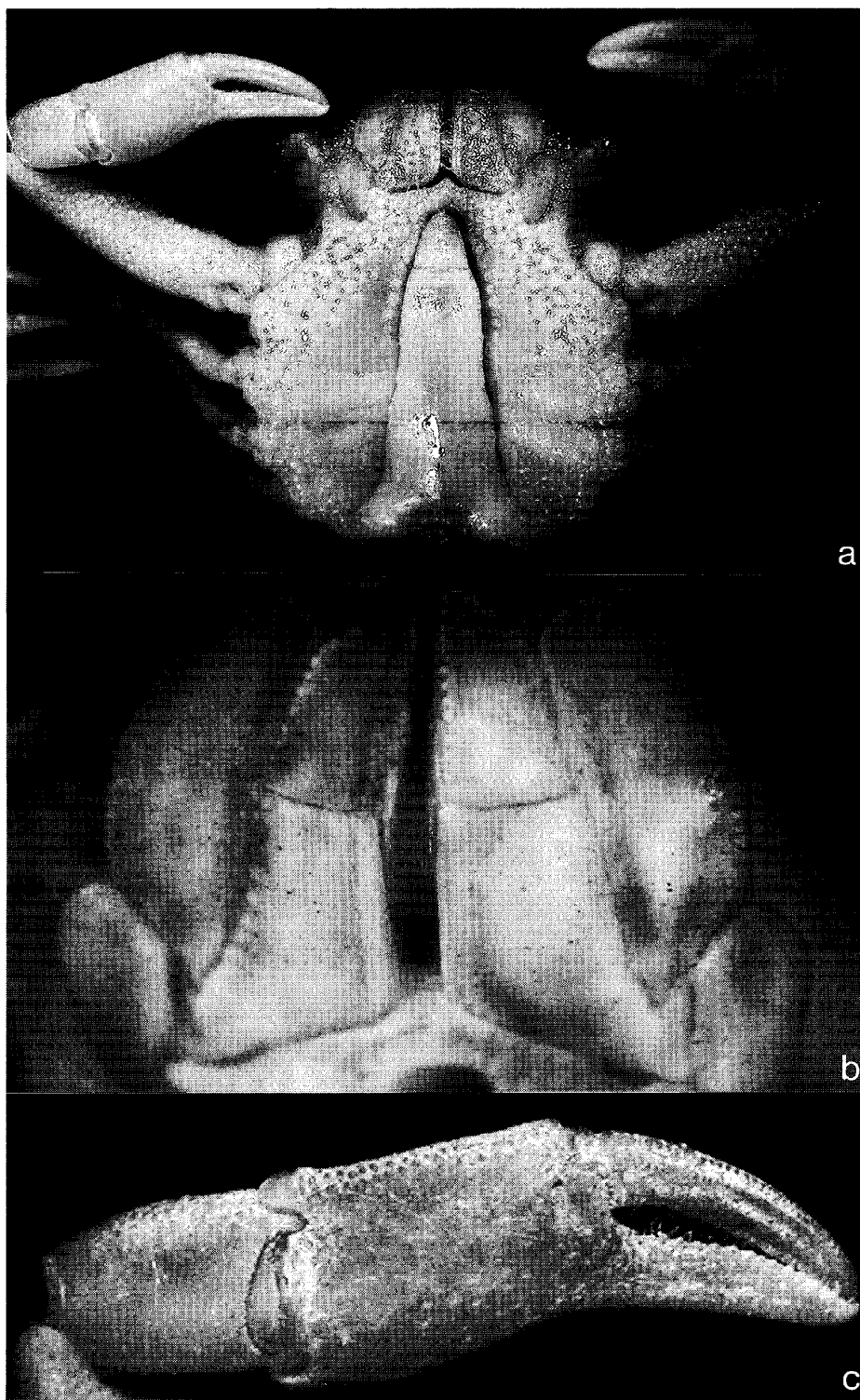


Fig. 7. *Philyra malefactrix* (Kemp, 1915). Male lectotype, 8.9 by 8.4 mm (BMNH 1919.11.1.81). a. ventral view of carapace and abdomen, b. third maxillipeds, c. outer view of right chela.

the merus is shorter than ischium (Fig. 7b). The G1 structures of the two taxa are similar. On the basis of the available data, we hereby synonymise *P. malefactrix* and *P. minuta*. The four specimens of *Philyra malefactrix* in the BMNH are all syntypes since Kemp (1915) did not designate any holotype. We hereby select the best male specimen, measuring 8.9 by 8.4 mm (BMNH 1919.11.1.81), as the lectotype of the species.

Kemp (1915: 211) had compared *P. malefactrix* with *P. ypsilon* (Ortmann, 1894) (type locality: Thursday Island, Australia) and *P. sagittifera* (Alcock, 1896) (type locality: Karachi, Pakistan), but both species are quite different. *Philyra ypsilon* is a distinctively more hexagonal species with the lateral carapace margins essentially entire, and the lateral and median rows of granules on the dorsal carapace surface do not meet (Ortmann, 1894: Pl. 2 fig. 7). The carapace of *P. malefactrix* is rounder and the ridges on the dorsal carapace surface meet (Fig. 6). Compared to *P. sagittifera*, *P. malefactrix* is a more rounded species, the antero- and posterolateral margins of *P. sagittifera* being almost straight (Alcock & Anderson, 1897: Pl. 29 fig. 9) while those of *P. malefactrix* are convex (Fig. 6). The ridges on the dorsal surface of the carapace of *P. sagittifera* are also lined with small, regularly sized granules, and are evenly and completely fused where they meet medially (Alcock & Anderson, 1897: Pl. 29 fig. 9). In contrast, the ridges on the dorsal surface of the carapace of *P. malefactrix* are covered with small and large granules, and the merger of the ridges is not as even (Fig. 6).

In general appearance, *P. malefactrix* is perhaps most similar to *P. scabra* (Dai, Yang, Song and Chen, 1986) (type locality: Hainan Island, China), but can be distinguished from the latter by the more prominent carapace granules as well as a distinctive G1 which has the distal part slender, sinuous and the tip bifurcated (cf. Dai et al., 1986: 56 Pl. 6(5), Figs. 28(3-4); Dai & Yang, 1991: 63, Pl. 6(7), Figs. 28(3-4)).

Philyra malefactrix also resembles *P.*

yangmatoensis Shen, 1932, described from muddy-gravelly bottoms in northern China, but the carapace of *P. yangmatoensis* is more rounded, with the lateral margins not dentate or lobate (just unevenly granulated), and the granules sparser in number (cf. Shen, 1932: 27, text-fig. 15, 16c, Pl. 1 fig. 3). Shen (1932: 28, text figs. 16d, 17, Pl. 1 fig. 4) also described "*P. yangmatoensis* forma *chefooensis*" which was differentiated by the deeper branchiocardiac grooves, which makes it more similar to *P. malefactrix*, but can be separated from it by the characters discussed above for *P. yangmatoensis*. *P. yangmatoensis chefooensis* is probably a distinct species. The G1s of these two species figured (Shen, 1932: Fig. 16c, d) are also very different from *P. malefactrix* being stouter, with the tip simple (not bent).

Another poorly known species that resembles *P. malefactrix* is *P. carinata* Bell, 1855 (type locality: Borneo). Nevertheless, it can be distinguished from *P. malefactrix* by its more rounded carapace with its lateral margins more prominently granulated, entire, and the presence of a granulated carina on the upper inner surface of the chela (cf. Bell, 1855: 302, Pl. 33 Fig. 3).

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