On two new species of the genera *Haberma* and *Parasesarma* (Crustacea: Decapoda: Brachyura: Sesarmidae) from Papua, Indonesia

D.L. Rahayu & P.K.L. Ng

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Dwi Listyo Rahayu, Research Centre for Oceanography, Indonesian Institute of Sciences (LIPI), Jalan Pasir Putih 1, Ancol Timur, Jakarta 11048, Indonesia (e-mail: dwilistyo@yahoo.com); Peter K.L. Ng, Department of Biological Science, National University of Singapore, Kent Ridge, Singapore 119260, Republic of Singapore (e-mail: peterng@nus.edu.sg).

Key words: Crustacea; Decapoda; Brachyura; Sesarmidae; taxonomy; *Haberma*; *Parasesarma*; new species; Indonesia.
Two new species of sesarmid crabs are described from the mangroves of Timika in Papua (= Irian Jaya), Indonesia. *Haberma kamora* spec. nov. is the second species in the genus described from Singapore, differing from the type species in the form of its male first pleopods and possessing relatively more slender ambulatory legs. *Parasesarma charis* spec. nov. resembles *P. erythrodactyla*, *P. tripectinis* and to some extent, *P. lepidum*, but has different ambulatory leg proportions and a distinctive male first pleopod structure. *Parasesarma acis* Davie, 1993, is regarded as a junior synonym of *P. tripectinis* Shen, 1940.

Introduction

The mangrove area around Timika Province in Papua (= Irian Jaya), Indonesia, has been extensively studied in recent years as part of environmental work being conducted there. With regards to decapod crustaceans, several new sesarmid crabs have already been reported (Rahayu & Takeda, 2000; Rahayu & Davie, 2002). In this paper two other new species, *Haberma kamora* and *Parasesarma charis* are described.

Specimens examined are deposited in the Museum Zoologicum Bogoriense (MZB), Cibinong, Indonesia; Research Centre for Oceanography (RCO), Indonesian Institute of Sciences, Jakarta, Indonesia; Zoological Reference Collection (ZRC) of the Raffles Museum, National University of Singapore; Nationaal Naturhistorisch Museum (NNM), Leiden, The Netherlands; and Muséum national d'Histoire naturelle (MNHN), Paris, France. Measurements given in the text are of the carapace breadth at the widest point, followed by the length. The abbreviations G1 and G2 are used for the male first and second pleopods respectively.

Descriptive part

Family Sesarmidae

Haberma kamora spec. nov.
(figs 1-3)

Material.— Holotype, ♂, 7.5 × 6.7 mm (MZB Cru 1509), Kamora, coll. J. Volosin, 4.iv.2000. Paratypes: 2 ♂♂, 7.5 × 6.6 mm, 5.7 × 5.3 mm (MZB Cru 1510), Kamora, coll. J. Volosin, 3.iv.2000. – 1 ♂ (ZRC

2000.1884), Kamora, coll. J. Volosin, 4.iv.2000. – 4 ♂♂, 8.4 × 7.4 mm, 7.5 × 6.8 mm, 7.2 × 6.7 mm, 6.8 × 5.8 mm, 3 ♀♀, 6.4 × 5.8 mm, 6.1 × 5.6 mm, 7.9 × 7.1 mm (ZRC 2002.0591), Kamora, near river bank, coll. I. Ermayanti, 9.x.2001. – 4 ♂♂, 5.0 × 4.7 mm, 6.0 × 5.5 mm, 6.5 × 5.8 mm, 6.9 × 6.3 mm, 2 ♀♀, 7.3 × 6.8 mm, 7.4 × 6.9 mm, 2 ovigerous ♀♀, 7.1 × 6.8 mm, 6.9 × 6.3 mm (RCO), Kamora, high mangrove forest, coll. I. Ermayanti, 11.x.2001. – 4 ♂♂, 7.3 × 6.6 mm, 6.8 × 6.2 mm, 6.6 × 6.1 mm, 7.0 × 6.5 mm, 2 ovigerous ♀♀, 7.5 × 7.0 mm, 6.1 × 5.6 mm, 1 ♀, 8.1 × 7.1 mm (NNM), Kamora, high mangrove forest, coll. I. Ermayanti, 17.x.2001. – 1 ♂, 5.0 × 4.7 mm, 3 ♀♀, 7.9 × 7.4 mm, 6.5 × 6 mm, 5.7 × 5.4 mm, 2 ovigerous ♀♀, 6.3 × 5.7 mm, 6.6 × 6.5 mm (MZB Cru 1511), Kamora, mangrove near river bank, coll. I. Ermayanti, 18.x.2001. – 1 ♂, 6.6 × 6.0 mm, 2 ♀, 6.8 × 6.3 mm, 5.7 × 5.0 mm, 1 ovigerous ♀, 8.2 × 7.7 mm (RCO), Kamora, high mangrove forest, coll. D. L. Rahayu, 22.x.2002. – 1 ♂, 7.0 × 6.5 mm, 1 ♀, 8.0 × 7.5 mm, 1 ovigerous ♀, 7.5 × 7.0 mm (RCO), Kamora, high mangrove forest, coll. D. L. Rahayu, 22.x.2002. – 1 ♂, 7.6 × 6.6 mm, 2 ♀, 7.7 × 7.0 mm, 7.4 × 6.8 mm, 3 ovigerous ♀, 8.0 × 7.6 mm, 7.3 × 6.6 mm, 6.5 × 6.0 mm (RCO), Kamora, high mangrove forest, coll. D. L. Rahayu, 29.x.2002. All localities in Timika, Papua, Indonesia.

Description.— Carapace 1.1 times broader than long; regions well defined, with grooves separating them; lateral carapace surface lined with strong oblique striae; carapace surface with scattered tufts of short setae which do not obscure margins or surface, lateral margins with short setae. Postfrontal distinct, separated into 4 lobes by short grooves, median lobes larger than lateral ones. Front 0.5 times carapace width, deflexed downwards, margin distinctly bilobed from dorsal view, each lobe broadly convex, separated by very broad median concavity. Supraorbital margin gently convex, entire. External orbital tooth triangular, directed slightly obliquely outwards, representing point of greatest width; fused with entire lateral carapace margin; antero-and posterolateral margins not demarcated, without trace of tooth or indentation, lateral margin gently sinuous, subparallel along most of length before curving to join straight posterior carapace margin. Eyes and orbits large, eye longer than orbit, tip of cornea extending beyond edge of external orbital tooth. Antennal and antennular basal segments adjacent, not separated by septum; basal antennular segment swollen. Antennal flagellum short, entering orbit. Ischium of third maxilliped with shallow median sulcus, merus with distinct median ridge; exopod slender, tip reaching to half length of outer margin of merus, flagellum long. Inner margin of merus and ischium with long setae.

Cheliped subequal, robust. Posterior border of merus serrated, with low subdistal tooth; outer anterior border serrated with large proximal spine; inner anterior border serrated with large subdistal tooth. Carpus longer than broad, with tuft of setae on inner margin. Outer and inner surfaces of palm smooth to gently rugose, naked. Dorsal surface of palm with several short uneven ridges lined with very small rounded granules, not pectinated. Fixed finger short, rounded and smooth on outer surface. Length of cutting edge 0.3 times length of propodus. Cutting edge of fixed finger and dactylus with small and large teeth. Dorsal surface of dactylus with several small, low granules. Tip of fingers chitinous, with small gape when fingers closed.

Ambulatory legs long, slender, third pair longest, about 2.3 times carapace width. Outer surface of merus, carpus and propodus gently rugose. Meri about 3 times as long as wide; dorsal margin serrated, with acute subdistal spine, dorsal and ventral margins with prominent long stiff setae. Carpus with 2 subparallel ridges on outer surface. Pro-

Fig. 1. *Haberma kamora* spec. nov. Holotype, ♂, 7.5 × 6.7 mm (MZB Cru 1509). A, overall view; B, carapace; C, ventral view. ▶


A
B
C

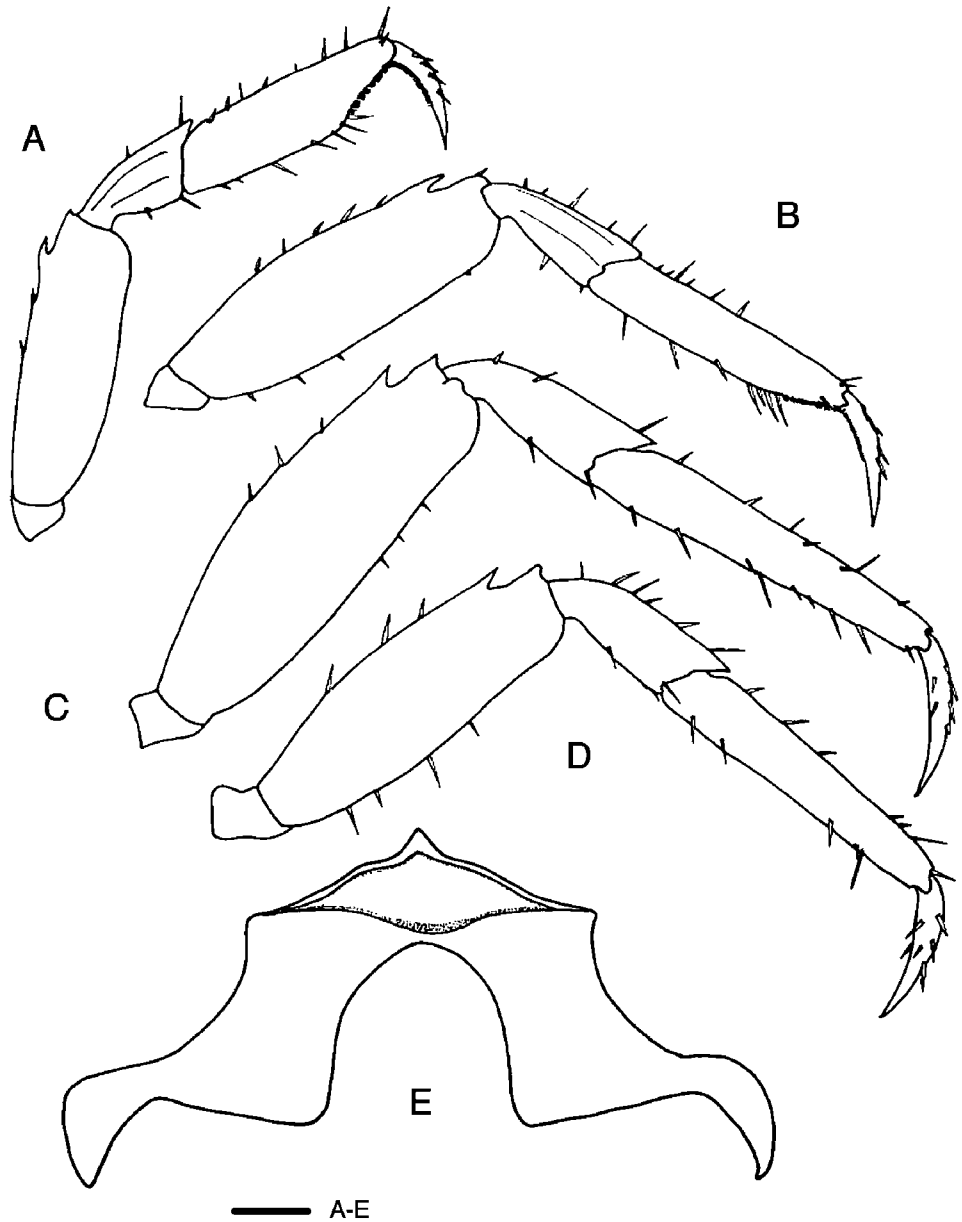


Fig. 2. *Haberma kamora* spec. nov. Holotype, ♂, 7.5 × 6.7 mm (MZB Cru 1509). A-D, first to fourth ambulatory legs, respectively; E, anterior thoracic sternum. Scales = 1.0 mm.

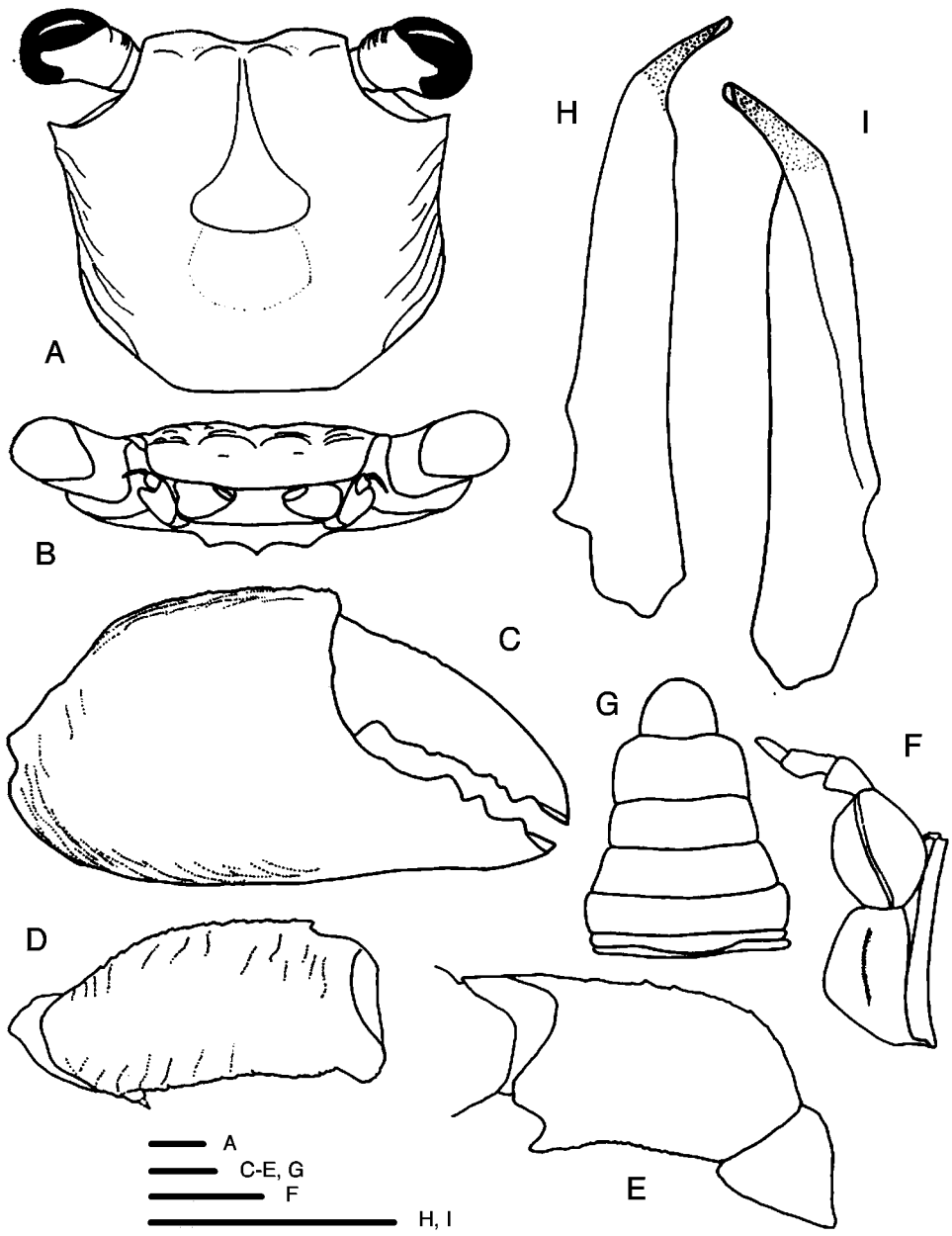


Fig. 3. *Haberma kamora* spec. nov. Holotype, ♂, 7.5 × 6.7 mm (MZB Cru 1509). A, dorsal view of carapace; B, frontal view of carapace; C, right chela; D, outer view of right merus of cheliped; E, dorsal view of right merus of cheliped; F, left maxilliped (denuded); G, ♂ abdomen; H, I, right G1 (denuded). Scales = 1.0 mm.

podus of first and second legs with ventro-distal margin sharply tapering to distal; dorsal and ventral margins with prominent long stiff setae, outer surface with longitudinal row of setae; disto-ventral margin with brush-like setae, with 2 long, stiff setae bracketing start of brush; dactylus of first and second legs styliform, narrow, proximal half with short brush-like setae along ventral margin; dactylus folding against tapered part of propodus when flexed, brush-like setae of each appendages appressing tightly against each other, forming distinct subchelate structure. Propodi and dactyli of third and fourth legs normal, not subchelate, dorsal and ventral margins with prominent stiff setae, outer surface with median longitudinal row of setae; dactylus distinctly shorter than propodus, slender, gently curved.

Surface of thoracic sternites 1-3 setose. Sternites 1-3 completely fused. Sternites 3 and 4 separated by low ridge lined with long setae. Abdominal cavity reaching just below the low ridge which separated sternites 3 and 4.

Male abdomen relatively broad. Telson semicircular, subequal in length to segment 6, lateral margin convex, tip rounded; segment 6 about twice as long as wide, lateral margins slightly convex. Segments 3-5 progressively more trapezoidal, lateral margins of segments 5 and 6 straight, lateral margins of segment 3 convex, segments 1 and 2 very narrow longitudinally.

G1 relatively slender, gently curving outwards; apical process gently bent, long, with truncate tip; subdistal setae long, simple, originating at base of apical process. G2 very short.

Female chelipeds more slender. Propodi and dactyli of first and second legs not clearly subchelate, ventro-distal margin of propodi not prominently tapering distally. Brush-like setae on ventral margin of propodi and dactyli of first and second legs absent.

Etymology.— The name is derived from the type locality, Kamora River. The name is used as a noun in apposition.

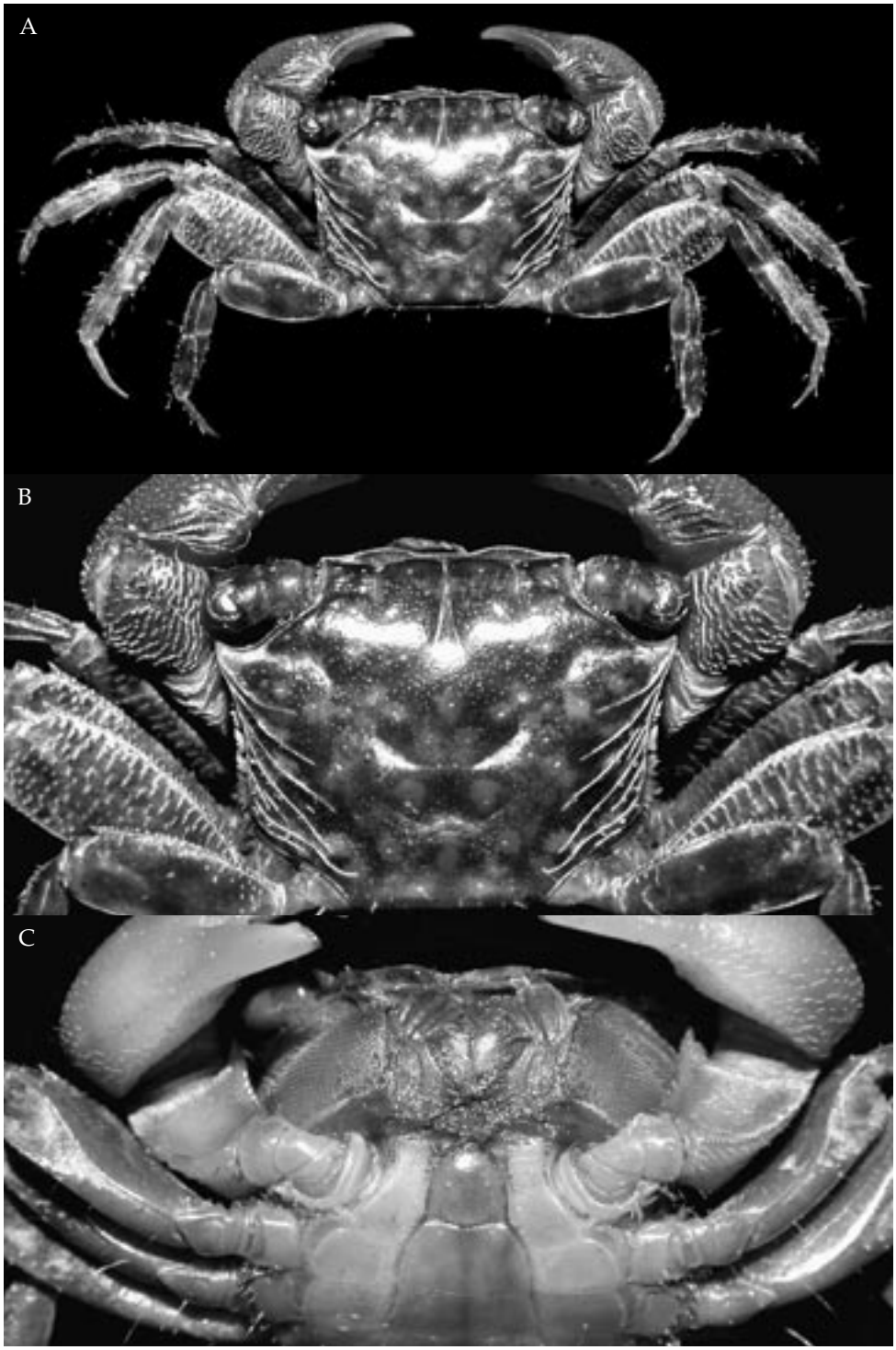
Colour.— In life, uniformly brown throughout with ventral surfaces lighter in colour; chelae orange.

Remarks.— The genus *Haberma* Ng & Schubart, 2002 (type species *Haberma nanum* Ng & Schubart, 2002) was only recently established for one species from Singapore. The present specimens from Papua are clearly referable to this genus, with males possessing the diagnostic male subchelate ambulatory legs. *Haberma kamora* spec. nov. is easily distinguished from *H. nanum* in having relatively more slender legs and a gently bent apical process of the G1 (*H. nanum* has the apical process of the G1 almost straight) (cf. Ng & Schubart, 2002).

Ng & Schubart (2002) commented that *H. nanum* prefers to live in relatively open, hard soiled habitat with no leaf cover in mangroves. *Haberma kamora* was collected from mangrove area with soft muddy bottoms along river banks, and also from hard substrates in high mangrove forests. The species moves rapidly, hiding under wood log and even climbs the root of mangroves.

Distribution.— The species is presently only known from the southeast coast of Papua, Indonesia.

Fig. 4. *Parasesarma charis* spec. nov. Holotype, ♂, 10.5 × 8.0 mm (MZB Cru 1512). A, overall view; B, ▶ carapace; C, ventral view.


A
B
C

Parasesarma charis spec. nov.
(figs 4-6)

Material.— Holotype, ♂, 10.5 × 8.0 mm (MZB Cru 1512), Ajkwa, coll. D. L. Rahayu 15.x.2001. Paratypes: 1 ♂, 5.8 × 4.9 mm (RCO), Kamora, high mangrove forest, coll. I. Ermayanti 9.x.2001. – 2 ♂♂, 10.1 × 7.8 mm, 8.8 × 6.6 mm, 1 ♀, 8.8 × 6.6 mm (ZRC 2002.594), 3 ♀♀, 7.2 × 5.8 mm, 10.9 × 8.37 mm, 9.0 × 6.9 mm (RCO), 1 ♂, 6.0 × 4.4 mm (RCO), 1 ♂, 6.8 × 5.1 mm (MNHN), 1 ovigerous ♀, 10.0 × 7.5 mm (MZB Cru 1513), Kamora, high mangrove forest, coll. I. Ermayanti, 11.x.2001. – 1 ♂, 10.2 × 7.8 mm, 1 ♀, 11.0 × 8.3 mm (NNM), Ajkwa, mud substrate in mangrove, coll. G. Setyadi 18 August 1999. – 1 ♂, 9.8 × 7.4 mm (ZRC 2002.595), 1 ovigerous ♀, 10.4 × 9.1 mm (MZB Cru 1514), Ajkwa, coll. I. Ermayanti 15.x.2001. All localities in Timika, Papua, Indonesia.

Description.— Carapace 1.3 times broader than long; mesogastric and cardiac regions well defined, intestinal region moderately defined; lateral carapace surface lined with strong oblique striae; carapace surface glabrous, lateral margins with short setae. Postfrontal crest distinct, separated into 4 lobes by narrow grooves, median lobes larger than lateral lobes. Front deflexed downwards, margin bilobed from dorsal view, each lobe broadly convex, separated by very broad median concavity. Supraorbital margin gently convex, entire. External orbital tooth triangular, directed obliquely outwards, representing point of greatest width; fused with entire lateral carapace margin; antero- and posterolateral margins not demarcated, without trace of tooth or indentation, lateral margin gently sinuous, subparallel along most of length before curving to join straight posterior carapace margin. Eyes extending slightly beyond edge of external orbital tooth. Antennal and antennular basal segments adjacent, not separated by septum; basal antennular segment swollen. Antennal flagellum relatively long, entering orbit. Ischium of third maxilliped with shallow median sulcus, merus with distinct submedian ridge; exopod slender, tip reaching to half length of outer margin of merus, flagellum long. Inner margin of merus and ischium with long setae, proximal outer margin of ischium and base of exopod with long, dense setae.

Cheliped subequal, robust. Merus with posterior border carinate, minutely tuberculate, without subdistal spine; anterior border with minute spines ending in large subdistal spine; outer surface with striae, inner surface with 2 longitudinal rows of setae. Carpus with inner angle not produced, outer margin and dorsal surface striated. Upper surface of palm with 3 transverse pectinated crests; primary crest composed of 20-22 tall narrow teeth; secondary crest well developed, slightly shorter than primary, with 17-18 broader, more widely spaced teeth; third crest composed of 7 much lower, broader, widely spaced teeth, followed by several blunt tubercles; region below crests with rows of small tubercles. Outer

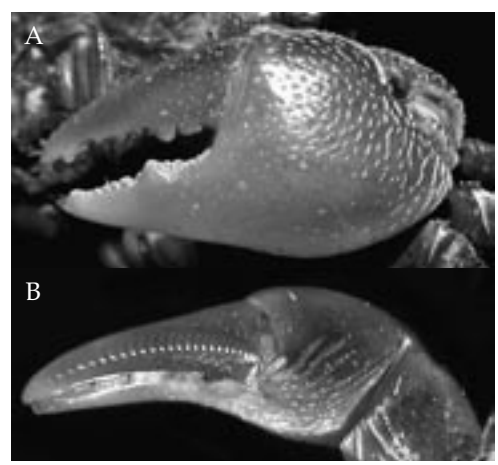


Fig. 5. *Parasesarma charis* spec. nov. Holotype, ♂, 10.5 × 8.0 mm (MZB Cru 1512). A, Outer view of left chela; dorsal view of left chela.

surface of palm striated proximally, smooth to gently granulate distally, naked; inner surface of palm with several tubercles. Fixed finger rounded, smooth on outer surface; without ventral ridge, moderately long. Length of cutting edge 0.46 times length of propodus. Cutting edge of fixed finger and dactylus with smaller and larger rounded teeth. Dorsal surface of dactylus bearing 26-28 symmetrical tubercles, all distinct, small, closely spaced proximally, becoming larger and more widely spaced distally. Several low tubercles on proximal third of inner edge of dorsal surface. Fingers with tips chitinous, crossing at tips when closed; adult males with moderately wide gape when fingers closed.

Ambulatory legs slender, flattened, broad; second and third pairs subequal, longer than others, about 1.5 times carapace width. Merus of third leg 2.2 times as long as wide; anterior margin of merus with acute subdistal spine. Meri of legs 1-3 with transverse striae on upper surface, merus of leg 4 smooth. Carpi of legs 1-4 with 2 carinae on outer surface. Propodus of third leg 3 times as long as wide with accessory carina on inferior proximal potion of outer surface, dorsal and ventral margins with prominent long stiff setae. Dactylus 0.8 length of propodus, slightly recurved, terminating in acute pectinated tip, dorsal and ventral margins with prominent long stiff setae.

Surface of thoracic sternites 1-3 setose. Sternites 1-3 completely fused. Sternites 3 and 4 separated by low ridge lined with long setae. Abdominal cavity reaching just below low ridge which separates sternites 3 and 4.

Male abdomen relatively broad. Telson semicircular, evenly rounded, as long as preceding segment; segment 6 almost twice as long as wide, lateral margins slightly convex. Segments 3-5 progressively more trapezoidal, lateral margins of segments 5 and 6 straight, lateral margins of segment 3 strongly convex, segments 1 and 2 very narrow longitudinally.

G1 relatively slender, moderately curved; apical process gently bent to form an angle of about 45°, strongly produced, corneous part long with truncate tip. Setae long, simple, originating at base of apical process. G2 very short.

Female with chelipeds smaller, primary pectinated crest on palm distinct, secondary and thirdly not well developed, dactylar tubercles indistinct.

Etymology.— The name is derived from the Greek for charming, alluding the delicate features and distinctive colour pattern of the species. The name is used as a noun in apposition.

Colour.— In life, carapace dark brown to almost black, mottled with light brown; palm and dactylus of cheliped bright red.

Remarks.— *Parasesarma* De Man, 1895 (type species *Cancer quadratus* Fabricius, 1798 (= *Cancer plicata* Latreille, 1806), designated by Rathbun, 1918) is a large genus of Indo-West Pacific sesarmid crabs that currently contains some 26 species. All its members possess an entire lateral carapace margin without teeth or lobes, a male palm that has two or three distinct pectinated crests, and the tubercles on the dorsal margin of the dactylus of the male chela are distinct and differentiated.

The characters of *P. charis* spec. nov. ally it most closely with *P. erythodactyla* (Hess, 1865) and *P. tripectinis* Shen, 1940. *Parasesarma erythodactyla* and *P. tripectinis*, have relatively broad third ambulatory legs in which the length of the propodus is less than three times the maximum width, the posterodistal angle of the merus of the cheliped possesses a distinct subdistal tooth, and there are 19 or more tubercles on the dactylus of

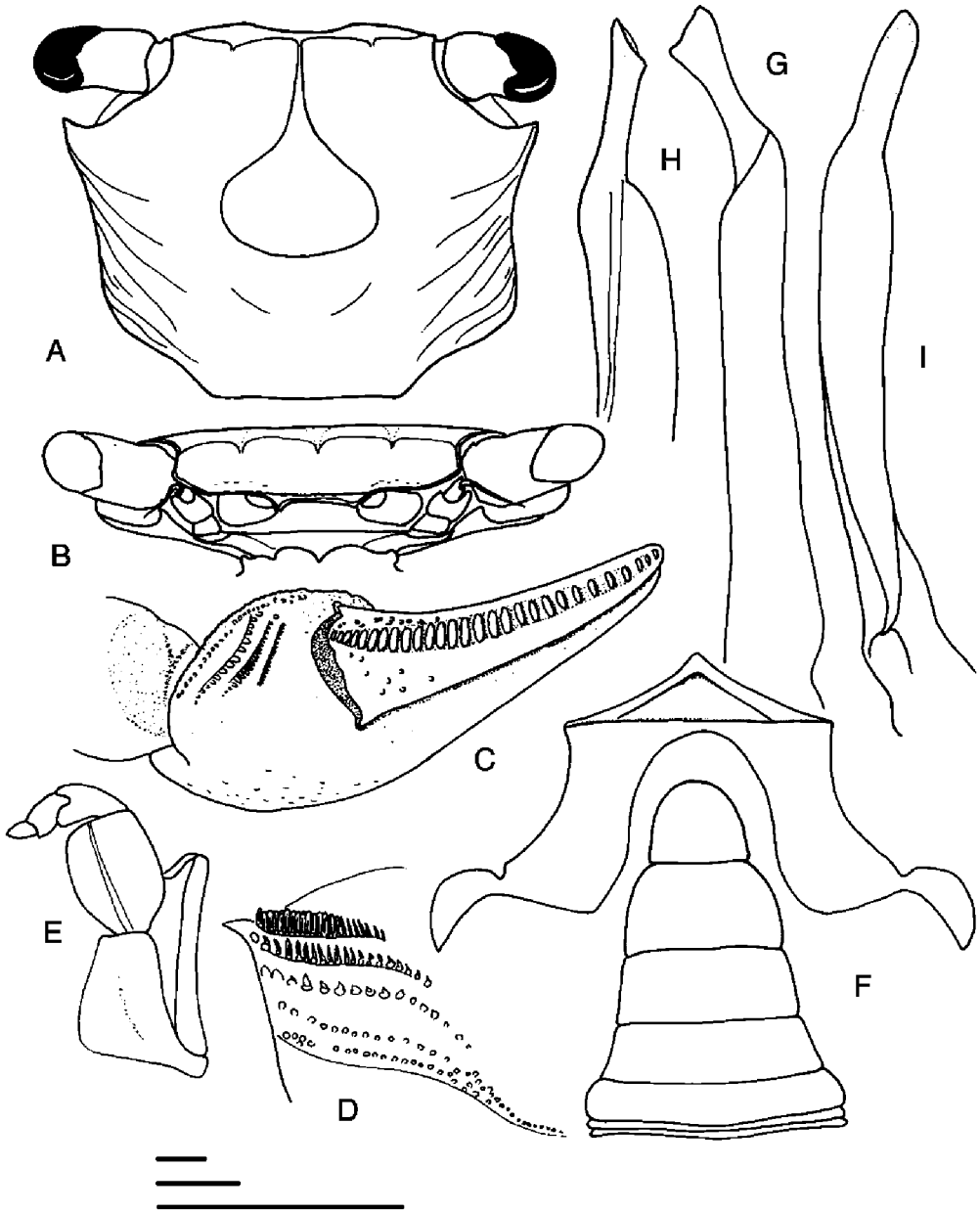


Fig. 6. *Parasesarma charis* spec. nov. Holotype, ♂, 10.5 × 8.0 mm (MZB Cru 1512). A, dorsal view of carapace; B, frontal view of carapace; C, dorsal view of right chela; D, lateral view of pectinated cristae on palm of chela; E, left maxilliped (denuded); F, anterior thoracic sternum and ♂ abdomen; G-I, right G1 (setae denuded). Scales = 1.0 mm.

the male chela, each of which is simple, with a transverse ridge marking the summit. *Parasesarma charis* can, however, easily be distinguished from *P. erythodactyla* and *P. tripectinis* by the outer dorsal surface of the male palm having three pectinated crests (vs. two in both later species), the dactylus of the male chela has 26-28 closely packed tubercles (vs. 22-24 and 17-20 more well spaced tubercles in *P. erythodactyla* and *P. tripectinis* respectively), the distal part of the G1 is gently bent at an angle of 45° (vs. 90°), and the carapace is covered with pale spots in life (vs. uniformly colored). In addition, *P. charis* appears to be a smaller species, with adults measuring only 10 mm in carapace width. In contrast, the adult specimens of *P. erythodactyla* and *P. tripectinis* we have on hand in the ZRC have carapace widths of 17.0 mm and 15.7 mm respectively, with specimens 10 mm and smaller generally inmature.

Parasesarma charis also resembles *P. lepidum* Tweedie, 1950 (type locality Labuan, Malaysia) in having the G1 strongly produced, its corneous part long with truncate tip. Examination of the paratypes in the ZRC reveal several differences, notably in the number of dactylar tubercles (17-18 in *P. lepidum* vs. 24-26 in *P. charis*). Although both species possess three pectinated crests on the palm of the cheliped, *P. charis* has a relatively longer pectinated crest that has more than 20 teeth whereas there are only 13 in *P. lepidum*. In addition, the dactylus of the third ambulatory leg of *P. charis* is about 0.8 times the length of the propodus, while in *P. lepidum*, the third ambulatory dactylus is as long as the propodus.

One species, *P. acis* Davie, 1993, is here formally regarded as a junior subjective synonym of *P. tripectinis* Shen, 1940. Ng et al. (2001: 42) noted that all indications are that both were taxa were identical but did not formally synonymise them. The authors have on hand, a good series of specimens of *P. tripectinis* from Hong Kong and Taiwan, all of which agree with the descriptions of Shen (1940) and Davie (1993) of their respective taxa. In describing *P. acis*, Davie (1993) made detailed comparisons with the Australian *P. erythrodactyla* s. str. and showed that it differed markedly from what had been identified with this species from Japan and Taiwan. However, the poorly known *P. tripectinis* Shen, 1940, originally described from southern China, was not considered. *Parasesarma tripectinis* was orginally described from six males and four females specimens from Tsimei in Fukien Province, China (Shen, 1940: 261, Figs. 17-21).

Acknowledgements

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