

Two new species of mangrove crabs of the genus *Neosarmatium* Serène & Soh, 1970 (Decapoda, Brachyura, Sesarmidae) from Papua, Indonesia

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ABSTRACT

Two new species of *Neosarmatium*, *N. papuense* n. sp. and *N. bidentatum* n. sp., are described from mangrove environments in the Timika region, Papua, Indonesia. *Neosarmatium papuense* n. sp. is characterized by the presence of two chitinous teeth, and one non-chitinous tooth, closely set proximally on the dorsal surface of the dactyl of the cheliped. The closest species is *N. trispinosum* Davie, 1994, which has three chitinous teeth on the dorsal surface of the dactyl of the cheliped. *Neosarmatium bidentatum* n. sp. differs from other species by having only two dorsal teeth on the proximal quarter of the dactyl of the cheliped as well as differences in abdomen and carapace proportions.

RÉSUMÉ

Deux nouvelles espèces de crabes de mangrove du genre Neosarmatium Serène & Soh, 1970 (Decapoda, Brachyura, Sesarmidae) de Papouasie (Indonésie).

Deux nouvelles espèces de *Neosarmatium*, *N. papuense* n. sp. et *N. bidentatum* n. sp., sont décrites de la région de Timika en Papouasie (Indonésie). *Neosarmatium papuense* n. sp. se caractérise par la présence de deux dents chitineuses et d'une non-chitineuse implantées les unes à côté des autres sur la partie proximale du bord dorsal du dactyle des chélipèdes. L'espèce qui lui est la plus proche est *N. trispinosum* Davie, 1994, qui se distingue par trois dents toutes chitineuses sur le dactyle. *Neosarmatium bidentatum* n. sp. diffère des autres espèces en n'ayant que deux dents dorsales sur le quart proximal du dactyle du chélipède ainsi que par des différences dans les proportions de l'abdomen et de la carapace.

KEY WORDS

Crustacea,
Decapoda,
Grapsoidea,
Sesarmidae,
Neosarmatium,
mangrove,
Papua,
Indonesia,
Western Pacific,
new species.

MOTS CLÉS

Crustacea,
Decapoda,
Grapsoidea,
Sesarmidae,
Neosarmatium,
mangrove,
Papouasie,
Indonésie,
Pacifique ouest,
espèces nouvelles.

INTRODUCTION

Brachyuran crabs from mangrove environments of Papua (formerly Irian Jaya), Indonesia, have been studied over the last five years with a number of new species being described (Rahayu & Takeda 2000; Rahayu & Davie 2002; Ng & Rahayu 2002; Rahayu & Ng 2003a, b, 2004, 2005). However, owing to the vast areas of mangrove forests in Papua, discovery of more new species is not unexpected. We describe two more new species of sesarmid crabs in the genus *Neosarmatium* Serène & Soh, 1970, *N. papuense* n. sp. and *N. bidentatum* n. sp.

Neosarmatium was revised by Davie (1994), and subsequently Ng *et al.* (1997) and Schubart & Ng (2002) provided new information on character interpretations, live colour photographs for several species, and new distributional data. Schubart & Ng (2002) also described a new Indonesian species, *N. daviei*, and transferred the Chinese *Chiromantes tangi* (Rathbun, 1931), previously redescribed by Ng & Liu (1999), to *Neosarmatium*. *Neosarmatium* now contains 16 Indo-West Pacific species, of which ten occur in Indonesian waters: *N. daviei* Schubart & Ng, 2002; *N. fourmanoiri* Serène, 1973; *N. indicum* (A. Milne-Edwards, 1868); *N. integrum* (A. Milne-Edwards, 1873); *N. laeve* (A. Milne-Edwards, 1869); *N. meinerti* (De Man, 1887); *N. rotundifrons* (A. Milne-Edwards, 1869); *N. trispinosum* Davie, 1994, and now *N. papuense* n. sp., and *N. bidentatum* n. sp.

Type specimens are deposited in Museum Zoologi Bogor, Indonesian Institute of Sciences (MZB), Queensland Museum, Brisbane (QM), Zoological Reference Collection of the Raffles Museum for Biodiversity Research, Singapore (ZRC) and Muséum national d'Histoire naturelle, Paris (MNHN).

Measurements given in the text are carapace width followed by length.

SYSTEMATICS

Family SESARMIDAE Dana, 1851

Genus *Neosarmatium* Serène & Soh, 1970

Metagrapsus – A. Milne-Edwards 1873: 308. — De Man 1880: 31. — Kingsley 1880: 212. [Non *Metagrapsus* H. Milne Edwards, 1853: 188].

Neosarmatium Serène & Soh, 1970: 397, 405. — Sakai 1976: 665. — Davie 1994: 36. — Ng *et al.* 1997: 146. — Schubart & Ng 2002: 28.

TYPE SPECIES. — *Sesarma smithi* H. Milne Edwards, 1853, by original designation; gender neuter.

Neosarmatium papuense n. sp.
(Figs 1; 2)

TYPE MATERIAL. — **Indonesia**. Holotype: Kamora, Papua, 19.IV.2004, ♂ 16.6 × 13.3 mm (MZB Cru 1538).

Paratypes: Ajkwa, Papua, 15.V.2001, ♂ 15.5 × 13.0 mm (ZRC); Ajkwa, Papua, 16.IV.2004, 2 ♂♂ 13.2 × 11.2, 12.5 × 9.8 mm (QM, MNHN).

ETYMOLOGY. — Named after the Indonesian region where it has so far only been found.

HABITAT. — Burrows in firm, moist mud in mangrove forest. Present specimens were all collected from a zone about 500 m landward from the river bank. This new species sometimes co-occurs with *Sarmatium germaini* (A. Milne-Edwards, 1869).

DISTRIBUTION. — So far known only from the west coast of Papua, Indonesia.

DESCRIPTION

Carapace (Fig. 1A, B) transversely rectangular, c.1.2 times broader than long, distinctly vaulted, entire surface minutely punctate; gastric region well defined, cardiac region indistinct. Branchial ridges prominent; first relatively short, beginning on posterior edge of first anterolateral tooth; second relatively long, arising from last anterolateral tooth; third arising from or just short of lateral margin; fourth arising from lateral margin. Lateral margin weakly sinuous, subparallel along most of length before curving to join straight posterior margin. Front (Fig. 1C) 0.4 times carapace width, slightly deflexed, margin with slight median concavity. Lateral postfrontal lobes narrow, not as swollen as medians; median lobes separated by narrow groove. Exorbital angle triangular. Anterolateral margin with one forwardly directed tooth behind exorbital angle, blunt, larger than exorbital angle; second anterolateral tooth minute, barely discernible. Setae in short tufts on anterior half, and posteriorly in rows

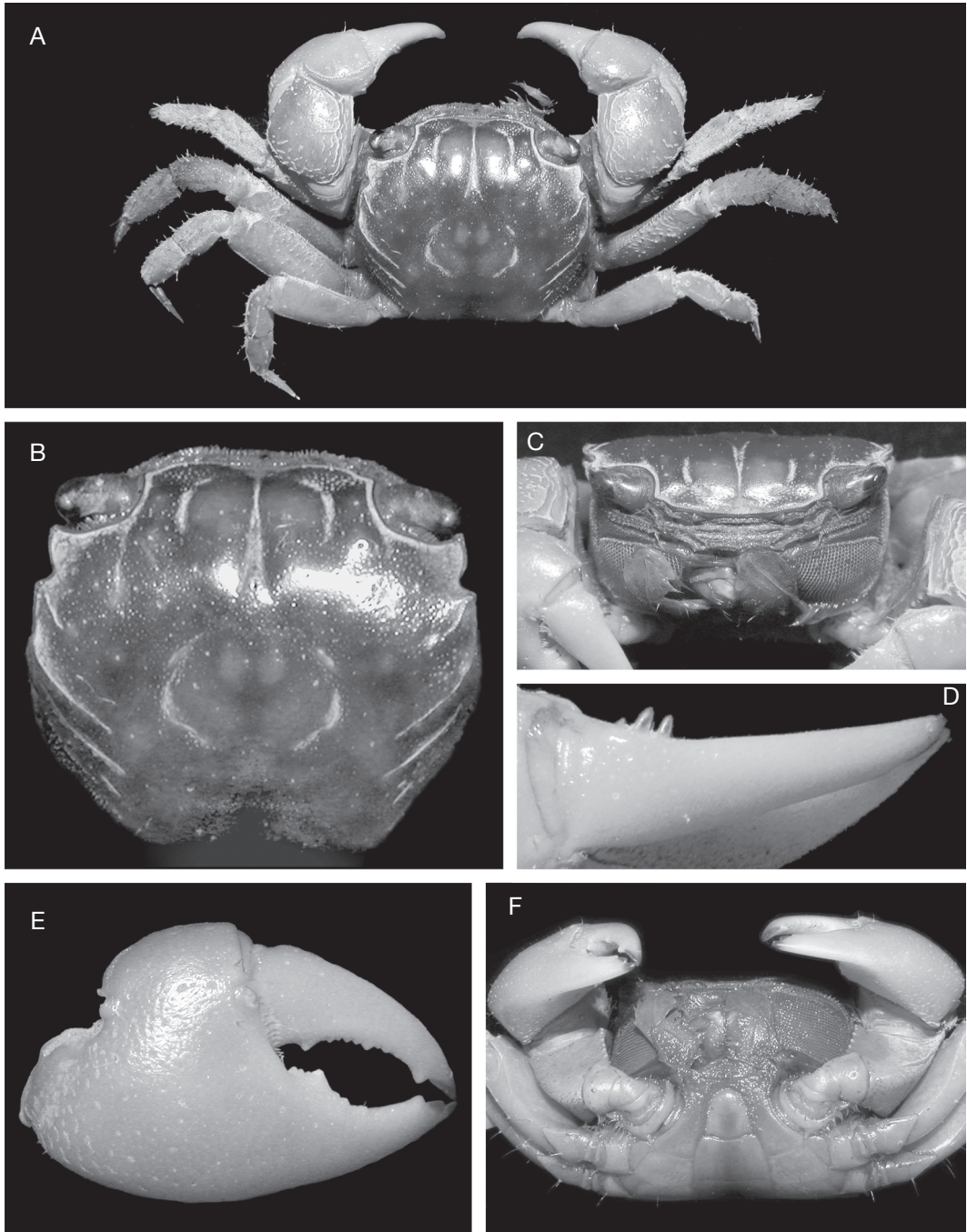


FIG. 1. — *Neosarmatium papuense* n. sp., paratype ♂ 15.5 × 13.0 mm, Indonesia (ZRC): **A**, dorsal view; **B**, carapace; **C**, frontal view; **D**, dorsal dactylar tubercles of cheliped; **E**, frontal view of chela; **F**, ventral view.

along branchial ridges; carapace surface otherwise glabrous and shiny. Upper orbital border weakly convex, finely granular. Lower orbital border evenly, finely granular. Eyes extending slightly beyond edge of exorbital 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 (Fig. 2C) with shallow, longitudinal, median sulcus; merus with distinct oblique, setose, submedian ridge ending near mesial margin; exopod slender, tip reaching to half length of outer margin of merus, flagellum long. Inner margin of merus and ischium with setae, proximal outer margin of ischium and base of exopod with dense setae.

Chelipeds (Figs 1E; 2B) subequal, robust. Merus with posterior border minutely tuberculate, without subdistal spine; outer anterior border serrated, ending in blunt subdistal spine; inner anterior border with tubercles; outer surface with fine striations, inner surface with longitudinal row of setae. Carpus with inner angle slightly produced, armed with a few blunt tubercles; inner margin unarmed, a tuft of long setae proximally on secondary ventral ridge of inner margin; a few granules present on inner face of carpus just below inner angle; outer surface with sparse striations. Palm with outer surface naked; low, barely discernible medial longitudinal ridge; row of short setae in gape below articulation with dactyl; inner surface of palm mostly smooth, with strongly raised granular vertical crest, continuing obliquely for about one-third of fixed finger. Fixed finger smooth, slightly flattened on outer surface; moderately long. Length of cutting edge 0.5 times length of propodus. Cutting margins of fixed finger and dactyl with larger rounded teeth subproximally and subdistally, with even row of very small teeth between. Dorsal surface of dactyl (Fig. 1D) with low elevation over proximal one-third, bearing two chitinous teeth and one small non-chitinous proximal tooth; short setae at base. Fingers with chitinous tips, wide gape between cutting margins.

Second pair of walking legs longer than others, about 1.4 times maximum carapace width. Merus of third leg 2.2 times as long as wide; anterior margin of merus with an acute subdistal spine. Meri of legs 1-3 each with faint transverse striae on upper sur-

face, merus of fourth leg smooth. Carpi of legs 1-3 each with two ridges on outer surface, dorsal half with mat of short setae. Propodi each with dorsal two-thirds covered by mat of short setae. Carpus of third leg 1.7 times as long as wide; propodus of third leg twice as long as wide. Dactyls 0.95 length of propodi, terminating acutely, two rows of short setae on outer surface.

Thoracic sternites 1-3 fused; surface scarcely setose. Sternites 3 and 4 separated by low ridge obscured by dense setae. Abdominal cavity reaching just below low ridge separating sternites 3 and 4.

Male abdomen (Fig. 2D) moderately wide; telson evenly rounded, as long as preceding segment; sixth segment 1.5 times wider than long, lateral margins slightly convex; segments 3-5 progressively more trapezoidal, lateral margins of segment 4 and 5 straight; lateral margins of third segment strongly convex; first and second segments similar in width to third segment, but longitudinally very narrow. Male first gonopod (Fig. 2E-H) almost straight in ventral view, outer margin weakly concave. Male second gonopod very short.

REMARKS

The form and position of the dorsal dactylar teeth on the cheliped are very important characters for separating most *Neosarmatium* species. In *N. papuense* n. sp., the dorsal surface of the dactyl has a low elevation over the proximal third with two prominent, upwardly directed, chitinous teeth, and a small non-chitinous proximal tooth. Also, on the carapace the second anterolateral tooth is barely discernible or just a trace in the smallest specimen.

Neosarmatium papuense n. sp. and *N. bidentatum* n. sp. belong to a group of species that have very deep bodies, sinuous lateral margins with the antero- and posterolateral margins distinctly demarcated, and well developed, strong chitinous teeth on the dorsal surface of the dactyl of the male chela. The other members of this group are: *N. indicum*, *N. integrum*, *N. malabaricum* (Henderson, 1893), *N. punctatum* (A. Milne-Edwards, 1873), *N. rotundifrons*, *N. daviei*, *N. smithi* (H. Milne Edwards, 1853) and *N. trispinosum*. All species in this group can be distinguished using the new key

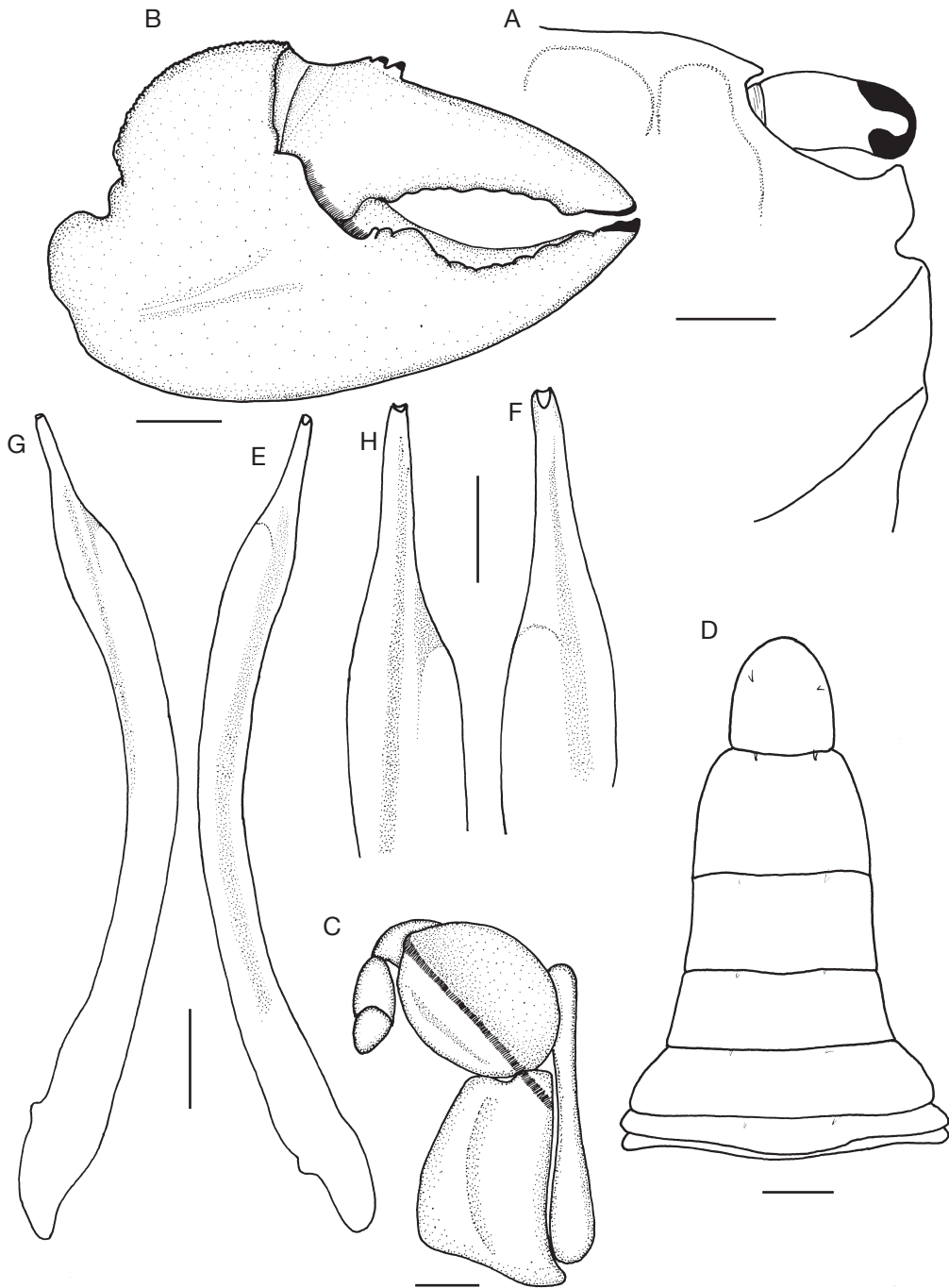


FIG. 2. — *Neosarmatium papuense* n. sp., holotype ♂ 16.6 × 13.3 mm, Indonesia (MZB Cru 1538): **A**, carapace anterolateral region; **B**, right cheliped; **C**, left third maxilliped (setae removed); **D**, abdomen; **E-H**, male left first gonopod (setae removed): **E**, **F**, ventral view; **G**, **H**, lateral view. Scale bars: A, B, D, 2 mm; C, E, G, 1 mm; F, H, 0.5 mm.

presented here. *Neosesartium papuense* n. sp. differs from *N. indicum*, *N. malabaricum*, *N. punctatum* and *N. bidentatus* n. sp., primarily in having two chitinous teeth and one smaller non-chitinous tooth on the dorsal surface of the cheliped dactyl. Other differences between *N. papuense* n. sp. and *N. bidentatus* are discussed under the latter new species.

In *N. papuense* n. sp. and *N. trispinosum*, the three teeth on the dorsal margin of the dactyl of the cheliped are set closely together subproximally, but the shape is different. In *N. trispinosum*, all teeth are large, acute and more spine-like, while in *N. papuense* n. sp. two teeth are distinctly blunt, and one proximal-most tooth is smaller. Specimens of *N. trispinosum* and *N. papuense* n. sp. of similar size have been compared, and the characteristic dorsal dactylar armature appears consistent with size-related variations. Even though the available specimens of *N. papuense* n. sp. are small, they are likely close to their adult size as they show the robust, strong condition of spines typical of adult *Neosarmatium* crabs. Also, *N. trispinosum* and its closest sister-species *N. smithi* (see Davie 1994) share a significantly elongated sixth segment of the male abdomen, that is quite different in appearance to the proportionately shorter one of *N. papuense* n. sp. This character is also consistent for equivalent sized specimens of *N. trispinosum*.

Neosarmatium bidentatum n. sp.
(Figs 3; 4)

TYPE MATERIAL. — **Indonesia**. Holotype: Ajkwa, Papua, 22.X.2001, ♂ 20.0 × 18.0 mm (QM).

Paratype: Minajerwi, Papua, 5.VIII.1999, ♂ 22.5 × 19.2 mm (MZB Cru 1539).

ETYMOLOGY. — Neuter form of the Latin *dentatus*, meaning tooth, in reference to the characteristic pair of teeth on the dorsal surface of the dactylus of the male cheliped.

HABITAT. — Burrows in firm, moist mud in mangrove forest. Present specimens were all collected from a zone about 500 m landward from the river bank.

DISTRIBUTION. — So far only known from the type locality on the south-west coast of Papua, Indonesia.

DESCRIPTION

Carapace (Fig. 3A, B) transversely subrectangular, 1.1 times broader than long, distinctly vaulted, entire surface minutely punctate, glabrous, shiny, but with well spaced, short tufts of setae over anterior half; posteriorly setae in rows along branchial ridges; gastric region well defined, cardiac region indistinct. Four distinct posterolateral branchial ridges; first curving inward from margin of second anterolateral tooth and reaching point inline with middle of orbit; second slightly longer, arising inside lateral margin; third about same length as first but not quite reaching lateral margin; fourth arising from lateral margin, sinuous, ending over coxa of last leg. Lateral margin sinuous; posterior margin straight. Front 0.5 times carapace width, moderately deflexed, with broad median concavity. Postfrontal lobes swollen, separated by deep narrow grooves; lateral lobes narrow, half width of medians. Exorbital angle acutely triangular; anterolateral margin with two blunt teeth behind exorbital angle; first tooth deeply incised, with lateral margin about twice length of exorbital tooth, without ridges on inner surface; second tooth much smaller but still distinct. Upper orbital border weakly convex, oblique, finely granular over outer half. Lower orbital border evenly, finely granular. Eyes not extending beyond exorbital tooth. Antennal and antennular basal segments adjacent, not separated by septum; basal antennular segment swollen. Antennal flagellum relatively long, almost reaching lower orbital margin; with very fine terminal setae, as long again as flagellum. Third maxillipeds (Fig. 4C) relatively slender; ischium with shallow, longitudinal, median sulcus; merus with distinct oblique, setose, submedian ridge ending near mesial margin; exopod slender, reaching to half length of outer margin of merus, flagellum long; inner margins of merus and ischium lined with long dense setae, proximal outer margin of ischium and base of exopod with dense setae.

Chelipeds (Figs 3E; 4B) equal, robust. Merus with posterior border minutely granular, without subdistal spine; inner and outer anterior borders more coarsely granular, otherwise unarmed; outer face with fine granular striations, anterior face smooth, inner face with longitudinal row of setae. Carpus

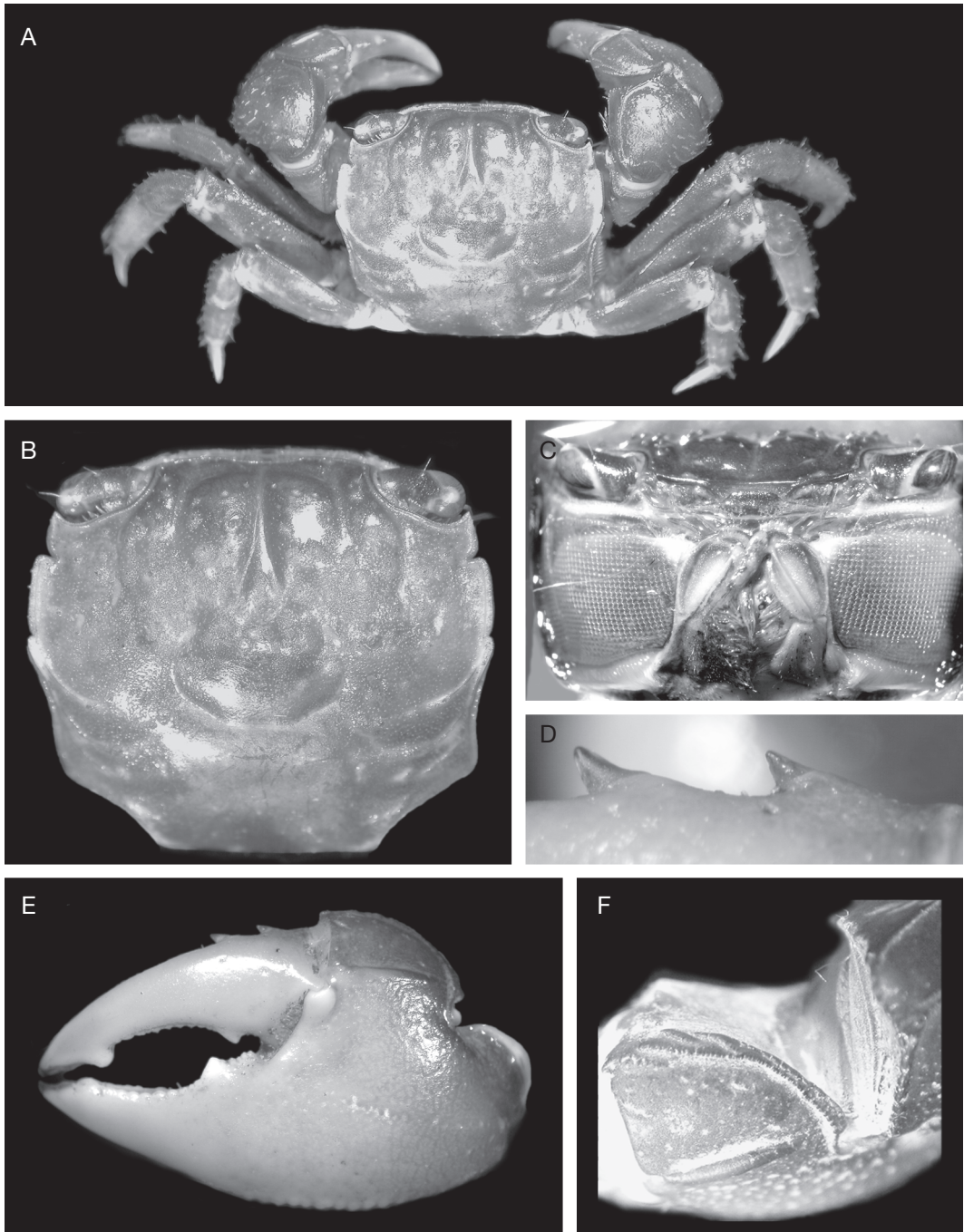


FIG. 3. — *Neosarmatium bidentatum* n. sp., holotype ♂ 20.0 × 18.0 mm, Indonesia (QM): **A**, dorsal view; **B**, carapace; **C**, frontal view; **D**, dorsal dactylar tubercles of cheliped; **E**, frontal view of chela; **F**, dorsal view of top of palm showing low granular crest on inner face.

with inner angle slightly produced, armed with a few blunt granules; inner margin unarmed, a tuft of long setae proximally on secondary ventral ridge of inner margin; a row of several larger tubercles on inner face of carpus below inner angle; outer surface with sparse striations. Palm with outer surface naked, coarsely punctate; strongly raised rounded crest extending from just above articulation of dactyl almost to superior posterior margin (Fig. 3F); a low, barely discernible medial longitudinal ridge; row of short setae on margin of gape below dactyl articulation; inner surface of palm mostly smooth, punctate, with raised tuberculate crest arising behind dactylar articulation and continuing as rounded granules onto fixed finger for about half length. Fixed finger smooth, slightly flattened on outer surface; moderately long, length of cutting edge 0.5 times length of propodus. Cutting margins of fixed finger and dactyl with larger rounded teeth subproximally and subdistally, with even row of very small teeth between. Dorsal surface of dactyl (Fig. 3D) with two inwardly directed, chitinous-spine tipped teeth on inner-side of proximal quarter; distal-most tooth placed dorsal to large subproximal tooth on cutting margin; first tooth placed halfway towards base of dactyl; otherwise dactyl smooth and rounded. Both fingers with chitinous tips; wide gape between cutting margins.

Second and third pairs of walking legs subequal, longer than others, about 1.7 times maximum carapace width. Merus of third leg 2.3 times as long as wide; anterior margin of merus with an acute subdistal spine. Meri of legs 1-3 each with faint short, transverse striae on upper surface, and sparse, small, sharp granules; merus of fourth leg smooth. Carpi of legs 1-3 each with two low ridges on outer surface, lower ridge more distinct, dorsal half with distinct covering of short setae, and small tufts of longer setae, but not completely hiding surface. Propodi similarly covered with setae on dorsal two-thirds. Carpus of third leg 2.1 times as long as wide; propodus of third leg 2.2 times longer than wide. Dactylus 0.9 times length of propodus, slightly recurved, evenly tapering, terminating acutely; two rows of short setae on outer surface.

Thoracic sternites 1-3 fused; surface scarcely setose. Sternites 3 and 4 separated by low ridge obscured by

dense setae. Abdominal cavity reaching just below low ridge separating sternites 3 and 4.

Male abdomen (Fig. 4D) moderately broad; telson evenly rounded, length 0.63 times sixth segment; sixth segment 1.1 times longer than wide, lateral margins slightly convex; segments 3-5 progressively tapering, lateral margins of segment 4 and 5 straight; lateral margins of third segment strongly convex; first and second segments similar in width to third segment, but longitudinally very narrow. Male first gonopod almost straight in ventral view, apical section abruptly narrowed, set obliquely, tip corneous. Male second gonopod very short.

REMARKS

As mentioned under *N. papuense* n. sp., *N. bidentatum* n. sp. belongs to the group of species that have very deep bodies, sinuous lateral margins with antero- and posterolateral margins distinct, and well developed, strong chitinous teeth on the dorsal surface of the dactyl of the male chela. In this group, only *N. indicum*, *N. malabaricum* and *N. punctatum* have two dorsal chitinous teeth as in *N. bidentatum* n. sp. *Neosarmatium indicum* also has a diagnostic protruding basal shelf on the outer face of the fixed finger, below the gape of the male chela, and also a different positioning of the dorsal dactylar teeth, with one dactylar tooth placed medially, and the other subproximally. Both *N. malabaricum* and *N. punctatum* differ from *N. bidentatum* n. sp. in having the inner surface of the cheliped palm with a strongly raised, protruding, granular, vertical crest. In *N. bidentatum* n. sp., however, the crest is low, not markedly enlarged or prominent, and consists of some enlarged granules. *Neosarmatium malabaricum* and *N. punctatum* also differ from *N. bidentatum* n. sp. in the positioning and size of the dactylar teeth. *Neosarmatium bidentatum* n. sp. shares in common with *N. malabaricum* and several other *Neosarmatium* species the presence of a strong longitudinal rim marking the outer edge of the upper surface of the palm of the cheliped.

Neosarmatium bidentatum n. sp. is also similar in general appearance to *N. daviei* and *N. papuense* n. sp. It differs from the latter two in having only two instead of three dorsal dactylar teeth differently

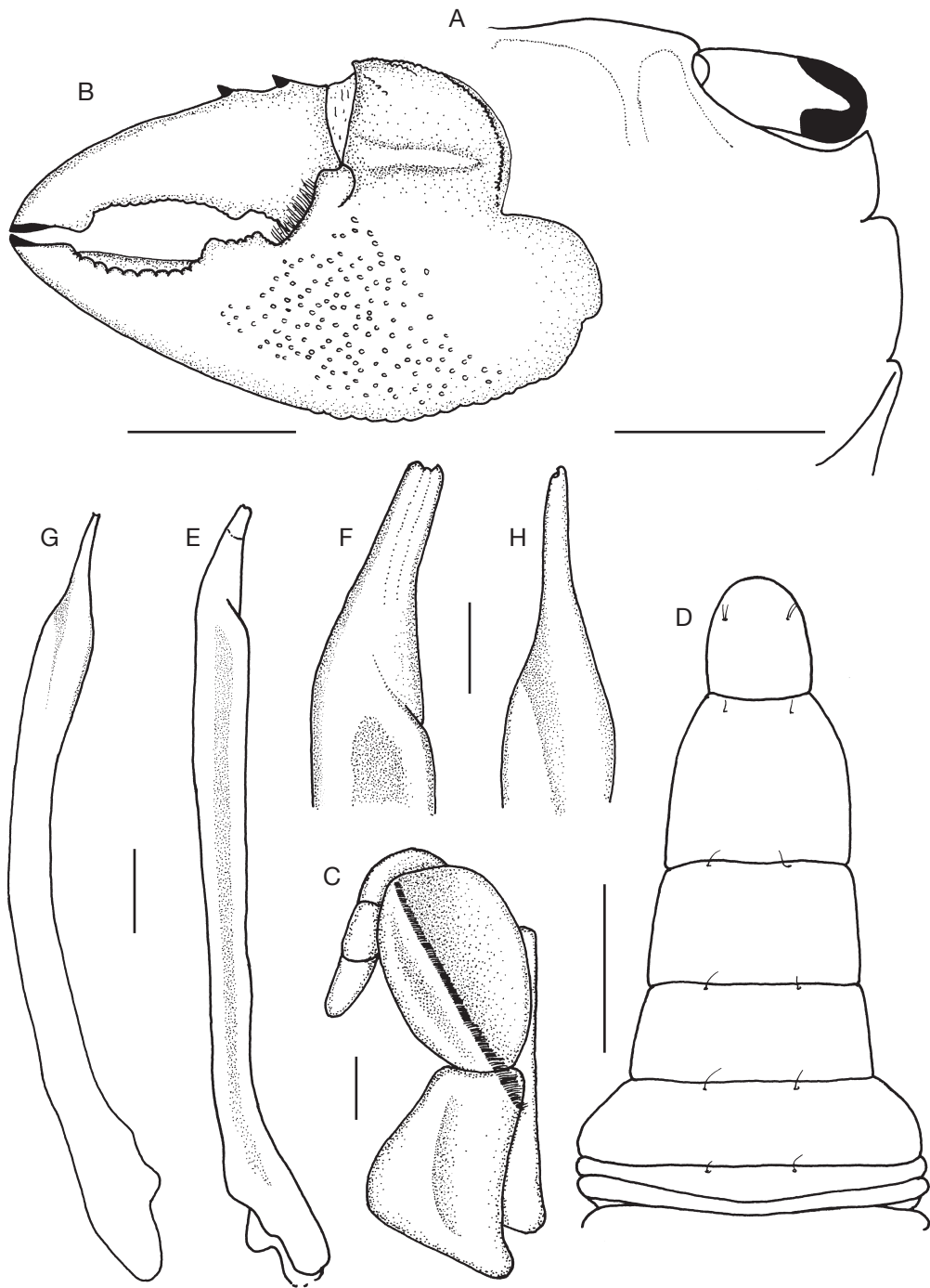


FIG. 4. — *Neosarmatium bidentatum* n. sp., paratype ♂ 20.0 × 18.0 mm, Indonesia (QM): **A**, carapace antero-lateral region; **B**, left cheliped; **C**, left third maxilliped (setae removed); **D**, abdomen; **E-H**, male left first gonopod (setae removed); **E, F**, ventral view; **G, H**, lateral view. Scale bars: A, B, D, 5 mm; C, E, G, 1 mm; F, H, 0.5 mm.

positioned; by having a more elongate sixth male abdominal segment; by having a strong longitudinal rim marking the outer edge of the upper surface of the palm of the cheliped; and by having a longer lateral margin on the first anterolateral carapace tooth. *Neosarmatium bidentatum* n. sp. differs conspicuously from *N. papuense* n. sp. by

having a strong, deeply incised first anterolateral carapace tooth. The male first gonopods of each species are also obviously different. In particular, the distal part of the male first gonopod of *N. bidentatum* n. sp. is relatively longer than that of *N. daviei*, but conversely also not as slender as that of *N. papuense* n. sp.

KEY TO THE INDO-WEST PACIFIC SPECIES OF *NEOSARMATIUM* SERÈNE & SOH, 1970
(modified from Davie 1994, and Schubart & Ng 2002)

This key relies heavily on characters from male chelae. However, the female chelae usually show the same features, albeit less obvious, and thus is also useful in identification.

1. Lateral carapace margins more or less straight, without clear antero- and posterolateral separation 2
- Lateral carapace margins more or less sinuous, antero- and posterolateral margins relatively clearly demarcated 3
2. Carapace rectangular, lateral margins weakly convergent posteriorly; anterolateral margin with a distinct tooth behind exorbital angle; dorsal margin of cheliped dactylus with 4 evenly spaced tubercles; chelipeds subequal *N. laeve*
- Carapace trapezoidal, lateral margins strongly convergent posteriorly; anterolateral margin without a tooth; dorsal margin of cheliped dactylus with 4 large submedian tubercles and row of numerous small granules along proximal margin; chelipeds distinctly unequal
..... *N. tangi*
3. Anterolateral margin entire, or if a low angular tooth behind exorbital angle then not separated by a deep notch from rest of margin (exorbital breadth subequal to length of carapace; male unknown) *N. integrum* (A. Milne-Edwards, 1873)
- Side of carapace with 1 or 2 anterolateral teeth (second often reduced to angular projection) 4
4. Dactyl of male cheliped with strong chitinous teeth on dorsal margin 5
- Dactyl of male cheliped either without strong chitinous teeth on dorsal margin, or bearing small, sharp, chitinous spinules only 13
5. Dactyl of male cheliped with 2 teeth on dorsal margin 6
- Dactyl of male cheliped with 3-5 teeth on dorsal margin 9
6. Male chela with protruding basal shelf on outer face of fixed finger below gape; 1 dactylar tooth placed medially, the other subproximally *N. indicum*
- Male chela without protruding basal shelf on outer face of fixed finger below gape 7
7. Inner surface of palm without strongly raised, granular, vertical crest (4 or 5 granules may be prominent on large males but are not raised onto a protruding crest); dorsal dactylar tubercles restricted to proximal quarter; distal-most tooth placed dorsal to large subproximal tooth on cutting margin; first tooth placed halfway towards base of dactyl
..... *N. bidentatum* n. sp.
- Inner surface of palm with a strongly raised, granular, vertical crest; dactylar tubercles otherwise positioned 8

8. Distal tooth on upper surface of dactyl placed close to middle; upper surface of palm of cheliped with strong longitudinal rim marking outer edge; carapace 1.15-1.25 times longer than wide *N. malabaricum*
 — Distal tooth on upper surface of dactyl placed clearly less than half-way to tip; longitudinal rim present on upper surface of palm of cheliped but not strongly differentiated; carapace 1.25-1.35 times longer than wide *N. punctatum*
9. Dactyl of male cheliped with 3 tubercles (one may be smaller and non-chitinous) on dorsal margin 10
 — Dactyl of male cheliped with 4 or 5 teeth on dorsal margin *N. rotundifrons*
10. Carapace distinctly vaulted, more or less rectangular (1.2-1.28 times wider than long); carapace dorsal surface almost smooth, setae present as very short, small tufts, hardly discernible; sixth segment of male abdomen not markedly elongated (much wider at base than long) 11
 — Carapace squarish (less than 1.2 times wider than long); carapace dorsal surface with prominent tufts and rows of setae; sixth segment of male abdomen markedly elongated (length equal to width) 12
11. First anterolateral carapace tooth sharply angular, prominent, anteriorly directed, separated from exorbital angle by a deep V-shaped notch; dorsal surface of dactyl typically with 3 chitinous teeth on proximal half *N. daviei*
 — First anterolateral carapace tooth low, blunt, separated from exorbital angle by broad U-shaped sulcus; dorsal surface of dactyl bearing 3 teeth on proximal third, a pair of closely-set chitinous teeth, and 1 very small, proximal, non-chitinous tooth *N. papuense* n. sp.
12. Dactylar teeth truncate, spaced evenly over proximal half *N. smithi*
 — Dactylar teeth acute, set close together over proximal two-fifths *N. trispinosum*
13. Dactyl of cheliped smooth, unarmed (walking legs relatively slender, length of merus of third walking leg 2.6-2.7 times width; male first gonopod short, with distal portion not strongly narrowing, and not much twisted) 14
 — Dactyl of cheliped armed with small, sharp, chitinous spinules 15
14. Inner angle of carpus of cheliped unarmed; inner face of palm with vertical row of granules behind gape *N. inerme*
 — Inner angle of carpus of cheliped armed with acute granular projection; inner face of palm with a patch of granules ventrally but not extending as a vertical row behind gape
 *N. spinicarpus*
15. Carapace with second anterolateral tooth weakly marked; male chela c. 1.7 times longer than high; lower margin evenly convex; dactylar spinules evenly spaced in a single row, and extending only to about half or two-thirds length of dactyl; vertical granular row on inside of chela strongly developed *N. meinerti*
 — Carapace without indication of a second anterolateral tooth; male chela c. 1.8 times longer than high; lower margin straight behind fixed finger; dactylar spinules more numerous, not confined to a single row, and extending almost to tip of dactyl; vertical granular row on inside of chela relatively lower *N. fourmanoiri*

Dedication

We dedicate this paper to Patsy A. McLaughlin, a major figure in crustacean research, but also a friend and mentor.

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independent visits to his laboratory, and also for taking the photographs presented in Figure 1. Also thanks to Alain Crosnier and Rafael Lemaitre for asking us to be a part of this special tribute volume to Patsy A. McLaughlin. The material for this study was collected during the Mangrove Invertebrate Monitoring Program of the Environmental Department of PT Freeport Indonesia, and we thank the members of the Coastal and Tailing Section for their field assistance.

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