Ceratoplax margarita n. sp., a new rhizopine crab (Crustacea: Brachyura: Pilumnidae) from Papua New Guinea, with rediagnoses of *C. truncatifrons* Rathbun, 1914, and *C. fulgida* Rathbun, 1914

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ABSTRACT
The taxonomy of two poorly known species of rhizopine crabs, *Ceratoplax truncatifrons* Rathbun, 1914, and *C. fulgida* Rathbun, 1914 (Brachyura Linnaeus, 1758: Pilumnidae Samouelle, 1819) is clarified on the basis of the type material from the Philippines. A new species, *C. margarita* n. sp., is described from Papua New Guinea. It can be distinguished from the above two species (and all congeners) by its carapace, sternal and gonopod characters.

KEY WORDS
Pilumnidae,
Ceratoplax,
Papua New Guinea,
new species.

RÉSUMÉ
Ceratoplax margarita *n. sp., un nouveau crabe rhizopine (Crustacea: Brachyura: Pilumidae) de Papouasie Nouvelle-Guinée, avec une nouvelle diagnose de* C. truncatifrons *Rathburn, 1914, et* C. fulgida *Rathburn, 1914.*
La taxonomie de deux espèces peu connues de crabes de la sous-famille des Rhizopinae Stimpson, 1858, *Ceratoplax truncatifrons* Rathbun, 1914, et *C. fulgida* Rathbun, 1914 (Brachyura Linnaeus, 1758 : Pilumnidae Samouelle, 1819) est éclaircie sur la base du matériel type des Philippines. Une espèce nouvelle, *C. margarita* n. sp., est décrite de Papouasie Nouvelle-Guinée ; elle se distingue des deux espèces précitées (et de tous ses congénères) par les caractères de la carapace, du sternum thoracique et des gonopodes.

MOTS CLÉS
Pilumnidae,
Ceratoplax,
Papouasie
Nouvelle-Guinée,
espèce nouvelle.

INTRODUCTION

During a workshop organized by Philippe Bouchet and Laure Corbari, Muséum national d'Histoire naturelle, 8-18.VI.2011 in France to sort Decapoda specimens collected from Papua New-Guinea collected by R.V. *Alis* during the BIOPAPUA cruise in September 2010, a small pilumnid crab specimen was identified as a species of the Indo-West Pacific genus *Ceratoplax* Stimpson, 1858 (type species *C. ciliata* Stimpson, 1858, from Hong Kong) (cf. Ng 1987). Serène (1968) had listed 10 species; but Ng (1987) reviewed the taxonomy of this genus, and restricted it to eight species: *Ceratoplax ciliata* (type species), *C. fulgida* Rathbun, 1914, *C. glaberrima* (Haswell, 1881) (= *Ceratoplax punctata* Baker, 1907), *C. hispida* Alcock, 1900, *C. inermis* (Haswell, 1881), *C. laevimarginata* (Yokoya, 1933), *C. lutea* (McNeill, 1929) and *C. truncatifrons* Rathbun, 1914 (see also Ng *et al.* 2008).

Of these, two species, *C. truncatifrons*, and *C. fulgida* are superficially similar and characterised by their proportionately wide carapaces (width to length ratio in excess of 1.3) that are smooth and glabrous, and with posterolateral margins that are converging (see Tesch 1918: 55). However, both species are poorly known. Rathbun (1914) only provided a brief diagnosis of *C. truncatifrons*, from the Philippines; and compared it with the closely related *C. fulgida*, also from the Philippines. Unfortunately, she did not figure both species. Tesch (1918) referred and figured specimens of *C. truncatifrons* from Indonesia, and the current understanding of this species is based mainly on this paper. The present specimen from Papua New Guinea was compared with the figures by Tesch (1918) of *C. truncatifrons*, but appear to differ with respect to their carapace shapes. In order to ascertain the identities of *C. truncatifrons*, and *C. fulgida*, the types of both species were examined and photographed.

MATERIAL AND METHODS

Specimens examined are deposited in the Muséum national d'Histoire naturelle (MNHN), Paris; Nationaal Naturhistorisches Museum (NNM), Naturalis, Leiden; and U.S. National Museum of Natural History (USNM), Smithsonian Institution, Washington D.C. The NNM collections have incorporated the material from the Zoological Museum in Amsterdam (ZMA) but are still curated separately.

Abbreviations

G1 and G2	male first and second gonopods;
coll.	collected by;
fms	fathoms;
ovig.	ovigerous;
stn	station.

Measurements

Measurements provided (in millimetres) are of the carapace width and length, respectively.

SYSTEMATICS

Family Pilumnidae Samouelle, 1819
Subfamily Rhizopinae Stimpson, 1858
Genus *Ceratoplax* Stimpson, 1858

Ceratoplax truncatifrons Rathbun, 1914
(Figs 1; 2; 4A-C)

Ceratoplax truncatifrons Rathbun, 1914: 147. — Tesch 1918: 205, pl. 12, fig. 1. — Serène 1968: 91 (list). — Ng 1987: 78, 88 (discussion). — Ng *et al.* 2008: 143 (list).

Type material. — **Holotype:** Philippines, ♂, 7.0 × 4.2 mm, (USNM 46399), stn 5206, off western Samar, Badian Island, north 27° east, 5.75 miles, 11°31'40"N, 124°42'40"E, 32 fms, coll. R.V. *Albatross*, 14.IV.1908.

Non-Type material. — 1 ♂, 5.2 × 3.3 mm, (NNM Cru D-2164), stn 193, on reef, Sanana Bay, east coast of Sula Besi, east of Sulawesi, coll. M. Webber, Siboga Expedition, 13-14.IX.1899; 1 ♂, 4.0 × 2.5 mm, 1 ♀ ovig., 3.9 × 2.4 mm, 3 ♀, 5.6 × 3.5 mm, 4.3 × 2.7 mm, 4.7 × 3.0 mm, 1 damaged ♀, (NNM-ZMA Crust De 203018), stn 193, on reef, Sanana Bay, east coast of Sula Besi, east of Sulawesi, coll. M. Webber, Siboga Expedition, 13 Sanana Bay, east coast of Sula Besi, east of Sulawesi 14.IX.1899.

Diagnosis. — Carapace transversely subovate, width 1.52-1.67 × length; dorsal surfaces smooth, glabrous, regions poorly demarcated, H-shaped gastric grooves barely discernible; anterolateral margin strongly convex, entire, reaching along ⅔ of lateral margin, submarginal parts smooth, not clearly demarcated from posterolateral margin; posterolateral margins almost straight, gradually converging to gently convex posterior carapace margin (Figs 1A; 2A-C). Frontal margin weakly divided into two low subtruncate lobes from dorsal view, gently confluent with supraorbital margin; with low external orbital tooth (Figs 1A, B; 2A-C). Orbit ovate, small, eyes with small cornea, fused to carapace, immovable (Fig. 1B). Posterior margin of epistome gently convex, not clearly divided into lobes (Fig. 1B). Anteroexternal angle of merus of third maxilliped strongly, acutely auriculiform; exopod stout (Fig. 4C). Male thoracic sternum wide, sternites 1 and 2 completely fused to form wide triangular structure; separated from fused sternites 3 and 4 by distinct sinuous or gently concave (towards buccal cavity) suture (Figs 1C; 2D, E). Male abdomen T-shaped; somite 6 rectangular, distinctly wider than long; telson triangular, longer than somite 6 (Figs 1C; 2D, E). Chelipeds stout, carpus with subdentiform inner angle and tuft of setae, outer angle sharp but not spiniform or dentiform; chela stout, fingers shorter than palm (Figs 1A, D, E; 2A-C). Ambulatory legs, long; articles slender, unarmed; dactylus of last leg upcurved (Fig. 2A, C). G1 distinctly sinuous, subdistal part hump-like with slender tapering tip that is prominently bent, opening large (Fig. 4A, B).

Type locality. — Western Samar, Badian Island, Philippines.

Distribution. — Known only from the type locality and Sulawesi.

Remarks

The series of specimens from Sulawesi are smaller than the holotype male but agree in all the key carapace, third maxilliped, thoracic sternal and ambulatory leg characters of *C. truncatifrons*. The G1 of the smaller male (4.0 × 2.5 mm, NNM-ZMA Crust De 203018) is similar in shape to the holotype except it is slightly more bent, but is otherwise identical.

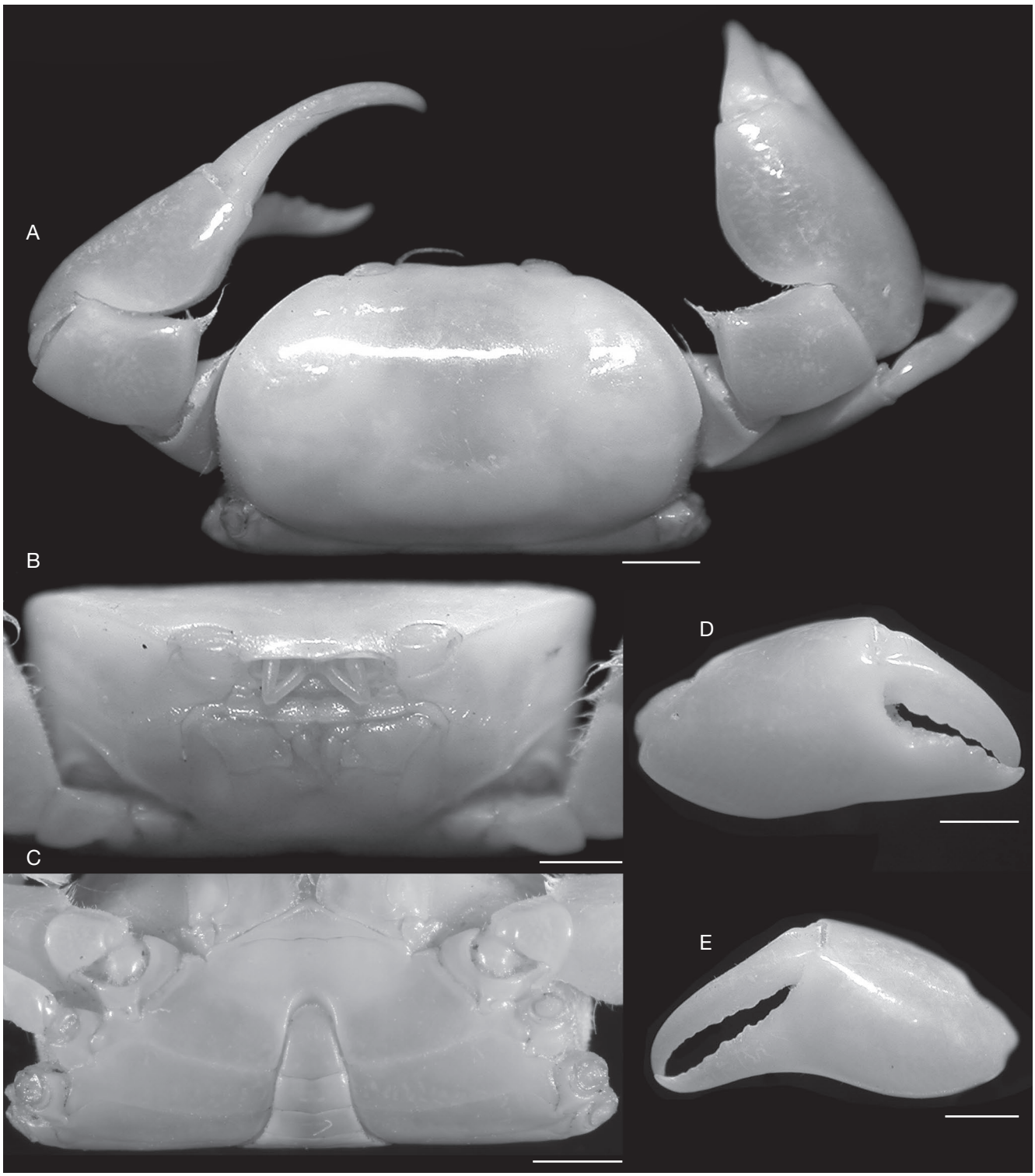

FIG. 1. — *Ceratoplax truncatifrons* Rathbun, 1914, holotype ♂, 7.0 × 4.2 mm, (USNM 46399), Philippines: **A**, overall dorsal view; **B**, frontal view of carapace; **C**, anterior thoracic sternum and abdomen; **D**, outer view of right chela; **E**, outer view of left chela. Scale bars: 1.0 mm.

The carapace proportions of this species increase with size, and smaller specimens have reduced carapace width to length ratios. The general shape of the carapace, however, remains almost the same (Fig. 2A-C). See discussion for *Ceratoplax margarita* n. sp.

Ceratoplax fulgida Rathbun, 1914
(Figs 3; 4D-I)

Ceratoplax fulgida Rathbun, 1914: 146. — Tesch 1918: 55 (key); Serène 1968: 91 (list). — Ng 1987: 78, 88 (discussion). — Ng *et al.* 2008: 143 (list).

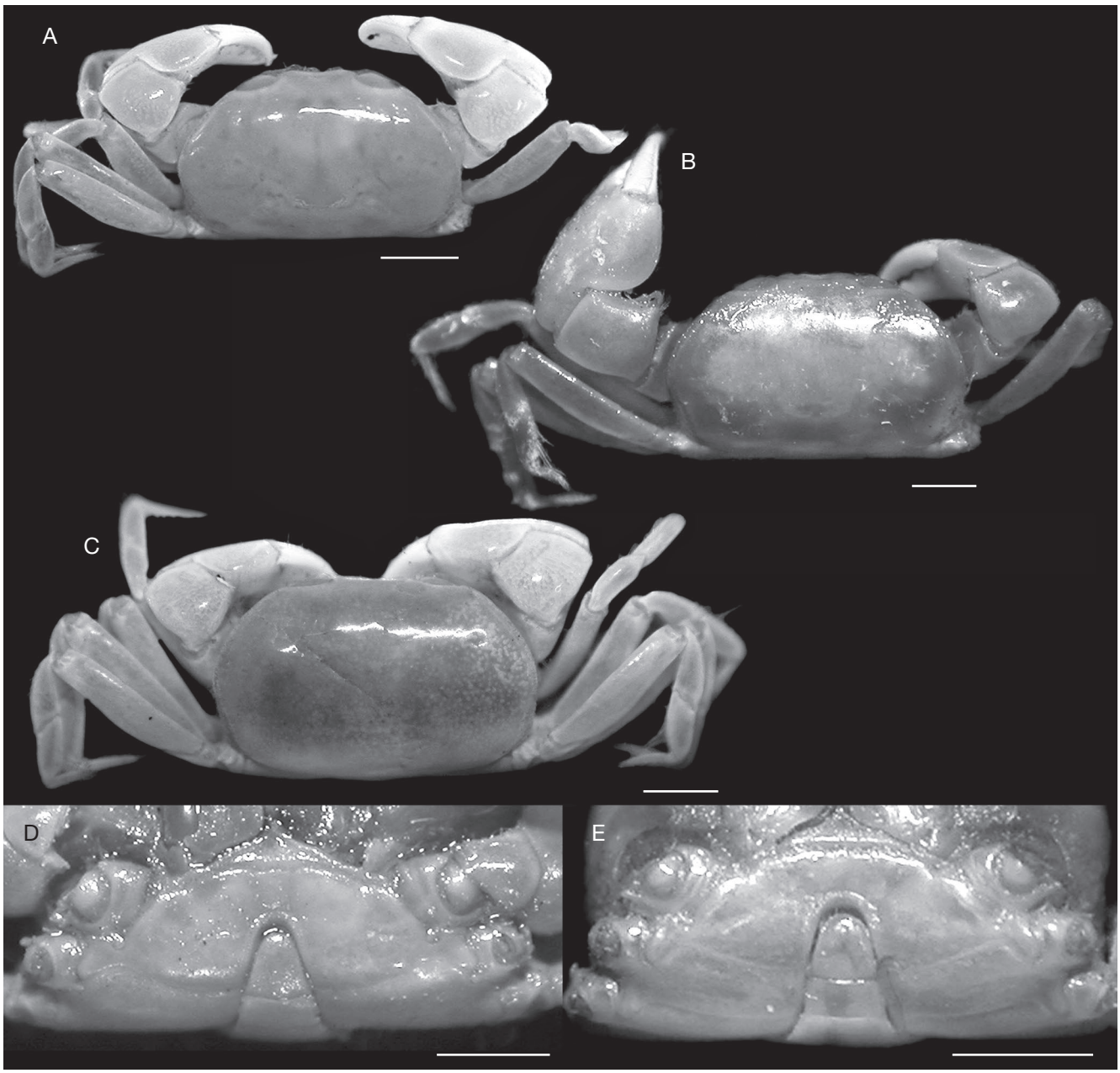

Fig. 2. — *Ceratoplax truncatifrons* Rathbun, 1914: **A**, **E**, ♂, 4.0 × 2.5 mm, (NNM-ZMA Crust De 203018), Indonesia; **B**, **D**, ♂, 5.2 × 3.3 mm, (NNM Cru D-2164), Indonesia; **C**, ♀, 5.6 × 3.5 mm, (NNM-ZMA Crust De 203018), Indonesia. **A**-**C**, overall dorsal views; **D**, **E**, anterior thoracic sternums and abdomens. Scale bars: 1.0 mm.

Type material. — **Holotype**: Near Marinduque Island, ♂, 7.1 × 4.3 mm, (USNM 46401). **Paratype**: 1 ♀, 6.3 × 4.1 mm, (USNM 46401), stn 5371, near Marinduque Island: Tayabas Light (outer), north 43° west, 6 miles, 13°49'40"N, 121°40'15"E, 83 fms, coll. R.V. *Albatross*, 24.II.1909.

Diagnosis. — Carapace transversely subovate, width 1.54-1.65 × length; dorsal surfaces smooth, glabrous, regions poorly demarcated, H-shaped gastric grooves barely discernible; anterolateral margin strongly convex, entire to weakly dentate with three small clefts, reaching along ⅔ of lateral margin, submarginal parts smooth, not clearly demarcated from posterolateral margin; posterolateral margins gently concave, gradually converging to gently convex posterior carapace margin (Figs 3A; 4H, I). Frontal margin weakly divided into two low subtruncate lobes from dorsal view, gently confluent with supraorbital margin; with low external orbital tooth (Figs 3A; 4H, I). Orbit ovate, small, eyes with small cornea, fused to carapace, immovable (Fig. 3B). Posterior margin of epistome gently convex, not clearly divided into lobes (Fig. 3B). Anteroexternal angle of merus of third maxilliped with rounded auriculiform structure; exopod stout (Fig. 4G). Male thoracic sternum wide, sternites 1 and 2 completely fused to form wide triangular structure; separated from fused sternites 3 and 4 by distinct sinuous suture (Fig. 3C). Male abdomen T-shaped; somite 6 rectangular, wider than long; telson triangular, elongate, much longer than somite 6 (Fig. 3C). Chelipeds stout, carpus with subdentiform inner angle and tuft of setae, outer angle sharp but not spiniform or dentiform; chela stout, fingers shorter than palm (Fig. 3A, D, E). Ambulatory legs, long; articles slender, unarmed; dactylus of last leg upcurved (Fig. 3A). G1 distinctly sinuous, subdistal part gently merging with tapering tip that is gently bent, opening slender (Fig. 4D-F).

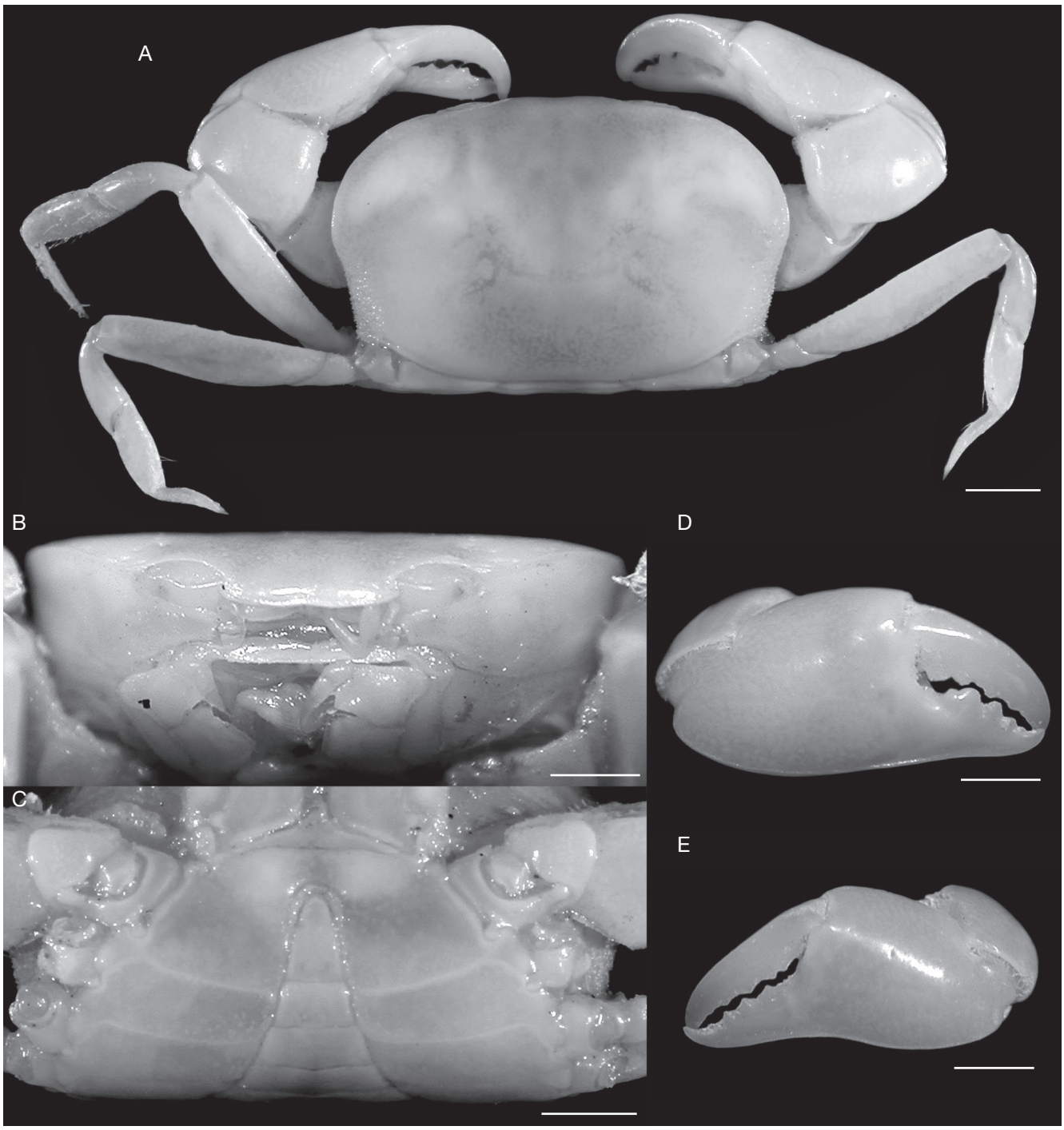

Fig. 3. — *Ceratoplax fulgida* Rathbun, 1914, holotype ♂, 7.1 × 4.3 mm (USNM 46401), Philippines: **A**, overall dorsal view; **B**, frontal view of carapace; **C**, anterior thoracic sternum and abdomen; **D**, outer view of right chela; **E**, outer view of left chela. Scale bars: 1.0 mm.

Type locality. — Tayabas Light (outer), near Marinduque Island, north 43° west, 6 miles, 13°49'40"N, 121°40'15"E.

Distribution. — Known only from the type locality.

Remarks

The type series for this species (and the only known specimens) is represented by a male and a female, but it is by no means certain both are conspecific. Although the female paratype specimen looks similar to the male holotype, its anterolateral margin has small clefts marking four low and broad lobes (Fig. 4I). In the holotype male, the anterolateral margin is entire (Figs 3A; 4H). Whether this is mere variation can only be ascertained with more material. See discussion for *Ceratoplax margarita* n. sp.

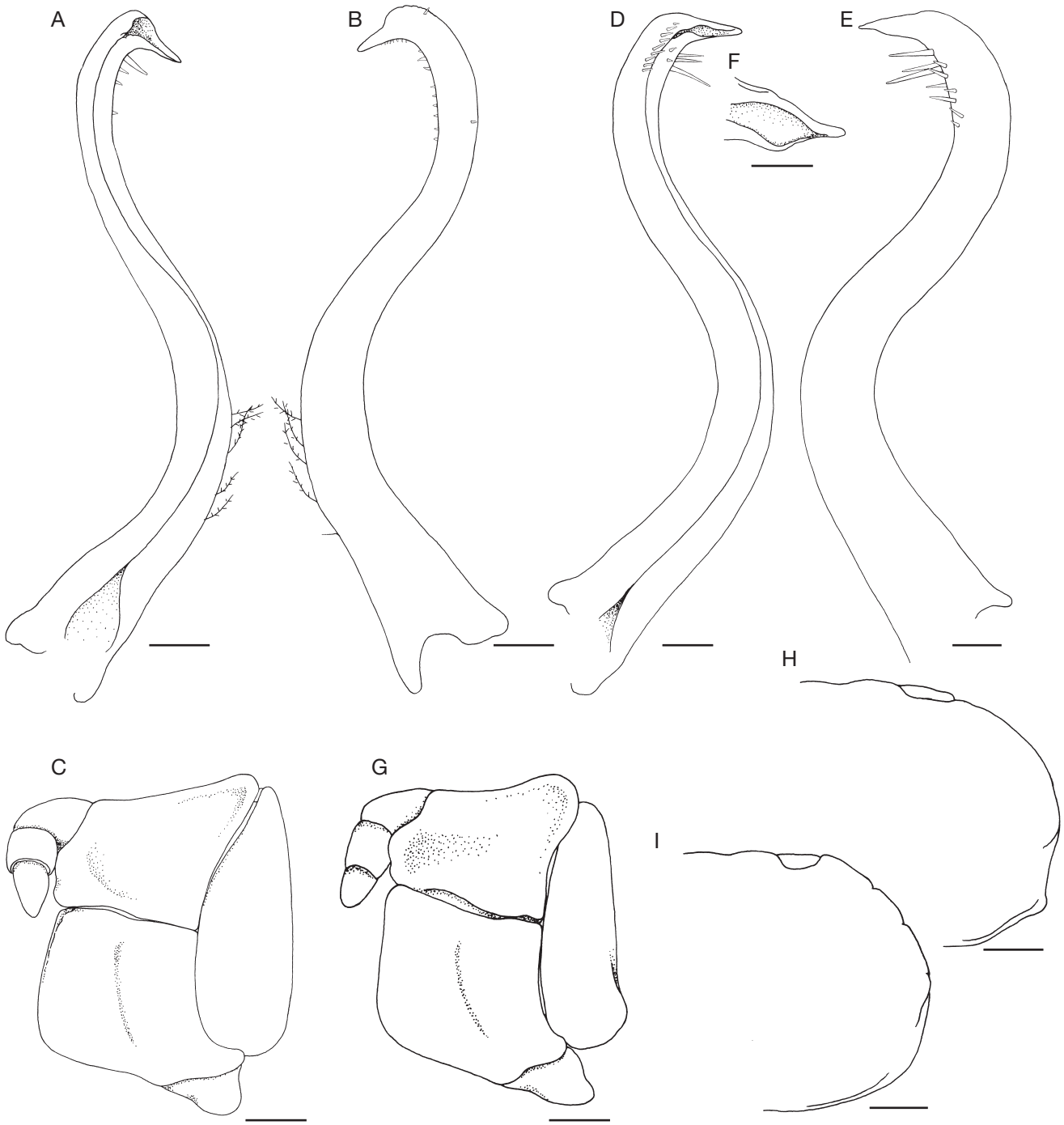

FIG. 4. — **A**-**C**, *Ceratoplax truncatifrons* Rathbun, 1914, holotype ♂, 7.0 × 4.2 mm, (USNM 46399), Philippines; **D**-**H**, *Ceratoplax fulgida* Rathbun, 1914, holotype ♂, 7.1 × 4.3 mm, (USNM 46401), Philippines; **I**, *Ceratoplax fulgida*, paratype ♀, 6.3 × 4.2 mm, (USNM 46401), Philippines; **A**, **D**, ventral views of left G1s; **B**, **E**, dorsal views of left G1s; **F**, ventral view of tip of left G1; **C**, **G**, left third maxillipeds (setae denuded); **H**, **I**, right side of carapace. Scale bars: A, B, D, E, 0.1 mm; C, G, 0.2 mm; F, 0.05 mm; H, I, 0.5 mm.

Ceratoplax margarita n. sp.
(Figs 5; 6)

TYPE MATERIAL. — **Holotype**: Papua New Guinea, ♂, 7.9 × 5.2 mm (MNHN-IU-2014-10126), stn DW3663, Open Bay, 04°50'S, 151°39'E, 220-292 m, 23.IX.2010, Cruise BIOPAPUA, R.V. *Alis*, coll. S. Samadi & L. Corbari.

ETYMOLOGY. — The Latin name, *margarita*, name alludes to the white, pearl-like appearance of the species. The name is used as a noun in apposition.

DIAGNOSIS. — Carapace transversely subovate, width 1.52 × length; dorsal surfaces smooth, glabrous, regions poorly demarcated, H-shaped gastric grooves barely discernible; anterolateral margin strongly convex, entire to weakly dentate with three small clefts, reaching along ⅔ of lateral margin, submarginal parts smooth,

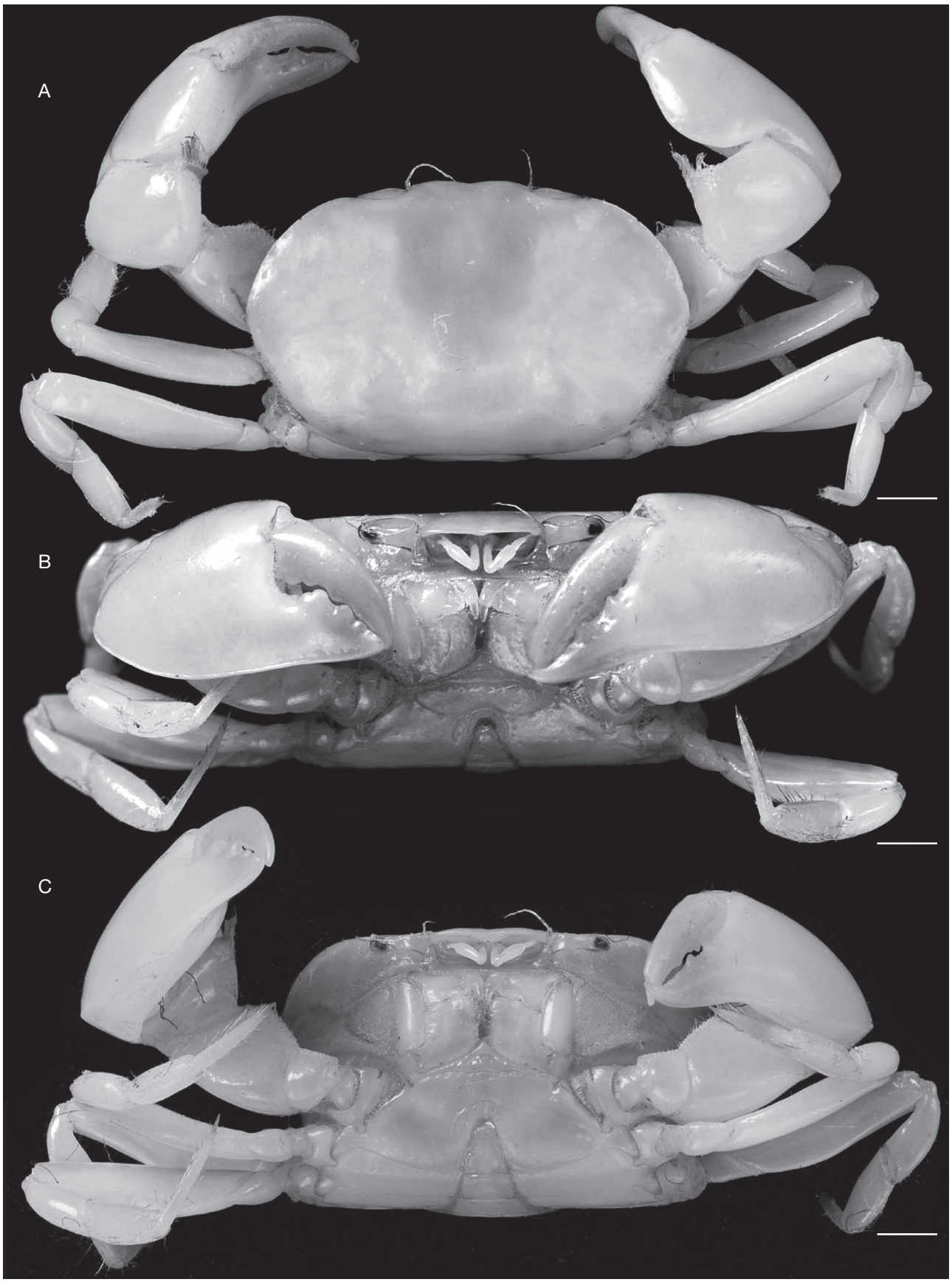

FIG. 5. — *Ceratoplax margarita* n. sp., holotype ♂, 7.9 × 5.2 mm (MNHN-IU-2014-10126), Papua New Guinea: **A**, overall dorsal view; **B**, frontal view of carapace and chelae; **C**, anterior thoracic sternum and abdomen. Scale bars: 1.0 mm.

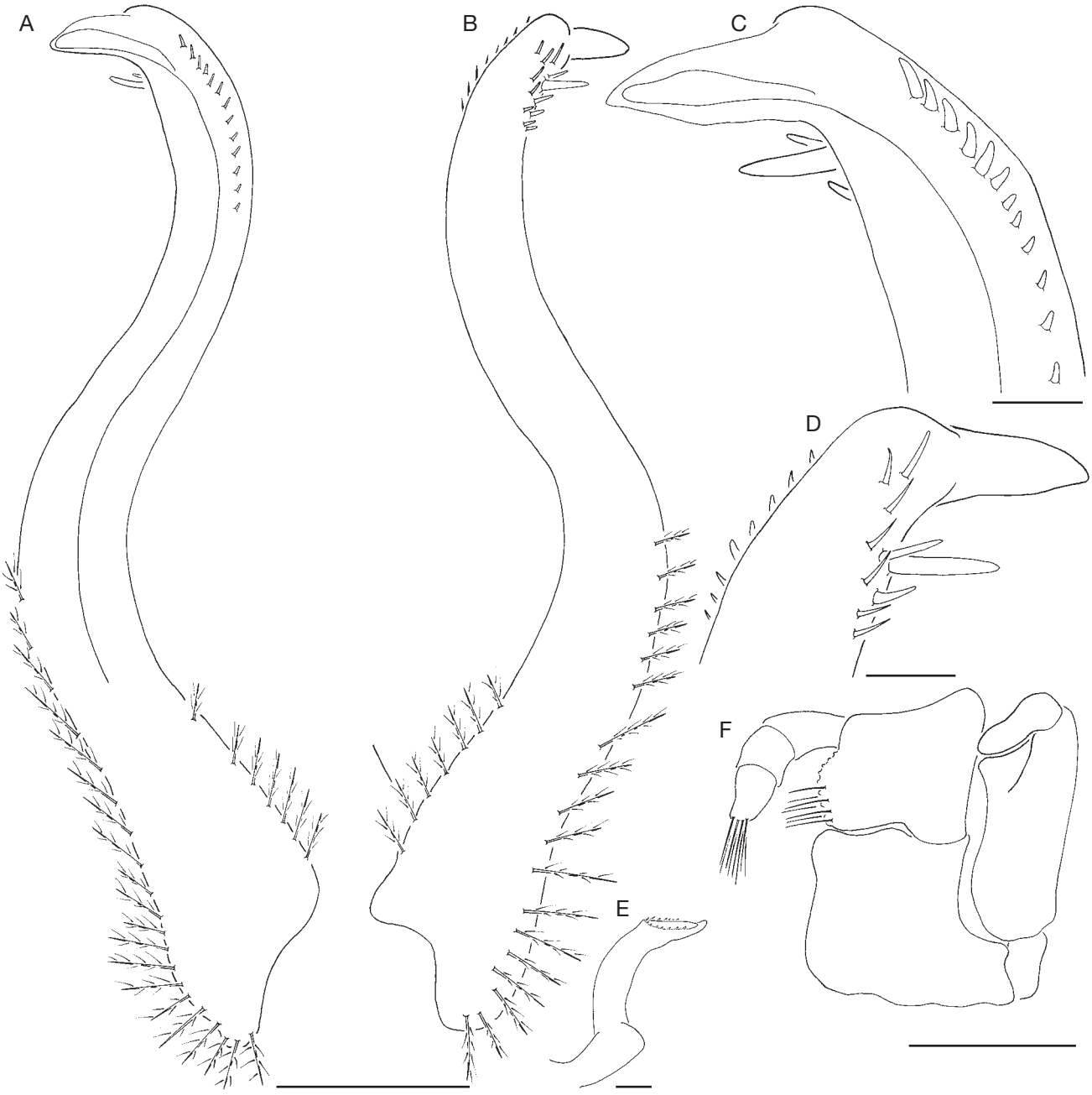

FIG. 6. — *Ceratoplax margarita* n. sp., holotype ♂, 7.9 × 5.2 mm (MNHN-IU-2014-10126), Papua New Guinea: **A**, ventral view of right G1; **B**, dorsal view of right G1; **C**, ventral view of distal part of right G1; **D**, dorsal view of distal part of right G1; **E**, right G2; **F**, left third maxilliped (setae not drawn). Scale bars: A, B, 0.5 m; C-E, 0.1 mm; F, 1.0 mm.

not clearly demarcated from posterolateral margin; posterolateral margins gently concave, converging to gently convex posterior carapace margin (Fig. 5A). Frontal margin weakly divided into two low subtruncate lobes from dorsal view, gently confluent with supraorbital margin; with low external orbital tooth (Fig. 5A). Orbit ovate, small, eyes with small cornea, fused to carapace, immovable (Fig. 5B). Posterior margin of epistome gently convex, not clearly divided into lobes (Fig. 5B). Anteroexternal angle of merus of third maxilliped with auriculiform structure; exopod stout (Fig. 6F). Male thoracic sternum wide, sternites 1 and 2 completely fused to form wide triangular structure; separated from fused sternites 3 and 4 by distinct sinuous suture (Fig. 5C). Male abdomen T-shaped; somite 6 rectangular, wider than long; telson triangular, elongate, much longer than somite 6 (Fig. 5C). Chelipeds stout, carpus with subdentiform inner angle and tuft of setae, outer angle sharp but not spiniform or dentiform; chela stout, fingers shorter than palm (Fig. 5A, B). Ambulatory legs, long; articles slender, unarmed; dactylus of last leg upcurved (Fig. 5A). G1 distinctly sinuous, subdistal part hump-like with tapering tip which is gently bent, opening slender (Fig. 6A-D).

TYPE LOCALITY. — Open Bay, 04°50'S, 151°39'E, Papua New Guinea.

DISTRIBUTION. — Known only from the type locality.

Remarks

There are many superficial similarities between *Ceratoplax margarita* n. sp., *C. truncatifrons* and *C. fulgida*. The series of specimens of *C. truncatifrons* from Indonesia show that the diagnostic characters of this species are quite consistent, notably in the general shape of the carapace (Figs 1; 2). Although the proportions change, being relatively broader in larger specimens (e.g., Figs 1A; 2C), the shape remains unchanged. The structure of the thoracic sternums is also quite consistent, although the male telsons are slightly more elongate in the larger males (Fig. 1C) compared to the more evenly triangular ones in smaller ones (Fig. 2D, E). In *C. fulgida*, the anterolateral margin may appear to be entire (Figs 3A; 4H) or weakly dentate (Fig. 4I).

Ceratoplax margarita n. sp. can be distinguished from *C. truncatifrons* and *C. fulgida* in having its posterolateral margin more distinctly converging towards the posterior carapace margin (Fig. 5A) (weakly converging in the other two species; Figs 1A; 2A-C; 3A). In addition, the anteroexternal angle of the merus of the third maxilliped of *C. margarita* n. sp. is auriculiform (Fig. 6F), resembling that of *C. fulgida* (Fig. 4G) but different from *C. truncatifrons* that has the anteroexternal angle prominently elongate (Fig. 4C). The sternoabdominal cavity of *C. margarita* n. sp. reaches to the median part of fused thoracic sternite 3 and 4, at an imaginary line connecting bases of coxae of chelipeds (Fig. 5C) (like in *C. truncatifrons*, Figs 1C; 2D, E) but in *C. fulgida*, it reaches up to two-thirds of fused thoracic sternites 3 and 4, to an imaginary line connecting midpoints of bases of cheliped coxae (Fig. 3C). The G1 of *C. margarita* n. sp. is relatively stout (Fig. 6A, B), but is distinctly more slender in *C. truncatifrons* (Fig. 4A, B). In stoutness, the G1 of *C. margarita* n. sp. looks more like that of *C. fulgida* but has a small hump on the dorso-subdistal part (Fig. 6A-D) (vs margin gently curved without any hump, Fig. 4D, E).

Acknowledgements

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