

First record and a new species of *Euphosynoplax* (Crustacea: Pseudorhombilidae) from the southwestern Atlantic

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Abstract. A new species of deep-water brachyuran crab, *Euphosynoplax dincao*, from southeastern Brazil is described and illustrated. The genus *Euphosynoplax* currently consists of two species, *E. clausa* Guinot, 1969, and *E. campechiensis* Vázquez-Bader & Gracia, 1991, both only known from the Gulf of Mexico. The new species can be easily separated from its northern counterparts by a suite of carapace and appendage characters. *Euphosynoplax campechiensis* is recorded for the first time from the Caribbean Sea (Guadeloupe and between Saint Kitts and Nevis).

Keywords. Taxonomy; Biodiversity; Brazil; Gulf of Mexico; Caribbean Sea; Deep-water.

INTRODUCTION

Euphosynoplax Guinot, 1969, was established as a monotypic genus for *E. clausa* Guinot, 1969, from Dry Tortugas, Gulf coast of Florida. More than two decades elapsed before a second species of the genus was described, namely *E. campechiensis* Vázquez-Bader & Gracia, 1991, also from the Gulf of Mexico. The genus currently consists of the above mentioned two species, both only known from the Gulf coasts (Vázquez-Bader & Gracia, 1991; Ng *et al.*, 2008; Felder *et al.*, 2009).

Euphosynoplax is now expanded to encompass a new species from much farther south, off the coast of southeastern Brazil. The new species is the first record of *Euphosynoplax* from the southwestern Atlantic Ocean.

MATERIAL AND METHODS

The studied specimens are deposited either in the collections of the MZUSP (Museu de Zoologia, Universidade de São Paulo, Brazil) or USNM (National Museum of Natural History, Smithsonian Institution, Washington D.C.). Abbreviations used include: carapace length (cl), taken from the front to the posterior margin of the carapace; carapace width (cw), taken at the level of the third anterolateral tooth of the carapace; P1 cheliped; P2-P5, pereopods 2 to 5; G1, G2, first and second gono-

pod, respectively; stn, station; coll., collected by; F/V, fishing vessel; R/V, research vessel; don., donated by. Dates are written in the format day.month.year, with months in lower-case Roman numerals.

RESULTS

Taxonomic account

Euphosynoplax Guinot, 1969

Type species: *Euphosynoplax clausa* Guinot, 1969, fixed by original designation and monotypy. Gender feminine.

Type locality: Florida, Dry Tortugas, 91 m.

Included species: *Euphosynoplax campechiensis* Vázquez-Bader & Gracia, 1991, *Euphosynoplax clausa* Guinot, 1969, and *Euphosynoplax dincao* sp. nov.

Euphosynoplax dincao sp. nov. (Figs. 1A-E; 2A, B; 3A, D, F)

Type material: Brazil: holotype male, cl 48.5 mm, cw 54 mm (MZUSP 25998), F/V "Daniela Moura I", stn 21, 27°45'07.2"S/47°47'13.2"W, off the coast of Florianópolis, Santa Catarina, 19.iv.2008, bot-

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tom tangle net, 123 m. 1 ovigerous female paratype cl 22.8 mm, cw 31 mm (MZUSP 41475), same data as holotype.

Comparative material: *Euphosynoplax clausa*: USA: holotype male, cl 24 mm, cw 33 mm (USNM 65938), Gulf of Mexico, Florida Keys, Dry Tortugas, south of Loggerhead Key, Tortugas Expedition Carnegie Laboratory, 24°40'12.0"N/81°34'48.0"W, W.L. Schmitt coll. 07.viii.1931, 91 m. 1 female (USNM 250197), Gulf of Mexico, R/V "Success", stn 23, from 29°44'55"N/87°11'53"W to 29°48'58"N/87°02'35"W, F. Hubbard coll. 19.iv.1989. *Euphosynoplax campechiensis*: USA: 1 male (USNM 298320), northern part of Gulf of Mexico, R/V "Oregon II", Cruise 210, stn 74, summer 1994. Caribbean Sea: 1 male (USNM 267608), between Saint Kitts and Nevis, R/V "Oregon II", stn 10843, 17°06'00.0"N/62°31'48.0"W, U.S. Fish and Wildlife Service coll. 08.xii.1969, 589 m. 1 female (MZUSP 29592), Guadeloupe, Mission ORSTOM-IRPM-SMCB, stn C32, west coast of Basse Terre, 16°21.34'N/61°49.14'W, G. Leblond and J. Poupin coll. iv.1993, 350 m [J. Poupin don.].

Description of the holotype: Carapace (Fig. 1A-C; 2A, B) distinctly wider than long, maximal width at third anterolateral tooth, coarsely granular near anterolateral margins and frontal region, finely granulated posteriorly, central parts of carapace scarcely granulated. Carapace regions well marked. Ventrally, granulation neatly more distinct on suborbital, subhepatic, pterygostomial and branchiostegal regions. Pterygostomial region granular near dehiscense line and near mxp3. Branchiostegal region granular, pubescent. Fronto-orbital width little less than half of maximal width of carapace; frontal margin V-shape clefted medially; frontal margin coarsely crenulated; region behind frontal margin coarsely tuberculated. Supraorbital margin coarsely crenulated, interrupted by 2 distinct notches. Inner supraorbital tooth separated from front by wide, smooth, shallow gap; tooth broad triangular, coarsely tuberculated, blunt. Outer supraorbital tooth lobe-like, coarsely tuberculated. Suborbital margin lined with large tubercles, mesially with triangular, coarsely tuberculated tooth directed toward front, laterally with rounded lobe, V-shape notch between suborbital lateral lobe and outer orbital tooth. Anterolateral margin projecting in 4 coarsely tubercular teeth (outer or-



Figure 1. (A-E) *Euphosynoplax dincao* sp. nov., holotype male, cl 48.5 mm, cw 54 mm (MZUSP 25998). (A, B) Habitus in dorsal and ventral view, respectively. (C) Anterior cephalothorax. Legs cropped electronically. (D, E) Right and left chelipeds, respectively, in lateral view. Scales: 15 mm.

bital excluded), increasing in size posteriorly from first to third tooth. First tooth straight, blunt; second largest, broad triangular, blunt, slightly curved forward; third curved forward; fourth spiniform. Gap between anterolateral teeth 2-3 distinctly wider than between teeth 1-2, 3-4. Posterolateral

margin well defined, rather straight behind last anterolateral tooth, distinctly longer than anterolateral margin. Limit between epistome, endostome well defined, forming pronounced, sinuous lip, interrupted by 2 V-shaped notches, one at each side of shallow mesial notch.

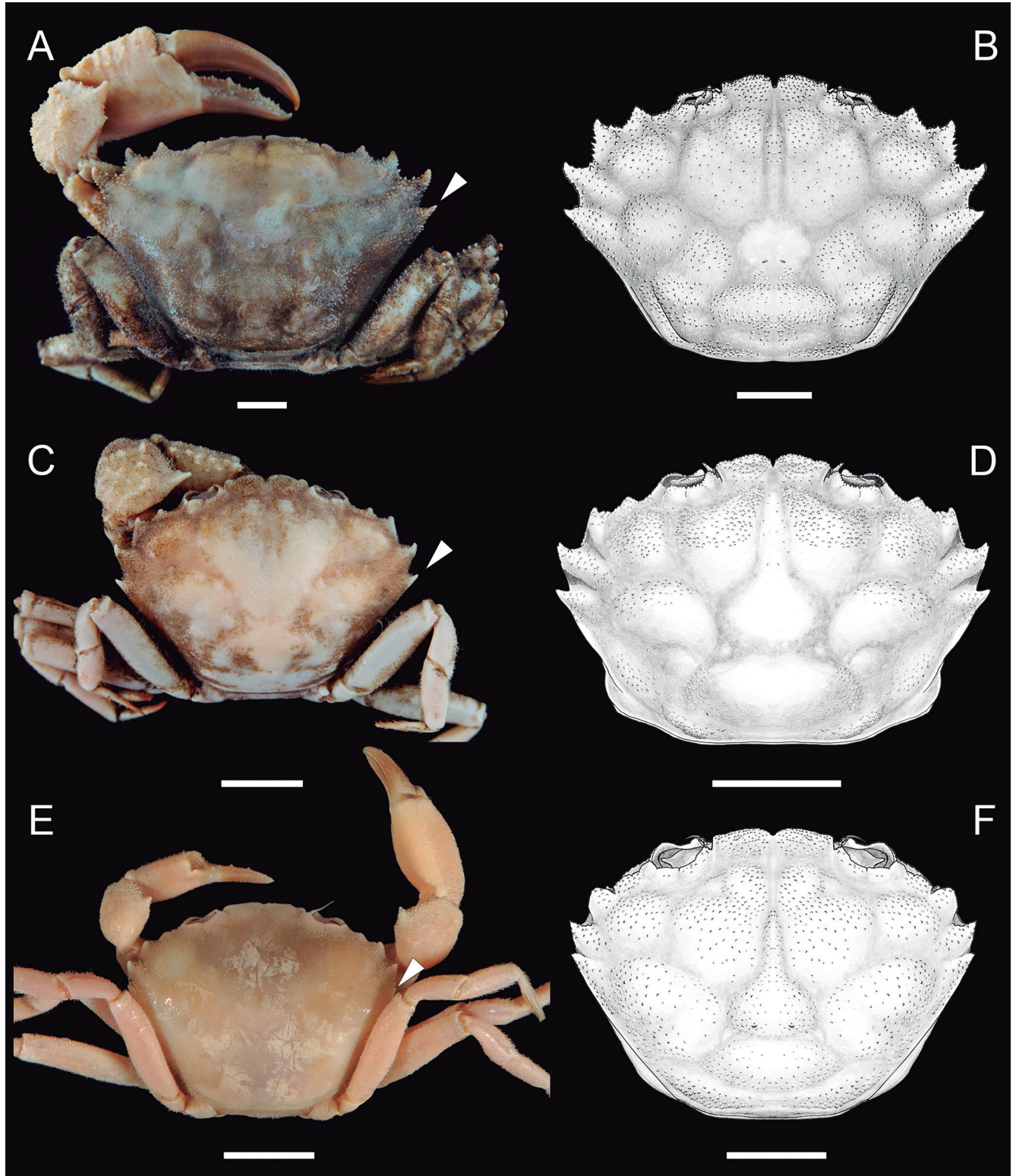


Figure 2. (A-F) Habitus and carapace in dorsal view. (A, B) *Euphosynoplax dincao* sp. nov., holotype male, cl 48.5 mm, cw 54 mm (MZUSP 25998). (C, D) *Euphosynoplax campechiensis* Vázquez-Bader & Gracia, 1991, male, cl 24 mm, cw 32 mm (USNM 267608). (E, F) *Euphosynoplax clausa* Guinot, 1969, male, cl 11 mm, cw 21 mm (USNM 250197). Arrows indicate the last (fourth) anterolateral carapace tooth. Note in (B) area behind the supraorbital margin distinctly granular and devoid of granules in (C, D). Pubescence not represented behind the supraorbital margin in (D). Note in (F) carapace appearing almost smooth to unaided eyes but provided with minute granules. Scales: 10 mm.

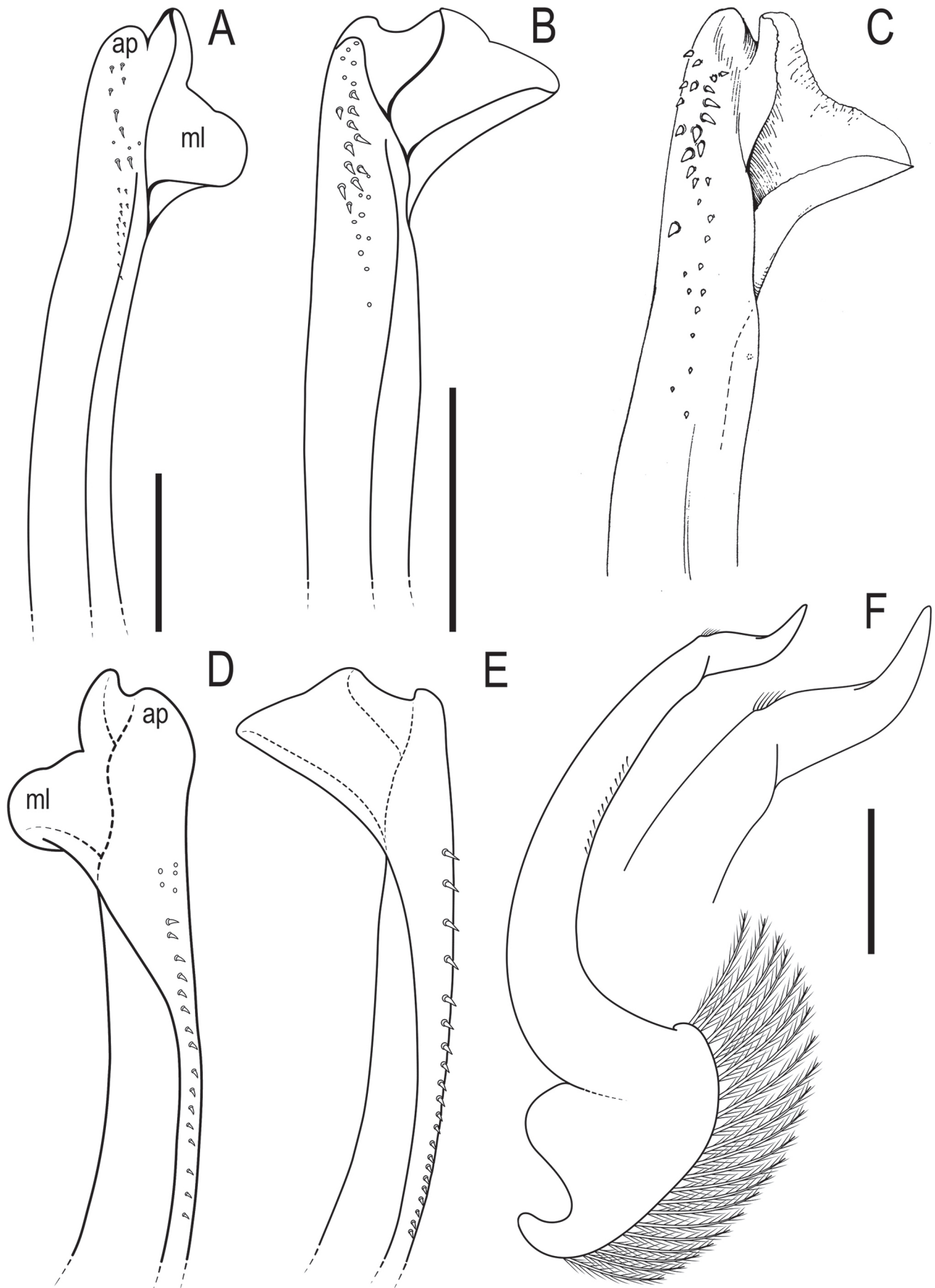


Figure 3. (A-E) First male gonopod in lateral (A-C) and mesial view (D, E). F, Second male gonopod in mesial view. (A, B, F) *Euphrosynoplax dincao* **sp. nov.**, holotype, cl 48.5 mm, cw 54 mm (MZUSP 25998). (B, E) *Euphrosynoplax campechiensis* Vázquez-Bader & Gracia, 1991, cl 22 mm, cw 31 mm (USNM 298320). (C) *Euphrosynoplax clausa* Guinot, 1969, holotype, cl 24 mm, cw 33 mm (USNM 65938) after Guinot (1969: 715, fig. 127). ap, apical lobe. ml, mesial lobe. Scales: 1 mm.

Ocular peduncle (Fig. 1C) coarsely granular dorsally, freely movable, thick, fully retractable into large orbital cavity; cornea occupying little less than one-third of whole eye, brownish, ommatidia well recognizable.

Antennules prominent; basal article thickest laterally, with transverse row of coarse granules; second article smooth, elongate, subcylindrical, articulated to basal article at mesial end of antennular fossa; third article nearly equal in length to second, swollen distally, tapered to proximal articulation with second article, terminally with long stiff setae.

Antennal article 2+3 immovable, filling orbital gap between strong, acute, inner orbital tooth and front; articles 4, 5 freely movable, subcylindrical. Thoracic sternum densely, evenly granular; lateral margins of sternites 2 to 4 coarsely granular. Sterno-pleonal cavity remarkably deep at level of sternites 4 to 6, pilose, smooth anteriorly, lateral margins granular. Pleonal locking system functional, thoracic sternal button small, directed forward, placed about mid-length between thoracic sternal sutures 4/5 and 5/6.

Third maxillipeds (exopod included) (Fig. 1B, C) densely, evenly granular, granules larger near margins; palp finely granular.

Chelipeds heterochelous (Fig. 1D, E), left P1 strongest. Merus of major P1 trigonal, dorsal margin with row of spiny tubercles; lateral and ventral surfaces evenly covered with minute granules, and few scattered larger tubercles. Carpus with strong, blunt spine on inner margin; surfaces coarsely tubercular, tubercles of different sizes, spiny. Propodus stout, surfaces minutely granular. Fingers massive, gently curved inward, closing terminally only; cutting edges bluntly dentate, teeth of different sizes. Minor cheliped similar to major cheliped except for its less stout propodus and slender fingers.

Ambulatory legs (Fig. 1A, B), pubescent, rather massive, similar to each other. Meri of P2-P5 spinulose dorsally and ventrally, granular laterally and mesially. Carpi of P2-P5 coarsely granular dorsally, otherwise smooth. Propodi of P2-P4 with scattered granular proximally; P5 propodus scattered granular dorsally. Dactyli of P2-P5 corneous-tipped, dorsal, ventral, lateral and mesial sides each with 2 longitudinal rows of long setae.

Pleon of 4 pleonites and telson. Pleonites 1-2 markedly shorter, coarsely granular, pubescent. Pleonite 1 slightly broader than pleonite 2. Pleonites 3-5 fused together; third coarsely granular proximally only, expanded lat-

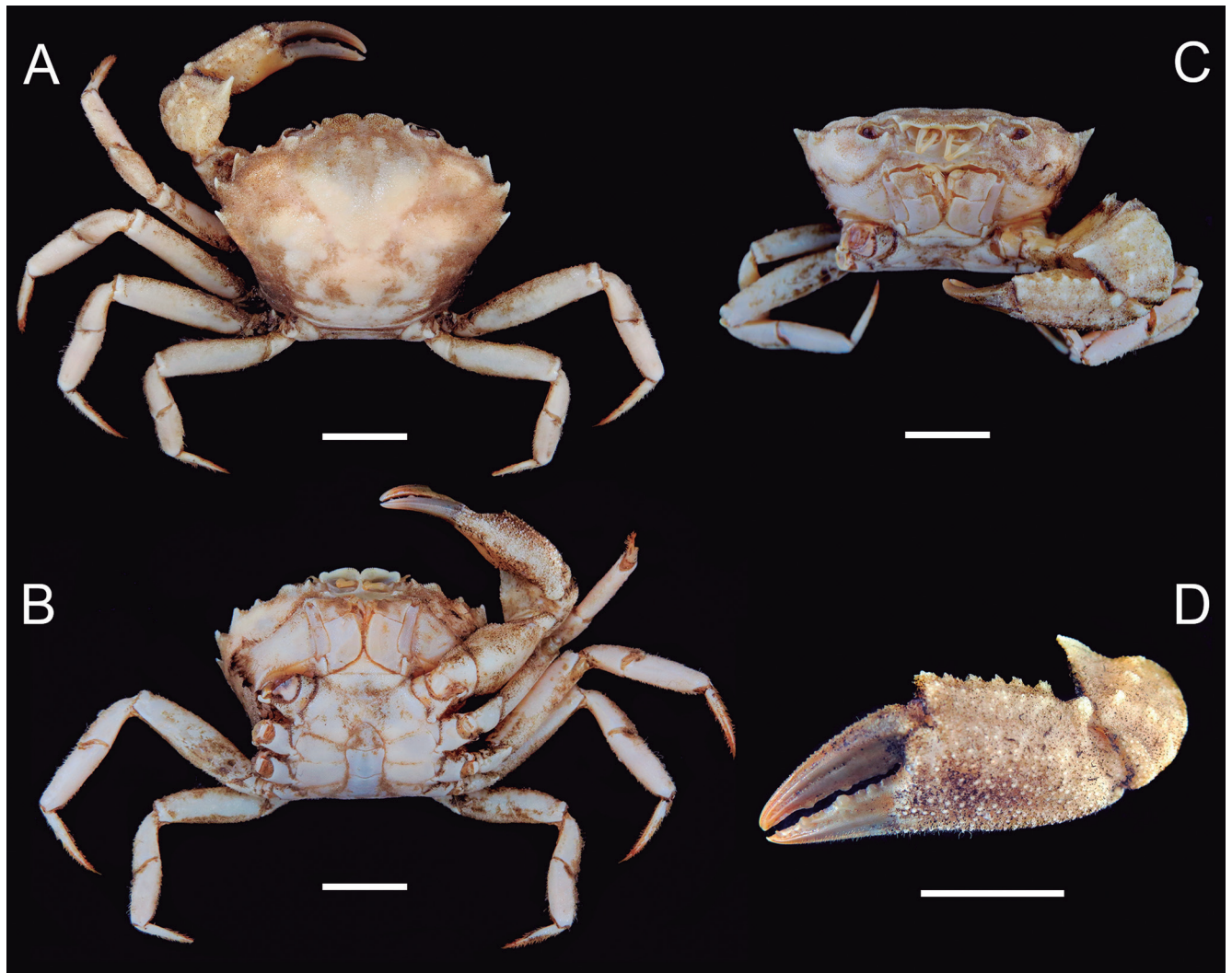


Figure 4. (A, D) *Euphrosynoplax campechiensis* Vázquez-Bader & Gracia, 1991, male, cl 24 mm, cw 32 mm (USNM 267608). (A, B) Habitus in dorsal and ventral view, respectively. (C) Anterior cephalothorax. (D) Left cheliped in lateral view. Scales: 10 mm.

erally, covering penis. Pleonites 4-6 and telson rather smooth. Pleonal suture 3/4 faint, still recognizable laterally; sutures 4/5 and 5/6 indistinct. Pleonite 6 expanded anterolaterally. Telson semicircular.

G1 (Fig. 3A, D) curved towards inside sterno-pleonal cavity, slightly overreaching thoracic sternal suture 4/5; distal end with V-shaped, large lobe on sternal side. G2 (Fig. 3F) very short, about 1/4 of the length of G1, strongly curved, tapering distally, ending in acute tip.

Female paratype resembling male, although much smaller. Pleon of 6 free, narrow pleonites and telson. Pleonites 1 to 5 of about same width and length; sixth pleonite almost twice as long previous pleonites. The paratype female carried numerous small eggs.

Etymology: We take great pleasure in naming this **new species** after our esteemed colleague and friend Fernando D’Incao (1947-2016), carcinologist and oceanographer at Universidade Federal do Rio Grande, Brazil. The specific name is used as a name in apposition.

Remarks: *Euphosynoplax* consists so far of two species, both currently known from the Gulf of Mexico, namely *E. clausa* and *E. campechiensis* (Guinot, 1969; Vázquez-Bader & Gracia, 1991; Felder *et al.*, 2009).

Euphosynoplax campechiensis is herein recorded for the first time from the Caribbean Sea (Guadeloupe and between Saint Kitts and Nevis- see above under material examined).

Euphosynoplax dincao **sp. nov.** (Fig. 1A-E; 2A, B; 3A, D, F) can be easily distinguished from the above two species in that the distal end of the male P5 merus falls short of the last (fourth) anterolateral carapace tooth or reaches to the base of the tooth at most, whereas in the northern counterparts the distal end of the male P5 merus extends almost to the tip of the last anterolateral carapace tooth (Fig. 2A-F). The three species also differ in the shape of the mesial lobe and development of the apical lobe of the G1 (Fig. 3A-E).

The **new species** is morphologically closer to *E. campechiensis* (Fig. 2C, D; 3B, E; 4A-D) of which it further differs in having the anterolateral teeth and anterolateral, pterygostomial and branchiostegal regions much more densely and coarsely tuberculated; the carapace front prominently protruded in ventral view (vs front distinctly less protruded in ventral view in *E. campechiensis*); and the area behind the supraorbital margin distinctly granular, devoid of tiny pubescence (vs area behind the supraorbital margin devoid of granules and with tiny pubescence in *E. campechiensis*).

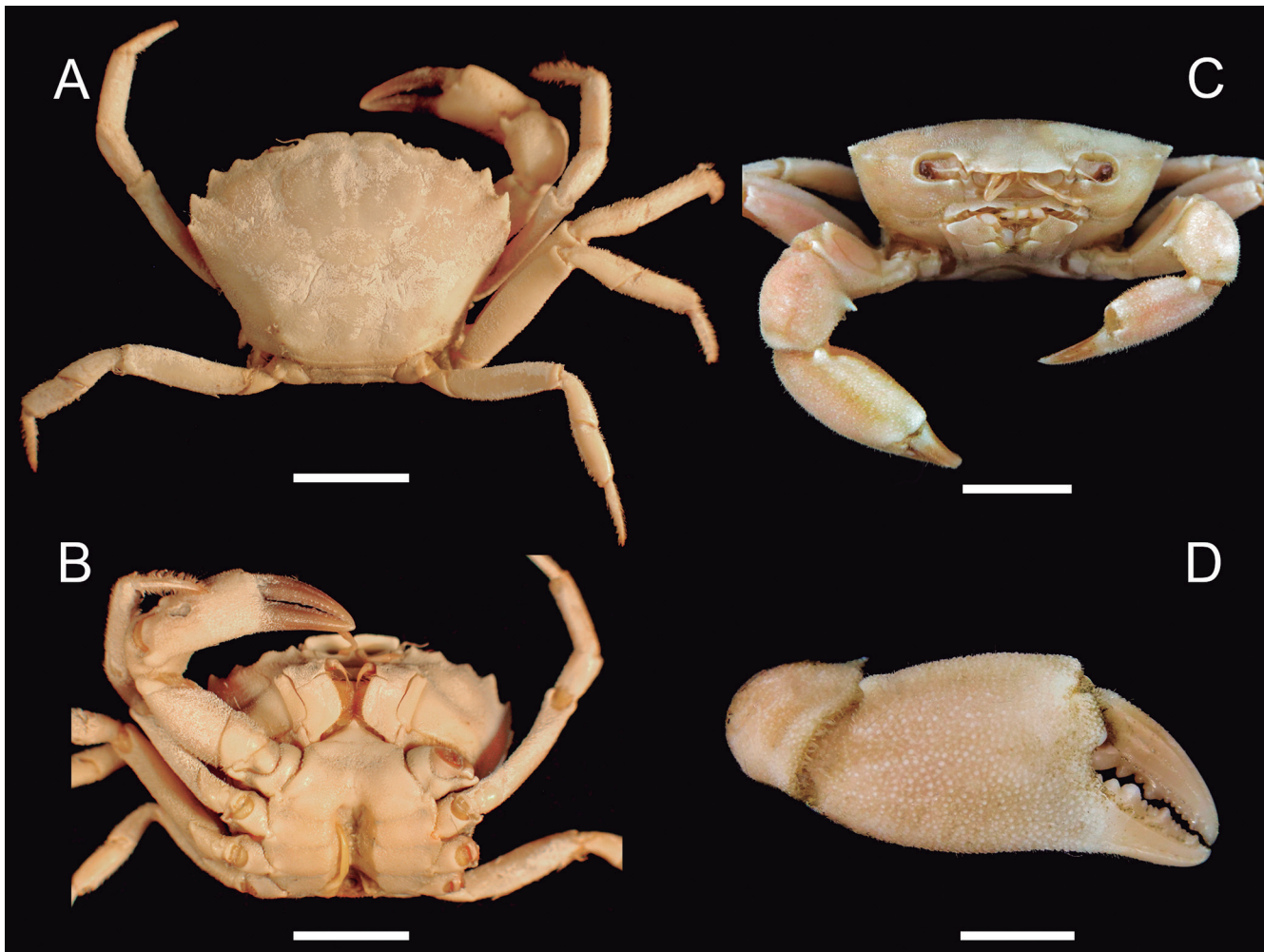


Figure 5. (A, D) *Euphosynoplax clausa* Guinot, 1969. (A, B) Habitus, dorsal and ventral view, respectively, holotype male, cl 24 mm, cw 33 mm (USNM 65938). (C, D) Anterior cephalothorax and right cheliped in lateral view, male, cl 11 mm, cw 21 mm (USNM 250197). Scales: A-C, 10 mm; D, 0.5 mm.

Euphosynoplax dincao sp. nov. additionally stands apart from *E. clausa* (Fig. 2E-F; 3C; 5A-D) in having the carapace and appendages unevenly tubercular with tubercles of different sizes (vs carapace and appendages more evenly and finely granular); carapace regions well marked (vs carapace regions faintly marked in *E. clausa*); last (fourth) anterolateral tooth large and more laterally directed (vs last carapace tooth much smaller and more forward directed in *E. clausa*); orbits, almost completely filled by the ocular peduncle, orbital cavity smooth (vs orbits distinctly larger than the ocular peduncle, upper region inside the orbital cavity granular in *E. clausa*); and the frontal margin, bilobed, V-shaped incised, each lobe with a lateral prominence (vs frontal margin much less prominent, U-shaped incised, each lobe only gently prominent laterally in *E. clausa*).

The north-south disjunct distribution pattern of *Euphosynoplax* is highly comparable to those of other moderately deep-water decapods, such as *Eumunida*, *Neopilumnoplax*, *Robertsella*, *Speocarcinus* and *Trichopeltarion* (Brandão *et al.*, 2010, 2012; Tavares & Melo 2005, 2010; Tavares & Gouvea, 2013; Tavares & Lima 2019). Such distribution gaps may well be only the result of poor distributional information and detectability, as exemplified by the deep-water genus *Chaceon*, whose fragmented distribution of some of its southwestern Atlantic representatives has been slowly filled as a result of the intensification of deep-water commercial fishing and detection facilitated by the species' large size (Manning & Holthuis, 1989; Manning *et al.*, 1989; Tavares & Pinheiro, 2011).

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AUTHOR'S CONTRIBUTIONS

Both authors contributed equally to this manuscript.

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