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A new genus and new species of crab of the family Xanthidae MacLeay, 1838 (Crustacea: Decapoda: Brachyura) from the southwestern Gulf of Mexico

Ana Rosa Vázquez–Bader and Adolfo Gracia

(ARVB), (AG) Instituto de Ciencias del Mar y Limnología, UNAM, Apdo. Postal 70-305, México, D.F., 04510, Mexico, e-mail: ana_rosav@yahoo.com.mx; gracia@mar.icmyl.unam.mx

Abstract.—A new genus and new species belonging to the Euxanthinae subfamily, *Batodaeus adanad,* are described from the southwestern part of the Gulf of Mexico. Whereas the new genus is similar to *Monodaeus* Guinot, 1967 in the carapace ornamentation and shape of pereopods, it differs in the structure of the abdomen and male telson, sternoabdominal cavity, and shape and ornamentation of the first gonopod.

Resumen.—Se describe un nuevo género y una nueva especie perteneciente a la subfamilia Euxanthinae, para el suroeste del Golfo de México. Este género nuevo es similar a *Monodaeus* Guinot, 1967, en la ornamentación del caparazón y forma de los pereopodos; sin embargo, difiere de éste en la forma y tamaño del abdomen, telson y cavidad esterno-abdominal, así como en la estructura de los apéndices sexuales.

In the course of deep-water biodiversity surveys in the Cayo Arcas and west side of Triangulos in the southwestern part of the Gulf of Mexico, specimens of an unusual species of xanthid crab were obtained. Although superficially similar to species of *Monodaeus* Guinot, 1967, they possess several atypical features that suggest otherwise. They are here described as a new genus and new species.

Material and Methods

Specimens were collected in 1998 during surveys investigating the marine fauna in the deep southwestern Gulf of Mexico, cruise BATO (Biota de los Arrecifes, de la Plataforma y Talud continental en el noroeste del Banco de Campeche), carried out on board the R/V *Justo Sierra* by the Instituto de Ciencias del Mar y Limnología, UNAM. The samples were caught using a semicommercial otter trawl.

The material was deposited in the reference collection of the Instituto de Biología, UNAM (CNCR). Measurements listed are in millimeters (mm): total carapace length (CL) and carapace width (CW).

Batodaeus, new genus

Diagnosis.—Carapace subhexagonal, broader than long; dorsal surface convex and granulated. Regions in male well demarcated especially in the anterior half, front strongly deflexed; inner orbital teeth conspicuous; thoracic sternum relatively narrow. Anterolateral margins armed with 4 teeth (excluding outer orbital tooth), subequal in size to posterolateral margins; posterior margin of epistome triangular, median part depressed, with distinct median fissure, and a pair of shallow but clearly visible lateral notches; preorbital and postorbital lobes conspicuous, granulated. Incomplete endostomial ridges present. Basal antennal segment long, subcylindrical, almost touching front, not filling space between front and inner orbital teeth; a small gap between basal antennal segment and suborbital mar-

gin. Third maxillipeds not filling buccal cavity; merus with deep, rounded depression near mesial margin. A longitudinal tuberculated ridge just below suture separating subhepatic and subterygostomian regions. Pereopods 2–5 long, slender, with conspicuous spines on upper margin of merus and carpus. Sternoabdominal cavity relatively narrow and deep; thoracic sternite 4 with median part slightly raised, with short longitudinal furrow. Abdomen long, completely covering sternoabdominal cavity. Second abdominal segment in each sex not reaching coxae of fifth pereopod, leaving a small portion of sternite 8 visible. Sternite 7 covering part of penis groove on sternite 8. First gonopod slender, slightly incurved; a row of spines on mesial margin. Second gonopod very short, sigmoid, terminal process curved with short setae on distal end.

Type species.—*Batodaeus adanad,* new species, by present designation.

Gender.—Masculine.

Etymology.—The name is a combination of Bato, the name of the cruise during which it was collected, and "daeus" to indicate its similarity with the genus *Monodaeus.*

Remarks.—The taxonomic position of *Batodaeus* is uncertain. Although the specimens studied here share some characteristics with the subfamily Actaeinae in having sternite 4 with a longitudinal furrow and the male abdomen with locking mechanism on sternite 5, they also share some features with the Xanthinae in having the carapace with four teeth and with thoracic sternite 4 being rather long (see Serène, 1984). In fact, *Batodaeus* more closely resembles the euxanthinid genus *Monodaeus* Guinot, 1967 in the following characters: regions of the carapace well demarcated; hepatic region inflated; presence of four anterolateral teeth; surface of carapace with several strong granules; basal antennal segment just touching the front; anterior border of buccal cavity with a conspicuous crest; third maxillipeds not completely closing buccal cavity and merus with prominent distolateral angle; and thoracic sternite 4 with a median longitudinal furrow. However, the carapace of *Batodaeus* is more convex and the regions are less well demarcated and with acute spines, particularly on the hepatic region; the posterolateral margins are subequal in length to the anterolateral; the front is more advanced, with a deep sulcus; the preorbital lobe is conspicuous; the sternoabdominal cavity is relatively deeper and narrower; thoracic sternite 4 has a shallow but distinct longitudinal median furrow; the abdomen is relatively narrow and longer; and the first male gonopod is long, slender and slightly incurved with few spines, not setose or stout as in *Monodaeus.*

The bathymetric and geographic distribution of these two genera is also different. *Monodaeus* (type species *Xantho couchii* Bell, 1851) at present contains eight species: *M. arnaudi* Guinot & Macpherson, 1988; *M. couchii* (Bell, 1851); *M. cristulatus* Guinot & Macpherson, 1988; *M. guinotae* Forest, 1972; *M. pettersoni* Garth, 1985; *M. rectifrons* (Crosnier, 1967); *M. rouxi* (Capart, 1851); and *M. tuberculidens* (Rathbun, 1911). They all occur in the Western Indian Ocean, the Eastern Atlantic, the Mediterranean Sea and the Eastern Pacific, from 20 to 500 meters. *Batodaeus adanad,* however, was collected in the Western Atlantic at depths from 160 to 250 m.

In comparison with *Medaeops* Guinot, 1967 (only known from the Indo-West Pacific), *Batodaeus* has a carapace which has the regions less inflated, the merus of third maxilliped with a prominent distolateral angle; the pereopods are more slender and longer, the thoracic sternum is not flat; and the first male gonopod lacks setae. It differs from the superficially similar Indo-West Pacific genus *Alainodaeus* Davie, 1992 in having a carapace which is subhexagonal, not ovoid; a straight frontal margin; a rounded telson (triangular in *Alainodaeus*) and an almost straight first male gonopod.

Batodaeus, for the moment, is tentatively

placed in the Euxanthinae, as it seems to fit there considering the primary character of the subfamily stated by Serène (1984): the form of the anterolateral margin which has the anterior part gradually sloping downwards via subhepatic region to meet the infraorbital margin. The similarity to *Monodaeus* confirms that it can be placed as Euxanthinae, even though the subfamily is now poorly defined.

Batodaeus adanad, new species
Figs. 1–4

Material examined.—Holotype: 1 ♂ CNCR (21023), 16.6 mm × 23.2 mm; Sta. 9, 22°17.19′N, 91°43.08′W (Banco de Campeche, off Cayo Arenas), 251 m, 23 May 1999. Allotype: 1 ♀ CNCR (22509), 11.8 mm × 16.6 mm, Sta. 9, 22°17.19′N, 91°43.08′W (Banco de Campeche, off Cayo Arenas), 251 m, 23 May 1999. Paratype: 1 ♀ CNCR (21024), 12.1 mm × 17.6 mm, off Sta. 8, 22°13.72′N, 91°46.64′W (Banco de Campeche, off Cayo Arenas), 162 m, 23 May 1999.

Description.—Carapace (Fig. 1A) subhexagonal, about 1.4 to 1.5 times broader than long; dorsal surface convex, granulated, granules coarse, more abundant on anterolateral and posterolateral margins, with sparse short setae on frontal, hepatic and protogastric regions. Regions in male well demarcated, especially in the anterior half; orbital region with small, acute spines; hepatic region inflated, with 3–4 rows of spines; a depression between cardiac and gastric region; meso and urogastric regions less granulated; front straight, strongly deflexed; margin dentate, at most ¾ as long as CW, separated from protogastric region by a long transverse furrow. Deep notch between frontal and preorbital lobes, the latter strongly granulated. Anterolateral margins armed with 4 teeth (excluding the outer orbital), first small, with margins granulated, second and third longest, subequal in size, spinose and directed anteriorly, fourth bigger than first, with borders and base granulated. Posterolateral and posterior margins of carapace almost straight, granulated. Pterygostomian region (Figs. 2A, 4C) densely granulated, with a longitudinal, spinose crest just below suture that divides subhepatic and pterygostomian regions; pterygostomian ridges present, marked with small tubercles.

Orbits ¾ as wide as front, separated from it by a deep, long notch, borders conspicuously dentate; 2 large sutures on supraorbital region; preorbital and postorbital lobes dentate. An acute granulated tooth on infraorbital angle. Eyestalks completely fitting in orbits when retracted, with 4 sharp spinules and stiff setae.

Antennules (Figs. 2A, 4C) with basal segment considerably inflated, and with a longitudinal crest of small granules; penultimate and ultimate segments slender.

Basal antennal segment subcylindrical, with 4 sharp spinules; second to fourth segments mobile, longer than broad; flagellum long.

Ischium of third maxilliped (Fig. 2B) longer than broad; outer surface with median longitudinal furrow. Merus subquadrate, outer surface coarsely granulated, mesial margin dentate, setose; distolateral angle ending in a semiacute lobe, directed anteriorly. Palp marginally setose. Exopod reaching to tip of distolateral angle of merus.

Left cheliped shorter than right and more spinose (Figs. 4A–B); merus granulose, upper and lower margins delimited by a row of strong, acute, inward spines; outer surface of carpus spinose, inner margin armed proximally with strong acute spine curving inwards, junction between carpus and chelae fringed with setae, inner surface densely granulated. Palm of long chela with 3 upper rows of acute spines directed inwards, diminishing in number and size towards lower margin, inner surface slightly punctate. Dactylus about as long as palm; fingers leaving small gap when closed, each terminating in inwardly curved corneous claw; movable

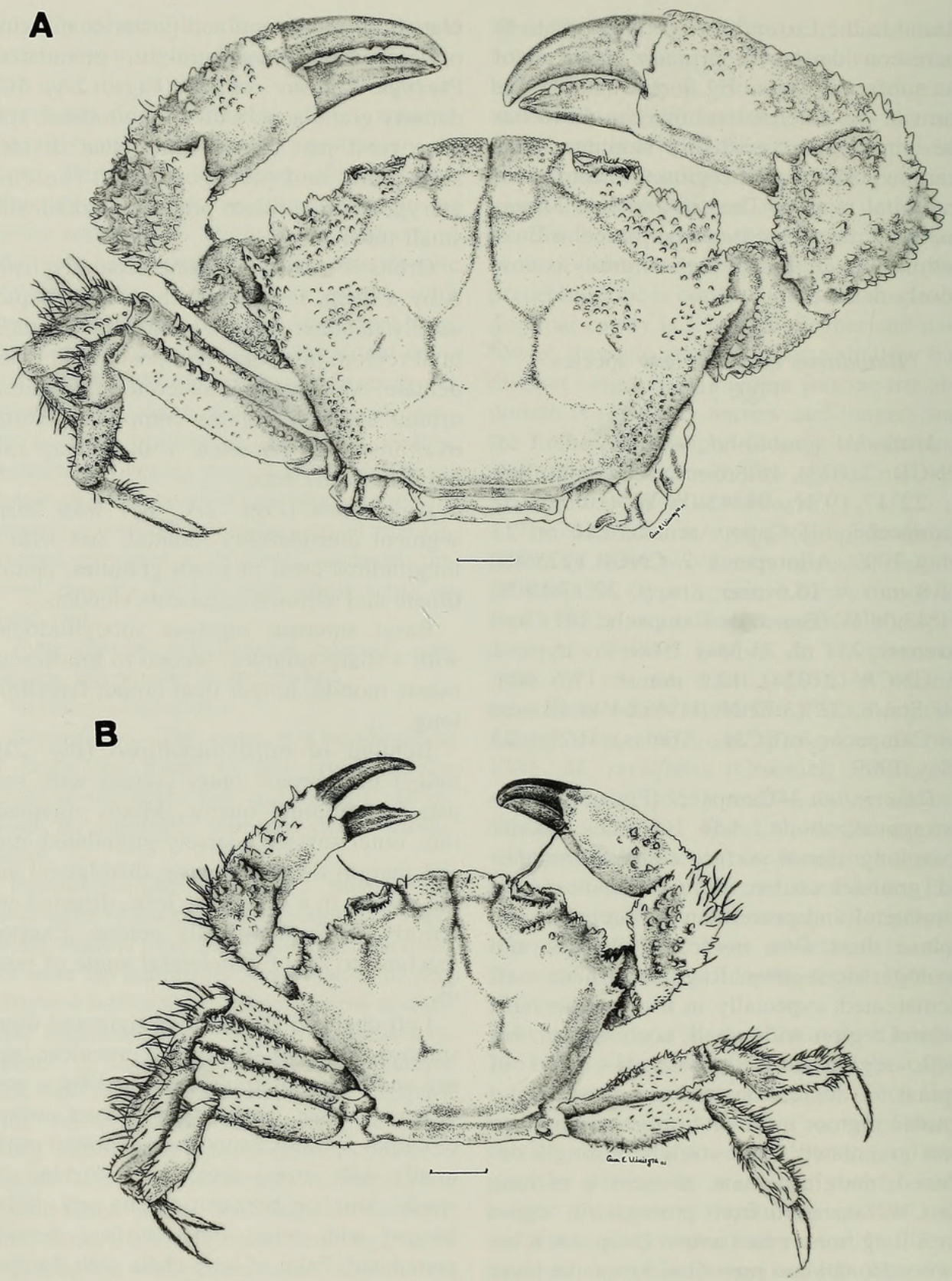

Fig. 1. *Batodaeus adanad,* new genus, new species. A. Holotype male 16.6 mm × 23.2 mm (CNCR 21023); B, Allotype female 11.8 mm × 16.6 mm (CNCR 22509), dorsal view.

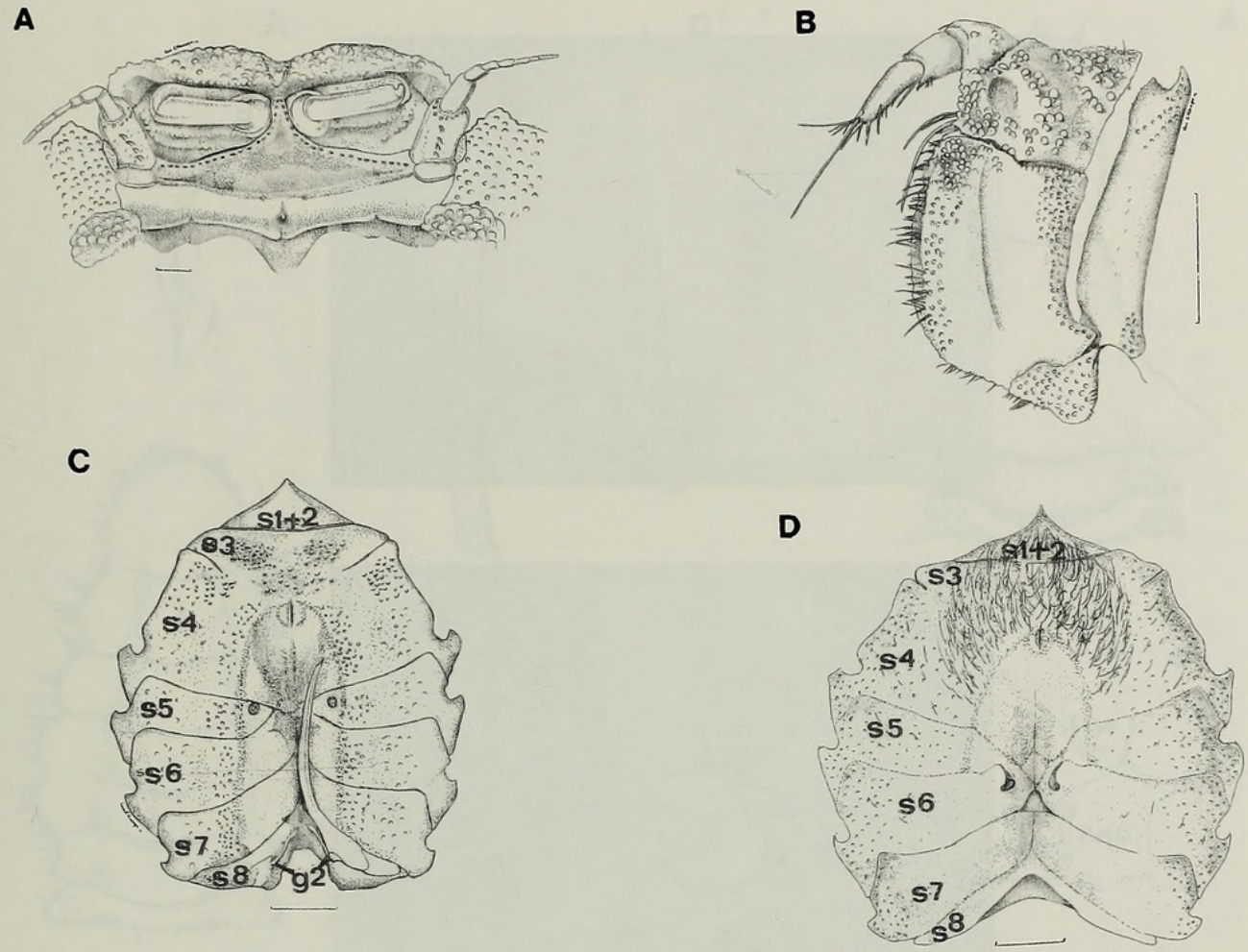

Fig. 2. *Batodaeus adanad. A–C,* holotype male. A, antennal, pterygostomian, suborbital, and epistomal regions; B, third left maxilliped, outer view; C, sternoabdominal cavity. D, allotype female, sternoabdominal cavity. Abbreviations: g2, gonopod 2; s1–8, sternites 1–8.

part with upper margin armed with small acute spines, cutting edges with blunt teeth.

Pereopods 2–5, slender, subequal in length; pereopod 4 slightly long, and pereopod 2 slightly short; all segments with lateral and mesial faces spinose, covered by dense, thin setae. Dactylus slightly longer than propodus, terminating in corneous claw. Propodus with long thin setae on upper border, outer surface punctate. Upper border of carpus with 4–6 small spines. Merus with 12 spines on upper border, which diminish in size proximally, directed anteriorly.

Thoracic sternum in male (Fig. 2C) relatively narrow, densely granulated; sternal sutures 1–2 indistinct, 2–3 complete, 3–4 incomplete and confined to lateral regions; 4–5 and 5–6 interrupted medially; 6–7 and 7–8 complete. Sternite 4 with slightly raised median part, with short longitudinal furrow. Locking mechanism on sternite 5 just below suture 4–5. Sternoabdominal cavity deep and relatively narrow.

Male abdomen (Fig. 3A) with short marginal setae on segments 1–6 and telson. First segment long, slender. Second as long as first, broadest, not reaching coxa of fifth pereopod, with small portion of sternite 8 visible (Fig. 3B). Third to fifth segments fused, punctate, longer than broad. Sixth segment as long as broad. Posterior margin of telson rounded. Male sexual openings coxal.

First gonopod (Fig. 3C, D) long, reaching beyond suture separating sternites 4 and

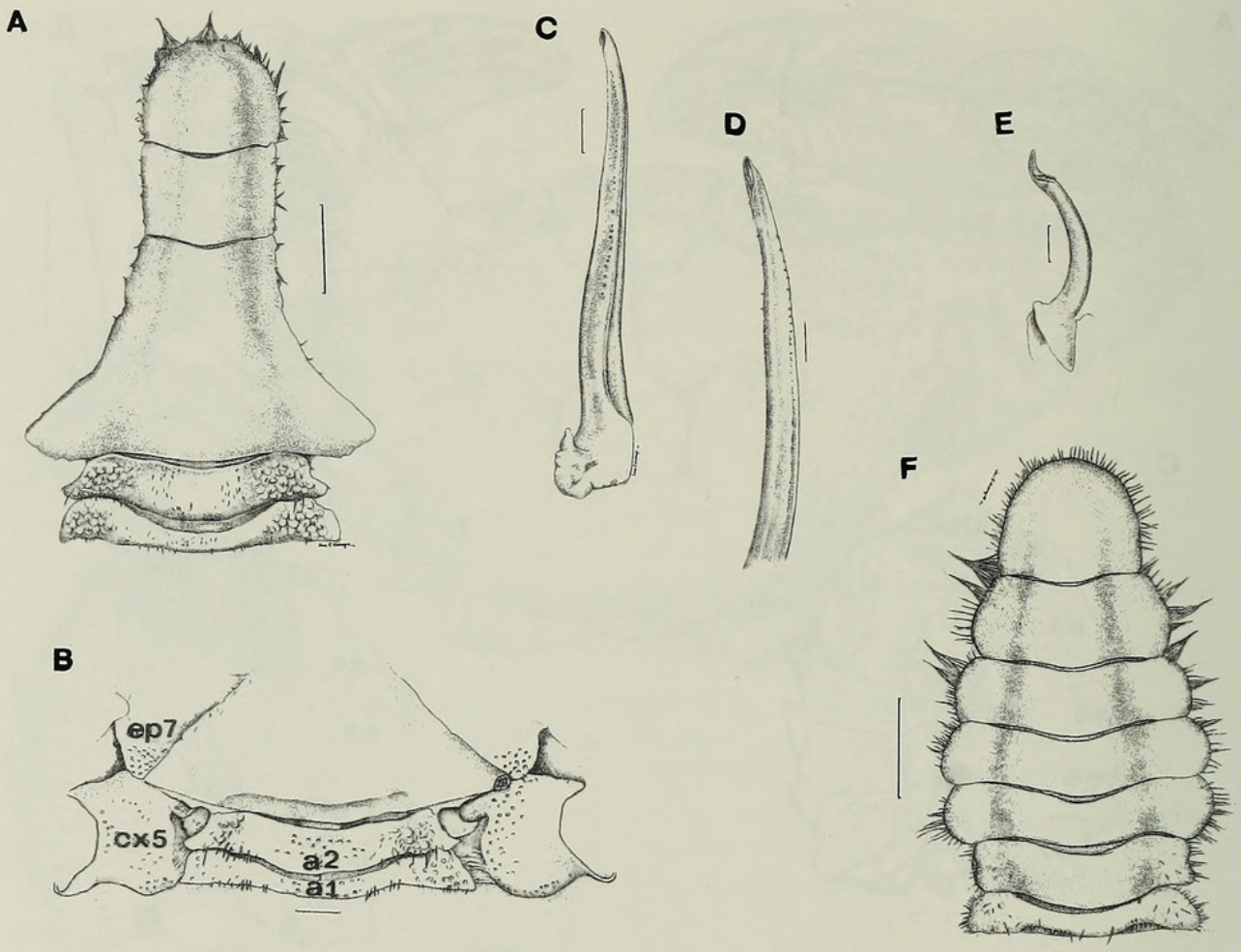

Fig. 3. *Batodaeus adanad. A–E,* holotype male. A, abdominal segments; B, abdominal segments 1–3, coxa 5 and sternite 8; C, gonopod 1; D, tip of gonopod 1; E, gonopod 2. F, allotype female, abdominal segments. Abbreviations: a1–2, abdominal segments 1 and 2; cx 5, coxa 5; ep7, episternite 7.

5, when in situ, slender and with distal part slightly incurved. Second gonopod (Fig. 3E) very short, curved, tip sharp, recurved.

Females with regions of carapace less demarcated (Fig. 1B); front straight, less deflexed; right cheliped longer than left, palm with less conspicuous spines, pereopods more setose, without spines on upper border of merus, carpus with spines more acute. Thoracic sternum (Fig. 2D) with longitudinal furrow on sternite 4 less marked; abdominal cavity less deep and broad; in longest specimen, locking mechanism on sternite 5 not visible. Abdomen (Fig. 3F), with first and second segments as in male, leaving visible a small portion of sternite 8; segments 3–6 free and subequal in size; posterior part of telson rounded. Pleopods long, slender, extending past edge of telson; gonopores small, ovate.

Color in life.—Cream, with tip of chelae fingers dark.

Etymology.—This species name is formed from an arbitrary combination of the two first letters of each of our sons' names: Adolfo, Andrés, and Adrián, and is used as a noun in apposition.

Distribution.—Western Atlantic; southwestern Gulf of Mexico; Banco de Campeche.

Remarks.—The shape and ornamentation of carapace and pereopods of *B. adanad* are superficially similar to the species of *Monodaeus,* notably *M. rouxi.* Also, the pterygostomial region is densely granulated and the incomplete endostomial ridges of *B.*

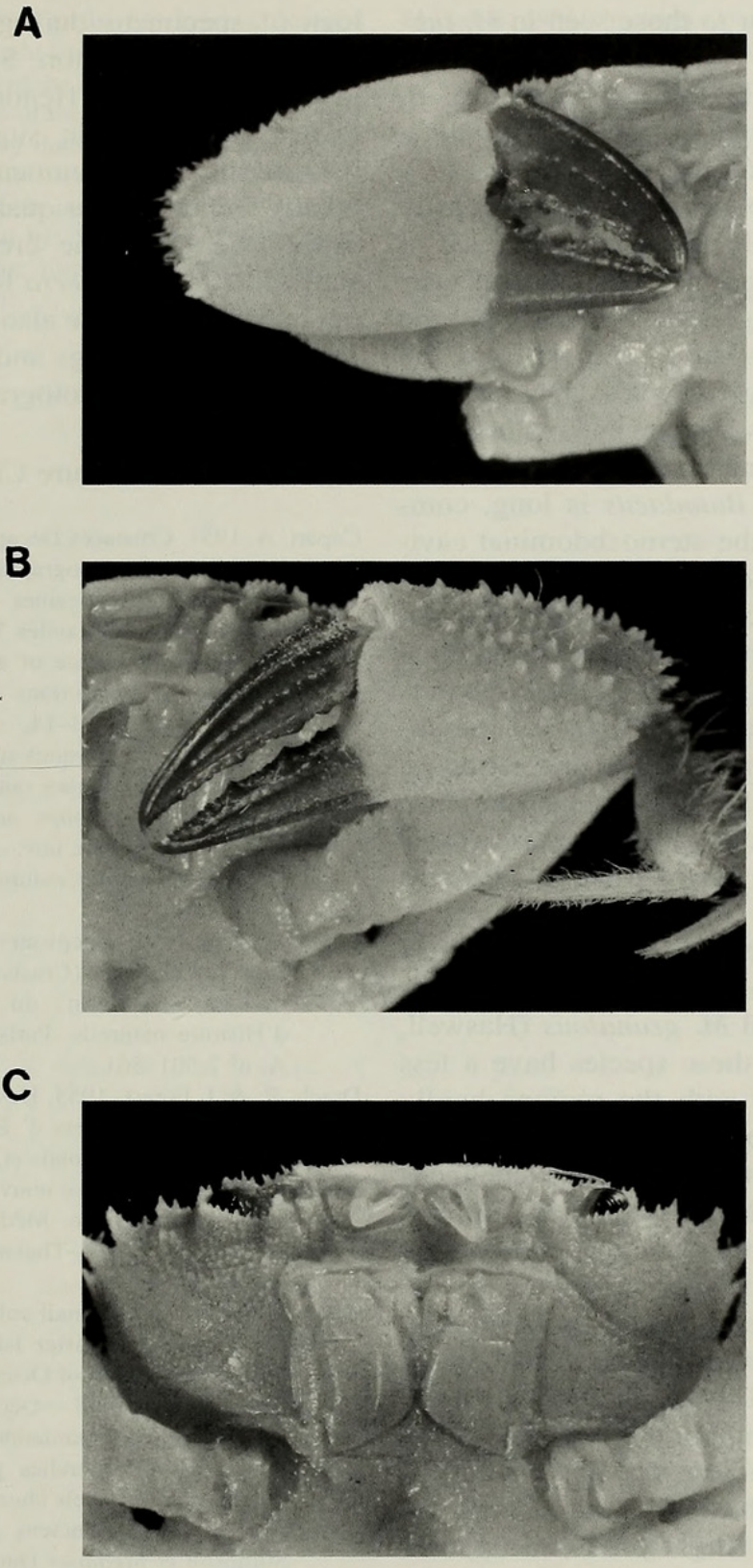

Fig. 4. *Batodaeus adanad,* holotype male. A, right chela; B, left chela; C, ventral view of anterior part of carapace.

adanad are similar to those seen in *M. tuberculidens* and *M. couchii.* The morphology of the merus of the third maxilliped of *B. adanad* also resembles those of *M. guinotae* and *M. tuberculidens.*

However, *Batodaeus adanad* is easily separated from all *Monodaeus* species in that the former has the posterolateral margin almost as long as the anterolateral, the chelipeds are less stout, spinose, and are covered by strong tubercles; the sternoabdominal cavity is deeper and with a less marked longitudinal furrow on sternite 4. The abdomen of *Batodaeus* is long, completely covering the sternoabdominal cavity, whereas in *Monodaeus* species the abdomen does not completely cover the sternoabdominal cavity, leaving a longitudinal furrow on sternite 4 exposed; the pereopods 2–5 without a granulated crest on the superior border of merus; and the telson of male is rounded. In addition, the morphology of the first gonopod in *B. adanad* differs from that in any known *Monodaeus* species.

The new species differs from *Medaeops edwardsi* Guinot, 1967, *M. neglectus* (Balss, 1922), and *M. granulous* (Haswell, 1882) in that all these species have a less convex carapace, with the regions hardly projecting; their pereopods are shorter and broader; and the fingers of their chelipeds are granulated. The first gonopod, thoracic sternum, and sternoabdominal cavity, too, are also different in morphology.

Batodaeus adanad can be easily separated from *Alainodaeus akiaki* Davie, 1992 and *A. rimatara* Davie, 1992 in that those species have a carapace that is transversally ovoid; the front is less deflexed; the chelipeds are more robust; the first male gonopod is stout with slightly twisted tip; and the second male gonopod is moderately longer.

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