Zootaxa 4890 (4): 589–598
https://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.4890.4.10
http://zoobank.org/urn:lsid:zoobank.org:pub:39544447-DA84-4C6A-B79A-4DF77640DD67

A new species of the hermit crab genus *Cancellus* H. Milne Edwards, 1836 from a mesophotic deep bank in the northwestern Gulf of Mexico (Crustacea: Decapoda: Diogenidae)

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Abstract

Recent sampling on mesophotic deep banks in the northwestern Gulf of Mexico has produced a previously undescribed hermit crab assignable to the genus *Cancellus* H. Milne Edwards, 1836. Members of the genus are most often found to occupy cavities of eroded coral, siliceous sponges, porous calcareous rock fragments, algal concretions, or worm tubes as shelters. The present specimen was found loose as by-catch in a dredged rhodolith sample taken for algal life history studies. In situ, it likely occupied a cavity within one of the collected calcareous rhodoliths or small sponges in the by-catch. While our description is based on a single female specimen, the holotype is fully mature and intact, and it was solidly frozen in seawater until its coloration could be photographically documented and tissues extracted for sequencing. In comparison to the three other known western Atlantic species, the frontal rim of the carapace shield in the new species is continuous between the blunt lateral teeth as in *C. ornatus* Benedict, 1901 and *C. viridis* Mayo, 1873, and thus distinct from the subdivided front found in *C. spongicola* Benedict, 1901. The rim itself is somewhat flattened as in *C. ornatus* rather than inflated as in *C. viridis*. However, each of the ocular scales bears a pair of spines at the tip, as in *C. viridis*. The lower palms of the chelipeds, while distinctly rugose, do not have a separated patch of stridulating ridges comparable to those reported for *C. spongicola*. The yellow-orange to deep-orange pigmentation of the color pattern differs from fresh coloration in both *C. ornatus* and *C. viridis*, but that of *C. spongicola* is unknown for other than preserved specimens. Description of the single available specimen is in this case justified by the low likelihood for timely acquiring of additional samples from the type locality or adjacent habitats, most of which are deep banks warranting protection under pending habitat management changes. Our diagnosis includes GenBank accession numbers for COI sequences to facilitate future molecular phylogenetic comparisons.

Key words: new species, Anomura, *Cancellus*, mesophotic, Gulf of Mexico

Introduction

In the course of recent faunistic surveys and phylogenetic studies in the northern Gulf of Mexico, a number of new decapod crustaceans have been discovered, especially on hard substrate deep banks of the outer continental shelf, most at mesophotic depths. Surveys in such settings, initiated in advance of and following the Deepwater Horizon oil spill, documented pre- and post-impact decapod assemblages on two such banks (Felder *et al*. 2014), and also provided materials for systematic studies of decapods on a number of similar deep reef prominences. As in the present case, previous new species descriptions based upon decapod crustacean materials from these sites have included documentation of coloration as well as analyses of gene sequence data, which have supported diagnoses of unique taxa (Felder & Thoma 2010; Bracken-Grissom & Felder 2014a, b; Felder *et al.* 2019; Thoma & Felder 2019; Felder 2020).

The present work is based upon a single specimen of the infrequently collected diogenid hermit crab genus *Cancellus* H. Milne Edwards, 1836, discovered among fragments of calcareous rhodoliths and small sponges dredged

Accepted by S. Ahyong: 8 Oct. 2020; published: 4 Dec. 2020

from an outer continental shelf bank in the northwestern Gulf of Mexico. Owing to its largely symmetrical habitus, the loose specimen was initially mistaken by field technicians for an axiidean and later found flash-frozen with a few specimens of that infraorder in seawater, intended for ongoing studies of that group by DLF. Normally occupying shallow cavities within loose pieces of coral rubble, sponges, eroded calcareous rocks, or abandoned calcareous worm tubes, members of this genus usually conceal themselves in such carcinoecia by closely opposing the mesial surfaces of the distal segments of their chelipeds and second pereopods (and rarely also the third pereopod) to form an operculum for their shelter opening (Mayo 1973; McLaughlin 2008). The texture and cryptic coloration on exposed surfaces of these appendages further mask the crab's presence to make it easily overlooked, even though some species occur at depths commonly accessible to divers.

To date, of the sixteen described species of *Cancellus* worldwide (McLaughlin *et al*. 2010), only three have been recorded from the western Atlantic, all of which range into western North Atlantic waters (Mayo 1973; Williams 1984; Abele & Kim 1986; Felder *et al.* 2009). Of these, *C. ornatus* Benedict, 1901 is the most widely reported, with well-established records in offshore to nearshore waters from North Carolina to the Florida Keys, Bahamas, eastern Gulf of Mexico, Cuba, and the Caribbean to northern Brazil. Fewer and more tropically restricted records are available for *Cancellus viridis* Mayo, 1973, which ranges north to the Florida Keys and the Caribbean Greater Antilles, and *Cancellus spongicola* Benedict, 1901 which ranges north to Bermuda, the Bahamas, and south to the western and southern Caribbean (Martínez-Campos *et al.* 2017).

While a single individual, the available specimen of the new species is in this case completely intact, sexually mature, and of documented coloration, in addition to being gene-sequenced and archived as a voucher with tissues of gene-sequence quality. It constitutes the only discovered representative of the new species after over a decade of near annual sampling in similar adjacent mesophotic habitats of the Gulf of Mexico, being collected at the end of a project to sample rhodolith nodules required for studies of calcareous algae life histories, resilience, and recovery on such banks (see Fredericq *et al*. 2019). Timely acquisition of additional materials from the type locality and immediately adjacent banks is unlikely because of pending restrictions on further sampling there.

Materials and methods

Materials examined include holdings from the University of Louisiana at Lafayette Zoological Collection, Lafayette, LA (ULLZ) recently transferred to the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM). Both catalog numbers are used, as specimens are now permanently cross-referenced under both numbers at the USNM. Comparative material examined included the following: *Cancellus ornatus*, female, sl 6.9 mm, (USNM 1539291 = ULLZ 2089), coll D. Camp, D. Felder, P. Steele & S. Beck, *R/V Hernan Cortez* station EJ-80-24, box dredge, coarse shelly sand, 71.3 m, off Sanibel Island, Florida, 26°24.3′N, 93°47.2′W, northeastern Gulf of Mexico, 30 July 1980. *Cancellus viridis* female, sl 2.2 mm, (USNM 1544358 = ULLZ 8947), coll D. Felder, S. Fredericq, E. Garcia *et al*., *R/V Pelican*, box dredge, coral and calcareous algal rubble, 66 m, off Dry Tortugas, Florida, 24°48.61′N, 83°40.59′W, southeastern Gulf of Mexico, 2 June 2004. *Cancellus spongicola*, male holotype, sl 6.3 mm, (USNM 9549), coll US Fish Commission, *R/V Albatross*, beam trawl, 238 m, off Cozumel Island, Mexico, 20°59.5′N, 86°23.6′W, Yucatan Channel, 22 January 1885. Other than for the third maxilliped, mouthparts of *C. heatherae* **n. sp.** are not dissected or illustrated given the existence of only the holotype of the new species being described. Measurements were determined with a calibrated ocular micrometer. Specimen size (+ 0.1 mm) is reported as shield length (sl), from the tip of the rostrum to the posterior midpoint of the shield. General terminology follows McLaughlin (2003), except for the use of "pleon" in lieu of "abdomen" in accord with Schram & Koenemann (2004) and thoracic sternites, which are referred to only by the pereopod pairs between which they are ventrally positioned (sensu Felder *et al.* 2019), thereby also identifying which of the posterior five thoracic somites they are derived from. Collectors (coll) are indicated and the collection depth is shown in meters (m). Digital color photographs were made immediately after specimens, briefly frozen in seawater, were defrosted, with the subject immobilized below the water surface of a shallow tray lined with black felt. Line illustrations were prepared on a Wild M5 dissecting microscope equipped with a camera lucida, after staining of selected structures with chlorazole black E, if necessary. The GenBank accession number included at the end of the species diagnoses applies to sequences obtained in general accord with methods previously reported by Wong *et al*. (2015).

Taxonomy

Family Diogenidae

Genus *Cancellus* H. Milne Edwards, 1836

***Cancellus heatherae* n. sp.**
(Figs 1A–F, 2A–F, 3A–D)

Type material. Holotype: female, sl 4.0 mm (USNM 1618800 = ULLZ 18309), coll S. Fredericq, S. Krayesky-Self, E. Garcia, C. Craig *et al*., *R/V Pelican*, rhodolith dredge sample, 95 m, off Louisiana, 27°53.56′N, 91°21.64′W, northwestern Gulf of Mexico, 17 May 2019.

Diagnosis. Cephalothoracic shield width not exceeding length; rostrum well developed, angular, produced anteriorly beyond blunt anterolateral projections; narrow flattened frontal rim continuous across front between anterolateral projections, crossing rostrum without disjuncture; dorsal surface with angular depression on either side of shield posterior to rim behind each ocular peduncle. Median calcified plate of cardiac region subrectangular, slightly longer than wide. Ocular acicles armed with 2 spinules distally. Antennal acicle extending anteriorly less than one-half length of ocular peduncle. Cheliped and second pereopod distal segments adapted to form operculum when withdrawn into habitat opening, outer surfaces of carpus and propodus with concave opercular depression. Cheliped propodus (palm) with opercular depression limited mesially by crest of 7 or 8 marginally denticulate lobes. Second pereopod propodus with opercular depression limited laterally by crest of 5 marginally denticulate lobes. Pleon elongate, with lightly sclerotized transverse tergites dorsally, 4 minute biramous pleopods on left side, depressed longitudinal groove along left side; sixth pleonite greatest width exceeding three-fourths greatest length, anterior lobes to either side of median incision each armed by 7 or 8 strong spines. Uropods and telson symmetrical; telson subovoid, anteriorly with subtriangular median dorsal prominence, posterior margin entire, unarmed except for setae. Color pattern of orange to yellow-orange dominating most dorsal surfaces and superior surfaces of anterior appendages, darker blotches and spots of deeper orange to reddish brown. A diagnostic COI gene sequence available under GenBank accession number MT800937.

Description. Cephalothoracic shield width subequal to maximum shield length (Figs 1A; 3A, B); rostrum angular, subacute, slightly overreaching blunt lateral projections; anterior margin between rostrum and lateral projections concave, with margin consisting of continuous narrow flattened rim slightly broadened behind ocular peduncle, extending across rostrum; lateral projections each armed with small terminal spine; lateral margin convex, with raised anterolateral edge formed by roughened crest of irregular tubercles positioned outside crescentic supramarginal furrow, crest slightly broadened and flattened anteriorly, extending anteromesially to outer end of flattened frontal rim; dorsal surface anteriorly with angular depression behind each ocular peduncle, positioned immediately behind frontal rim, depressions forming anterolateral limits of broad submedian gastric elevation to each side of narrow median furrow extending posterior to rostrum, elevation and surface lateral to depression weakly sculpted by low rugae. Median calcified plate of cardiac region slightly longer than wide.

Ocular acicles subtriangular, separated by approximately half basal width of single acicle, mesial two-thirds of each produced anteriorly, terminating in 2 spinules distally. Ocular peduncle (including cornea) approximately four-fifths length of carapace shield, slender, slightly broadened proximally, with few widely spaced granules along length dorsomesially, very slightly curved to diverge distally. Cornea subspherical, weakly inflated.

Antennular peduncle reaching to distal margin of cornea when fully extended, anterior of basal article with 3 ventrolateral spines.

Antennal peduncle (Fig. 1A, B) with fifth segment extending to about mid-length of ocular peduncle. Acicle extending distinctly less than one-half length of ocular peduncle, terminating in strong spine, with 2 lateral spines along distal half, and 1 dorsomesial spine proximally. Basal segment with distolateral angle produced as strong spine, with small dorsomesial spine. Flagellum approximately as long as or slightly longer than cephalothoracic shield, articles bearing short setae about 1 flagellar article in length or less.

Third maxilliped endopod (Fig. 1C) ischium with well-developed, coarsely toothed crista dentata, appearing serrate, lacking accessory tooth; basis armed with 2 strong, well-separated teeth distally, smaller tooth proximally. Exopod distinctly narrowed distally.

Chelipeds (Figs 1D, 3A–D) symmetrical, similar in strength. Dactylus gaping widely from fixed finger, upper (extensor) surface densely covered by subacute coniform tubercles or denticles, most with corneous tips, with 2 primary subconiform calcareous teeth along outer opposable margin, terminating in heavy, blunt, darkly pigmented tip surrounded basally on mesial and lateral surfaces by multiple dense tufts of stiff bristle-like setae. Palm with longitudinal opercular depression limited laterally by coarse tuberculate crest formed at superior ends of transverse rows of tuberculate rugae crossing upper lateral surface, lateral rugae broken and diminished toward longitudinal opercular depression and midlaterally, lower lateral surface with finer lines of granules forming rugae; mesial border of longitudinal opercular depression and boundary from inner (mesial) surface of propodus formed by raised crest of at least 7 irregular lobes separated by narrow fissures at bases of tuberculate lobes, with dentiform tubercles of their distal margins corneous; inner (mesial) surface mostly smooth, with few very flattened broad tubercles, lower extreme with 2 or 3 setose, transverse rugae and few separate tubercles extending onto inferior margin; fixed finger stout, with 2 primary subacute coniform, calcareous teeth along outer opposable margin, terminating in heavy, blunt, darkly pigmented corneous tip surrounded on mesial and lateral surfaces proximal by 4 primary dense tufts of dense, stiff, bristle-like setae. Carpus and merus lateral surfaces with broken pattern of low tubercles or granules weakly disposed into rows or rugae. Carpus opercular surface with converging tuberculate crests, edges serrate in appearance, defining proximally narrowing depression contiguous with weak longitudinal depression on outer (opercular) surface of palm. Merus lateral surface with distinct groove extending transversely from low subdistal tooth of superior margin, mesial surface inferior margin armed with several acute, distally directed denticles.

Second pereopod (Fig. 1E, F) with dorsolateral surfaces of carpus, propodus and dactylus opercular in shape; opercular surfaces of carpus and propodus tuberculate, longitudinally concave, some tubercles on concave surfaces mammiform with short narrowed tips; opercular surface of dactylus mostly flat, weakly concave along superior crest of extensor margin. Dactylus superior crest armed with 9 or 10 well-defined dentiform lobes or teeth, decreasing in size distally; laterally smooth; mesially with inner limits of opercular surface defined by raised ridge including 8 or 9 enlarged tubercles, outer limits of opercular surface defined by superior crest; inferior flexor margin with 5 distinct corneous spines among marginal setae; narrowed corneous tip hooked, subacute. Propodus superior crest subdivided into 5 marginally denticulate lobes, distalmost broadest, most complex; laterally smooth with few low rugae; mesially with inner limits of concave opercular surface defined by raise ridge of paired enlarged tubercles formed by ends of coarsely tuberculate rugae transecting opercular surface, outer limits of opercular surface defined by overlapping lobes of superior crest; inferior (flexor) margin with 5 or 6 minute corneous spines, each within tuft of longer setae. Carpus thick, heavy, length about 1.5 times height, superior crest subdivided into 5, marginally denticulate lobes becoming broader distally; laterally smooth with few low rugae; mesially with inner ridge of 7 enlarged tubercles defining limits of opercular surface, outer limits of opercular surface defined by 4 distalmost denticulate lobes of superior crest; inferior margin forming broadly obtuse angle in distal half. Merus lateral and mesial surfaces mostly smooth with few low, broken rugae, margins weakly dentate, superior margin with distinct subdistal tooth.

Third pereopod (Fig. 2A, B) with lateral and mesial surfaces of merus and carpus mostly smooth, with few very low rugae, superior margins dentate. Dactylus superior crest armed with 9 or 10 coniform, distally directed teeth; laterally smooth except for proximal tubercle; mesially with low longitudinal ridge defining inner limits of upper surface; inferior flexor margin with 5 distinct corneous spines among marginal setae; narrowed corneous tip hooked, subacute. Propodus superior margin armed with 7 or 8 enlarged, distally directed, bluntly spiniform teeth; laterally with several small tubercles on upper half; mesially with at least 7 scattered setal tufts overall and few small tubercles in upper half, inferior margin with 4 minute corneous spines concealed in setal tufts. Carpus compressed, tuberculate superior surface narrow, length twice height, inferior margin broadly convex over distal two-thirds.

Fourth pereopod (Fig. 2C) semichelate, segments heavy. Dactylus opposed to distal margin of propodal rasp, subcylindrical, laterally with arched row of small corneous denticles along opposable margin, narrowing and hooked distally, terminating in subacute corneous tip. Propodus laterally with rounded, slightly elongate propodal rasp consisting of corneous scales covering distal two-thirds of segment.

Fifth pereopod chelate. Propodus (Fig. 2D) length distinctly less than 3 times that of dactylus, laterally with elongate rasp consisting of corneous scales covering most of lateral surface of segment, extending onto fixed finger and dactylus, distal end of palm with dense setation including tuft of setae overreaching articulation with dactylus.

Thoracic sternum (Fig. 1G) forming bicuspate sclerite between first pereopod (cheliped) coxae; raised pair of closely positioned subtriangular sclerites between second pereopod coxae; small median, minutely tuberculate sclerite between third pereopod coxae.

Pleon robustly elongate, subcylindrical, soft integument overall covered by fine dense pubescence (Fig. 3A, C), left side surface with longitudinal fold extending full length of soft integument just below level of pleopods; dorsally with 4 distinct, separated, translucent, lightly sclerotized transverse tergites, each on left side articulated to very small biramous pleopod; small dorsal vestige of fifth tergite with small lateral setose tubercles, fifth pleopod obscure, minute. Sixth pleonal tergite hexagonal, length exceeding three-fourths maximum width, anterior incision separating strongly spinose anterior lobes, marking median longitudinal furrow extending to transverse crest forming rounded triangular projection to each side; anterior margins of anterior lobes each bearing 7 or 8 strong spines among smaller, some slightly curved, some shouldered on others, 1 or 2 additional strong anterolateral spines just anterior to each rounded triangular lateral projection, a few smaller spines on dorsal surface; posterolateral lobes each with margins lined by arch of coniform teeth, appearing serrate, separated medially by short unarmed margin lacking median denticle.

Uropods symmetrical; protopod superior surface (Fig. 2E) slightly excavate posterior to articulation of exopod, projection posterior to endopod with 3 short blunt marginal teeth and additional ventrally directed spine; endopod elongate, strongly tapered to subacute distal end. Telson symmetrical, subovoid, length less than three-fourths width; dorsal surface with large strong, subtriangular median prominence, pair of smaller lower elevations to each side and posteriorly, less elevated surfaces toward posterolateral depressed with shallow furrows forming low oblique rugae extending to setose posterior margin, latter entire, undivided and lacking spines.

Color (Fig. 3A–D). Dominant dorsal pigmentation of sclerotized surfaces orange, accented by some spots of darker orange to reddish brown, scattering of off-white where orange pattern is more broken distally on ambulatory legs (second and third pereopods); tips of many spines and teeth white to off-white, especially those of antennal acicles and distal articles of ambulatory legs. Cephalothoracic shield with anterolateral margins mostly orange, each marked by row of small whitish spots, similar small white spots symmetrically distributed across posterior half of shield, single small dark spot of reddish orange to either side. Median plate of cardiac region slightly more mottled and darkly pigmented than shield, pair of small transverse white bars on anterior margin; small dark reddish orange spot positioned well to each side of plate on soft integument. Side of thorax with two large dark reddish orange blotches. General pigmentation of ventral sclerotized surfaces more speckled or spotted than dorsally, on a predominantly lighter off-white to pale orange background.

Ocular peduncles orange with faint lighter spots forming row along mesial margins in dorsal view; distal articles of antennular peduncles yellow orange with broad very diffuse band of darker orange centered near mid-length. Fifth segment of antennal peduncle banded by slightly diffuse narrow band near mid-length, pale orange to off-white anterior and posterior to it. Third maxilliped merus, carpus, and propodus banded with distinct dark orange. Less intensely pigmented large darker blotches on the opercular surfaces of cheliped propodus (palm), one each on mesial and lateral sides; incompletely defined double bands encircle propodus and merus of walking legs, with upper extremes of bands broadest and most darkly pigmented (especially evident as dark blotch on proximal upper surface of third pereopod).

Pleon overall covered somewhat uniformly by small spots of dark reddish orange to reddish brown, partially concealed by overlying pubescence. At least first four tergites with small dark reddish orange spot centered on median line, additional slightly smaller spot to either side; sixth pleonal tergite with larger, slightly lighter, more diffuse spot similarly centered on midline anterior to the transverse crest, additional much smaller, darker, ovoid spot near margin to either side and transverse bar of intense reddish orange centered on posterior margin. Overall, spine tips and heavily sclerotized surfaces of sixth pleonal tergite, uropods, and telson extensively white or off-white to pale orange, with small variably diffuse spots of orange, spotting most extensive in ill-defined bands on uropodal endopod and depressed surfaces of telson.

Etymology. This species name "heatherae" is chosen to honor Heather Bracken-Grissom for her extensive contributions to molecular phylogenetic studies of decapod crustaceans, including works focused on hermit crabs and other anomurans populating Gulf of Mexico waters. Her laboratory also generously made available the gene sequences here reported in our diagnosis.

Size. The shield length and width both measure 4.0 mm. The cardiac plate is about 1.6 mm in length while the width is nearer 1.5 mm. Post-preservation, the pleon measures about 5 mm in greatest width and 9.8 mm in length when measured from its anterior attachment to the thorax to the posterior margin of the sixth tergite.

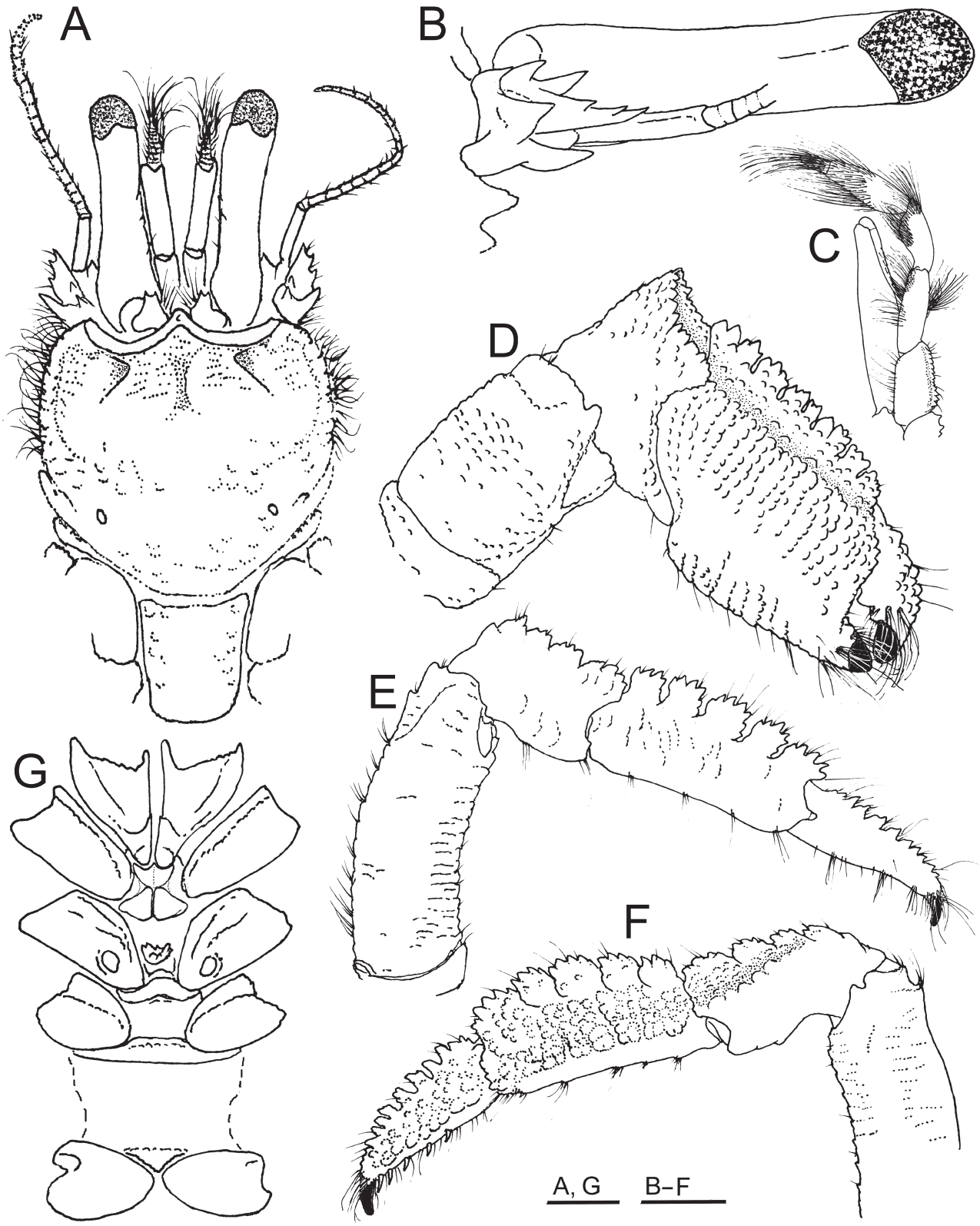

FIGURE 1. *Cancellus heatherae* **n. sp.**, female holotype (USNM 1618800 = ULLZ 18309), northwestern Gulf of Mexico: A, anterior carapace, peduncles, and appendages; B, right antennal peduncle and eyestalk, lateral surfaces; C, right third maxilliped, internal surface; D, right first pereopod (cheliped), lateral surface; E, right second pereopod, lateral surface; F, right second pereopod, mesial surface; G, thoracic sternum and pereopod coxae, ventral surfaces. Scale bars = 1.0 mm (A, C–G); 0.5 mm (B).

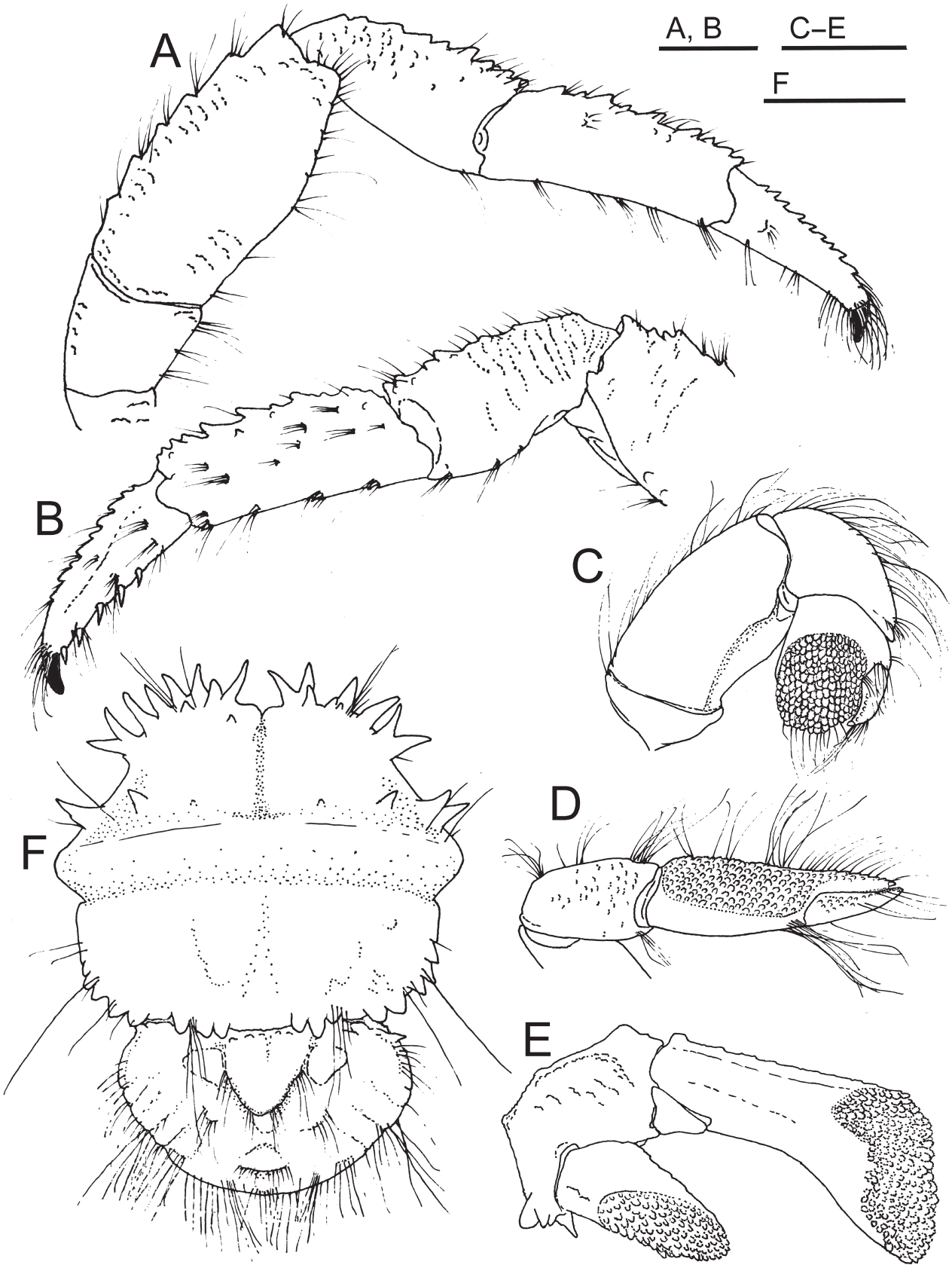

FIGURE 2. *Cancellus heatherae* **n. sp.**, female holotype (USNM 1618800 = ULLZ 18309), northwestern Gulf of Mexico: A, right second pereopod, lateral surface; B, right second pereopod, mesial surface; C, right fourth pereopod, lateral surface; D, carpus and chela of right fifth pereopod, lateral surface; E, right uropod, lateral surface, setae not shown; F, sixth pleonal tergite and telson, dorsal surfaces. Scale bars = 1.0 mm.

FIGURE 3. *Cancellus heatherae* **n. sp.**, female holotype, sl 4.0 mm (USNM 1618800 = ULLZ 18309), northwestern Gulf of Mexico: A, habitus, dorsal; B, habitus, right side; C, habitus, ventral; D, sixth tergite and telson, dorsal. *Cancellus viridis* Mayo, 1973, female, sl 2.2 mm (USNM 1544358 = ULLZ 8947), southeastern Gulf of Mexico: E, in carcinoecium, front; F, habitus, dorsal. *Cancellus ornatus* Benedict, 1901, female, sl 6.9 mm (USNM 1539291 = ULLZ 2089), northeastern Gulf of Mexico: G, front; H, habitus, dorsal.

Habitat. The sole specimen was found among rhodoliths and other calcareous rubble on a mesophotic offshore bank at 95 m depth.

Distribution. The species is known only from the type locality off Louisiana in the northwestern Gulf of Mexico, western Atlantic Ocean.

Remarks. The three other known western Atlantic species of *Cancellus*, *C. spongicola*, *C. viridis*, and *C. orna-*

tus, all range into the eastern Gulf of Mexico or waters off Yucatan, and may in some settings occur sympatrically with *C. heatherae* **n. sp.** However, they are readily distinguished by morphology, even when separations cannot be based upon the distinctive coloration of fresh specimens. As in *C. ornatus* and *C. viridis*, the frontal rim of the carapace shield in *C. heatherae* **n. sp.** is continuous between the blunt lateral projections (Fig. 1A), extending continuously across the concave margin behind each eye and crossing the rostrum, and thus distinct from the subdivided front, interrupted behind each eye (Mayo 1973: fig. 2a) in *C. spongicola.* Also, while the lower palms of the chelipeds are to varied degrees, rugose in *C. ornatus*, *C. viridis* and *C. heatherae* **n. sp.**, none of these three species has a distinctly circumscribed patch of stridulating ridges on this surface comparable to that found in *C. spongicola* (Mayo 1973: fig. 3a).

Morphological separation of *C. heatherae* **n. sp.** from *C. ornatus* can in turn be based on the former having paired spines arming the tip of each ocular acicle, as in *C. viridis*, rather than a single spine as in *C. ornatus*. However, the anterior rim of the cephalothoracic shield does not match that of *C. viridis*, being flattened, much as in *C. ornatus*, rather than inflated. Finally, the shape of the pleon, despite its soft texture, clearly appears more elongate in *C. heatherae* **n. sp.** than in any of its western Atlantic congeners, both pre- and post-preservation. The longitudinal groove or fold along the left side of the pleon in the holotype of this new species does not appear to be an artifact or abnormality, and thus is considered another distinguishing feature. For the other three species, the pleon is described as spherical to ellipsoid, with no mention of a fold or groove (Mayo 1973). Finally, the female pleopods appear to be striking larger in relative size on the pleon of *C. ornatus* (Fig. 3H), than in the female holotype of *C. heatherae* **n. sp.** (Fig. 3A) or examined females of *C. viridis* (Fig. 3F). With only one specimen of *C. heatherae* **n. sp.** to judge from, it cannot for present be determined whether this might vary with size or maturation.

For fresh specimens, the conspicuous orange coloration (Fig. 3A–D) readily distinguishes *C. heatherae* **n. sp.** from its two morphologically closest western Atlantic relatives, *C. viridis* and *C. ornatus*. *Cancellus viridis*, named for the green pigment of its patterning (Fig. 3E, F; Mayo 1973: 30, 33), consistently exhibits grades of this color in the types and specimens collected since its original description, and none of these specimens was noted to have extensive orange pigmentation. The coloration of *C. heatherae* **n. sp.** is also in stark contrast to that of *C. ornatus* in which pigmentation ranges from deep scarlet over the ocular peduncles, proximal surfaces of the ambulatory legs, and much of the dorsal thoracic integument, to varied shades speckled or diffuse brick red elsewhere, including on the pleon (Fig. 3G, H).

Acknowledgements

For obtaining materials aboard the *R/V Pelican*, we thank S. Fredericq and S. Krayesky-Self, University of Louisiana at Lafayette, who were funded for a related project under U.S. National Science Foundation grant DEB-1754504. We are also grateful to E. Garcia and C. Craig who assisted these investigators in sorting and freezing of samples aboard ship. The COI gene sequence were generously provided by Heather Bracken-Grissom, Florida International University, under her NSF grant DEB-1856667. For assisting with access to comparative materials for this study, we thank K. Reed and other support staff of the Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. This is UL Lafayette Laboratory for Crustacean Research contribution number 212.

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