



***Cantabroxanthus loredoensis* new genus, new species (Decapoda, Brachyura, Etyoidea) from the Middle Campanian of Loredo, Ribamontán al Mar, (Cantabria, northern Spain)**

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Abstract

The discovery of *Cantabroxanthus loredoensis* n. gen., n. sp., from the Sponge Beds (middle Campanian) of Cantabria (Spain), increases the number of known Cretaceous brachyuran taxa that the coastline outcrops of Cantabria have yielded. The new genus is herein placed within the family Feldmanniidae (Etyoidea) on the basis of similarities with the genus *Caloxanthus* A. Milne-Edwards, 1864. *Cantabroxanthus* is also compared to the Palaeocorystoidea families, however important differences, for example, *Cantabroxanthus* possesses an entire supraorbital margin, preclude any relationship with Palaeocorystoidea.

Keywords: *Cantabroxanthus*, Decapoda, Etyoidea, Feldmanniidae, Campanian, Cantabria.

Resumen

El hallazgo de *Cantabroxanthus loredoensis*, nuevo género, nueva especie, en los niveles llamados Sponge Beds (Campaniano medio) de Cantabria (España), incrementa el número de nuevos taxones de decápodos braquiuros que el Cretácico de la Costa Cantábrica ha proporcionado. El nuevo género ha sido ubicado en la familia Feldmanniidae (Etyoidea) con base en sus similitudes con el género *Caloxanthus* A. Milne-Edwards, 1864. También se ha comparado *Cantabroxanthus* con las familias de Palaeocorystoidea, sin embargo, importantes diferencias como el margen supraorbital entero, descartan cualquier relación con esa superfamilia.

Palabras clave: *Cantabroxanthus*, *Caloxanthus*, Decapoda, Etyoidea, Feldmanniidae, Campanian, Cantabria.

1. Introduction

Previous reports of decapod crustacean from the Cretaceous of Cantabrian Coast are mainly referred to the abundant and well-known mecochirid *Meyeria magna* M'Coy, 1849 from Upper Aptian-Lower Albian strata (López-Horgue, 2009; González-León *et al.*, 2014). Scarce but interesting brachyuran taxa (Palaeocorystoidea) from the same levels have already been cited or described (Amézarri-Grandal *et al.*, 1977; Van Bakel *et al.*, 2012) or will be described in upcoming works (Ossó *et al.*, in progress). In addition, some brachyurans have also been recognized from the Cretaceous of the same area including: *Homolopsis* sp. (Homolidae), *Caloxanthus formosus* A. Milne-Edwards, 1864 (Feldmanniidae) and two unidentified raninids from the Cenomanian; *Cenomanocarcinus* sp. (Cenomanocarcinidae) from the Turonian; *Graptocarcinus urbasaensis* Van Bakel, Guinot, Corral and Artal, 2012 from the Santonian, and a possible graptocarcinid (Dynomenidae) from the Maastrichtian.

Cantabroxanthus loredoensis n. gen., n. sp. increases the number of brachyurans from the Cretaceous of Cantabrian Coast and represents a new form within the Feldmanniidae (Etyoidea).

2. Geological settings

Upper Cretaceous exposures in Cantabria are mainly restricted to the Santander coastal areas that belong to the North Cantabrian Basin (Figure 1). They are well exposed in Santander and in the neighbouring villages of Langre and Loredo (East) and Arnia (West). Campanian outcrops, exposed as coastal cliffs, permit a good lateral correlation of the beds.

In Langre (3 km east of Loredo), coastal cliff exposures permit a complete study of the section from Santonian to Campanian time. Schlüter (2009) proposed five litho units, ranging from lower to middle Campanian for these exposures: *Holaster similis* Marls, Sponge *Rhythmites*, Burrow Infilled Generated Facies, *Pycnodonte* Layers and *Globator* Beds (Figure 2). This section is well correlated with the neighbouring Loredo outcrops. The crab described in this study was collected from the basal part of the Sponge Beds, middle Campanian (*Menabites delawarensis* zone) that overlies the lower Campanian *Holaster similis* Marls (Rehfeld and Otto, 1995) (Figure 3). The sponge Beds consist of alternating marl-limestone beds deposited on a distal shelf that grade into shallow marine ramp carbonates with tempestites, indicating deposition above storm wave base (Schlüter *et al.*, 2004). The dominant fauna are sponges,

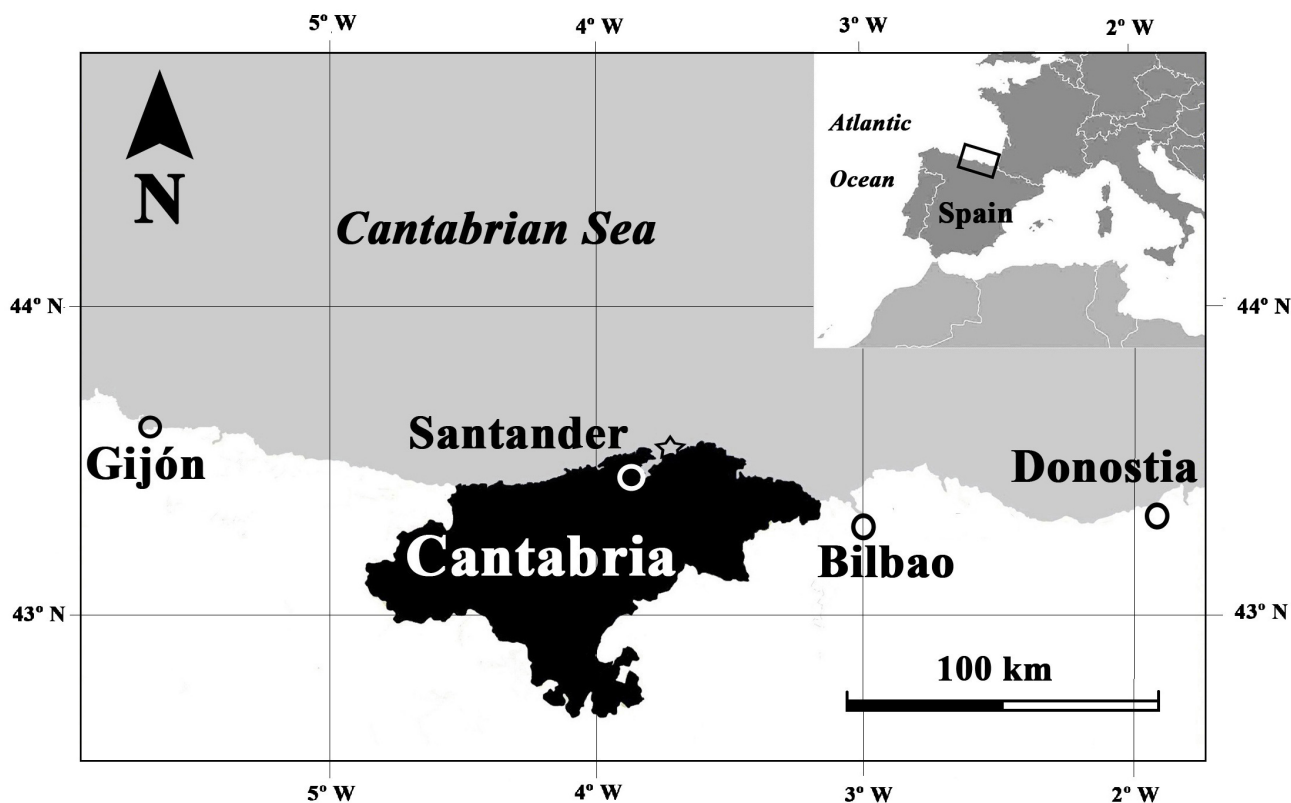


Figure 1. Location map of Cantabria region in northern Spain. Star indicates fossil locality.

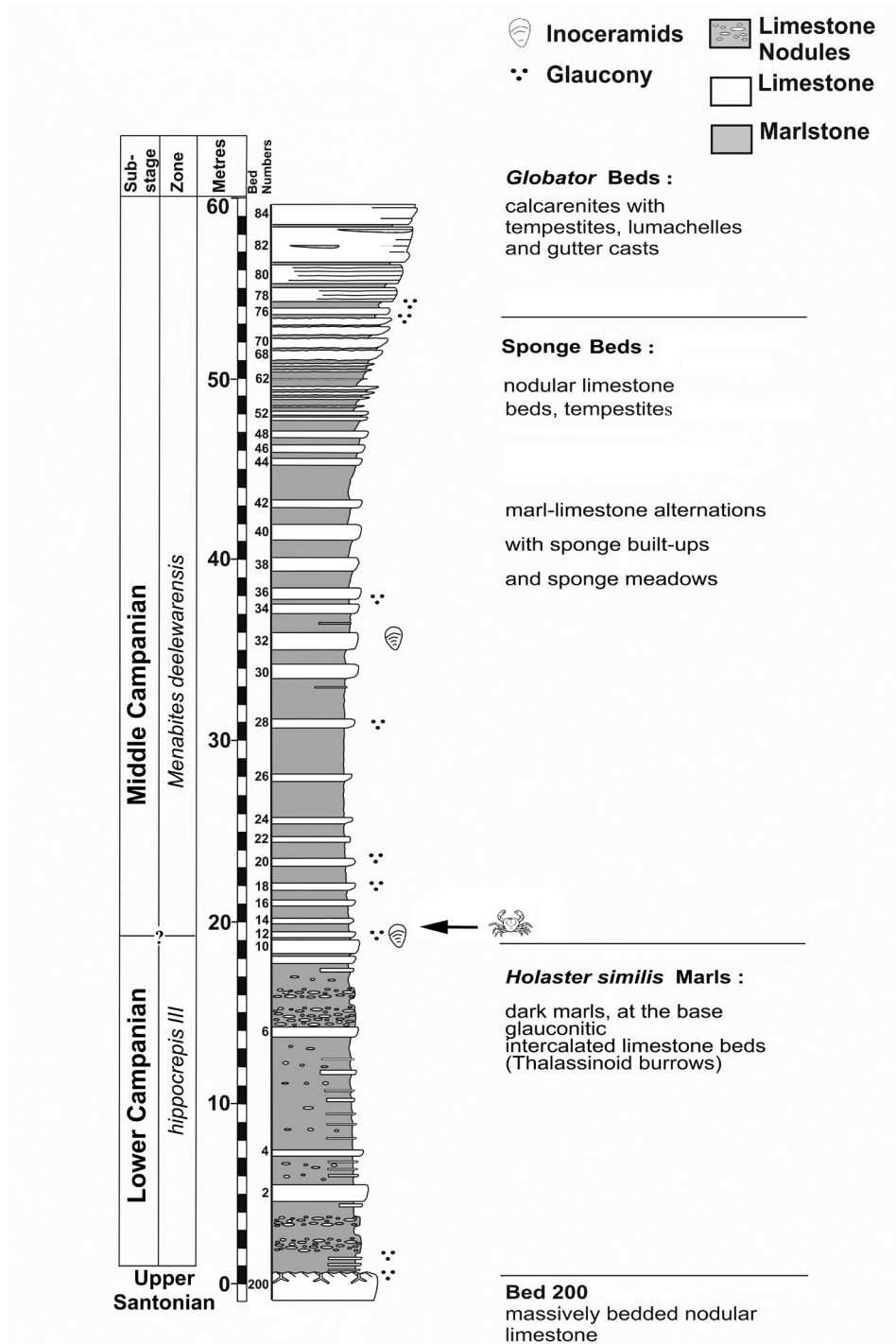


Figure 2. Stratigraphic column of Langre Section. Modified from Schlüter (2009).

Exogira spinosa, and echinoids (Schlüter *et al.*, 2004). Additional information on the geology of the area can be found in Rehfeld and Otto (1995), Wilmsen *et al.* (1996), and Schlüter *et al.* (2004).

The specimen here described is housed in the Museo Marítimo del Cantábrico of Santander (Cantabria, Spain), acronym MMCAN.

3. Systematic paleontology

Infraorder Brachyura Latreille, 1802
 Section Podotremata Guinot, 1977
 Superfamily Etyoidea Guinot & Tavares, 2001
 Family Feldmanniidae Schweitzer, Feldmann, Franțescu & Klompmaker, 2012

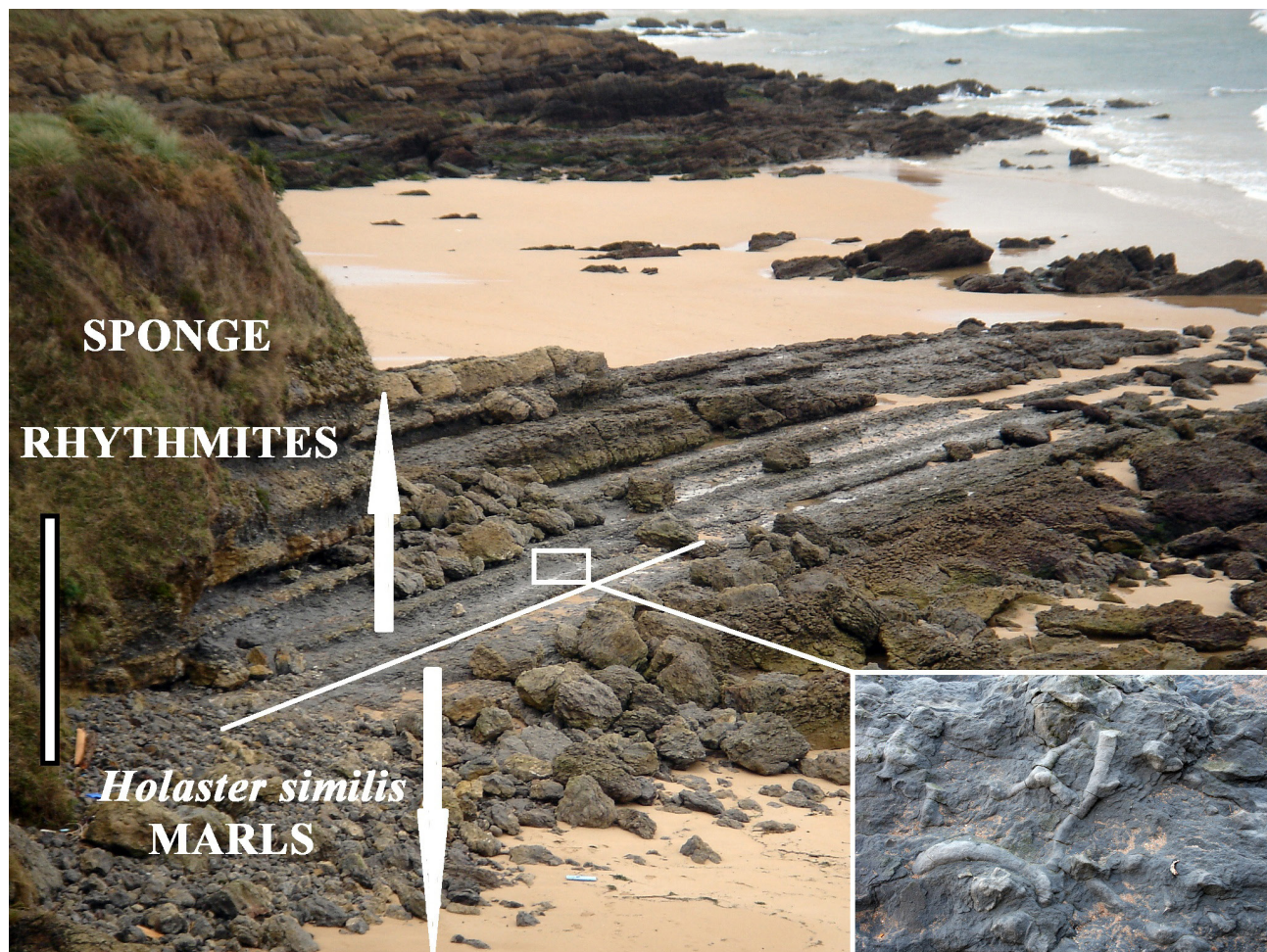


Figure 3. View of outcrops (Loredo's Beach) with close-up view of crab bearing level (rectangle). Scale bar = 1 m.

Genus *Cantabroxanthus* n. gen.

Type species: *Cantabroxanthus loredoensis* n. sp.

Etymology: The genus name refers to the Cantabrian Coast, northern Iberian Peninsula, and the suffix *-xanthus*, for the similarities with *Caloxanthus*.

Type locality and horizon: The fossil crab described here was collected from talus beach rock in the village of Loredo, municipality of Ribamontán al Mar (Cantabria, Spain); middle Campanian.

Material and measurements (in mm): Holotype MMCAN/2014/0003: carapace length 15mm, carapace width 20 mm, orbito frontal width 13 mm, frontal width 6 mm, posterior margin width 8mm.

Diagnosis: Carapace small, hexagonal, slightly ovate transversely, wider than long, widest at anterior third, convex in both directions, anterior third longitudinally deflexed; strong cuticle with coarse granules; frontal margin broken; orbits relatively broad, transversely ovate, entire, supraorbital margin rimmed, finely granulated; anterolateral margin strongly convex, bordered by six small spaced

granulated lobes; posterolateral margin straight, bordered by granules; posterior margin straight, vaulted, rimmed by a parallel row of granules; carapace regions evident; hepatic region slightly swollen; lobes of protogastric region strongly inflated, mesogastric region narrow anteriorly, metogastric region narrow, urogastric region depressed, smooth; lobes of epi-mesobranchial region strongly inflated, metabranchial region depressed, smooth; lobe of cardiac region rhomboidal, axially elongate, inflated; intestinal region depressed, smooth; cervical groove anteriorly placed, deep, smooth.

Discussion: *Cantabroxanthus* n. gen. is here in tentatively placed within Feldmanniidae (Etyoidea) that includes the genera: *Bretonia* Schweitzer, Feldmann, Franțescu and Klompaker, 2012, *Caloxanthus* and *Feldmannia* Guinot and Tavares, 2001 (see Schweitzer *et al.*, 2102) on the basis of some similarities with *Caloxanthus*.

Cantabroxanthus n. gen. has some affinities with the genus *Caloxanthus* A. Milne-Edwards, 1864 (Feldmanniidae) in having a similar transversally ovate carapace ornamented with coarse granules, maximum width at the anterior third of carapace, large oval orbits that are forward directed, an

entire supraorbital margin without fissures, an orbital rim strongly elevated and a cervical groove anteriorly placed. *Cantabroxanthus* differs from *Caloxanthus* in not having a transversally ovate carapace, having an anterolateral margin with lobes instead of the smooth ones as in *Caloxanthus* and also by having regions well-defined whereas in *Caloxanthus* they are poorly defined (Schweitzer *et al.*, 2012; Vega *et al.*, 2014). *Bretonia* differs from *Cantabroxanthus* n. gen. in having a smooth carapace without well marked regions and having a supraorbital margin with two fissures instead of the entire margin as in *Cantabroxanthus* (see Collins and Breton, 2009, p. 47-49, f. 8-9). *Feldmannia* differs from *Cantabroxanthus* in having a wider carapace, being ornamented with granules not as coarse and having less-defined regions.

Furthermore, all genera belonging to the other Etyoidea: *Etyidae* Guinot and Tavares, 2001 differ from *Cantabroxanthus* n. gen. in having a wider carapace, a maximum width placed more posteriorly, and more strongly dentate anterolateral margins. In addition, the cervical groove in *Etyidae* is more sinuous and placed more posteriorly than in *Cantabroxanthus* n. gen., and the epi-mesobranchial lobes are differentiated by two well-marked branchial grooves (bg1 and bg2), whereas in *Cantabroxanthus* n. gen. those two lobes are not differentiated (see Schweitzer *et al.*, 2012).

The above mentioned affinities are important characters that *Cantabroxanthus* n. gen. shares with *Caloxanthus*, allowing tentative placement of *Cantabroxanthus* n. gen. within the Feldmanniidae. No ventral features preserved in the sole specimen of *Cantabroxanthus* n. gen. permit comparing it with the typically strongly deflexed sternum seen in the Feldmanniidae (see Schweitzer *et al.*, 2012, Vega *et al.*, 2014).

The general shape of *Cantabroxanthus* n. gen., is similar to several members of Palaeocorystoidea, Lörenthey in Lörenthey and Beurlen, 1929 as *Paranecrocarcinus* Van Straelen, 1936 (Paranecrocarcininae, Necrocarcinidae), with similarities like expanded anterolateral margins and carapace ornamented with coarse granules in some of their species such as *Paranecrocarcinus quadricissus* (Noetling, 1881). *Cantabroxanthus* n. gen. differs from *Paranecrocarcinus* in having a larger and apparently straight front, broader frontal and fronto-orbital margin and mainly by having the supraorbital margin entire without fissures. In Paranecrocarcininae Fraaije, Van Bakel, Jagt & Artal, 2008 the supraorbital margin has two fissures. Furthermore in *Cantabroxanthus* n. gen. the postfrontal slits are absent, which are a diagnostic character for the Paranecrocarcininae (Fraaije *et al.*, 2008, p. 201; Van Bakel *et al.*, 2012).

Other genera of Palaeocorystoidea show some resemblance to *Cantabroxanthus* n. gen., however there are evident differences. The new genus differs from Necrocarcinidae Förster, 1968, in lacking the usual strong dorsal tubercles, having a broader frontal and frontorbital margin and by its supraorbital margin being entire whereas

in Necrocarcinidae the supraorbital margin is bi-fissured. *Shazella* Collins and Williams, 2004 (Necrocarcinidae) possesses a posterior carapace half with three axial inflations that is similar to *Cantabroxanthus*, however *Shazella* has a straight anterolateral margin that is not as laterally expanded as in *Cantabroxanthus*, ruling out any relationship between the two genera. Absence of well-developed epibranchial spines and of the diagnostic three axial ridges in *Cantabroxanthus* n. gen. precludes its placement in Cenomanocarcinidae Guinot, Vega and Van Bakel, 2008. Also, not having the spiny frontal margin as in *Cantabroxanthus*, excludes any relationship with the family Orithopsidae Schweitzer, Feldmann, Fam, Hessin, Hetrick, Nyborgand, Ross, 2003. Absence of the two supraorbital fissures present in all families of Palaeocorystoidea rules out placement of *Cantabroxanthus* within the Palaeocorystoidea (see Van Bakel *et al.*, 2012).

Cantabroxanthus loredoensis n. gen.

Figure 4

Etymology: From Loredó, village of the municipality of Ribamontán al Mar, Cantabria (Spain), where the holotype was collected.

Diagnosis: as for the genus.

Description: Carapace sub-hexagonal, slightly ovate transversely, wider than long, widest at anterior third, at level of third anterolateral lobe, slightly convex transversally and longitudinally, strongly convex at anterior third; strong cuticle with coarse granules covering all the regions inflated; frontal margin broken, probably not prominent; orbits relatively broad, transversely ovate, supraorbital margin entire, rimmed, elevated, finely granulated and forward directed; anterolateral margin strongly convex, bordered by six small spaced granulated lobes; posterolateral margin straight, bordered by granules; posterior margin straight, vaulted in posterior view, rimmed by a parallel row of granules; carapace regions well marked; hepatic region slightly swollen; epigastric lobes inflated, lobes of protogastric region strongly inflated, anteriorly divided by a groove, mesogastric region anteriorly narrow, metagastric region narrow marked by a two transversal rows of granules, urogastric region narrow, depressed, smooth; lobes of epi-mesobranchial region strongly inflated, metabranchial region depressed, smooth, ornamented with few scattered granules; lobe of cardiac region rhomboidal, axially elongate, inflated, reaching almost the posterior margin; intestinal region depressed, very reduced, smooth; cervical groove deep, smooth, anteriorly placed.

4. Conclusion

The discovery of *Cantabroxanthus loredoensis* n. gen., n. sp. expands the knowledge of the Etyoidea showing a new pattern of carapace shape not previously seen for this

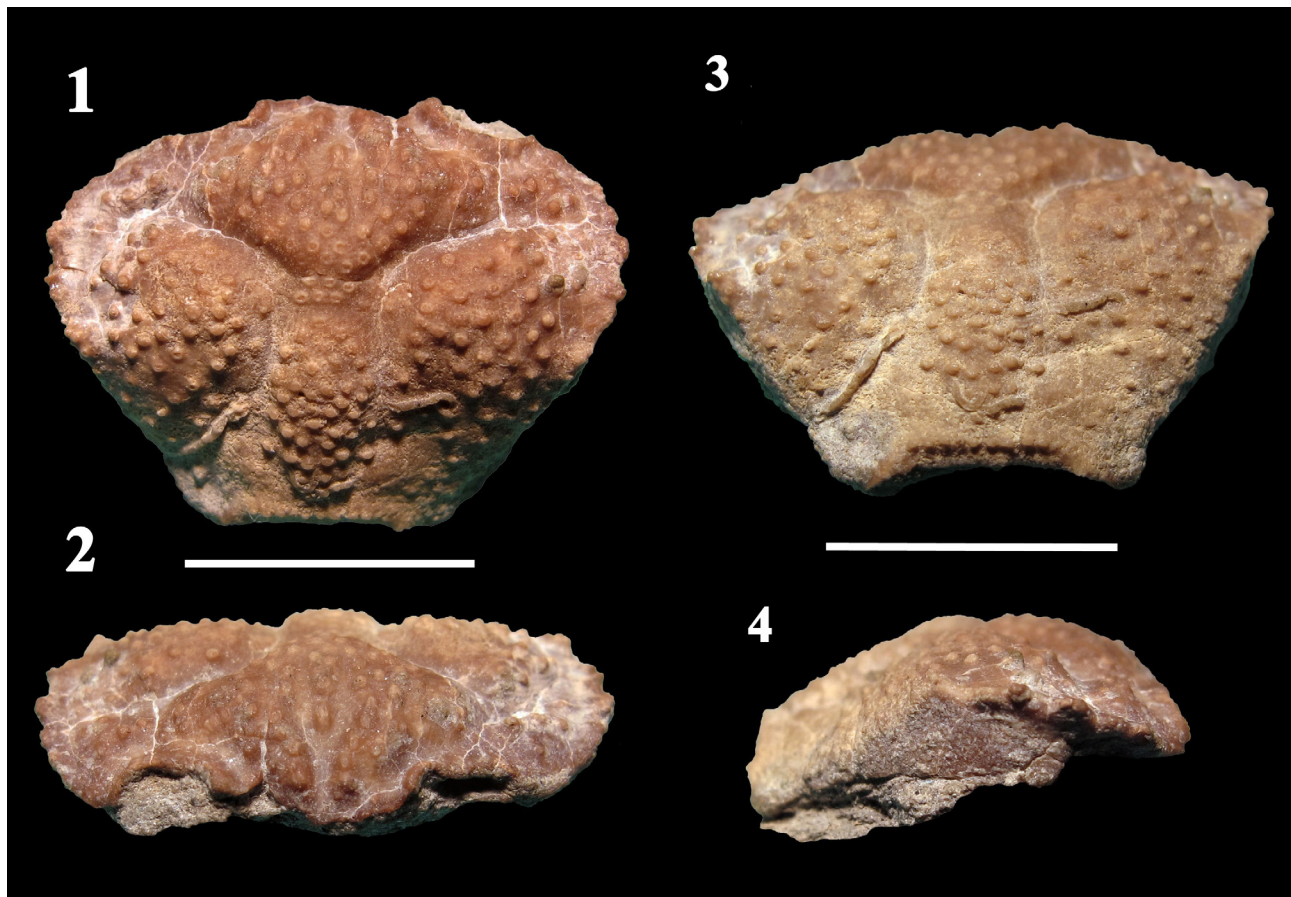


Figure 4. *Cantabroxanthus loredoensis* n. gen. n. sp. Holotype MMCAN/2014/0003 1-dorsal view. 2-frontal view. 3-posterior view. 4-right lateral view. Scale bar = 1 cm.

superfamily. Works in progress on Etyoidea (Van Bakel) will improve the understanding of this group with new data.

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