



Caecidae of the northeast Pacific (Gastropoda: Caenogastropoda)

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Abstract

A review of northeast Pacific Caecidae. McLean (1978) reported five species. One additional species is reported here and the taxonomic positions of two other species are updated.

Key words: Mollusca, biodiversity, taxonomy, systematics, Caecidae

Introduction

Although abundant in the northeast Pacific, the species diversity of Caecidae is limited to no more than a half dozen species. Their unique ability of discarding previous growth stages once they have out grown them has resulted in numerous synonyms.

Caecids are often extremely prolific in shallow water, living interstitially in sand and gravel. A dozen genera have been proposed, but there is little agreement as to their application. Shell septum, aperture, and sculpture characteristics, which were once widely used to determine generic placement have become somewhat unreliable and problematic as taxonomically informative.

For information regarding growth morphology and septum formation, see Pizzini *et al.* (1998) and Lima *et al.* (2013), for classification, see Bandel (1996) and Absalão & Pizzini (2002).

Abbreviations

- LACM: Natural History Museum of Los Angeles County, California, USA.
NHMUK: The Natural History Museum of the United Kingdom, London, UK.
SBMNH: Santa Barbara Museum of Natural History, California, USA.
USNM: National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA.
OD: Original designation.
SD: Subsequent designation.
†: fossil.

Systematics

Caecidae Gray, 1850

Description. Shell 1–7 mm, tubular, slightly curved; smooth or crossed by collabral rings, axial ribs, or in combination; posterior end closed by conical septum. Protoconch spiral, typically deciduous. Color variable, from translucent, white, tan or brown. Operculum multispiral. Eyes at tentacle base. Foot short. Radula taenioglossate. Larval stage planktonic.

***Caecum* Fleming, 1813**

Caecum Fleming, 1813: 67. Type species (SD: Gray, 1847) *Dentalium trachea* Montagu, 1803. Northeastern Atlantic.
Odontidium Philippi, 1836: 102. Type species (OD) *Odontidium rugulosum* Philippi, 1836. Palermo, Sicily †.
Brochina Gray, 1857: 101. Type species (OD) *Dentalium glabrum* Montagu, 1803. European Atlantic.
Elephantanellum Bartsch, 1920: 567. Type species (OD) *Caecum heptagonum* Carpenter, 1857. Mazatlan.
Caecum (*Defolinia*) Weisbord, 1962: 166. Type species (OD) *Caecum* (*Defolinia*) *tomaculum* Weisbord, 1962. Mare formation, Punta Gorda, Venezuela †.
Pictocaecum Habe, 1978: 3. Type species (OD) *Pictocaecum japonicum* Habe, 1978. Kyushu, Japan.

Description. Shell minute; teleoconch slightly curved tube, smooth or crossed by collabral rings, axial ribs, or in combination. Posterior end closed by conical septum. Protoconch planispirally coiled.

Remarks. Within the genus *Caecum*, growth is accomplished by discarding earlier growth stages and forming a succession of new septa, with the initial spiral protoconch seen only on the first growth stage.

***Caecum dextroversum* Carpenter, 1857**

(Figures 1A–B)

Caecum dextroversum Carpenter, 1857: 326. Syntypes NHMUK 1867.6.4.1548. Mazatlan.
Fartulum occidentale Bartsch, 1920: 566. Syntypes USNM 152166. San Pedro, California.
Fartulum hemphilli Bartsch, 1920: 566. Holotype USNM 340728. San Pedro, California.
Fartulum bakeri Bartsch, 1920: 566. Holotype USNM 340729. San Pedro, California.

Description. Tube somewhat large, cylindrical, arched, smooth except for axial growth lines; color translucent tan to brown. Septum mucronate in subadult stages, somewhat protruding over cutting plane, angular heeled mucro; pronounced hemispherical septum in mature stage, faint pimple-like mucro if not worn. Aperture simple, without varix. Periostracum brown, longitudinal wavy line microsculpture. Operculum thin, corneous, light brown. Length up to 4.0 mm.

Distribution. Kachemak Bay, Kenai Peninsula, Alaska, to Magdalena Bay, Baja California Sur. Common in intertidal and sublittoral zones, 1–50 m.

Remarks. Older specimens will often become thicker and more calcified. The coloration will also tend to change to a dull white with brownish purple staining. Comparison of the type material of *Fartulum occidentale*, *F. hemphilli*, and *F. bakeri* by SEM imaging indicates that they are conspecific with *C. dextroversum* as suggested by Lightfoot (1993: 79).

***Caecum quadratum* Carpenter, 1857**

(Figures 1C–D)

Caecum quadratum Carpenter, 1857: 322. Syntypes NHMUK 1857.6.4.1529. Mazatlan.
Caecum compactum Carpenter, 1857: 322. Syntypes NHMUK 1857.6.4.1530. Mazatlan.
Caecum dalli Bartsch, 1920: 568. Holotype USNM 340724. San Diego, California.
Caecum grippi Bartsch, 1920: 568. Holotype USNM 206961. San Diego, California.
Caecum licalum Bartsch, 1920: 568. Holotype USNM 340725. San Diego, California.
Caecum diegensense Bartsch, 1920: 568. Holotype USNM 340726, lost. San Diego, California.

Description. Tube small, subcylindrical, arched, stout, with 16–24 angulate or squarish distally spaced axial rings; microsculpture consisting of longitudinal lines within interspaces; cream to light tan in color. Septum mucronate, somewhat protruding over cutting plane, with low pointed mucro. Aperture of mature specimens somewhat developed, with last three rings closely spaced, preceded by weak sulcus. Periostracum thin, light brown. Operculum thin, corneous, concave. Length up to 2.5 mm.

Distribution. Farallon Islands, California to Baja California Sur, south to Colima. Although found in the lower intertidal, *C. quadratum* is more abundant in the sublittoral zone in gravel and under kelp, 1–40 m.

Remarks. The shell of *Caecum quadratum* is highly variable in the strength and number of rings. McLean (1978) considered *C. dalli* Bartsch, 1920, to be a separate species. However, after comparing the type material of *C. dalli* and *C. quadratum*, this author has determined that they are conspecifics.

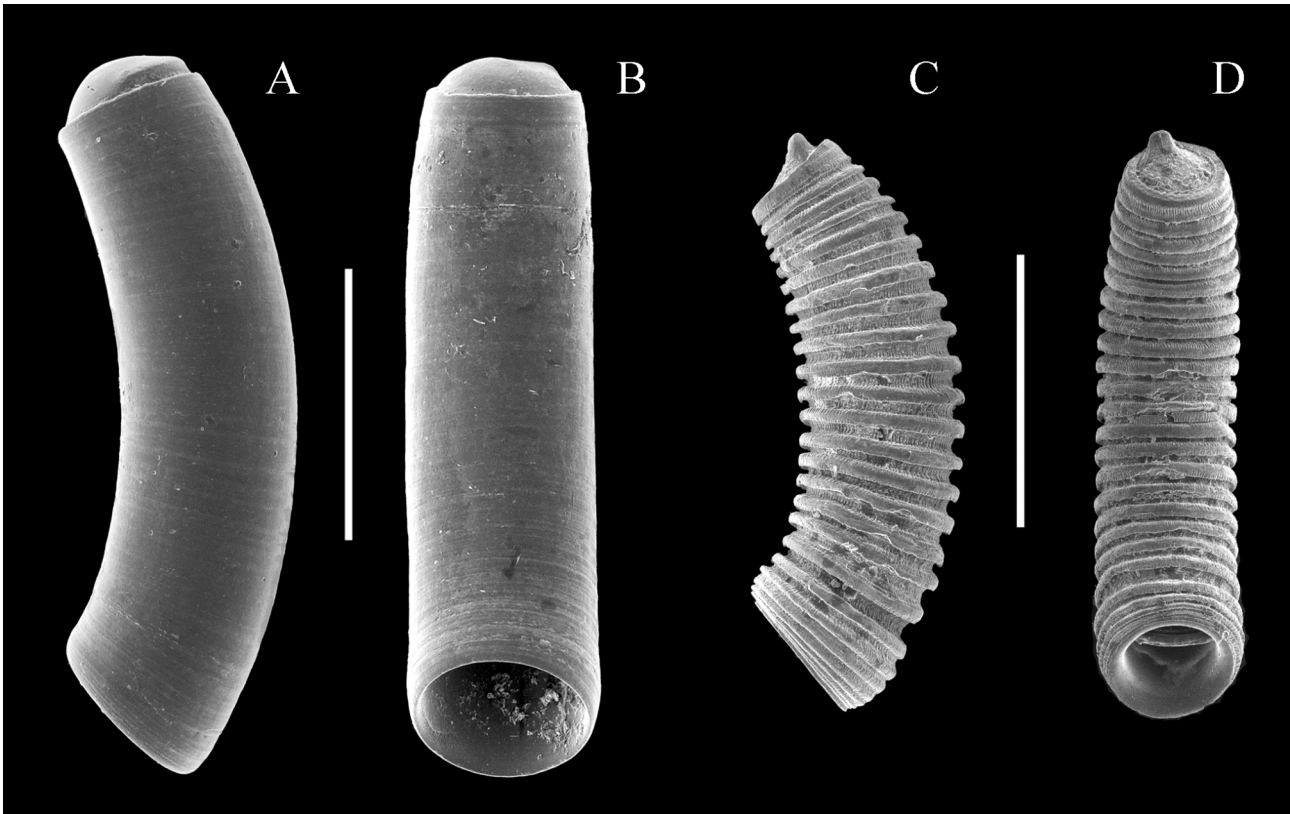


FIGURE 1. A. *Caecum dextroversum* Carpenter, 1857, profile view, 0–5 m, Paradise Cove, Los Angeles County, California, 2.7 mm (LACM 1972-205.17). B. *Caecum dextroversum* Carpenter, 1857, ventral view, 0–5 m, Paradise Cove, Los Angeles County, California, 2.6 mm (LACM 1972-205.17). C. *Caecum quadratum* Carpenter, 1857, profile view, 10–20 m, San Clemente Island, Los Angeles County, California, 2.1 mm (LACM 1969-29.57). D. *Caecum quadratum* Carpenter, 1857, ventral view, 10–20 m, San Clemente Island, Los Angeles County, California, 2.25 mm (LACM 1969-29.57). Scale bars = 1 mm.

***Caecum crebricinctum* Carpenter, 1864**

(Figures 2A–B)

Caecum crebricinctum Carpenter, 1864: 215. Holotype USNM 14930. San Diego, California.

Micranellum pedroense Bartsch, 1920: 569. Holotype USNM 346723. San Pedro, California.

Micranellum catalinense Bartsch, 1920: 569. Holotype USNM 211331. Santa Rosa Island, California.

Micranellum profundicolum Bartsch, 1920: 569. Holotype USNM 209960. San Diego, California.

Micranellum barkleyense Bartsch, 1920: 569. Holotype USNM 211589. Barkley Sound, Vancouver Island, British Columbia .

Micranellum oregonense Bartsch, 1920: 569. Holotype USNM 216413. Forrester Island, Alaska.

Micranellum rosanum Bartsch, 1920: 569. Holotype USNM 211859a. Santa Rosa Island, California.

Description. Tube relatively large, subcylindrical, somewhat arched, stout, numerous close-set flattened axial rings; cream colored, often light brown mottling present. Septum mucronate, sharply projecting over cutting plane, long oblique mucro. Aperture simple, without varix. Operculum corneous, concave, dark brown. Length up to 7.0 mm.

Distribution. Kachemak Bay, Alaska, to Punta Abreojos, Baja California Sur. Abundant on a various types of substrates, including gravel near rocks and fine particles in deeper water, 3–200 m.

Remarks. Bartsch (1920: 569) described the genus *Micranellum* for *Caecum crebricinctum*. However, his diagnosis of "closely spaced, slender, axial annulations" is of specific level characteristics, and does not warrant a separate genus. Bartsch described six other taxa from northeastern Pacific localities, as listed in the synonymy above. The type material has been examined using SEM imaging and all fall within the normal range of variation for *C. crebricinctum*. This species is the largest species known in the family, and the only

member occurring in relatively deep water in the northeastern Pacific. *Caecum crebricinctum* is also one of the more common fossil caecids found in the upper Pleistocene exposures from San Pedro to San Diego.

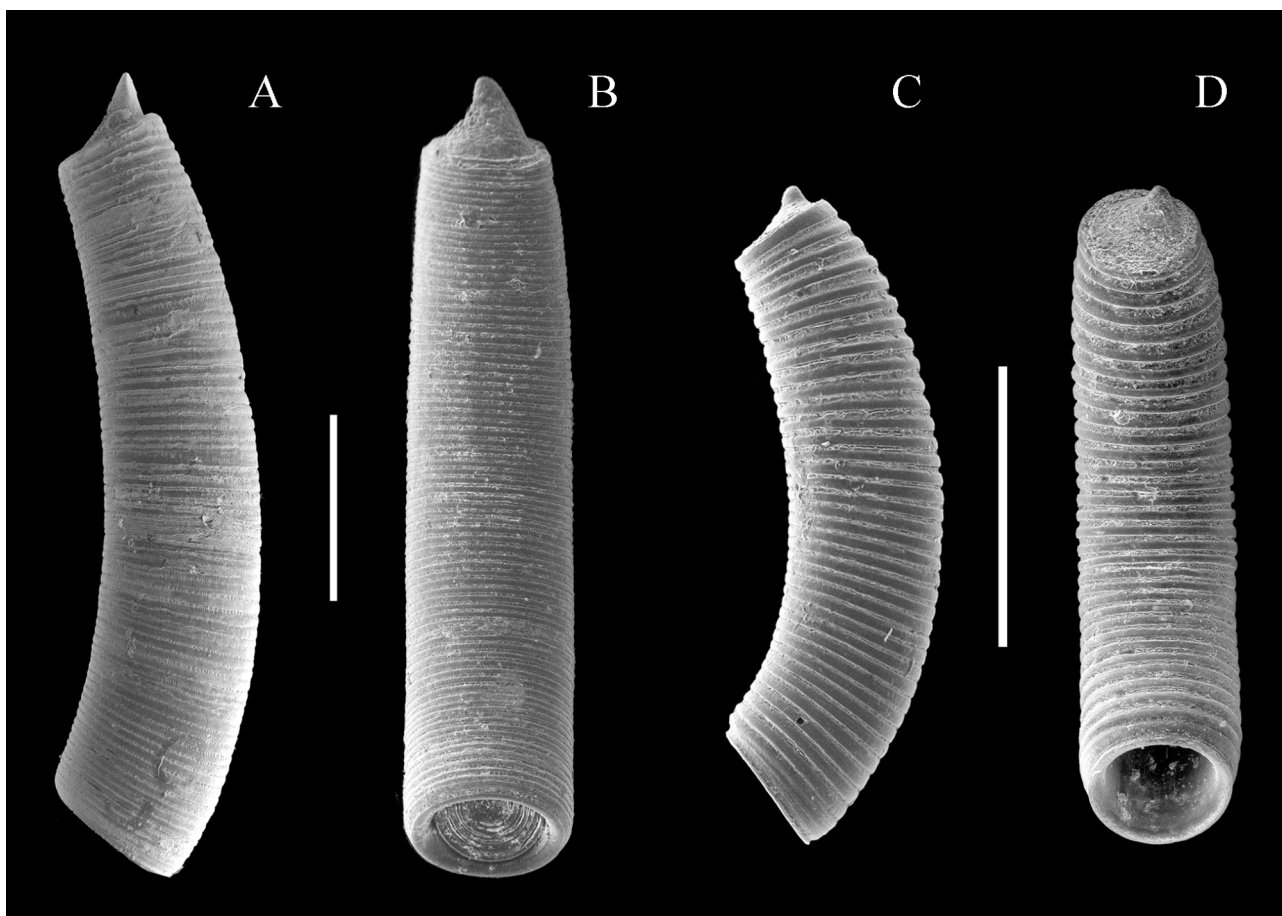


FIGURE 2. A. *Caecum crebricinctum* Carpenter, 1864, profile view, 30 m, Rocky Point, San Pedro, Los Angeles County, California, 4.8 mm (SBMNH 20619). B. *Caecum crebricinctum* Carpenter, 1864, ventral view, 30 m, Rocky Point, San Pedro, California, 4.7 mm (SBMNH 20619). C. *Caecum californicum* Dall in Orcutt, 1885, profile view, Intertidal, San Diego, California, 2.8 mm (SBMNH 215002). D. *Caecum californicum* Dall in Orcutt, 1885, ventral view, Intertidal, San Diego, California, 2.75 mm (SBMNH 215002). Scale bars = 1 mm.

Caecum californicum Dall in Orcutt, 1885

(Figures 2C–D)

Caecum cooperi Carpenter, 1864: 216. Syntypes USNM 15719. San Diego. [non S. Smith, 1862].

Caecum californicum Dall in Orcutt, 1885: 541 [nomen novum].

Description. Tube small, cylindrical, arched, glossy, 30–40 close-set rings; color cream to light brown. Septum mucronate, somewhat protruding over cutting plane, low pointed mucro. Aperture simple, without varix, thickened, terminating with slightly constricted ring. Periostracum thin, light brown. Operculum thin, corneous, light brown. Length up to 3.0 mm.

Distribution. Sonoma County, California to Cape San Lucas, Baja California Sur. Abundant in sand and gravel, in tidepools and near eelgrass, and low intertidal and sublittoral zones, 1–30 m.

Remarks. In 1864, Carpenter named the species *Caecum cooperi*, not realizing that the name had been previously used for a western Atlantic caecid. Twenty years later, noting the error and abundance of the species, Dall (1885) renamed it *C. californicum*. Fossils of this species are known from Pleistocene exposures of San Monica, California to Baja California Sur.

***Caecum orcutti* Dall in Orcutt, 1885**

(Figures 3A–B)

Caecum orcutti Dall in Orcutt, 1885: 541, Holotype USNM 60927. San Diego, California.

Description. Tube small, stout, slightly arched, smooth with the exception very fine growth lines; translucent white to tan in color. Septum somewhat hemispherical protruding over cutting plane, with low heel-like mucro. Aperture oblique, without varix. Periostracum reddish brown. Operculum thin, corneous, brown. Length up to 2.5 mm.

Distribution. Pacific Grove, Monterey County, California, to Asuncion Island, Baja California. Abundant on the under surfaces of stones and debris at the high tide mark in protected rocky areas of open coast. Intertidal.

Remarks. The degree of aperture obliqueness is quite variable within *C. orcutti*, and it can be difficult to tell the difference between a late stage subadult and a mature specimen.

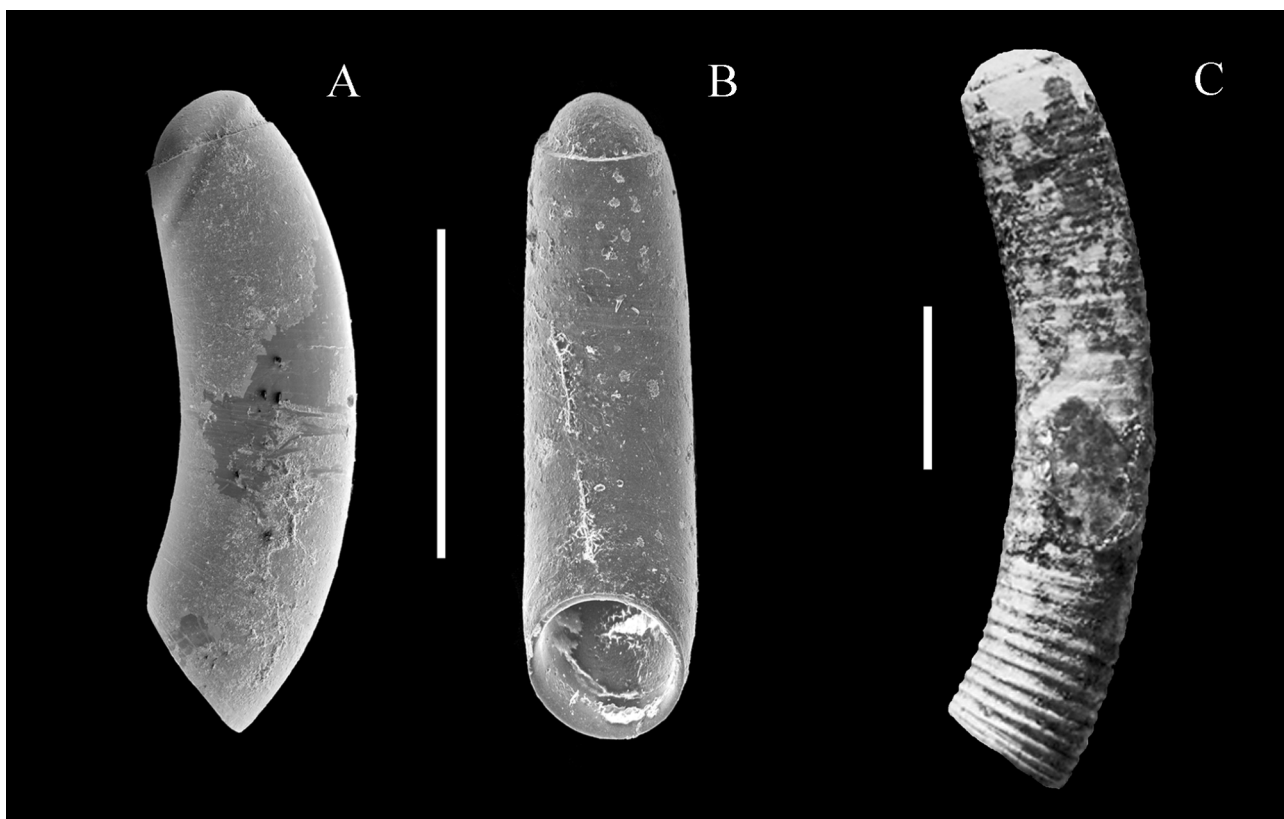


FIGURE 3. A. *Caecum orcutti* Dall in Orcutt, 1885, profile view, 0–5 m, Paradise Cove, Los Angeles County, California, 2.7 mm (LACM 1972-205.18). B. *Caecum orcutti* Dall in Orcutt, 1885, ventral view, 0–5 m, Paradise Cove, Los Angeles County, California, 2.6 mm (LACM 1972-205.18). C. *Caecum carpenteri* (Bartsch, 1920), profile view, San Diego, California, 4.8 mm (USNM 340727, holotype). Scale bars = 1 mm.

***Caecum carpenteri* (Bartsch, 1920)**

(Figure 3C)

Elephantanellum carpenteri Bartsch, 1920: 567. Holotype USNM 340727. San Diego, California.

Description. Tube large, cylindrical, arched, thin, fragile, 8–12 well defined low axial rings near apertural end; microsculpture weak longitudinal lines, growth rings; color translucent white to gray. Septum hemispherical, protruding over cutting plane. Aperture simple, without varix. Periostracum thin, yellow–tan. Operculum thin, corneous, concave. Length up to 5.0 mm.

Distribution. Santa Monica, Los Angeles County, California south to the Gulf of California. Rare.

Remarks. For many years *C. carpenteri* had only been known from its type material. Herein is the first published image of the holotype (Fig. 3C). *Caecum carpenteri* also has a more restrictive range than has been reported by Keen (1971: 398) and Lightfoot (1993: 82).

Discussion

A comprehensive study of eastern Pacific Caecidae is currently underway and expected to be published in the near future.

The image herein of *Caecum carpenteri* was produced by McLean sometime during his efforts to document and systematically review the northeastern Pacific gastropods, and we are fortunate to have it. Not only is it the first published image of the holotype, it is the last image of it undamaged. The holotype is now broken into at least two pieces. It is unknown when the damage occurred.

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