

SPIXIANA	39	1	23–27	München, September 2016	ISSN 0341–8391
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First record of the azooxanthellate coral genus *Coenocyathus* Milne Edwards & Haime, 1848 in the southeastern Pacific Ocean

(Anthozoa, Scleractinia)

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Araya, J. F., Araya, M. & Cairns, S. D. 2016. First record of the azooxanthellate coral genus *Coenocyathus* Milne Edwards & Haime, 1848 in the southeastern Pacific Ocean (Anthozoa, Scleractinia). *Spixiana* 39(1): 23–27.

New records of the azooxanthellate coral genus *Coenocyathus* Milne Edwards & Haime, 1848 are presented based on the record of two colonies of the species *Coenocyathus bowersi* Vaughan, 1906, collected from shallow water off northern Chile, Atacama Region, near the port of Caldera (27° S) by commercial fishermen. This new record extends the southern distribution record of this species by about 2400 km; this species is the first shallow water coral found in northern Chile.

Se presentan nuevos registros del género de coral azooxantelado *Coenocyathus* Milne Edwards & Haime, 1848 basados en el registro de dos colonias de la especie *Coenocyathus bowersi* Vaughan, 1906, colectadas por pescadores comerciales en aguas someras en el norte de Chile; Región de Atacama, cerca del puerto de Caldera (27° S). Este nuevo registro extiende considerablemente la distribución septentrional de este género (en cerca de 2400 km hacia el sur); esta especie es el primer registro de un coral de aguas someras encontrado en el norte de Chile.

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Introduction

Studies on hard corals and research on anthozoan species in general along the Chilean coasts have been scarce until recently: apart from the studies done on Chilean anthozoans from southern Chile (Häussermann 2004a–c, 2006, Häussermann & Försterra 2005, 2007a, 2008, Sinniger & Häussermann 2009, van Ofwegen et al. 2006, 2007) and of some azooxanthellate cold-water corals from the Chilean fjords (Försterra & Häussermann 2003, Försterra et al. 2005, Häussermann & Försterra 2007b), a recent revision

of the Chilean Scleractinia reported only 23 species of corals, all of them azooxanthellate (Cairns et al. 2005). Most of these scleractinian coral species have offshore distributions, with the majority of species found only in deep water areas and represented by only few records. In Chilean Patagonia, however, three caryophylliid species are found in diving depth (Häussermann & Försterra 2009).

The genus *Coenocyathus* Milne Edwards & Haime, 1848 is a caryophylliid genus diagnosed by having colonial, firmly attached coralla with hexameral septal symmetry, the septa arranged in multiple

cycles, and a fascicular columella (Cairns & Kitahara 2012). This azooxanthellate genus consists of eight species (Roberts et al. 2009), previously known from the Atlantic and southwestern Pacific Oceans, thriving from 2 to 500 m depth. Here we provide the first record of this genus in the southeastern Pacific Ocean, based on the collection of two colonies of the species *Coenocyathus bowersi* Vaughan, 1906 recovered from rocky bottoms in shallow water off the Port of Caldera (27° S). This extends the current southern distribution record of this species 2400 km southwards from its previous range in Panama, being also the first shallow water coral species recorded in northern Chile.

Materials and methods

Two colonies of *Coenocyathus bowersi* Vaughan, 1906 were recovered in January 2013, near Caldera (27°20' S, 70°56' W). The samples were taken as bycatch specimens in the fisheries of the Congrio Dorado (Pink Cusk-Eel) in a depth of 30 to 55 m. Both colonies are deposited in the collections of the Museo de la Pesca Artesanal, in Caldera, Chile (MPACCL). A fragment of the larger colony is deposited in the Museo Paleontológico de Caldera, Caldera, Chile (MPCCL 190716).

Results

Phylum Cnidaria Hatschek, 1888
Class Anthozoa Ehrenberg, 1834
Subclass Hexacorallia Haeckel, 1866
Order Scleractinia Bourne, 1900
Family Caryophylliidae Dana, 1846

Genus *Coenocyathus* Milne Edwards & Haime, 1848

Diagnosis. Colonial, corallites usually extratentacularly budded from a thick, common, basal coenosteum, rarely branching; occasionally from lateral edges of other corallites (e.g. *C. bowersi*); and rarely intratentacularly. Corallites cylindrical and usually stout, corallites do not anastomose, but branches do. Neither do in this species. Septotheca costate and granular. Septa in 3 or 4 cycles of variable symmetry. A crown of well-formed pali occurs before penultimate septal cycle. Columella fascicular (twisted elements). Endotheca absent. (after Cairns 2000).

Type species: *Coenocyathus cylindricus* Milne Edwards & Haime, 1848, by subsequent designation (Milne Edwards & Haime 1850: xii)

Coenocyathus bowersi Vaughan, 1906

Coenocyathus bowersi Vaughan, 1906: 847, pl. 77, figs 1–3; Durham 1947: 34; Durham & Barnard 195: 83, pl. 10, fig. 45a–d; Bythell 1986: 14, pl. 3, fig. A, pl. 5, figs A, F; Cairns 1994: 25, pl. 8a–f (including a more complete synonymy).

Description

Corallum colonial. Cylindrical corallites arising by extratentacular budding; corallites 2 to 12 mm in diameter, 4 to 16 mm in height. Some corallites, however, are widely spaced and taller (up to 25 mm in height) and others are short and closely spaced. Calices elliptical to circular. Some corallites show also intratentacular budding. Costae broad and flat, slightly convex, granulose. Corallum white. Septa symmetry very irregular. Each calice has 6–14 primary septa, which are larger than all others, dividing the corallite into 6–14 sectors. Each sector has 1 secondary and 2 smaller tertiary septa plus 1 P2. The 5-septa-sector consists of 1 secondary, 2 tertiary, and a pair of small quaternary septa, plus 1 P2. The 7-septa-sector consists of 1 secondary, 2 tertiary, and two pairs of quaternary septa, accompanied by 2 P3. Most calices have a mixture of developmental stages, producing a very irregular septal insertion pattern, with some corallite having up to 46 septa. All septa are a little exsert and they have slightly sinuous inner edges. Pali (P2 or P3) relatively slender and extremely sinuous. Some calices form a well-defined palmar crown, while others have poorly formed crowns, missing pali in various sectors. Fossa of moderate depth, containing a small fascicular columella composed of 1–4 twisted laths. Occasionally the columella is absent, the axial edges of the primary septa being slightly expanded and almost meeting in center of calice.

Dimensions of the examined colonies. Large colony (28 cm longest dimension); corallites 2 to 12 mm in diameter, 4 to 12 mm in height (MPACCL unnumbered, Fig. 1A). Smaller colony (10 cm longest dimension); corallites 4 to 12 mm in diameter, 5 to 16 mm in height (MPACCL unnumbered, Fig. 1B).

Distribution. From the United States (Monterey Bay, including Channel Islands, Cortes Bank and Isla Guadalupe, Mexico (Gulf of California) to Panama, at depths of 9 to 302 m (Cairns 1994).

Remarks. Apparently this species is quite variable in development, with corallites of different dimensions in different colonies (Cairns 1994). In the examined colonies this is quite evident, with each colony having different corallite dimensions and

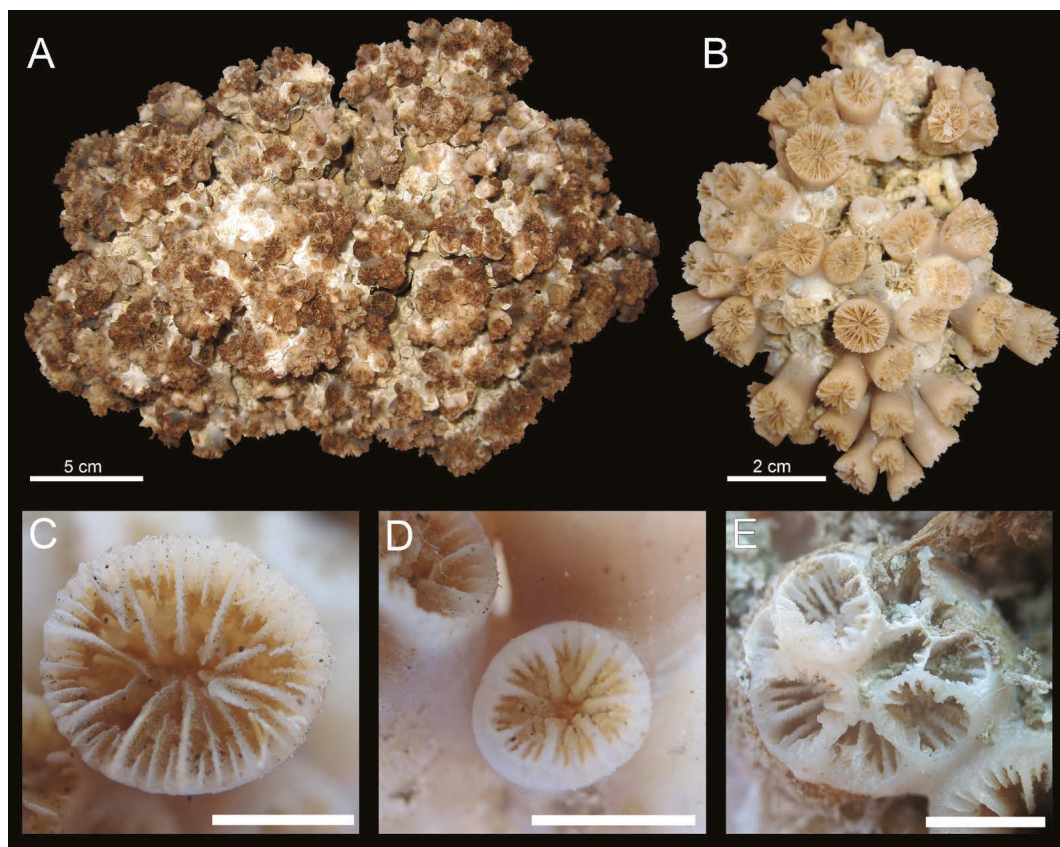


Fig. 1. *Coenocyathus bowersi* Vaughan, 1906, Caldera, Chile. A. Large colony, about 28 cm long (MPACCL, unnumbered); B. small colony, about 10 cm long (MPACCL, unnumbered); C–D. detail of different corallite morphologies; E. detail of corallite with intratentacular budding. Scale bar is 5 mm for C, D and E.

morphologies. Among the accompanying fauna, two brachiopod species (*Disciniscia laevis* (Sowerby, 1822) and an unidentified species) were collected within the larger colony, along with specimens of the bivalve *Kellia tumbesiana* (Stempell, 1899), the gastropods *Crucibulum* sp., *Mitrella* sp., *Nassarius coppingeri* (E. A. Smith, 1881), an encrusting sponge and an unidentified serpulid worm.

Discussion

Eight recent species of *Coenocyathus* are known: *C. anthophyllites* Milne Edwards & Haime, 1848 (northeastern Atlantic); *C. bowersi* Vaughan, 1906 (California to Chile); *C. brooki* Cairns, 1995 (New Zealand: Kermadec Islands, including Raoul, Macauley, Curtis and Cheeseman Islands, and Esperance Rock); *C. caribbeana* Cairns, 2000 (Caracas Baai, Curacao, Bahamas, Honduras); *C. cylindricus* Milne Edwards

& Haime, 1848 (northeastern Atlantic); *C. goreau* Wells, 1972 (Bermuda; Desecheo Island, Puerto Rico); *C. humanni* Cairns 2000 (off West Palm Beach, Florida) and *C. parvulus* (Cairns, 1979) (Bahamas; northeastern Gulf of Mexico; Caribbean, Brazil from Cumuruxatiba to Ilha de Sebastiao). Among them, *C. bowersi* is the only species distributed in the eastern Pacific and one of the few colonial caryophylliids in this region (Pérez et al. 2005). It is a common species in shallow waters off the Gulf of California and in the Pacific of Baja California (Reyes Bonilla & Cruz Piñón 2000, Reyes Bonilla et al. 2005).

This species may be more widespread in northern Chile, as well as in localities between Chile and Panama; however, further sampling is essential in order to assess its distribution. As this species was found near the port of Caldera, with a relatively high maritime traffic, their colonies may be exposed to damage by pollution or direct human activities. So far, only six of the 23 species of scleractinian corals

occurring in Chile can be found in shallow water, and none of them in northern Chile (Cairns et al. 2005). In conclusion, we extended the known range of *C. bowersi* to the southeastern Pacific Ocean and report the first record of a shallow water coral in northern Chile.

Acknowledgements

We thank Andrés Lopez-Perez (Departamento de Hidrobiología, Metropolitan Autonomous University, Mexico) for his help with literature; the personnel of the Museo de la Pesca Artesanal for the access to their collection and to an anonymous reviewer for corrections and suggestions to the text.

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Zeitschrift/Journal: [Spixiana, Zeitschrift für Zoologie](#)

Jahr/Year: 2016

Band/Volume: [039](#)

Autor(en)/Author(s): Araya Juan Francisco, Araya Marta Esther, Cairns Stephen D.

Artikel/Article: [First record of the azooxanthellate coral genus *Coenocyathus* Milne Edwards & Haime, 1848 in the southeastern Pacific Ocean \(Anthozoa, Scleractinia\) 23-27](#)