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# New Species of Stylasterid (Cnidaria: Hydrozoa: Anthoathecata: Stylasteridae) from the Northwestern Hawaiian Islands<sup>1</sup>

Stephen D. Cairns<sup>2</sup>

**Abstract:** A new species of *Cryptbelia*, *C. kelleyi*, is described from a seamount in the Northwestern Hawaiian Islands, making it the fifth species of stylasterid known from the Hawaiian Islands. Collected at 2,116 m, it is the fourth-deepest stylasterid species known.

ONCE THOUGHT TO be absent from Hawaiian waters (Boschma 1959), four stylasterid species have been reported from this archipelago, primarily on seamounts and off small islands in the Northwestern Hawaiian Islands at depths of 293–583 m (Cairns 2005). This is consistent with the theory of Cairns (1992) that stylasterids are insular in occurrence, usually being found on seamounts and off small volcanic islands. Cairns (1978) reported the first Hawaiian species, *Distichopora anceps*, from off Laysan, and he described three more species in 2005, the latter in the genera *Distichopora* and *Stylaster*. Herein a fifth species is reported, also from the Northwestern Hawaiian Islands, but at a much greater depth, 2,116 m, making it the fourth-deepest stylasterid ever collected among the 316 known species. The three deeper species are *Cryptbelia affinis* Moseley, 1879 (2,789 m); *Cryptbelia medioatlantica* Zibrowius & Cairns, 1992 (2,644 m); and *Conopora verrucosa* (Studer, 1878) (2,355 m).

## MATERIALS AND METHODS

The specimen was collected on the *Okeanos Explorer* expedition to the Northwestern Hawaiian Islands, which took place in August 2015. The benthic Cnidaria from this expedition were preserved in 70% ethanol and subsequently deposited at the NMNH. The scanning electron photomicrographs were taken by the author using a Zeiss EVO MA15 scanning electron microscope.

The following abbreviations are used in the text: BPBM, Bernice P. Bishop Museum, Honolulu; D2, *Deep Discover* remotely operated vehicle; EX, *Okeanos Explorer*; L2, Leg 2 of cruise; NMNH, National Museum of Natural History, Washington, D.C.; SEM, Scanning Electron Microscope (prefacing stub number of Cairns series); USNM, United States National Museum (now the National Museum of Natural History), Washington, D.C.

## RESULTS AND DISCUSSION

### SYSTEMATIC ACCOUNT

#### Class HYDROZOA

#### Order ANTHOATHECATA

#### Suborder FILIFERA

#### Family STYLASTERIDAE Gray, 1847

#### Genus *Cryptbelia* Milne Edwards & Haime, 1849

**DIAGNOSIS.** Corallum usually uniplanar, but may also be biplanar or monopodial; commensal calcareous worm living in calcareous tubes often present. Coenosteal texture usually linear-imbricate; nematopores common. Gastro- and dactylopores arranged in cyclo-systems, which usually occur unilinearly on anterior face, but may also occur on posterior

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face. Gastropore tube double-chambered, the upper chamber separated from the lower by a circular ring constriction; gastrostyles absent. Gastropores covered by a fixed lid of variable size and inclination. Both male and female ampullae usually superficial, occurring in a variety of positions on the corallum; efferent pores also variable in placement, but often occur beneath the cyclo-system lid.

**DISTRIBUTION.** Cosmopolitan, except for off continental Antarctica and the Arctic, 85–2,789 m.

**REMARKS.** Including the new species described herein, the genus *Cryptbelia* contains 47 Recent species (Cairns 2016), making it the second-most species-rich genus in the family, following *Stylaster* with 88 Recent species. Almost half of these species were recently redescribed and figured by Cairns (2015) from the New Caledonian region. As he pointed out, the species can be segregated as to whether they harbor commensal polynoid polychaetes or not, as well as by their ampullar formula (i.e., the location of the female and male ampullae and their respective efferent pores) (Cairns 2015:table 9).

*Cryptbelia kelleyi* Cairns, **n. sp.**

Figures 1A–F, 2A–D

**TYPE MATERIAL.** Holotype: one female colony and numerous small fragments preserved in 70% ethanol, SEM C2347–2349, USNM 1294083; fragments (part of holotype) BPBM D2339.

**TYPE LOCALITY.** *Okeanos Explorer* EX1504L2\_D2\_Dive 11: 27° 07' 51" N, 175° 34' 15" W (north rift zone ridge of Bank 9 North, south of Pearl and Hermes Atoll, Northwestern Hawaiian Islands), 2,116 m, 12 August 2015.

**DESCRIPTION.** The corallum is flabellate, the holotype (Figure 1A) measuring 64 mm in height and 53 mm in width. Branch anastomosis is common, especially in the basal region of the corallum; there is no polychaete commensalism. The coenosteal texture is linear-imbricate (Figure 1C, E) to reticulate-imbricate, the latter condition common around the cyclo-systems, the former on the branches. The coenosteal strips are slightly

convex and 0.06–0.085 mm in width; each platelet is highly corrugated (Figure 1E), approximately 6–9 longitudinal ridges occurring on the surface, giving each platelet a rough texture. Nematopores occur on the edge of the cyclo-system lid (Figure 2B), on the female ampullae, on the upper and outer edges of the pseudosepta (Figures 2A, D), and on the sides of the cyclo-systems (Figure 1F), but rarely on the branch coenosteum. There is no regularity in placement of the nematopores, less than 10 occurring on the lid and associated ampullae, and usually less than 10 on the pseudosepta and adjacent regions, again not in any fixed order. The nematopores are usually raised on a small (0.05 mm tall and 0.08–0.09 mm in basal diameter) cone, the aperture diameter being about 0.04–0.045 mm. The corallum is uniformly white.

The cyclo-systems are uniaxially arranged on the corallum and are elliptical to slightly irregular in outline (Figures 1B, D, 2B), the greater diameter ranging from 1.4 to 1.6 mm. Based on 50 cyclo-systems, the range of dactylo-pores per cyclo-system is 12–21, average 17.06 ( $\sigma = 1.81$ ), and mode of 17.

The upper gastropore chamber is spherical, about 0.65 mm in diameter, opening to the lower chamber through a gastropore ring constriction of about 0.4 mm in diameter (Figure 2C). The lower chamber is quite compressed (about 0.1 mm deep) and only slightly wider than the upper chamber, about 0.75 mm in diameter (Figure 2C). The cyclo-system lid is tongue-shaped (Figures 1B, D, F, 2B), obliquely oriented, and covers 30%–50% of the cyclo-system; the edges of the lid are turned slightly upward. Rarely a smaller accessory lid is present on the opposite side of the cyclo-system, usually fusing with the larger lid. The dactylo-tomes are uniformly 0.08–0.09 mm in width, separated by pseudosepta 0.08–0.15 mm in basal width (Figure 2D). The upper surface of the pseudosepta is slightly concave and quite porous; pseudosepta are of equal length (Figure 2D).

The female ampullae occur in the cyclo-system lid, 1–3 occurring per cyclo-system (Figures 1B, D, F, 2A), usually in a linear

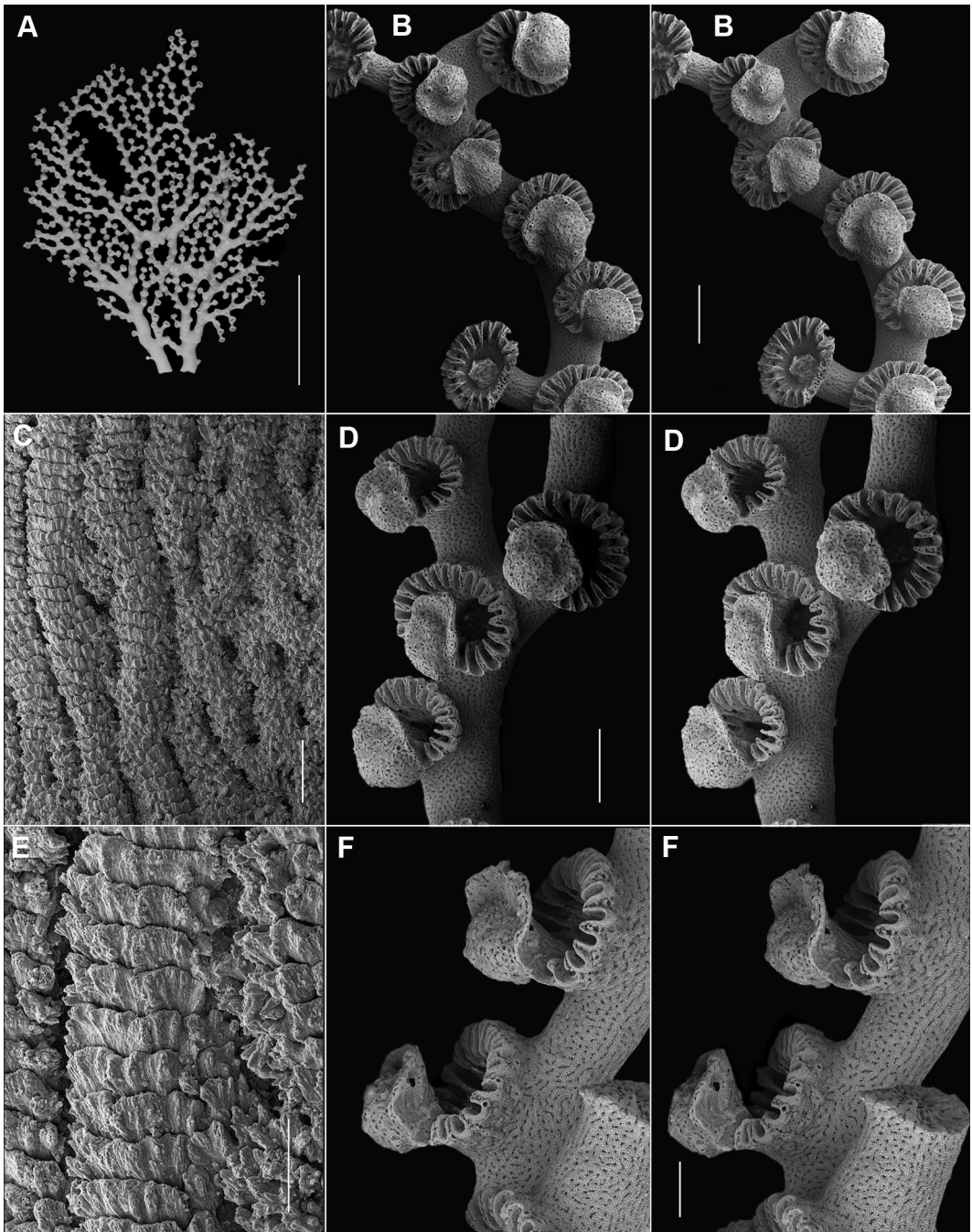


FIGURE 1. Holotype of *Cryptbelia kelleyi*, n. sp.: *A*, holotype colony; *B*, *D*, stereo views of unifacial cyclosystems with female ampullae in lids; *C*, *E*, linear-imbricate coenosteal texture; *F*, stereo oblique view of two cyclosystems, showing female efferent pores beneath lids. Scale bars: *A*, 2 cm; *B*, *D*, 1.0 mm; *C*, *E*, 0.1 mm; *F*, 0.5 mm.



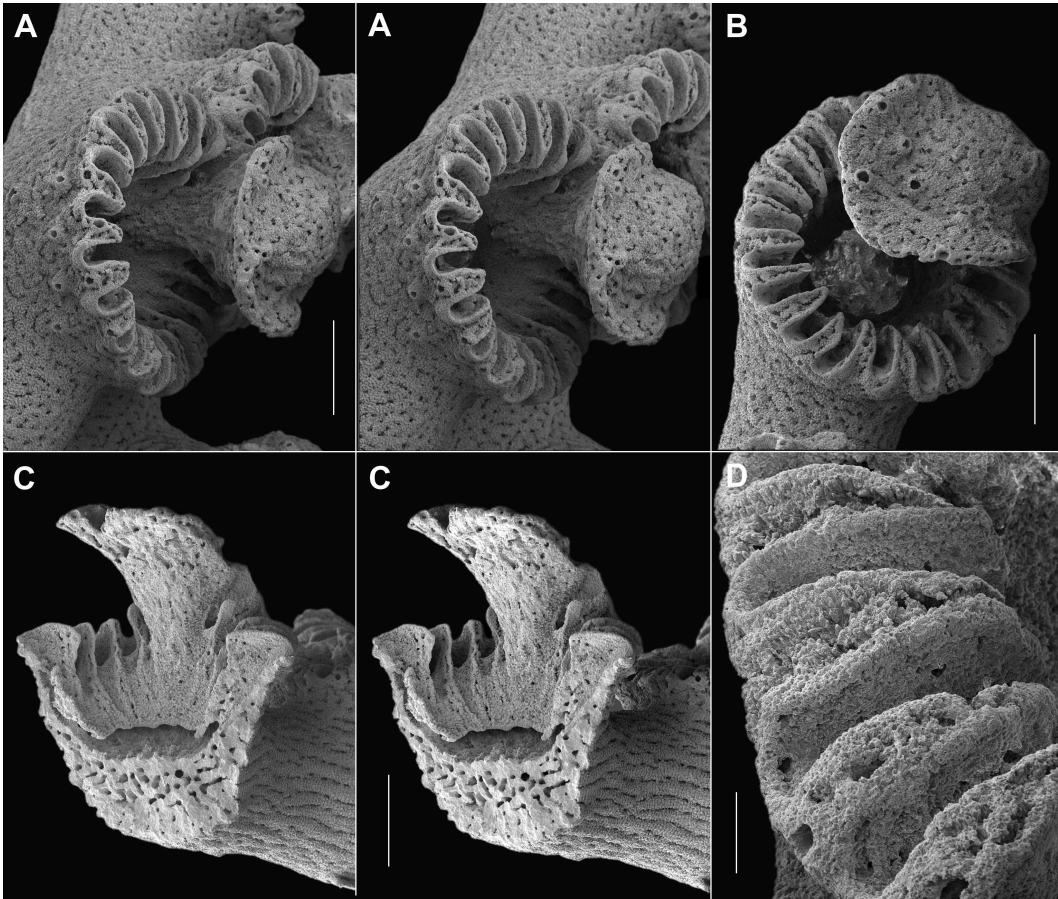


FIGURE 2. Holotype of *Cryptbelia kelleyi*, n. sp.: A, stereo view of a cyclosystem with female ampulla in lid; B, apical view of a cyclosystem; C, stereo view of longitudinal section of a cyclosystem showing double-chambered gastropore tube; D, pseudosepta and dactylotomes. Scale bars: A–C, 0.5 mm; D, 0.1 mm.

order [female arrangement A sensu Cairns (2015:table 9)]. They form prominent hemispherical mounds 0.55–0.65 mm in diameter. Their efferent pores occur beneath the lid and are about 0.11 mm in diameter (Figure 1F). Male ampullae are unknown.

COMPARISONS. Among the 47 species of *Cryptbelia* (Cairns 2016), 33 lack a commensal relationship with polynoid polychaetes and the attendant calcareous tubes they form to modify the coral's corallum. Of these 33 species, 17 occur in the Indo-West Pacific region. Of these only three have their female ampullae restricted to the cyclosystem lid [female arrangement A sensu Cairns (2015:table

9)]: *C. kelleyi*, n. sp.; *C. clausa* Broch, 1947; and *C. pudica* Milne Edwards & Haime, 1849. *Cryptbelia kelleyi* is easily distinguished from *C. clausa* (Maldive Islands, 609–915 m) by its much smaller cyclosystems, lower number of dactylopores per cyclosystem, and presence of nematopores. It is, however, similar to *C. pudica*, the type species of the genus, which is widely distributed from the Philippines, western Australia, and Japan at 368–1,633 m. *Cryptbelia kelleyi* differs largely in degree, having smaller female ampullae, smaller inclined lids, and slightly larger cyclosystems. *Cryptbelia kelleyi* also tends to have a reticulate branching pattern with branch anastomosis,

whereas that of *C. pudica* is open branched. *Cryptbelia pudica* was most recently re-described and illustrated by Cairns (1983).

**DISTRIBUTION.** Known only from the type locality.

**ETYMOLOGY.** Named in honor of Christopher Kelley, deep-sea biologist specializing in Hawaiian fauna.

#### ACKNOWLEDGMENTS

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