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Caryophylliidae (Scleractinia) from the Colombian Caribbean

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Abstract

The family Caryophylliidae comprises the highest diversity of hard corals (Order Scleractinia), represented by more than 300 species around the world. More than 90% are non-symbiotic species (azooxanthellate), whereas less than 30 species are symbiotic (zooxanthellate) or facultative (apozooxanthellate) species. This paper includes 35 species (20 genera) of caryophylliids present in soft and hard bottoms of Colombian seas, which have been mainly collected through INVEMAR expeditions (between 10 and 500 m depth) during the last 10 years. Two new species are described, *Stephanocyathus isabellae* and *Heterocyathus antoniae*, the latter belonging to a genus previously known only from the Indian and Pacific oceans.

Key words: Caryophylliidae; Colombian Caribbean; azooxanthellate coral; biodiversity; taxonomy

Introduction

Taxonomic inventories of azooxanthellate corals in the tropical western Atlantic are relatively well advanced. The majority of campaigns have been carried out in Florida, Gulf of Mexico, Yucatan, Great Antilles, Lesser Antilles, Barbados, and the Leeward Islands (Duerden 1902; Boschma 1953; Almy and Carrión-Torres 1963; Roos 1971; Beltrán-Torres and Carricart-Ganivet 1999; Cairns 1979; 1982; 2000). However, the southern and western Caribbean, including Venezuela, Colombia, Panama, and Nicaragua has been less studied. This information gap is remarkable considering the less survey effort in those areas. For instance, of the 1200 sampling stations where coral specimens have been collected throughout the tropical western Atlantic, only 50 sites were located in the Colombian Caribbean (~3.5%), and only 43 of the 129 azooxanthellate coral species were known from such areas before the year 2000.

The first azooxanthellate coral species recorded for the Colombian Caribbean was *Stephanocyathus nobilis* (Moseley, 1873) [= *Stephanocyathus paliferus* Cairns, 1977], based on one specimen incidentally collected by a shrimp trawling net off La Guajira at 300 m depth (Erhardt 1976). The second record corresponds to *Madracis myriaster* (M. Edwards & Haime, 1849), which was observed by Werding & Erhardt (1977) during a deep Scuba diving exploration (50 m depth) in coral reefs located at the northern Colombian Caribbean (Santa Marta). The most complete revision of deep sea coral species inhabiting the tropical western Atlantic have been published by Cairns (1979), which includes the description of 18 azooxanthellate coral species for Colombian areas, based on the material collected by the R/V Albatross, R/V Oregon, and R/V Pillsbury campaigns. Other records of azooxanthellate corals from Colombian waters have been included in subsequent inventory lists (Prahl & Erhardt 1985; Werding & Sánchez 1989; Díaz *et al.* 2000), as a result of occasional samples from ecological studies on coral reefs or as part of the by-catch fauna collected by industrial fisheries. Prahl & Erhardt (1989) compiled in a list of 25 azooxanthellate coral species the known information for Colombian seas at that time. This number increased up to 43 species after the revision of the shallow water azooxanthellate corals published by Cairns (2000) and an annotated list by Reyes (2000). This knowledge was latter complemented with the description of the transpanamic species *Tethocyathus prahli* Lattig & Cairns, 2000, and the record of nine additional species collected through the Macrofauna I expedition carried out in deep waters, 200 to 500 m depth, along the Colombian Caribbean (Lattig & Reyes 2001)

The family Caryophylliidae Dana, 1846 comprises the highest diversity of azooxanthellate corals, including more than 300 species from the approximately 1314 known scleractinian species around the world (Cairns 1999a; Cairns *et al.* 1999). Approximately 90% of the caryophylliids are non-symbiotic species (azooxanthellate), while less than 30 species are symbiotic (zooxanthellate) or facultative (apozooxanthellate) species (see Cairns *et al.* 1999). Among the known Colombian caryophylliids only two species, *Cladocora arbuscula* (Lesueur, 1821) and *Eusmilia fastigiata* (Pallas, 1766) present the coral/zooxanthellate symbiosis. On the other hand, five species have been described within the family Caryophylliidae based on Colombian material: *Caryophyllia ambrosia caribbeana* Cairns, 1979 (holotype from Rosario Islands), *Caryophyllia*

crypta Cairns, 2000 (paratype from Santa Marta), *Tethocyathus prahli* Lattig & Cairns, 2000 (holotype from off the Magdalena River delta), and two new species reported herein: *Stephanocyathus* (*Stephanocyathus*) *isabellae* and *Heterocyathus antoniae*.

This paper is the first of a series aiming to compile the status of knowledge of the anthozoan fauna inhabiting Colombian seas. A total of 35 species (20 genera) of caryophylliids are described or listed in this article (Table 1), from which two are described as new species (Table 1, **) and six are first records for Colombian waters (Table 1, *). Furthermore, new museum specimens from 31 of the 35 caryophylliids (Table 1, +) are presented.

TABLE 1. The 35 species of Caryophylliidae (Order Scleractinia) known from Colombian Caribbean. ** New species, * First records for Colombia, + Additional records for Colombia.

Caryophylliidae Dana, 1846
Genus *Caryophyllia* Lamarck, 1801
+ *Caryophyllia berteriana* Duchassaing, 1850
Caryophyllia crypta Cairns, 2000
+ **Caryophyllia barbadensis* Cairns, 1979
+ *Caryophyllia ambrosia caribbeana* Cairns, 1979
Genus *Coenocyathus* Milne Edwards & Haime, 1848
+* *Coenocyathus parvulus* (Cairns, 1979)
Genus *Trochocyathus* Milne Edwards & Haime, 1848
+ *Trochocyathus rawsonii* Pourtalès, 1874
+ *Trochocyathus* sp. cf. *T. fasciatus* Cairns, 1979
Genus *Tethocyathus* Kühn, 1933
+ *Tethocyathus prahli* Lattig & Cairns, 2000
+* *Tethocyathus variabilis* Cairns, 1979
Genus *Paracyathus* Milne Edwards & Haime, 1848
+ *Paracyathus pulchellus* (Philippi, 1842)
Genus *Polycyathus* Duncan, 1876
+ *Polycyathus senegalensis* Chevalier, 1966
+* *Polycyathus mayae* Cairns, 2000
Genus *Cladocora* Ehrenberg, 1834
+ *Cladocora debilis* Milne Edwards & Haime, 1849
+ *Cladocora arbuscula* (Lesueur, 1821)
Genus *Deltocyathus* Milne Edwards & Haime, 1848
+ *Deltocyathus calcar* Pourtalès, 1874
+ *Deltocyathus* sp. cf. *D. italicus* (Michelotti, 1838)
+ *Deltocyathus eccentricus* Cairns, 1979
Genus *Stephanocyathus* Seguenza, 1864
Stephanocyathus (*Stephanocyathus*) *diadema* (Moseley, 1876)
+ *Stephanocyathus* (*Stephanocyathus*) *paliferus* Cairns, 1977
Stephanocyathus (*Stephanocyathus*) *laevifundus* Cairns, 1977
** *Stephanocyathus* (*Stephanocyathus*) *isabellae* new species
Stephanocyathus (*Odontocyathus*) *coronatus* (Pourtalès, 1867)
Genus *Thalamophyllia* Duchassaing, 1870
+* *Thalamophyllia riisei* (Duchassaing & Michelotti, 1860)
Genus *Eusmilia* Milne Edwards & Haime, 1848
+ *Eusmilia fastigiata* (Pallas, 1766)

continued next page

TABLE 1. (continued)

Genus *Lophelia* Milne Edwards & Haime, 1849
+ *Lophelia pertusa* (Linnaeus, 1758)
Genus *Oxysmilia* Duchassaing, 1870
+ *Oxysmilia rotundifolia* (Milne Edwards & Haime, 1848)
Genus *Colangia* Pourtalès, 1871
+* *Colangia immersa* Pourtalès, 1871
Genus *Phyllangia* Milne Edwards & Haime, 1848
+ *Phyllangia americana americana* Milne Edwards & Haime, 1849
Genus *Rhizosmilia* Cairns, 1978
+ *Rhizosmilia maculata* (Pourtalès, 1874)
Genus *Phacelocyathus* Cairns, 1979
+ *Phacelocyathus flos* (Pourtalès, 1878)
Genus *Anomocora* Studer, 1878
+ *Anomocora fecunda* (Pourtalès, 1871)
+ *Anomocora prolifera* (Pourtalès, 1871)
+ *Anomocora marchadi* (Chevalier, 1966)
Genus *Coenosmilia* Pourtalès, 1874
+ *Coenosmilia arbuscula* Pourtalès, 1874
Genus *Heterocyathus* Milne-Edwards & Haime, 1848
** *Heterocyathus antoniae* new species

Methods

We examined the Colombian azooxanthellate coral specimens deposited at the National Museum of Natural History (Smithsonian Institution, United States), and the collection of the Museo de Historia Natural Marina de Colombia (INVEMAR, Colombia). The examined Smithsonian specimens included in this revision were collected during the R/V Oregon (15 stations) and R/V Pillsbury (16 stations) campaigns, particularly from stations located in the Colombian Caribbean. The INVEMAR specimens were mainly sampled during the INVEMAR expeditions Macrofauna I (1998–1999), Macrofauna II (2000), Corpoguajira (2005) and MARCORAL (2005) on board the B/I Ancón. Sampling was undertaken by trawling (10 x 1 x 16 m), Van Veen grab (60 l), and heavy rock dredge (1 x 0.40 m); other specimens have been collected through Scuba diving in the course of several field trips for the characterization of coral reefs (16 stations), which have been performed since the year 1970. Therefore, this revision includes a total of 204 sampling stations (Fig. 1, Appendix 1): 194 stations located within the Colombian Caribbean territorial waters; two stations were on the Colombian borders with Venezuela and Panama, respectively; five sites were located elsewhere in the tropical western Atlantic (listed here as part of the reference material and/or new species descriptions), and three stations corresponded to the Colombian Pacific sampled by the R/V ARC Malpelo (listed here as additional records for *T. prahli*). Corals collected with polyps were preserved in 70 or 96% ethanol, whereas the skeletons were kept dry. A total of 628 lots belonging to the INVEMAR collections and approximately 50 lots of the Smithsonian collections were taken into account. Identification was primarily based on the revisions of Cairns (1979; 2000) and Zibrowius (1980). Some species were confirmed by comparison with samples and type material deposited at the NMNH.

Abbreviations used in the text include: *Institutions & Museums*, (INVEMAR) Instituto de Investigaciones Marinas y Costeras, Colombia; (MHNMC) Museo de Historia Natural Marina de Colombia at INVEMAR; (NMNH) National Museum of Natural History at Smithsonian Institution. *Material*, (INV CNI0000) catalog number at MHNMC collection; (USNM 0000) catalog number at NMNH collection. *Expeditions, localities* &

methods, (AMP-CRSB) Marine Protected Area "Corales del Rosario and San Bernardo"; (BEM) snorkelling/scuba survey stations by the Biodiversity and Ecosystems Program at INVEMAR; (Corpoguajira) INVEMAR expedition achieved in cooperation with the governmental institution Corporación Autonoma Regional de La Guajira; (C) heavy rock dredge station by MARCORAL project; (D) Van Veen Grab sampling station by MARCORAL project; (E) trawling net station by various INVEMAR projects; (Macrofauna) Macrofaunal Biodiversity Surveys along the Upper Slope and Continental Shelf of Colombia; (MARCORAL) Biodiversity of Colombian Continental Margins project; (O-) R/V Oregon; (P-) R/V Pillsbury; (SMR) sampling stations at Santa Marta Bay by researchers at INVEMAR. *Morphological terms*, (BD) Base Diameter; (CD) Calicular Diameter; (Cx, Px, Sx) Costae, Pali, or Septa, respectively, of cycle designated by numerical script; (GCD) Great Calicular Diameter; (GCD:LCD) Ratio of greater to lesser calicular diameters; (LCD) Lesser Calicular Diameter; (PD) Pedicel Diameter; (PD:GCD) Ratio of pedicel to greater calicular diameters.

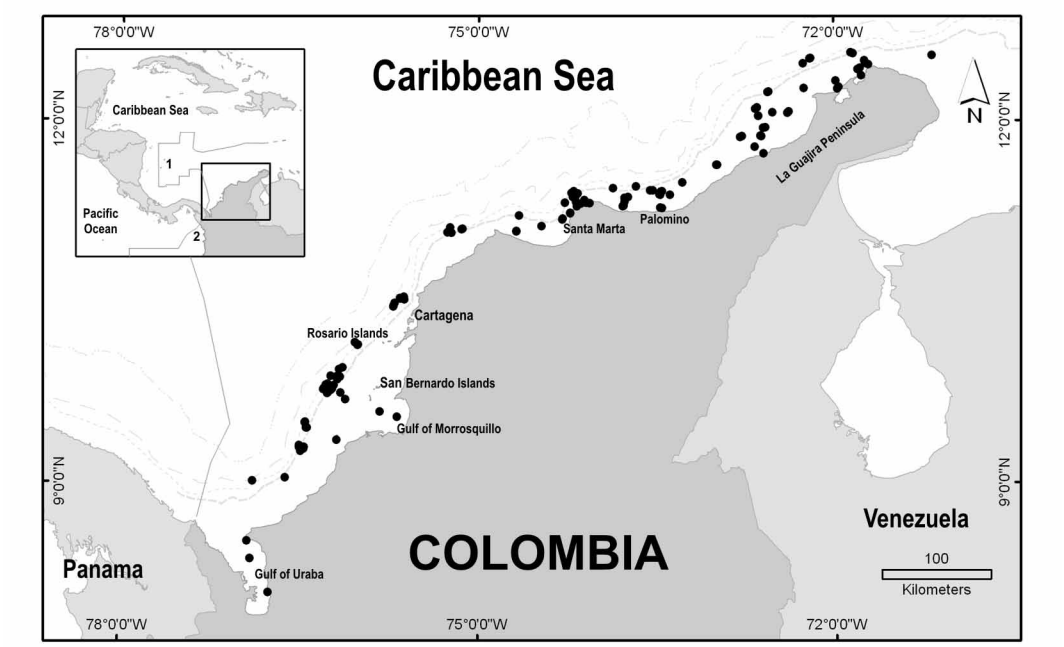

FIGURE 1. Sites in the Colombian Caribbean Sea where Caryophylliidae specimens have been collected. Dashed lines show 100, 200, 500 and 1000 m depth isobaths, respectively. *Upper left*, general location showing the Exclusive Economic Zone of Colombia (gray line), in both Caribbean Sea and Pacific Ocean: 1, San Andres and Old Providence Archipelago; 2, stations at the northern coast of the Colombian Pacific.

Caryophylliidae Dana, 1846

Caryophyllia berteriana Duchassaing, 1850

Fig. 2A–B

Caryophyllia berteriana Duchassaing, 1850: 15.—Cairns, 1979: 47–49, pl. 6, figs. 4–8, pl. 7, fig. 1, Map 7 (description and synonymy; in part).—Viada & Cairns, 1987: 132.—Cairns *et al.*, 1991: 47 (listed).—Stolarski, 1995: 30–32, figs. 8A–H (microstructure).—Cairns, 2000: 61–62, figs. 62–63.—Lattig, 2000: 116, fig. 60.—Lattig & Reyes, 2001: 25–26, fig 3.—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 498–499, 507, fig. 2H.—Santodomingo *et al.*, 2007: 286 (listed).

Caryophyllia formosa Pourtalès, 1867: 113.

Remarks: *C. berteriana* specimens from Colombia exhibit corallites up 2 cm in GCD and 4 cm length. Growth form is pseudo-colonial, with two generations of coralla. This species usually presents wide and flat costae; C4 wider than C1–3 (Cairns 2000), but in the Colombian specimens C1 is the widest and most exsert

costae. Costae from the major septa are progressively smaller than C1. Due to its morphological characteristics, relatively large corallites and pseudo-colonial development, and the high abundance of this species, it has been suggested that *C. berteriana*, among other scleractinian species, could build azooxanthellate coral communities along the Colombian Caribbean continental margin (Reyes *et al.* 2005; Santodomingo *et al.* 2007).

Distribution: Tropical western Atlantic, from Florida to Brazil, between 100 to 1033 m (Cairns 1979; 2000; Kitahara 2007). In Colombia, *C. berteriana* has been found off Quitasueño Bank, Punta Gallinas, Santa Marta and San Bernardo Islands, between 100 and 293 m depth.

Material: USNM 61733, O-4832; USNM 49027, 1 specimen, O-4834; INV CNI318, 1 specimen, O-4834; INV CNI376, 2 specimens, E8; INV CNI664, 1 specimen, E85; INV CNI665, 4 specimens, E156; INV CNI666, 1 specimen, E156; INV CNI667, 11 specimens, E155; INV CNI668, 70 specimens, E155; INV CNI2416, 1 specimen, C2; INV CNI2433, 2 specimens, C2; INV CNI2457, 2 specimens, C3; INV CNI2506, 33 specimens, D3; INV CNI2530, 72 specimens, D12; INV CNI2536, 3 specimens, D28; INV CNI2687, 3 specimens, D30; INV CNI2694, 3 specimens, D31; INV CNI2736, 1 specimen, D38; INV CNI2788, 5 specimens, D23; INV CNI2792, 1 specimen, D67; INV CNI2836, 1 specimen, D15; INV CNI2890, 20 specimens, D28; INV CNI2896, +50 specimens, C2; INV CNI2913, 9 specimens, C3.

Caryophyllia crypta Cairns, 2000

Fig. 2C

Caryophyllia sp. cf. *C. antillarum:* Goreau & Wells, 1967: 449 (listed).—Wells & Lang, 1973:58 (listed).—Wells, 1973: 60. [Not *C. antillarum* Pourtalès, 1874].
Caryophyllia smithi Zlatarski & Martínez, 1982: 258–259 (in part: pl. 111, figs. 1–6, text-figs. 60–61).
Caryophyllia sp. Fenner, 1993a: 14 (listed).
Caryophyllia crypta Cairns, 2000: 64–66, figs 16, 66–88 (description and synonymy).—Kitahara, 2007: 507, fig. 2I.

Remarks: *C. crypta* was described based on specimens collected off the northern Caribbean of Colombia (Santa Marta). Four paratype specimens are deposited at the NMNH with catalog number USNM 99187. Colombian specimens exhibit the typical light brown theca and white axial portion of the septa, pali and columella. They are attached to a carbonate substrate, and some corallites are covered by encrusting bryozoans.

Distribution: Bahamas, Caribbean, Brazil, rare in Windward Islands, between 12 and 183 m depth (Cairns 2000). In Colombia, *C. crypta* is only known from Santa Marta at 17 m depth.

Caryophyllia barbadensis Cairns, 1979

Fig. 2D–E

Caryophyllia barbadensis Cairns, 1979: 60–61, pl. 8, figs. 7–9, pl. 9, fig. 1, Map 11 (description and illustrations).—Zibrowius, 1988: 135 (listed).—Cairns *et al.*, 1994: 8.—Cairns, 2000: 68–69.—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 500, fig. 2J.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: Our specimens of *C. barbadensis* have no significant differences with those described by Cairns (1979). Colombian specimens were collected settled on fossil reef coral limestone.

Distribution: Barbados, Louisiana, and off southern Brazil, from 129 to 249 m depth (Cairns 2000). In Colombia, *C. barbadensis* was collected off the San Bernardo Islands, from 123 to 155 m depth. These records extend the distribution of *C. barbadensis* to the southern Caribbean coast.

Material: INV CNI669, 1 specimen, E155; INV CNI2935, 6 specimens, C2.

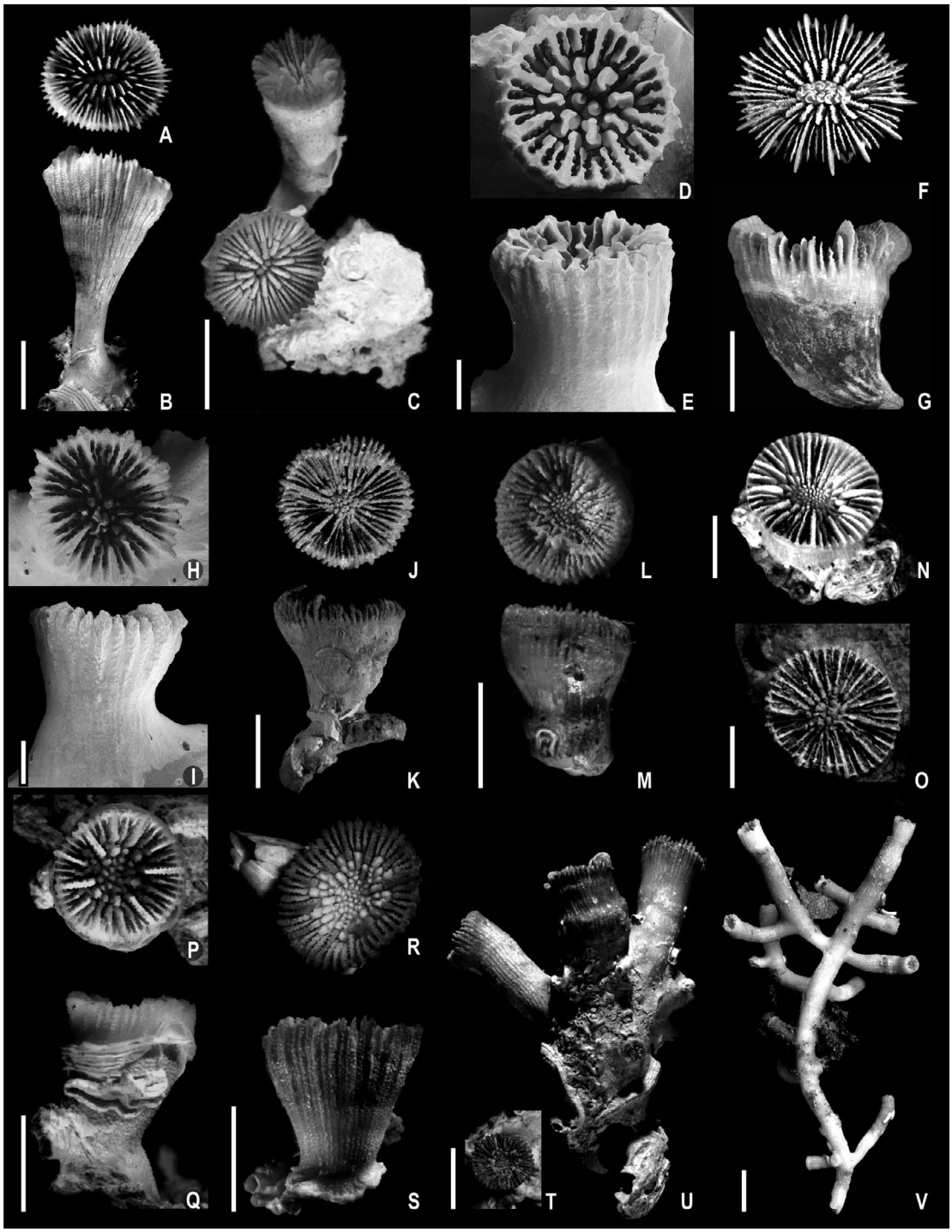

FIGURE 2. A–B, *Caryophyllia berteriana*, INV CNI2553, off San Bernardo Islands, calicular and lateral views, both x 1.5; C, *Caryophyllia crypta*, USNM 99187, Santa Marta, paratype, x 4; D–E, *Caryophyllia barbadensis*, INV CNI669, off San Bernardo Islands, calicular and lateral views, both x 10; F–G, *Caryophyllia ambrosia caribbeana*, INV CNI364, off La Rada inlet, calicular and lateral views, both x 1.6; H–I, *Coenocyathus parvulus*, INV CNI671, off San Bernardo Islands, calicular and lateral views, both x 10; J–K, *Trochocyathus rawsonii*, INV CNI681, off Gulf of Morrosquillo, calicular and lateral views, both x 3.2; L–M, *Trochocyathus* sp. cf. *T. fasciatus*, INV CNI379, off Santa Marta, calicular and lateral views, both x 4.6; N, *Tethocyathus prahli*, INV CNI905, off La Guajira (Punta Gallinas), calicular view x 2.7; O, *T. prahli*, INV CNI1514, off Chocó, Pacific Ocean, calicular view x 2.7; P–Q, *Tethocyathus variabilis*, INV CNI2404, off San Bernardo Islands, calicular and lateral views, both x 4; R–S, *Paracyathus pulchellus*, INV CNI2305, off La Guajira, calicular and lateral views, both x 4.4; T–U, *Polycyathus senegalensis*, INV CNI809, off La Guajira, calicular view and colony, both x 2.7; V, *Cladocora debilis*, INV CNI877, off Palomino, colony fragment showing typical branching pattern, x 0.8. Scale bars for A–B, F–G, V = 1 cm; C, J–U = 5 mm; D–E, H–I = 1 mm.

***Caryophyllia ambrosia caribbeana* Cairns, 1979**
Figs. 2F–G

Caryophyllia communis var. *costata* Pourtalès, 1880: 100, pl. 1, figs. 12–13.
Caryophyllia ambrosia Boone, 1928: 7–8, pls. 2–3.—Keller, 1975: 180, pl. 2, figs. 5–8.
?*Caryophyllia clavus* Lewis, 1965: 1063.
Caryophyllia ambrosia caribbeana Cairns, 1979: 56–59, pl V, fig 4, pl VI, figs 1–3, 9.—Lattig, 2000: 114–115, fig. 59.—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 500–501, fig. 2L.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: This species is one of the most abundant azooxanthellate coral species inhabiting the deep soft and muddy bottoms along the Colombian Caribbean. The solitary and free corallites exhibit a base slightly curved (45º to 90º). Some larger corallites present a light brown pigmentation, while the smaller ones are white. Colombian material fit in the size range described by Cairns (1979).

Distribution: Widespread species, along the Caribbean and Gulf of Mexico, from Florida to Uruguay; between 183 m and 1646 m depth (Cairns 1979). In Colombia, it has been collected from La Guajira Peninsula to the Gulf of Uraba, between 200 and 814 m depth.

Material: USNM 45972, holotype, P-388; USNM 45973, 15 specimens, P-394; USNM 48945, O-4907; USNM 48940, O-4911; USNM 48925, O-10825; INV CNI350, 1 specimen, E7; INV CNI351, 1 specimen, E8; INV CNI352, 10 specimens, E25; INV CNI353, 25 specimens, E26; INV CNI354, 8 specimens, E30; INV CNI355, 15 specimens, E35; INV CNI356, 22 specimens, E36; INV CNI357, 14 specimens, E37; INV CNI358, 1 specimen, E37; INV CNI359, 2 specimens, E38; INV CNI360, 2 specimens, E49; INV CNI361, 7 specimens, E54; INV CNI362, 1 specimen, E55; INV CNI363, 1 specimen, E60; INV CNI364, 7 specimens, E63; INV CNI365, 10 specimens, E64; INV CNI366, 1 specimen, E64; INV CNI367, 14 specimens, E67; INV CNI368, 5 specimens, E68; INV CNI369, 1 specimen, E71; INV CNI370, 4 specimens, E75; INV CNI371, 1 specimen, E5; INV CNI372, 1 specimen, E46; INV CNI373, 2 specimens, E59; INV CNI374, 1 specimen, E76; INV CNI375, 1 specimen, E78; INV CNI657, 1 specimen, E140; INV CNI658, 1 specimen, E150; INV CNI659, 1 specimen, E150; INV CNI660, 2 specimens, E154; INV CNI661, 16 specimens, E153; INV CNI662, 30 specimens, E153; INV CNI663, 2 specimens, E113; INV CNI2675, 4 specimens, D9.

***Coenocyathus parvulus* (Cairns, 1979)**
Figs. 2H–I

Caryophyllia parvula Cairns, 1979: 62–63, pl. 9, figs. 6–8, pl. 10, figs. 5–6, Map 12.—Rezak *et al.*, 1985: 225 (listed: stn. 120, Sidner Bank; stn. 118, Diaphus Bank, LA, 120 m).—Cairns *et al.*, 1994: 6.
Coenocyathus parvulus Cairns, 2000: 75–76 (new combination).—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 500–501, fig. 3A.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: In contrast to the specimens described by Cairns (1979; 2000), which exhibit a colonial growth from a common basal coenosteum, all Colombian specimens are isolated corallites settled on carbonate substrates, such as limestone, bivalves or coral skeletons. Some of them exhibit brown-reddish pigmentation.

Distribution: Bahamas, off the northeastern coast of Gulf of Mexico, Caribbean and Brazil, but rare in the southern Caribbean; between 97 and 399 m depth (Cairns 1979; 2000). In Colombia, it was found in La Guajira Peninsula (Dibulla) and San Bernardo Islands; from 21 to 160 m depth. These records extend the depth range for this species up to 21 m, as well as their geographical distribution up to the northern coast of South America. Specimens were compared with type material, USNM 46865 (holotype, 20º50'N, 73º34'W) and USNM 10094 (paratype, 23º11'N, 82º19'W).

Material: INV CNI670, 21 specimens, E155; INV CNI671, 5 specimens, E155; INV CNI672, 6 specimens, E156; INV CNI673, 14 specimens, E156; INV CNI674, 1 specimen, E105; INV CNI2396, 1 specimen, C1; INV CNI2397, 3 specimens, C1; INV CNI2478, 1 specimen, C3; INV CNI2503, 29 specimens,

D3; INV CNI2524, 8 specimens, D12; INV CNI2752, 1 specimen, D46; INV CNI2907, 3 specimens, C3; INV CNI2932, 7 specimens, C2.

Trochocyathus rawsonii Pourtalès, 1874

Figs. 2J–K

Trochocyathus rawsonii Pourtalès, 1874: 35, pl. 6, figs. 7–10.—Cairns, 1979: 77–79, pl. 13, figs. 5–7, pl. 14, figs. 1–6, Map 17 (description and synonymy).—Cairns *et al.*, 1991: 47 (listed).—Cairns *et al.*, 1994: 4 (listed).—Cairns, 2000: 78–79.—Lattig, 2000: 119–120, fig. 63.—Lattig & Reyes, 2001: 28–29, fig. 5.—Kitahara, 2007: 502–503, fig. 3B.—Santodomingo *et al.*, 2007: 287 (listed).

Remarks: Colombian specimens are smaller than those recorded from other Caribbean localities. The largest Colombian specimen is 11.8 x 11 mm in CD, 5.4 mm in height, and 2.3 mm in PD. S4 are still incomplete and the septal plan is not well defined. Discrete columella, composed of few thin bent ribbons, loosely fused to their bases. Nevertheless, Colombian specimens are quite similar to *T. rawsonii*, according to the description by Cairns (1979; 2000). They present a twisted corallum base with attachment scar, and epithecal bands near the calicular edge, above which costae are well defined. The specimens USNM 46086 (Trinidad y Tobago), USNM 46088 (Martinique) and USNM 61802 (Venezuela) were used to confirm the identity of the Colombian material. Although within the genus *Trochocyathus* some subgenera have been established, i.e. *Trochocyathus* (*Aplocyathus*) d'Orbigny, 1849, and *Trochocyathus* (*Platycyathus*) Fromentel, 1863, the species included in this revision have not been assigned to any subgenus so far (see Cairns 1979; 2000; Fautin 2008; Alroy 2009).

Distribution: Tropical western Atlantic, from 32ºN to 0º, including Gulf of Mexico, Bahamas and Brazil, between 55 and 700 m depth. Also found in the Indian Ocean (Cairns 1979; 2000). In Colombia, this species was collected from La Guajira Peninsula (Cabo de La Vela) to off San Bernardo Islands, between 70 m and 308 m depth.

Material: INV CNI378, 1 specimen, E18; INV CNI681, 1 specimen, E153; INV CNI682, 1 specimen, E102; INV CNI2394, 1 specimen, D34; INV CNI2685, 5 specimens, D20; INV CNI2852, 4 specimens, D18; INV CNI2908, 3 specimens, C3.

Trochocyathus sp. cf. *T. fasciatus* Cairns, 1979

Figs. 2L–M

Trochocyathus fasciatus Cairns, 1979: 81–82, pl. 14 fig. 10, pl. 15 figs. 1–3.—Lattig, 2000: 118–119, fig. 62.—Lattig & Reyes, 2001: 29–30, fig. 6.—Santodomingo *et al.*, 2007: 287 (listed).

Remarks: Colombian specimens have white corolla. Costae are rounded and granulated, more prominent near the calicular edge that extend to the base and covered with thin and smooth epitheca around the calicular edge. Septal granulation is low and rounded. Colombian specimens differ from the type material in the absence of C1–3 brown pigmentation, and also in the presence of very thin and shallow intercostals furrows. The best preserved specimen is 4.88 mm in GCD and 2.66 mm in PD; PD:GCD relation is 0.48. The largest corallite is 6.2 mm in GCD.

Distribution: Previously known only from Yucatan (Cairns 1979) at 238 m depth. In Colombia, *T.* sp. cf. *fasciatus* was collected off Santa Marta and San Bernardo Islands, between 105 and 218 m depth. This record extends its bathymetric range up to 105 m depth.

Material: INV CNI379, 1 specimen, E7; INV CNI2877, 4 specimens, D36; INV CNI2886, 1 specimen, D76; INV CNI2920, 6 specimens, C3.

***Tethocyathus prahli* Lattig & Cairns, 2000**
Figs. 2N–O

Tethocyathus prahli Lattig & Cairns, 2000: 590–595, fig 1.

Remarks: *T. prahli* is one of the few extant scleractinian species with a transpanamic distribution. This species was described based on specimens collected in the Colombian Caribbean and Cocos Island, and fossil material dating from the early Pleistocene (Panama, Pacific coast), suggesting a relictual distribution of a previously more widespread species. In the Caribbean Sea, *T. prahli* has been found settled on empty shells of *Pomacea* sp. (a freshwater gastropod) and sea urchin skeletons. New material was collected in the Colombian Pacific represented by six *T. prahli* specimens; some of them were found in a well preserved condition, attached to empty shells of the gastropod *Polystira* sp., but the majority of these Pacific samples were skeletons settled on wood debris and mud consolidates. *T. prahli* specimens are associated with river flow debris deposits in both the Caribbean and the eastern Pacific. There are some morphological differences among the specimens according to their geographical distribution. Thus, thecal rings in the Caribbean corallites are thin and extend to near the calicular edge, whereas in the Pacific specimens the rings are retracted into the calicular space; palar ornamentation in the Caribbean samples is smaller, about 2/3 the size in comparison to the Pacific corallites.

Distribution: Previously known only from the type localities off the Magdalena River delta (Colombia) and Cocos Island (Costa Rica), between 303 and 333 m (Lattig & Cairns 2000). Our records extend the distribution of *T. prahli* to the northern coast of the Colombian Pacific, off Octavia Bay to off the San Juan River delta (see Fig. 1); from 76 to 295 m depth. In the Caribbean, it is known from off the Magdalena River delta to off Punta Gallinas. The bathymetric range was also extended up to 76 m depth, off the northern coast of the Colombian Pacific.

Material: INV CNI241, 1 specimen, holotype, E49; INV CNI242, 1 specimen, paratype, E49; INV CNI905, 4 specimens, E89; INV CNI320, 1 specimen, SB2424 (Cocos Island); INV CNI1514, 6 specimens, P14E11a115; INV CNI1516, 1 specimen, P1E22b37; INV CNI1517, 2 specimens, P3E17b27; INV CNI1518, 1 specimen, P3E17b27.

***Tethocyathus variabilis* Cairns, 1979**
Figs. 2P–Q

Tethocyathus cylindraceus Pourtalès, 1868: 134 (in part); 1871: 13 (in part); 1880: 101 (in part).
Tethocyathus laevigatus Pourtalès, 1878: 202 (in part).
Tethocyathus rawsonii Pourtalès, 1880: 101 (in part).
Asterosmilia prolifera Squires, 1959: 12.
Tethocyathus variabilis Cairns, 1979: 86–87, pl. 15, figs. 7–10—Zibrowius, 1980: 81–82, pl. 37, figs. A–N, pl. 38, figs. A–L.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: Colombian specimens have a thick and banded epitheca, which covers the costae. Near the calicular edge, between the epitheca and the theca, there is a narrow and deep notch. Epitheca bands disappear at 3/4 of the corallite length, showing the costae with one or two pointed granules; the shallow and wide intercostal furrows are twice the costal width. Colombian specimen was identified as *T. variabilis* because of their thick epitheca and their well defined palar crown before S2. Cairns (1979: 86) description read as “S1 and S4 are straight, but lower inner edges of S2 and S3 have numerous undulations in the proximity of the columella”, however Colombian specimen showed a serrated S3–S4 axial septal edge resembling *T. rawsonii*. In spite of this similarity to *T. rawsonii, T. variabilis* differs in the palar arrangement (one P2), the epitheca type and the junction of the inferior-superior septa throughout their paliform lobes. Colombian specimen exhibits the septa joined to the columella only in the deep fossa.

Distribution: Antillean distribution, also in Yucatan channel; 250–576 m (Cairns 1979). Eastern Atlantic, off the western Sahara coast and Azores; 250–860m depth (Zibrowius 1980). In Colombia, one specimen was collected off San Bernardo Islands at 106 m depth. This is the first record for Colombia, and it extends the bathymetrical range of the species from the upper slope up to the continental shelf.

Material: INV CNI2739, 1 specimen, D38.

***Paracyathus pulchellus* (Philippi, 1842)**
Figs. 2R–S

Cyathina pulchellus Philippi, 1842: 42.

Paracyathus defilippi Duchassaing & Michelotti, 1860: 60, pl. 9, figs. 2–3.—Cerame-Vivas & Gray, 1966: 263 (listed).—Avent, King & Gore, 1977: 200, fig. 111.—Castañares & Soto, 1982: Table 1 (listed).

Paracyathus confertus Pourtalès, 1868:134.

Paracyathus pulchellus Cairns, 1979: 88–89, pl. 16, figs. 1–4, 6, Map 20 (synonymy of western Atlantic records and description).—Zibrowius, 1980: 90–93, pl. 44, figs. A–K, pl.45, figs. A–L (synonymy of eastern Atlantic records and description).—Rezak *et al.*, 1985: 225 (listed: stn 113, Coffe Lump; stn 115,128, Geyer Bank; stn 118, Diaphus Bank; stn, Sidner Bank; stn 122, Alderice Bank).—Not Hubbard &Wells, 1986: 133 (=*Polycyathus senegalensis*).—Prahl & Erhardt, 1989: 545.—Cairns *et al.*, 1991: 47.—Fenner, 1993a: 12, 14 (listed).—Cairns *et al.* 1994: 4 (listed).—Cairns, 2000: 81–83, figs. 89–91.—Lattig, 2000: 123–124, fig. 65.—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 502–503, fig. 3D.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: Colombian specimens fit in the species diagnosis presented by Cairns (1979; 2000) and Zibrowius (1980). *P. pulchellus* were common on coralline hardgrounds and debris accumulation, but rare below 200 m depth. Colombian specimens were found settled on sponges, other scleractinian skeletons such as *Cladocora debilis*, *Madracis myriaster*, *Oxysmilia rotundifolia* and *Eguchipsammia* sp., or over dead *P. pulchellus* skeletons.

Distribution: Amphi-atlantic distribution. Tropical western Atlantic, from 34º37'N to 0º18'N, between 17 and 838 m depth (Cairns 2000). Eastern Atlantic, from Portugal to Guinea Gulf, including the Mediterranean Sea and the Azores, from 40 to 1260 m depth (Zibrowius 1980). In Colombia, *P. pulchellus* is known from Honda Bay (La Guajira) to off the Gulf of Morrosquillo, between 50 and 269 m depth.

Material: INV CNI310, 1 specimen, P392; INV CNI380, 1 specimen, E67; INV CNI798, 1 specimen, E156; INV CNI799, 1 specimen, E98; INV CNI800, 3 specimens, E155; INV CNI801, 3 specimens, E155; INV CNI802, 2 specimens, E104; INV CNI803, 11 specimens, E104; INV CNI804, 1 specimen, E105; INV CNI805, 4 specimens, E103; INV CNI806, 43 specimens, E102; INV CNI807, 26 specimens, E102; INV CNI2166, 2 specimens, E215; INV CNI2304, 4 specimens, E234; INV CNI2305, 38 specimens, E240; INV CNI2306, 1 specimen, E242; INV CNI2383, 1 specimen, D33; INV CNI2401, 1 specimen, C1; INV CNI2410, 3 specimens, C4; INV CNI2432, 1 specimen, D34; INV CNI2468, 1 specimen, E246; INV CNI2470, 1 specimen, E246; INV CNI2512, 5 specimens, D3; INV CNI2529, 5 specimens, D12; INV CNI2565, 30 specimens, D15; INV CNI2578, 32 specimens, D17; INV CNI2686, indeterminate specimens number) D20; INV CNI2712, 121 specimens, D37; INV CNI2723, 2 specimens, D19; INV CNI2740, 37 specimens, D38; INV CNI2755, 44 specimens, D16; INV CNI2768, 43 specimens, D21; INV CNI2777, 29 specimens, D33; INV CNI2794, 3 specimens, D67; INV CNI2801, 1 specimen, D75; INV CNI2805, 5 specimens, D22; INV CNI2815, 10 specimens, D69; INV CNI2823, 6 specimens, D74; INV CNI2830, 2 specimens, D34; INV CNI2841, 2 specimens, D15; INV CNI2853, 1 specimen, D18; INV CNI2887, 1 specimen, D76; INV CNI2912, 15 specimens, C3; USNM 80890, 3 specimens, SMR2.

***Polycyathus senegalensis* Chevalier, 1966**
Figs. 2T–U

Polycyathus senegalensis Chevalier, 1966: 971–974, pl. 4, figs. 7–8, text-fig. 21.—Best, 1968: 72 (listed).—Wijsman-Best, 1970: 83–84.—Zibrowius, 1980: 94.—Hubbard & Wells, 1986: 133–134, figs. 21–22.—Cairns *et al.*, 1994: 7.—Cairns, 2000: 83–86, figs. 17, 92–95.
Polycyathus mullerae Hubbard & Wells, 1986: 134, figs. 23–24. [Not *Polycyathus muellerae* (Abel, 1959)]
Paracyathus pulchellus Cairns, 1979: 88–90, pl. 16 fig. 5 (in part).—Hubbard & Wells, 1986: 133. [Not *Cyathina pulchellus* Philippi, 1842].

Remarks: Colombian specimens differ from those described by Cairns (2000) in having a colonial growth form and undivided P3. However, all other morphological characteristics were similar to previous descriptions. Several recruits were found settled on rocks and other coral skeletons.

Distribution: Amphi-atlantic distribution. Tropical western Atlantic, from Gulf of Paria (Venezuela) to French Guyana, and also in Florida; from 12 to 143 m depth (Cairns 2000). Eastern Atlantic and Mediterranean Sea, in Senegal and Morocco; from 46 to 100 m depth (Zibrowius 1980; Cairns 2000). In Colombia, *P. senegalensis* is known in the northern Caribbean coast (Punta Gallinas, La Guajira Peninsula), between 73 and 152 m depth.

Material: INV CNI808, 1 colony, E89; INV CNI809, 5 corallites, E88; INV CNI810, 1 colony fragment, E88; USNM 46160, 1 colony fragment, P-769.

***Polycyathus mayae* Cairns, 2000**
Fig. 3B

Polycyathus mayae Cairns, 2000: 86–88, figs. 4, 96–101.—Reyes *et al.*, 2005: 324 (listed).—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: Colombian specimens have no differences with the original description (Cairns 2000). *P. mayae* specimens were found settled on *Anomocora fecunda* skeletons and inside grooves and crevices of coral limestone, all of them collected off San Bernardo Islands.

Distribution: Tropical western Atlantic, Antillean distribution from Bahamas to Barbados, 137–309 m depth (Cairns 2000). In Colombia, it is only known off Rosario and San Bernardo Islands, from 75 to 217 m depth. These records extend its distribution up to the northern coast of South America, and the bathymetric range up to 75 m depth. Specimens were confirmed by comparison with the holotype (1 colony), USNM 99214.

Material: INV CNI796, 2 corallites, E156; INV CNI797, 8 corallites, E155; INV CNI2412, 3 corallites, C4; INV CNI2419, 4 corallites, C4; INV CNI2462, 1 corallites, C3; INV CNI2507, 4 corallites, D3; INV CNI2522, 4 corallites, D12; INV CNI2816, +30 corallites, D69; INV CNI2825, 2 corallites, D74; INV CNI2880, 12 corallites, D76; INV CNI2888, 11 corallites, D76; INV CNI2911, 6 corallites, C3; INV CNI2934, 6 corallites, C2.

***Cladocora debilis* Milne Edwards & Haime, 1849**
Fig. 2V

Cladocora debilis Milne Edwards & Haime, 1849a: 308.—Pourtalès, 1871: 30; 1878: 205.—Moseley, 1881: 184–185.--Not Vaughan, 1901: 298 (=*Oculina* sp.).—Not Durham & Barnard, 1952: 58 (=*C. pacifica* Cairns, 1991).—Tommasi, 1970: 56, figs. 5d, 6a.—Leite & Tommasi 1976: 101, fig. 2.—Avent, King & Gore, 1977: 200, fig. 11m.—Cairns, 1978a: 10 (listed); 1979: 207 (listed).—Zibrowius, 1980: 31–33, pl. 11, figs. A–L (description and synonyms of eastern Atlantic records).—Zlatarski & Martínez, 1982: 116.—Hubbard & Wells, 1986: 125–126, figs.

4–5.—Cairns *et al.*, 1994: 6.—Cairns, 2000: 88–92, figs. 18,102–107.—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 502–503, fig. 3F.—Santodomingo *et al.*, 2007: 286 (listed).

Cladocora patriarca Pourtalès, 1874: 42, pl. 7, fig. 7.

Cladocora coespidosa (sic) Cerame-Vivas, 1966: 263 (listed).

Cladocora arbuscula Tommasi, 1970: 56, figs. 5–6. [Not *Cladocora arbuscula* (Lesueur, 1821)].

Cladora (sic) debilis Zibrowius, 1988: 135 (listed).

Remarks: This species has bushy colonies with 1 or 2 thin axial corallites, from which secondary corallites branch at right angle, occasionally showing a third generation of corallites (Cairns 2000). Bipolar corallites are common among the Colombian material. Some specimens collected in La Guajira (30–40 m) show sympodial growth pattern, similar to that described by Cairns (2000), which probably represents an undescribed species. At La Guajira Peninsula *C. debilis* builds carbonate thickets on the continental shelf, from 50 to 70 m depth (Reyes *et al.* 2005). *C. debilis* was collected together with a high abundance of sponges and bryozoans. Reyes *et al.* (2005) named this particular association as *C. debilis*-sponges communities, and they seem to be a common assemblage in the northern Caribbean coast of Colombia, from Dibulla to Palomino, establishing a *C. debilis-sponge* belt along 42 km parallel to the continental shelf. This sector is characterized by a complex geomorphology related to the occurrence of a submarine canyon (La Aguja Canyon) and a seasonal upwelling event (December to March). The high diversity of crustaceans, molluscs, echinoderms and fishes associated to these coralline assemblages suggest the presence of a large coral formation (Reyes *et al.* 2005).

Distribution: Amphi-atlantic, tropical and subtropical, from 28 to 100 m depth (Cairns 2000; Zibrowius 1980). In Colombia, *C. debilis* colonies have been collected from Punta Gallinas to off San Bernardo Islands; although it occurs between 20 and 150 m depth, it is abundant in the range of 50–70 m depth. Specimens collected below 150 m depth were eroded and bad preserved; perhaps they correspond to debris material transported from shallower to deeper zones of the continental shelf.

Material: USNM 62352, 8 colony fragments, P-773; USNM 62356, 3 colony fragments, P-775; USNM 62349, P-392; USNM 62368, P-772; USNM 62356, 2 colony fragments, P-775; USNM 62363, P-768; INV CNI308, 1colony fragment, P-775; INV CNI311, 1 colony fragment, P-773; INV CNI322, 1 colony fragment, P-768; INV CNI866, 2 colony fragments, E88; INV CNI867, 8 colony fragments, E88; INV CNI868, 62 colony fragments, E97; INV CNI869, 29 colony fragments, E97; INV CNI870, 59 colony fragments, E96; INV CNI871, 210 colony fragments, E98; INV CNI872, 75 colony fragments, E98; INV CNI873, 58 colony fragments, E99; INV CNI874, 17 colony fragments, E100; INV CNI875, 2 colony fragments, E101; INV CNI876, 13 colony fragments, E102; INV CNI877, 327 colony fragments, E102; INV CNI878, 37 colony fragments, E104; INV CNI879, 51 colony fragments, E104; INV CNI880, 120 colony fragments, E104; INV CNI881, 28 colony fragments, E105; INV CNI882, 60 colony fragments, E105; INV CNI883, 24 colony fragments, E108; INV CNI884, 11 colony fragments, E108; INV CNI885, 6 colony fragments, E109; INV CNI886, 2 colony fragments, E110; INV CNI887, 2 colony fragments, E122; INV CNI888, 15 colony fragments, E127; INV CNI889, 2 colony fragments, E128; INV CNI890, 1 colony fragment, E129; INV CNI2017, 10 colony fragments, E103; INV CNI2151, 6 colony fragments, E237; INV CNI2152, 1 colony fragment, E215; INV CNI2153, 1 colony fragment, E240; INV CNI2154, 3 colony fragments, E235; INV CNI2170, 18 colony fragments, E236; INV CNI2173, 4 colony fragments, E238; INV CNI2174, 1 colony fragment, E234; INV CNI2238, 1 fragment, E203; INV CNI2239, 1 colony fragment, E204; INV CNI2243, 83 colony fragments, E236; INV CNI2248, 32 colony fragments, E240; INV CNI2297, 1 colony fragment, E214; INV CNI2312, 14 colony fragments, E234; INV CNI2466, 1 colony fragment, E246; INV CNI2556, 1 colony fragment, D35; INV CNI2572, 12 colony fragments, D15; INV CNI2737, 4 colony fragments, D38; INV CNI2785, 3 colony fragments, D33; INV CNI2808, 4 colony fragments, D22; INV CNI2834, 1 colony fragment, D15.

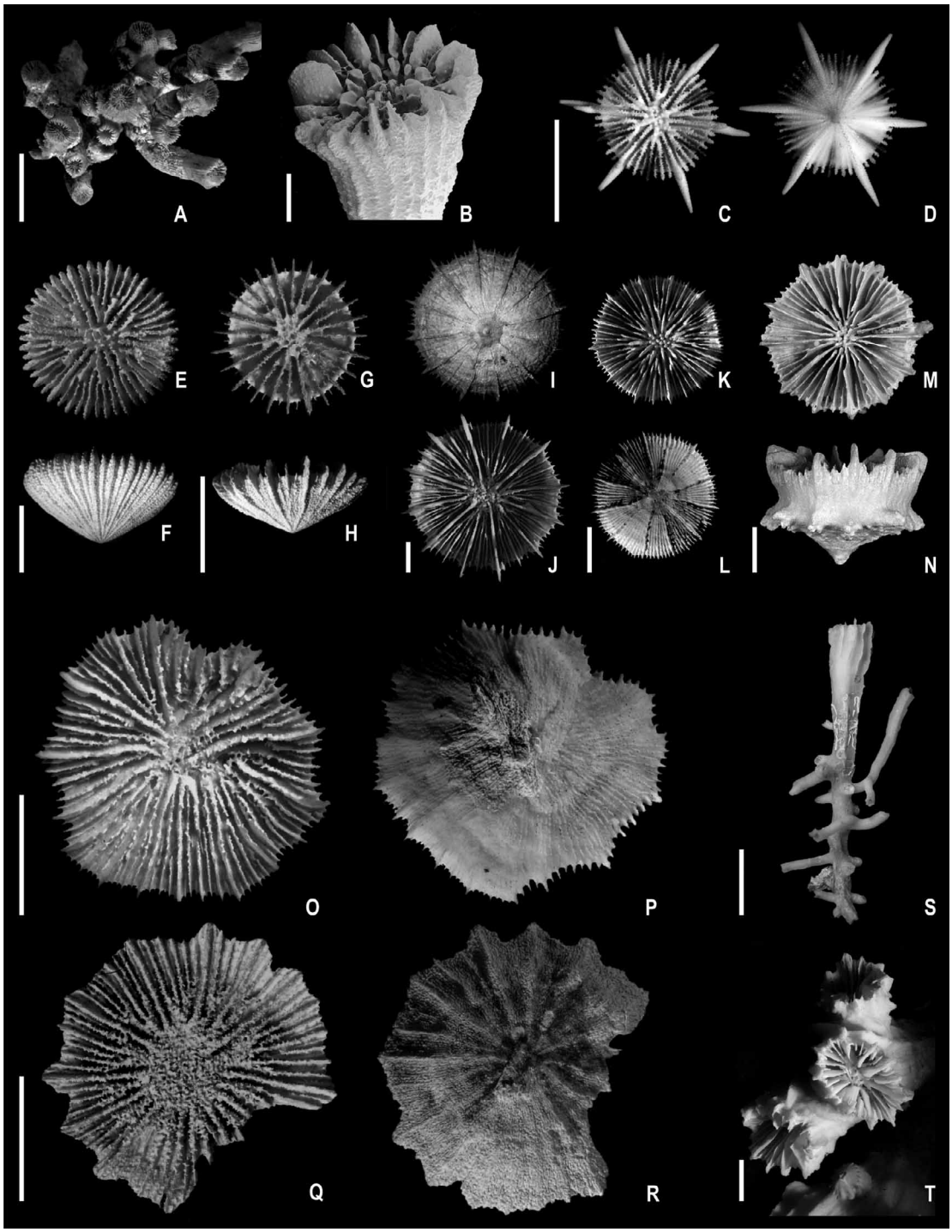

FIGURE 3. A, *Cladocora arbuscula*, INV CNI215, off Santa Marta (Cinto Bay), colony, x 1.5; B, *Polycyathus mayae*, INV CNI797, off San Bernardo Islands, oblique lateral view, x 10; C–D, *Deltocyathus calcar*, D17 MARCORAL, off San Bernardo Islands, calicular and basal views, both x 4.4; E–F, *Deltocyathus* sp. cf. *D. italicus*, INV CNI711, off Cartagena, lateral and calicular views, both x 3; G–H, *Deltocyathus eccentricus*, INV CNI721, off San Bernardo Islands, calicular and lateral views, both x 4.2; I–J, *Stephanocyathus* (*S.*) *diadema*, INV CNI329, off Gulf of Uraba, calicular and basal views, both x 0.7; K–L, *Stephanocyathus* (*S.*) *paliferus*, INV CNI388, off Barranquilla, calicular and basal views, both x 1; M–N, *Stephanocyathus* (*O.*) *coronatus* INV CNI324, Venezuela, Cariaco Basin, calicular and lateral views, both x 1; O–P, *Stephanocyathus* (*S.*) *isabellae* INV CNI694, holotype, off San Bernardo Islands, calicular and basal views, both x 2.6; Q–R, *Stephanocyathus* (*S.*) *isabellae*, INV CNI2076, paratype, off San Bernardo Islands, calicular and basal views, both x 2.7; S, *Thalamophyllia riisei*, INV CNI676, off San Bernardo Islands, branching pattern, x 1.4; T, *Eusmilia fastigiata*; colony from calicular view, x 0.9. Scale bars for A, I–T = 1 cm; C–H = 5 mm; B = 1 mm.

***Cladocora arbuscula* (Lesueur, 1821)**
Fig. 3A

Caryophyllia arbuscula Lesueur, 1821: 275, pl.15, fig.2.
Cladocora arbuscula Milne Edwards & Haime, 1849a: 307.—Agassiz, 1880, pl. 3, figs. 1–7.—Quelch, 1886: 70.—Vaughan, 1901: 298, pl. 2, figs. 3–3a.—Duerden, 1902: 558–563, pls. 6–7, figs. 48–63.—Vaughan, 1919: 362.—Thiel, 1941: 14–15.—Smith, 1948. 87–88, pl. 22.— Almy & Carrión-Torres, 1963: 153–154, pl. 13a.— Roos, 1971: 65, pl. 22a–b.— Olivares, 1971: 75, Lam. 1, figs. A–B.– Weisbord, 1974: 372–375, pl. 40, figs. 1–2. Zlatarski & Martínez, 1982: 115–116, 125–126, pl. 39–40.— Cairns, 1982: 287, fig. 128a.

Remarks: *C. arbuscula* is one of the two zooxanthellate caryophylliids occurring in Colombian Caribbean waters. This species is present in shallow reefs lagoons or seagrass beds. Colombian samples are small bushy colonies. They do not have significant differences with the previous species revision by Cairns (1982).
Distribution: Caribbean Sea; 0.5–27 m depth (Zlatarski & Martínez 1982). In Colombia, *C. arbuscula* is known from remote oceanic coral reefs (Serranilla Bank), and along the Colombian Caribbean coast off Rosario Islands (Pfaff 1969), San Bernardo Islands (Erhardt & Meinel 1975), Santa Marta (Geyer 1969; Erhardt 1974), Palomino and La Guajira Peninsula.

Material: USNM 94683, Serranilla Bank; USNM 158293, Serranilla Bank; INV CNI83, 1 colony fragment, P-979; INV CNI215, 1 colony fragment, E120; INV CNI2195, 4 colony fragments, E202; INV CNI2198, 1colony fragment, E201; INV CNI2299, 1 colony fragment, E240; INV CNI2300, 1 colony fragment, E214.

***Deltocyathus calcar* Pourtalès, 1874**
Figs. 3C–D

Deltocyathus agassizii var. *calcar* Pourtalès, 1874: 35–36, pl. 6, fig. 11.
Deltocyathus calcar Cairns, 1979: 93–95, pl. 17, figs. 7–10, pl. 18, fig. 7, Map 22 (description and synonymy).—Viada & Cairns, 1987: 132.—Zibrowius, 1988: 135 (listed).—Prahl & Erhardt, 1989: 545.—Cairns *et al.*, 1991: 47 (common name).—Cairns *et al.*, 1994: 4 (listed).—Pires, 1997: 182.—Lattig, 2000: 124–125, fig. 66.—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 502–503, fig. 3J.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: This species can be distinguished from other Atlantic *Deltocyathus* species by their wide and rounded C1, which bears a large and prominent spine projected up until a distance equal to the calicular radius. It is also common to observe specimens with reduced spines or even without them, and some specimens with two spines on each costae. The base of *D. calcar* show a high variability, from conical, slightly rounded to almost flat (Cairns 1979). This variability of base shape can be the result of the substrate type where the larvae settled on; therefore, specimens growing on muddy bottoms develop conical bases, while sandy bottoms dwellers have rounded or flat bases (Reyes 2001; 2005). *D. calcar* is one of the most common azooxanthellate coral species living on the Colombian continental shelf. It was present in almost all localities, between 150 and 300 m depth.

Distribution: Western Atlantic, from 33º39'N to 25º15'S, including Bermuda, Bahamas, the eastern Gulf of Mexico and the Caribbean (Cairns 2000); from 81 to 675 m depth. In Colombia, *D. calcar* has been collected throughout the Colombian Caribbean, from Punta Gallinas (nearby the limits with Venezuela) till the Gulf of Uraba (nearby the Panama border), including localities around the San Andres and Old Providence Archipelago; depth ranging from 150 to 520 m.

Material: USNM 46267, 475 specimens, P-1354; INV CNI458, 3 specimens, E2; INV CNI459, 1 specimen, E17; INV CNI460, 1 specimen, E32; INV CNI461, 2 specimens, E35; INV CNI462, 35 specimens, E36; INV CNI463, 33 specimens, E36; INV CNI464, 58 specimens, E37; INV CNI465, 9 specimens, E37; INV CNI466, 36 specimens, E37; INV CNI467, 35 specimens, E37; INV CNI468, 36 specimens, E38; INV CNI469, specimens, E37; INV CNI470, 38 specimens, E38; INV CNI471, 27 specimens, E38; INV CNI472,

24 specimens, E45; INV CNI473, 62 specimens, E45; INV CNI474, specimens, E46; INV CNI475, 21 specimens, E46; INV CNI476, 41 specimens, E46; INV CNI477, 31 specimens, E47; INV CNI478, 13 specimens, E47; INV CNI479, 99 specimens, E45; INV CNI480, 16 specimens, E48; INV CNI481, 19 specimens, E48; INV CNI482, +100 specimens, E48; INV CNI483, 30 specimens, E48; INV CNI484, 35 specimens, E48; INV CNI485, 27 specimens, E48; INV CNI486, 23 specimens, E49; INV CNI487, 40 specimens, E49; INV CNI488, 13 specimens, E50; INV CNI489, 4 specimens, E50; INV CNI490,1 specimen, E51; INV CNI491, 31 specimens, E53; INV CNI492, 37 specimens, E53; INV CNI493, 38 specimens, E53; INV CNI494, 12 specimens, E54; INV CNI495, 18 specimens, E54; INV CNI496, 7 specimens, E59; INV CNI497, 17 specimens, E55; INV CNI498, 10 specimens, E59; INV CNI499, specimens, E59; INV CNI500, 22 specimens, E59; INV CNI501,1 specimen, E62; INV CNI502, 9 specimens, E63; INV CNI503, 7 specimens, E63; INV CNI504, +70 specimens, E63; INV CNI505, 5 specimens, E55; INV CNI506, +50 specimens, E63; INV CNI507,1 specimen, E61; INV CNI508, +50 specimens, E63; INV CNI510, 30 specimens, E64; INV CNI511, 30 specimens, E64; INV CNI513, 30 specimens, E64; INV CNI514, 9 specimens, E67; INV CNI515, 12 specimens, E67; INV CNI516, 20 specimens, E67; INV CNI517, 20 specimens, E67; INV CNI518, 6 specimens, E68; INV CNI519, 7 specimens, E68; INV CNI520, 10 specimens, E73; INV CNI521, 22 specimens, E73; INV CNI522, 7 specimens, E74; INV CNI523, 4 specimens, E76; INV CNI524, 11 specimens, E75; INV CNI525, 4 specimens, E76; INV CNI526, 10 specimens, E76; INV CNI527, 9 specimens, E70; INV CNI528, 27 specimens, E69; INV CNI695, 7 specimens, E154; INV CNI696, 3 specimens, E154; INV CNI697, 74 specimens, E153; INV CNI698, 79 specimens, E153; INV CNI699, 11 specimens, E140; INV CNI700, 37 specimens, E140; INV CNI701,1 specimen, E122; INV CNI702, 2 specimens, E160; INV CNI703, 24 specimens, E141; INV CNI704, 13 specimens, E141; INV CNI705, 1 specimen, E159; INV CNI706,1 specimen, E142; INV CNI707,1 specimen, E150; INV CNI708, 2 specimens, E155; INV CNI709, 1 specimen, E155; INV CNI1608, 126 specimens, E81; INV CNI1609, 30 specimens, E83; INV CNI1610, 138 specimens, E84; INV CNI1611, 13 specimens, E82; INV CNI2436, 1 specimen, C2; INV CNI2469, 3 specimens, E246; INV CNI2575, 1 specimen, D17; INV CNI2658, 24 specimens, D36; INV CNI2659, 58 specimens, D21; INV CNI2660, 1 specimen, D68; INV CNI2661, 30 specimens, D35; INV CNI2662, 10 specimens, D1; INV CNI2663, 24 specimens, D37; INV CNI2664, 5 specimens, D75; INV CNI2665, 3 specimens, D13; INV CNI2666, 26 specimens, D76; INV CNI2667, 39 specimens, D16; INV CNI2668, 20 specimens, D35; INV CNI2669, 5 specimens, D67; INV CNI2670,1 specimen, D3; INV CNI2671, 13 specimens, D76; INV CNI2672, 13 specimens, D31; INV CNI2673, 46 specimens, D38; INV CNI2674, 2 specimens, D3; INV CNI2701, 2 specimens, D11; INV CNI2778, 2 specimens, D33; INV CNI2820, 5 specimens, D69; INV CNI2845, 2 specimens, D18; INV CNI2855, 18 specimens, C3; INV CNI2856, 52 specimens, C2; INV CNI2857, 29 specimens, D9; INV CNI2858, 2 specimens, D57; INV CNI2859, 6 specimens, D67; INV CNI2860, 1 specimen, D22; INV CNI2861, 1 specimen, D30; INV CNI2862, 3 specimens, D60; INV CNI2863, 3 specimens, D34; INV CNI2864, 5 specimens, D23; INV CNI2865, 24 specimens, D20; INV CNI2867, 31 specimens, D46; INV CNI2871, 11 specimens, D36; INV CNI2936, 1 specimen, C2.

***Deltocyathus* sp. cf. *D. italicus* (Michelotti, 1838)**

Figs. 3E–F

?*Turbinolia italica* Michelotti, 1838: 51, pl. 1, fig. 8.

Deltocyathus agassizii Pourtalès, 1871: 15 (in part); 1878: 200 (in part).—Moseley, 1876: 546, 551 (in part).—Boone, 1928: 8.

Deltocyathus italicus Pourtalès, 1880: 101 (in part: variety *agassizii*), pl. 1, figs. 2–3.—Moseley, 1881: 145–147 (in part).—Marenzeller, 1904: 281 (in part).—Gravier, 1920: 34–36 (in part).—Keller, 1975: 177, pl. 2, figs. 1–4b.—Cairns, 1977b: 5; 1978a: 11; 1979: 95–97, pl. 17, figs. 1–3.—Lattig, 2000:127–127, fig. 68.—Kitahara, 2007: 502–503, fig. 3E.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: This species has sharp conical base. Deltas at S2-S3 and S3-S4 junctions are robust; S3-S4 junctions reach the axial edge of P3. In small specimens, P2 were relatively larger than in the bigger ones, because the pali are absorbed or reduced by increasing the size of the S2-S3 delta junctions during the corallite growth. This species could be also distinguished from other Atlantic *Deltocyathus* by its bigger columella in relation to the GCD.

Distribution: Western Atlantic, from Florida to Rio de Janeiro; Eastern Atlantic, from the Gulf of Gascony to the Gulf of Guinea; 403–2600 m depth (Cairns 1979; Zibrowius 1980). In Colombia, *D. italicus* have been found from La Guajira Peninsula to off San Bernardo Islands; 296–500 m depth.

Material: INV CNI381, 1 specimen, E76; INV CNI710, 7 specimens, E142; INV CNI711, 8 specimens, E142; INV CNI712, 1 specimen, E150; INV CNI713, 2 specimens, E143; INV CNI714, 1 specimen, E143; INV CNI715, 1 specimen, E151.

Deltocyathus eccentricus Cairns, 1979

Figs. 3G–H

Deltocyathus agassizii Pourtalès, 1871: 15 (in part); 1874: 35–36 (in part: off Barbados); 1878: 200 (in part).—Moseley, 1876: 546 (in part).
Deltocyathus italicus Pourtalès, 1880: 101 (in part).—Moseley, 1881: 145 (in part).—Jourdan, 1895: 16 (in part).—Gravier, 1920: 34 (in part).
Deltocyathus andamanicus Gravier, 1920: 37, pl. 4, figs. 55–59, pl. 15, fig. 209.
Deltocyathus eccentricus Cairns, 1979: 98–100, pl. 18, figs 8–11.—Zibrowius, 1980: 86–87, pl. 40, figs. A–M, pl. 41, figs. A–N.—Lattig, 2000: 125–126, fig. 65.—Kitahara, 2007: 502–503 (listed).—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: It was remarkable that all Colombian specimens have a conical base and a very thin theca. No major differences were observed among the Colombian specimens and those described by Cairns (1979) and Zibrowius (1980).

Distribution: Amphi-atlantic distribution, tropical and sub-tropical, from the South Carolina coast to off the Amazon River delta, and from Portugal to Cape Verde Islands; 183–1000 m (Cairns 1979; Zibrowius 1980). In Colombia, *D. eccentricus* has been collected from off Portete Bay (La Guajira) to the Gulf of Morrosquillo; 270–500 m depth.

Material: USNM 46423, 4 specimens, P-394; USNM 46434, 1 specimen, P-1356; INV CNI382, 4 specimens, E13; INV CNI383, 1 specimen, E42; INV CNI384, 1 specimen, E64; INV CNI385, 3 specimens, E65; INV CNI386, 6 specimens, E71; INV CNI716, 7 specimens, E149; INV CNI717, 7 specimens, E149; INV CNI718, 10 specimens, E153; INV CNI719, 2 specimens, E150; INV CNI720, 2 specimens, E153; INV CNI721, 3 specimens, E150; INV CNI722, 2 specimens, E143.

Stephanocyathus (*Stephanocyathus*) *diadema* (Moseley, 1876)

Figs. 3I–J

Ceratotrochus diadema Moseley, 1876: 553–554.—Thomson, 1878: 113, fig. 30.
? *Ceratotrochus discoides* Moseley, 1876: 554.
Flabellum angulare Pourtalès, 1878: 203.
Stephanotrochus diadema Pourtalès, 1880: 96, 104, pl. 2, fig. 1.—Moseley, 1881: 152–153, pl. 3, figs. 1 a–c.—Sclater, 1886. 130.—Agassiz, 1888: 149–150.
? *Stephanotrochus discoides* Moseley, 1881: 153–154, pl. 3, figs. 2 a–c.
Not *Stephanotrochus diadema* Jourdan, 1895: 18.—Stephens, 1909: 24.—Gravier, 1920: 43–51.—Thompson, 1931: 9.
Stephanocyathus diadema Gardiner & Waugh, 1938: 191.–Cairns, 1977a: 730–731, figs. 1–2; 1978a: 11 (listed); 1979: 103–105, pl. 19, figs. 1–6. [not *Stephanocyathus diadema* Lattig, 2000: 128–129, fig. 69].—Kitahara, 2007: 502–503, fig. 3G.

***Stephanocyathus diadema nobilis* Keller, 1975: 180, pl. 2, figs. 9 a–b.**

Remarks: All Colombian specimens were collected by *Pillsbury* (1966) and *Oregon II* (1970) expeditions.

Distribution: Western Atlantic, from South Carolina to Rio de Janeiro, 795–2133 m depth (Cairns 1979). In Colombia, it is know from off Cartagena to off Gulf of Uraba; 434–1271 m depth (Prahl and Erhardt, 1989; Cairns 1979).

Material: USNM 46318, 2 specimens, P-364; USNM 46326, 1 specimen, P-374; USNM 46319, 2 specimens, P-391; USNM 49055, 3 specimens, O-11240; INV CNI329, 1 specimen [voucher from USNM 46320].

***Stephanocyathus* (*Stephanocyathus*) *paliferus* Cairns, 1977**
Figs. 3K–L

Stephanocyathus elegans Pourtalès, 1880: 103 (not *C. elegans* Seguenza, 1864).
Stephanocyathus nobilis Erhardt, 1976: 59–61, pl. 1, figs. 1–2.
Stephanocyathus (*S.*) *paliferus* Cairns, 1977a: 731–735, figs. 4–7; 1978a: 11 (listed); 1979: 105–107, pl. 19, figs. 7–9, 11.—Lattig, 2000: 129–130, fig. 70.—Kitahara, 2007: 502–503, fig. 3H.—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: The specimens examined have a mean of 24 mm in GCD, almost half of holotype size, but the septa are completely developed. Some specimens were found settled on dead *Deltocyathus calcar*. Moreover, one specimen collected off Gulf of Morrosquillo at 270 m depth shows reproduction by polyp rejuvenescence, with the parental corallite still attached and being 1/4 in CD of the budding coralla.

Distribution: Tropical western Atlantic, from off Florida to off the Amazon River delta; 229–715 m depth (Cairns 1979). *S. paliferus* is one of the most abundant azooxanthellate coral species with a wide distribution along the Colombian Caribbean, from La Guajira Peninsula to the Gulf of Uraba; 270–634 m depth.

Material: USNM 46447, 1 specimen, P-394; USNM 49086, 4 specimens, O-11290; USNM 49069, O-4907; USNM 80225, O-5692; USNM 100665, 1 specimen, E78; INV CNI387, 1 specimen, E10; INV CNI388, 1 specimen, E54; INV CNI389, 1 specimen, E55; INV CNI390, 3 specimens, E64; INV CNI391, 2 specimens, E64; INV CNI392, 3 specimens, E67; INV CNI393, 1 specimen, E68; INV CNI394, 2 specimens, E78; INV CNI689, 7 specimens, E153; INV CNI690, 1 specimen, E153.

***Stephanocyathus* (*Stephanocyathus*) *laevifundus* Cairns, 1977**

Stephanocyathus variabilis Pourtalès, 1880: 104, pl. 2, fig. 2 (not *Ceratocyathus variabilis* Seguenza, 1864).
Stephanocyathus (*S.*) *laevifundus* Cairns, 1977a: 735–736, figs. 8–12; 1979:107–108, pl. 19, fig.10, pl. 20, figs. 1–4.

Remarks: Since the description of *S. laevifundus* by Cairns (1977a), no new Colombian specimens have been collected.

Distribution: Florida Strait, Haiti, Lesser Antilles and off Panam-Colombia Limits (Cairns 1977a). Colombian paratype was sampled during the Pillsbury expedition, station 407 (9º00'N to 77º25'W) off Gulf of Uraba, between 1158 and 1225 m depth.

Material: USNM 45753, paratype, 1 specimen, P-407

***Stephanocyathus* (*Stephanocyathus*) *isabellae*, new species**
Figs. 3O–R

Description: The corallum is free, with a slightly rounded base without trace of previous attachment scar; however, regeneration scars are always present; polychaete tubes have been incorporated on the base of some specimens. The C1-C2 septocostae are thin, not well defined, but always reach the base center; C3 is evident, only near the calicular edge, and the C4-C5 are a series of minute spurs near the calicular margin. Costae are formed by the lateral fusion of the high and slender granules bases; dorsal costae and coastal granules bear a shallow and thin furrow along its length as fracture lines. Intercostal spaces are wide, showing along its central section relatively deep holes alternating with tall spine shape granules, some of the latter are fused near the calicular margin constituting a short secondary ridged costae. The calicular edge is slightly lanceolated, projecting at the S1-S2 ends. The septal arrangement is not well defined; but corallites always show up to 103 septa in five cycles (S1≥S2>S3>S4≥S5), the fifth never complete. S1 are the only independent septa; S3-S4 join to their superior septa through several slender synapticulae or by a thin plate. S5 are conspicuous near the calicular edge, but up to 1/3–1/2 of the columella distance each S5 is reduced to a slender spines row that reach the columella. Paliform lobes (P1-P2) are small and their septal notches are shallow and wide; S3 to S5 no have paliform lobes. Upper septal and palar edges are smooth near the calicular margin, but from half of the columella distance they become serrated and bear numerous transversely oriented bent granules. The S2-S3 axial sides present granules which are fused to the columella elements. Lateral septal faces present low and rounded scattered granules. All septa are exsert (S1≥S2>S3≥S4>>S5). Columella is small, fascicular in larger corallites, composed of elements derived from the axial edge of septa; sometimes absent in smaller corallites. Fossa is shallow. Corallites are white or creamy.

Discussion: *S. isabellae* belongs to the genus *Stephanocyathus* because of the presence of paliform lobes instead of pali, the septal notches are shallow and wide, and its columella is composed by elements derived from the septal axial edges. *S. isabellae* differs from other Atlantic *Stephanocyathus*, but some specimens resemble juvenile forms of *S. diadema*, due to their lanceolated calicular edges (Cairns 1979). The septal edge granulation, and its rudimentary S5 are similar to those described for *Stephanocyathus moseleyanus* (Sclater, 1886) sensu Zibrowius (1980: pl. 49 fig. F). On the other hand, the small paliform lobes and the septal edge ornamentation are similar to *Stephanocyathus crassus* (Jourdan, 1895) sensu Zibrowius (1980: pl. 50, fig. G), but neither of the mentioned species had been previous recorded in the tropical western Atlantic. *S. isabellae* is distinguishable from the other species of the genus by its basal regeneration scars, the observed thin furrows at the dorsal section of the costae, and by its particular intercostal spaces as longitudinal fracture lines, all perhaps due to its characteristic parricidal budding as the common reproductive mode in the species.

Distribution: Tropical western Atlantic, off Louisiana (Gulf of Mexico); Caribbean, off the southwestern Walton Bank (Jamaica). In Colombia, this species was found off Cabo de La Vela (La Guajira) to off San Bernardo Islands; ranging from 408 to 732 m depth.

Etymology: This new species is named after the youngest daughter of J. Reyes, Isabella Reyes.

Material: Holotype, INV CNI395, 1 specimen, 24.7 mm GCD, E54, Colombia (off Bocas de Ceniza). Paratypes: INV CNI694, 2 specimens, 25.5 and 24.4 mm GCD, respectively, E150, Colombia (off San Bernardo Islands); USNM 100539, 1 specimen, 12.7 mm GCD, P-1256, Jamaica (SE of Walton Bank); USNM 100538, 1 specimen, 20.9 mm GCD, CI-83 R/V Columbus Iselin, Straits of Florida; USNM 100537, 1 specimen, O-3252, Gulf of Mexico (off Louisiana). Additional records: USNM 100540, 1 fragment, P-776, Colombia (La Guajira, off Aramtka Point); INV CNI691, 1 specimen and 3 fragments, E93, Colombia (La Guajira, off Cabo de la Vela); INV CNI692, 3 fragments, E115, Colombia (La Guajira, off Buritaca); INV CNI693, 1 specimen, E92, Colombia (La Guajira, off Cabo de la Vela).

***Stephanocyathus* (*Odontocyathus*) *coronatus* (Pourtalès, 1867)**
Figs. 3M–N

Platytrochus coronatus Pourtalès, 1867: 114.
? *Trochocyathus coronatus* Pourtalès, 1871: 14–15, pl. 6, fig. 16.—Moseley, 1876: 550–551.—Pourtalès, 1880: 96, 106.
Odontocyathus coronatus Moseley, 1881: 148–151, pl. 2, figs. 4a–b, 5a–b.
Stephanocyathus (*Odontocyathus*) *coronatus* Gardiner & Waugh, 1938: 191.—Cairns, 1977a: 736–738, figs. 13–16; 1978a: 11 (listed).
Stephanocyathus (*Odontocyathus*) sp. Keller, 1975: 179.

Remarks: No new specimens have been collected in Colombia since the revisions by Cairns (1977a; 1979).

Distribution: Bahamas to Brazil; in the Caribbean except in the Colombian continental coast (Cairns 1979). In Colombia, *S. coronatus* is only known from San Andres and Old Providence Archipelago.

Material: USNM 49246, 1 specimen, O-3573.

***Thalamophyllia riisei* (Duchassaing & Michelotti, 1860)**
Fig. 3S

Desmophyllum riisei Duchassaing & Michelotti, 1860: 61, pl. 9, fig. 5.
Thalamophyllia riisei Duchassaing, 1870: 28.—Cairns, 1979: 121–123, Map 33 (description and synonymy; but not G-103, = *L. prolifera*).—Wood, 1983: 63, 120 (colour fig.).—Hubbard & Wells, 1986: 136–138, figs. 27–28.—Viada & Cairns, 1987: 132.—Messing, 1987: 12, fig 2.—Humann, 1993: 160–161, colour fig.—Fenner, 1993a: 14 (listed).—Cairns *et al.*, 1994: 9.—Reyes *et al.*, 2005: 325 (listed).—Santodomingo *et al.*, 2007: 286 (listed).
Desmophyllum riisei Colin, 1978: 289 (colour fig.), 290–291.—Castañares & Soto, 1982: Table 1 (listed).
Desmophyllum striatum Cairns, 1979: 121 (in part).

Remarks: Colombian specimens are similar to those described by Hubbard & Wells (1986), in which corallites bud from the theca of the parental corallites, but our specimens do not exhibit more than three generations. Budding corallites were straight or slightly bent from the principal axis of the parental corallite, being always attached to the respective parental corallite through a thin, curved and cylindrical base, PD:GCD ratio about 1:3 to 1:4. Distal buds have their bases bent 90º. The budding corallites usually grow from the base of the parent coralla. The calices are flared and the C1-2 project up to 2/3 the septal length from the calicular edge. No specimens were found attached to hard substrate and no traces of settlement scars were observed. Stoloniferous coralla are the typical growth pattern of the Colombian samples, suggesting that *T. riisei* could settle on soft substrata with the basal section buried into the sediments. *T. riisei* and other corals such as *Anomocora prolifera*, *Coenosmilia arbuscula* and *Madracis myriaster*, were abundant in the azooxanthellate coral communities off San Bernardo Islands (Reyes *et al.* 2005, Santodomingo *et al.* 2007).

Distribution: Tropical western Atlantic, mainly Antillean distribution, from Bahamas and Florida to Trinidad; 4–914 m depth (Cairns 2000). This record extends its distribution to the Caribbean coast of Colombia, around Rosario and San Bernardo Archipelago, between 22 and 265 m depth. *T. riisei* was reported as suspected in the Colombian Caribbean by Reyes (2000), due to their closely distribution around San Andres Islands, but specimens reported here are the first documented record of this species for the Caribbean coast of Colombia.

Material: INV CNI675, 5 colony fragments, E155; INV CNI676, 148 colony fragments, E155; INV CNI677, 9 colony fragments, E155; INV CNI678, 1 colony fragment, E158; INV CNI679, 47 colony fragments, E156; INV CNI2390, +10 colony fragments, D34; INV CNI2403, 1 colony fragment, C1; INV CNI2411, 1 colony fragment, C4; INV CNI2428, 8 colony fragments, E246; INV CNI2464, +1 colony fragments, E246; INV CNI2519, 19 colony fragments, D12; INV CNI2547, +20 colony fragments, D35; INV CNI2552, +50 colony fragments, D35; INV CNI2562, +50 colony fragments, D15; INV CNI2702, 1 colony fragment, D11; INV CNI2705, 1 colony fragment, D13; INV CNI2729, 18 colony fragments, D38; INV

CNI2746, 3 colony fragments, D46; INV CNI2772, 1 colony fragment, D21; INV CNI2782, 1 colony fragment, D33; INV CNI2804, +20 colony fragments, D22; INV CNI2814, 3 colony fragments, D69; INV CNI2837, 2 colony fragments, D15; INV CNI2872, +50 colony fragments, D36; INV CNI2881, 1 colony fragment, D76; INV CNI2889, 11 colony fragments, D76; INV CNI2901, 15 colony fragments, C2; INV CNI2902, 39 colony fragments, C3; INV CNI2944, +10 colony fragments, C2.

***Eusmilia fastigiata* (Pallas, 1766)**
Fig. 3T

Madrepora fastigiata Pallas, 1766: 301–302.—Ellis & Solander, 1786: 152.
Caryophyllia fastigiata Lamouroux, 1821: 50.—Ehrenberg, 1834:316.—Lamarck, 1836: 355.
Eusmilia fastigiata Milne Edwards & Haime, 1848: 264, pl.5 fig. 1; 1857: p. 187.—Pourtalès, 1871: 67.—Vaughan, 1919: 361.— Almy & Carrión-Torres, 1963: 160–161. pl. 21, fig. a.—Roos, 1971: 83, pl. 52, figs. a–b.—Smith, 1971: 95, pl. 48.—Wells, 1973: 47–48, figs. 34–35.—Weisbord, 1974: 446–451, pl. 52, fig. 5.— Zlatarski & Martínez, 1982: 253–258, pls. 107–108.—Cairns, 1982: 299, fig. 133e–f.—Prahl & Erhardt, 1985.— Humann, 1993: 162–163, colour figs.—Reyes *et al.*, 2002: 64–66 (conservation).

Remarks: *E. fastigiata* is a zooxanthellate coral species common in the Caribbean shallow coral reefs. The main habitats of the "smooth flower coral" are the back-reef and the reef-lagoon borders, and occasionally can be also found on the reef-slope. *E. fastigiata* rarely establishes monospecific aggregations in reefs (Almy & Carrión-Torres 1963). Nevertheless, in the past *E. fastigiata* constituted an important coralline formation off Santa Marta Bay at the northern coast of Colombia; however, its populations have decreased, almost disappeared, over the past three decades in that area due to the construction of the Santa Marta harbour, and its consequent negative effects for the coralline fauna, such as the increment of sedimentation and pollution. For that reason, *E. fastigiata* was included in the Colombian Red List of Marine Invertebrates under the category of Vulnerable (Reyes *et al*. 2002), according to the criteria established by the International Union for Conservation of Nature and Natural Resources (IUCN).

Distribution: Caribbean, Gulf of Mexico, Florida, Bahamas (Zlatarski & Martínez 1982). In Colombia, *E. fastigiata* is known from all continental and oceanic coral reefs (Díaz *et al*. 2000).

Material: USNM Antonius collection, catalog numbers C2, C4, C6; INV CNI52, 1 colony, BEM1861; INV CNI136, 1 colony, BEM977; INV CNI191, 1 colony, BEM916; INV CNI257, 1 colony, BEM916; INV CNI259, 1 colony, BEM-E1003; INV CNI268, 1 colony, BEM6844; INV CNI537, 1 colony, BEM3629; INV CNI580, 1 colony, BEM6842; INV CNI628, 1 colony, BEM3629; INV CNI920, 1 colony, BEM6842.

***Lophelia pertusa* (Linnaeus, 1758)**
Fig. 4A

Madrepora pertusa Linnaeus, 1758: 797.
Madrepora prolifera Pallas, 1766: 307.
Lophelia prolifera Cairns, 1979: 125–127, pl. 24, figs. 1–5, Map 34 (description and synonymy); 1981: 10.—Viada & Cairns, 1987: 132.—Zibrowius, 1988: 136 (listed).—Prahl & Erhardt, 1989: 547.—Cairns *et al.*, 1991: 47 (listed).—Cairns *et al.*, 1994: 4 (listed).
Lophelia pertusa Zibrowius, 1980: 126–130, pl. 66, figs. A–L (description and synonymy).—Cairns, 1994: 27–28, pl. 9, figs. e–i.—Lattig, 2000: 131–132, fig. 71.—Kitahara, 2007: 502–503, fig. 4A–B.

Remarks: *L. pertusa* is the principal azooxanthellate coral builder of deep-sea bioherms in the Atlantic, reaching the major development in the northeastern Atlantic off the Norwegian coast (Reed 2002). In Colombia, only fossil specimens have been collected off La Guajira, suggesting that *L. pertusa* may have built bioherms in the past, although it is also possible that living assemblages of *Lophelia* could occur at deeper

surrounding areas. Further studies should be done in order to establish the actual status of their populations in Colombian waters. Our specimens present a thin and slender skeleton.

Distribution: Worldwide distribution, from the equator to the sub-polar regions, more abundant in the North hemisphere; from 40 to 3000 m depth (e.g. Freiwald & Roberts 2005). In Colombia, *L. pertusa* is only known in the northeastern coast, off Honda Bay and off Carrizal Point, both located in the surrounding areas of the Rancheria Canyon; from 300 to 450 m depth.

Material: USNM 46016, P-776; INV CNI396, 5 colony fragments, E10; INV CNI397, 3 colony fragments, E10; INV CNI723, 1 colony fragment, E91.

Oxysmilia rotundifolia (Milne Edwards & Haime, 1848)

Figs. 4B–C

Lophosmilia rotundifolia Milne Edwards & Haime, 1848: 247, pl. 5, figs. 3–3a.

Oxysmilia rotundifolia Duchassaing, 1870: 27.—Cairns, 1979: 73–75, pl. 10, figs. 7–9, pl. 11, figs. 1–4, Map 16 (description and synonymy).—Fricke & Meischner, 1985: 183, fig. 11b.—Rezak *et al.*, 1985: 225 (listed).—Prahl & Erhardt, 1989: 544–545.—Cairns *et al.*, 1991: 47 (listed).—Cairns *et al.*, 1994: 6–7.—Reyes *et al.*, 2005: 324 (listed).—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: The examined specimens fit in all aspects to the previous species description (Cairns 1979; 2000), but they have no traces of P3 development. *O. rotundifolia* is the largest attached corallum that has been collected in the Colombian Caribbean, although it is not abundant. Only few samples (two) were collected with living tissue off Gulf of Morrosquillo at 155–160 m depth. Colombian specimens resemble in shape to some individuals collected in Guyana, USNM 61887 (Guyana) and USNM 61874 (French Guyana).

Distribution: Tropical western Atlantic, from Onslow Bay (North Carolina) to Surinam, including the Caribbean and the north coast of the Gulf of Mexico; from 46 to 640 m depth (Cairns 1979; 2000). In Colombia, it is known from San Andres Archipelago, off Santa Marta and off San Bernardo-Rosario Islands, between 100 and 238 m depth.

Material: USNM 61879, O-4904; USNM 61876, 2 specimens, O-4832; USNM 61880; INV CNI326, 1 specimen [voucher from USNM 61876], O-4832; INV CNI684, 1 specimen, E156; INV CNI685, 1 specimen, E156; INV CNI686, 2 specimens, E155; INV CNI687, 14 specimens, E155; INV CNI688, 2 specimens, E122; INV CNI2400, 3 specimens, C1; INV CNI2431, 2 specimens, E246; INV CNI2437, 1 specimen, C2; INV CNI2454, 3 specimens, C3; INV CNI2467, 3 specimens, E246; INV CNI2508, 2 specimens, D3; INV CNI2518, 5 specimens, D12; INV CNI2534, 1 specimen, D28; INV CNI2714, 1 specimen, D37; INV CNI2738, 1 specimen, D38; INV CNI2843, 1 specimen, D15; INV CNI2894, 12 specimens, C2; INV CNI2909, 1 specimen, C3.

Colangia immersa (Pourtalès, 1871)

Figs. 4D–E

Colangia immersa Pourtalès, 1871: 31–32.–Goreau & Wells, 1967: 448 (listed).—Porter, 1972: 112 (listed).—Wells & Lang, 1973: 57 (listed).—Cairns, 1979: 207 (listed); 1982: 290, fig. 128f.—Castañares & Soto, 1982: Table 1 (listed).—Hubbard & Wells, 1986: 129–130, figs. 13–16.—Humann, 1993: 168–171, 3 colour figs.—Fenner, 1993b: 12, 14 (listed).

Rhizosmilia maculata Cortés, 1992: 243, fig. 1; 1996: 331. [Not *Bathycyathus maculatus* Pourtalès, 1874].

Remarks: The unique Colombian specimen is a single dead corallite in worn condition, which exhibits many sipunculid erosion holes. The specimen was collected at the calcareous algae seabed off Manaure (La Guajira Peninsula).

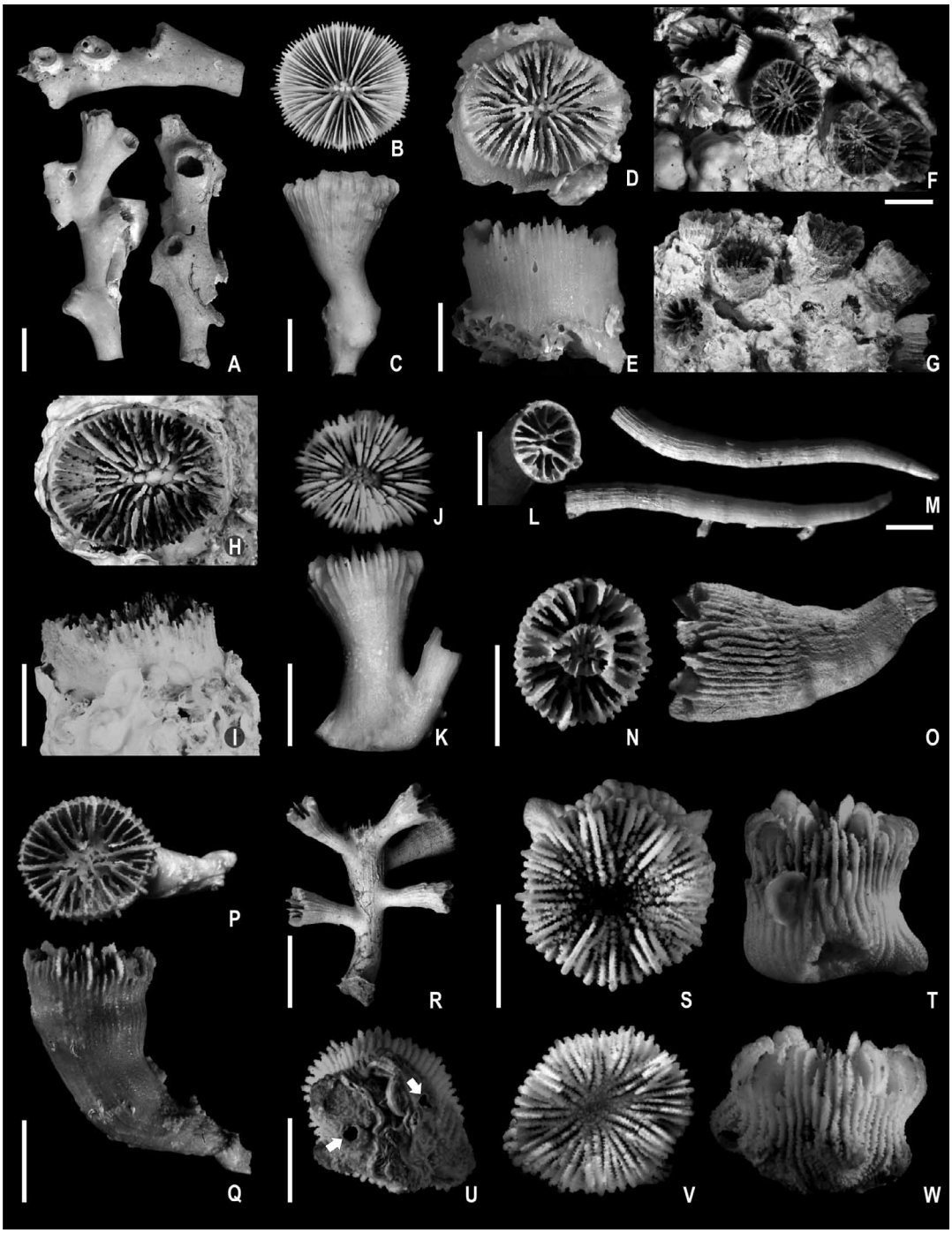

FIGURE 4. A, *Lophelia pertusa*, INV CNI396, off La Guajira (Honda Bay), colony fragments, x 1; B–C, *Oxysmilia rotundifolia*, INV CNI687, off San Bernardo Islands, calicular and lateral views, both x 1.1; D–E, *Colangia immersa*, INV CNI683, off La Guajira (Punta Gallinas), calicular and lateral views, both x 3; F–G, *Phyllangia americana americana*, INV CNI274, off La Guajira (Caricari Point), colony from calicular and oblique views, both x 2; H–I, *Rhizosmilia maculata*, INV CNI178, off Santa Marta, calicular and lateral views, both x 3.6; J–K, *Phacelocyathus flos*, INV CNI2940, off San Bernardo Islands, calicular and lateral views, both x 3.6; L–M, *Anomocora fecunda* INV CNI2897 off San Bernardo Islands, calicular and lateral views, x 3.2, x 1, respectively; N–O, *Anomocora prolifera*, INV CNI2725, off San Bernardo Islands, calicular view showing rejuvenescence stage and lateral view, both x 4.4; P–Q, *Anomocora marchadi*, INV CNI2303, off La Guajira, calicular and lateral views, both x 3.6; R, *Coenosmilia arbuscula*, INV CNI855, off San Bernardo Islands, branching pattern, x 1.5; S–T, *Heterocyathus antoniae*, paratype, INV CNI2076, off Manaure, calicular and lateral views, both x 4.5; U–W, *Heterocyathus antoniae*, INV CNI740, holotype, off Santa Marta (Neguanje Bay): U, basal view showing sipunculid holes, V, calicular view, and W, lateral view, all x 4.5. Scale bars for A–C, M, R = 1 cm; D–L, N–Q, S–W = 5 mm.

Distribution: Caribbean, Bahamas and Bermuda (Cairns 2000); from 0.5 to 347 m. In Colombia, it is only known from the northern coast off Manaure (La Guajira Peninsula) at 73 m depth.

Material: INV CNI683, 1 specimen, E88.

Phyllangia americana americana Milne Edwards & Haime, 1849

Figs. 4F–G

Phyllangia americana Milne Edwards & Haime, 1849b: 182.—Pourtalès, 1871: 30, 79.—Vaughan, 1901: 299.—Duerden, 1902: 555–558, pl. 5, fig. 46, text-fig. 9h (histology and description of living polyps).—Vaughan & Wells, 1943: 178.—Almy & Carrión-Torres, 1963: 156, fig. 15b.—Goreau & Wells, 1967: 448.—Weisbord, 1968: 68–71, pl. 10, fig. 3, pl. 11, fig. 1 (synonymy).—Smith, 1971: 87–88.—Roos, 1971: 74, pl. 36, figs. a–b.—Olivares & Leonard, 1971: 64, pl. 8, figs. C–D.—Porter, 1972: 111.—Wells & Lang, 1973: 57 (listed).—Erhardt, 1974: 406 (listed).—Weisbord, 1974: 403–405, pl. 46, figs. 4–5.—Colin, 1978: 262–263, colour fig. (p. 257).—Zibrowius, 1980: 137.—Cairns, 1982: 290, fig. 128e.—Zlatarski & Martínez, 1982: 127–129, pl. 41, figs. 1–5, pl. 42, figs. 1–3, pl. 43, figs. 1–6 (description and variation).—Castañares & Soto, 1982: Table 1 (listed).—Wood, 1983: colour fig. (p. 109).—Prahl & Erhardt, 1985: 102, fig. 83.—Hubbard & Wells, 1986: 129, figs. 10–12 (in part).—Prahl & Erhardt, 1989: 542, fig. 1.—Humann, 1993: 170–173, 3 colour figs.—Not Cairns *et al.*, 1994: 8 (= *P. pequegnatae* Cairns, 2000).—Pires, 1997: 184.

Stellangia reptans Duchassaing & Michelotti, 1860: 80, pl. 10, figs. 1–2.—Quelch, 1886: 12 (listed).

Phyllangia americana americana Cairns, 2000: 114–118, fig. 19, 135–140.—Kitahara, 2007: 502–503, fig. 3I.

Remarks: Cairns (2000) recognized two subspecies given the geographic separation, *P. americana americana* distributed in the western Atlantic, and *P. americana mouchezii* (Lacaze-Duthiers, 1897) distributed in the eastern Atlantic. *P. americana americana* is a common species, found elsewhere in Colombian waters, colonizing rocky substrates, mollusc shells, dead corals or any hard substrate; furthermore, single corallites or colonies have been observed on man-made structures such as buoys, pilings, docks and the offshore gas platforms located in La Guajira.

Distribution: Tropical western Atlantic, from Beaufort (North Carolina) to Rio de Janeiro (Brazil); ranging from 0 to 53 m depth (Cairns 2000). In Colombia, it has been collected from Honda Bay (La Guajira) to the Gulf of Morrosquillo; between 0 and 73 m depth.

Material: INV CNI61, 1 corallite, BEM4466; INV CNI194, 1 corallite, BEM1817; INV CNI214, 1 corallite, BEM120; INV CNI274, 1 corallite, BEM-E13456; INV CNI583, 1 corallites, BEM3629; INV CNI680, 1 corallite, E88; INV CNI1459, 1 corallite, BEM4292; INV CNI2157, 3 corallites, E214; INV CNI2159, 5 corallites, E215; INV CNI2199, 1 corallites, E202; INV CNI2201, 8 corallites, E204; INV CNI2203, 4 corallites, E201; INV CNI2240, 1 corallites, E203; INV CNI2293, 2 corallites, E214; INV CNI2294, 1 corallites, E236; INV CNI2311, 14 corallites, E214; INV CNI2317, 2 corallites, E213.

Rhizosmilia maculata (Pourtalès, 1874)

Figs. 4H–I

Bathycyathus maculatus Pourtalès, 1874: 34–35, pl. 6, figs. 5–6.—Cerame-Vivas & Gray, 1966: 236 (listed).—Tommasi, 1970: 55 (listed).

Coenocyathus bartschi Wells, 1947: 170–171, pl. 11, figs. 1–3.—Werding & Erhardt, 1977: 106.— Zlatarski & Martínez, 1982: 259–262, pl. 112, figs. 1–5, pl. 113, figs. 1, 4–5 (not 2–3, = *Coenocyathus caribbeana*), pl. 114, figs. 1–6.—Prahl & Erhardt, 1985: 174, fig. 106.—Estallela, 1987: 6–7, figs. 1A–B.

Caryophyllia maculata Cairns, 1977b: 9–10, pl. 1, figs. 1–3 (synonymy).—Cairns, 1978a: 11 (listed).—Castañares & Soto, 1982: Table 1 (listed).

Rhizosmilia maculata Cairns, 1978b: 220, pl. 1, fig. 8.—Hubbard & Wells, 1986: 132, figs. 19–20.—Prahl & Erhardt, 1989: 548, fig. 7.—Not Cortés, 1992: 243, fig. 1 (= *Colangia immersa*).—Humann, 1993: 168–169, 4 colour figs.—Pires, 1997: 185.—Kitahara, 2007: 502–503, fig. 3O.

Rhizosmilia gerdae Hubbard & Wells, 1986: 132, figs. 17–18. [Not *R. gerdae* Cairns, 1978b].

Remarks: *R. maculata* is a common species in the Colombian Caribbean; it has been observed elsewhere in the coral reefs, although only two specimens from Colombian reefs have been collected and deposited at the MHNMC collection.

Distribution: Tropical western Atlantic, from Florida to Brazil (Cairns 2000); 0.5–508 m depth. In Colombia, *R. maculata* is known from Santa Marta to the Gulf of Uraba, around 15 m depth.

Material: INV CNI178, 1 specimen, BEM4466; INV CNI250, 1 specimen, BEM4133.

***Phacelocyathus flos* (Pourtalès, 1878)**
Figs. 4J–K

Paracyathus flos Pourtalès, 1878: 201.
Phacelocyathus flos Cairns, 1979: 144–146, pl. 27, figs. 1–4, Map 41 (synonymy and description).—Cairns *et al.*, 1991: 47 (listed).—Humann, 1993: 174–175, colour fig.—Cairns *et al.*, 1994: 4 (listed).—Kitahara, 2007: 502–503, fig. 4F.—Santodomingo *et al.*, 2007: 286 (listed).
Caryophyllia flos Castañares & Soto, 1982: Table 2 (listed).

Remarks: Colombian specimens show the typical triangular paliform lobes characteristic of this species. Our samples have a corallum entirely white, belonging to the minority group according to Cairns (2000), who described a white colour for only 25% of the examined specimens.

Distribution: Tropical western Atlantic, from Bahamas to Recife Brazil; 20–560 m depth (Cairns 1979), but most part of the records were above 200 m. In Colombia, it was found off San Bernardo Islands, from 150 to 180 m depth, mainly associated to deep-sea coralline formations (Santodomingo *et al.* 2007).

Material: USNM 61932, O-4832; INV CNI2521, 1 specimen, D12; INV CNI2940, 1 specimen, C2.

***Anomocora fecunda* (Pourtalès, 1871)**
Figs. 4L–M

Coelosmilia fecunda Pourtalès, 1871: 21–22, pl. 1, fig. 12, pl. 6, figs. 14–15.
Anomocora fecunda Cairns, 1979: 127–129, pl. 24, figs. 6–8, Map 35 (synonymy and description).—Hubbard & Wells, 1986: 138, figs. 29–30.—Viada & Cairns, 1987: 132.—Prahl & Erhardt, 1989: 547.—Cairns *et al.*, 1991: 47 (listed).—Cairns *et al.*, 1994: 4 (listed).— Cairns, 2000: 128–129 (synonymy and description).—Reyes *et al.*, 2005: 324 (listed).—Kitahara, 2007: 502–503, fig. 4C.—Santodomingo *et al.*, 2007: 286 (listed).
Coenosmilia fecunda: Zibrowius, 1980: 131–133 (in part: pl. 67, figs. A–K).

Remarks: Most of the Colombian specimens present elongated and cylindrical corallum, tapering slightly towards the base, resembling those described for the tropical western Atlantic (Cairns 1979; 2000). However, three of our specimens show straight slender coralla, without thecal budding scars. It is remarkable that some of the *Anomocora fecunda* and *Coenosmilia arbuscula* specimens collected at the same station (off Santa Marta and San Bernardo Islands), exhibit intermediate morphological characteristics between both species, suggesting a possible hybridization process between them, such as it has been observed for other coral reef species in the Caribbean (e.g. *Acropora* species, see Vollmer & Palumbi 2002). With *A. fecunda*, these intermediate specimens share the following characteristics, elongated and cylindrical corallum, spaced dissepiments, and poorly formed columella. With *C. arbuscula*, they shared some other morphological features such as the absence of paliform lobes and the presence of ceratoid buds on the parental corallum, which are attached just below the calicular edge. In Colombia, *A. fecunda* and its intermediate forms with *C. arbuscula*, have been collected from hard bottoms, conforming deep sea coral assemblages together with other azooxanthellate coral species (Reyes *et al.* 2005; Santodomingo *et al.* 2007).

Distribution: Tropical western Atlantic, from Bahamas to Brazil; 37–640 m depth. Eastern Atlantic, known from Madeira, Canarias and the Azores, between 130 to 540 m depth (Cairns 2000; Zibrowius 1980).

In Colombia, it is known from off Dibulla (La Guajira) to off San Bernardo Islands, and San Andres and Old Providence Archipelago; from 70 to 576 m depth.

Material: USNM 46508, 2 corallites, P-776; USNM 46509, 19 corallites, P-775; USNM 62508, O-4832; INV CNI315, 1 corallite, P-775; INV CNI398, 13 corallites, E8; INV CNI399, 3 corallites, E8; INV CNI838, 5 corallites, E94; INV CNI839, 2 corallites, E95; INV CNI840, 2 corallites, E96; INV CNI841, 3 corallites, E102; INV CNI842, 3 corallites, E102; INV CNI843, 1 corallite, E104; INV CNI844, 3 corallites, E116; INV CNI845, 16 corallites, E117; INV CNI846, 1 corallite, E118; INV CNI847, 1 corallite, E94; INV CNI849, 2 corallites, E155; INV CNI1795, 1 corallite, E182; INV CNI2391, 6 corallites, D34; INV CNI2476, 1 corallite, C3; INV CNI2505, +100 corallites, D3; INV CNI2528, +500 corallites, D12; INV CNI2543, +50 corallites, D28; INV CNI2548, +20 corallites, D35; INV CNI2553, +50 corallites, D35; INV CNI2570, 5 corallites, D15; INV CNI2684, 1 corallite, D20; INV CNI2690, +50 corallites, D31; INV CNI2783, +30 corallites, D33; INV CNI2799, 1 corallite, D75; INV CNI2838, 2 corallites, D15; INV CNI2897, +50 corallites, C2; INV CNI2922, +100 corallites, C3.

Anomocora prolifera (Pourtalès, 1871)

Figs. 4N–O

Ceratocyathus prolifer Pourtalès, 1871: 19–20, pl. 3, figs. 8–10.

Asterosmilia prolifera Cairns, 1979: 138–140, pl. 26, figs. 5–6, 8, Map 39 (synonymy and description).—Zibrowius, 1980: 140–141, pl. 73, figs. A–N, pl. 107, fig. J (synonymy and description).—Hubbard & Wells, 1986: 138–139, figs. 31–32.—Prahl & Erhardt, 1989: 548.—Cairns *et al.*, 1991: 47 (listed).—Cairns *et al.*, 1994: 4 (listed).

Anomocora prolifera Cairns, 2000: 129–130, figs.148–150 (new combination).—Reyes *et al.*, 2005: 324 (listed).—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: Most of the Colombian specimens show parricidal budding, without thecal buds, and ridged costae. Coralla are 6.7–8 mm in GCD and 12.7–24.7 mm in length.

Distribution: Amphi-atlantic, from 30 to 329 m (Cairns 1979; 2000; Zibrowius 1980). In Colombia, *A. prolifera* is known from La Guajira Peninsula to the Gulf of Morrosquillo, being more abundant in La Guajira region; 10–200 m depth.

Material: USNM 46781, 7 specimens, P-393; USNM 46792, P-768; USNM 46799, 54 specimens, P-775; USNM 80736, O-5698; USNM 80373, O-5699; INV CNI316, 1 specimen [voucher from USNM 46794], P-775; INV CNI406, 5 specimens, E8; INV CNI833, 2 specimens, E103; INV CNI834, 10 specimens, E102; INV CNI835, 3 specimens, E122; INV CNI836, 4 specimens, E97; INV CNI837, 1 specimen, E100; INV CNI2142, 28 specimens, E239; INV CNI2143, 15 specimens, E238; INV CNI2146, 43 specimens, E237; INV CNI2164, 1 specimen, E234; INV CNI2176, 4 specimens, E236; INV CNI2392, 1 specimen, D34; INV CNI2571, 5 specimens, D15; INV CNI2577, 23 specimens, D17; INV CNI2683, 26 specimens, D20; INV CNI2725, 37 specimens, D19; INV CNI2754, 5 specimens, D16; INV CNI2798, 2 specimens, D75; INV CNI2847, 12 specimens, D18; INV CNI2874, 4 specimens, D36.

Anomocora marchadi (Chevalier, 1966)

Figs. 4P–Q

Dasmosmilia marchadi Chevalier, 1966: 944–949, pl. 5, figs. 3–4, text-figs. 11–13.

Asterosmilia marchadi Cairns, 1979: 140–142, pl. 26, figs. 7, 9–10, Map 40 (synonymy and description).—Zibrowius, 1980: 141–142, pl. 74, figs. A–K (synonymy and description).—Prahl & Erhardt, 1989: 548.—Cairns *et al.*, 1991: 47 (listed).—Cairns *et al.*, 1994: 7.—Cairns & Zibrowius, 1997: 131–132, figs. 17a–b (synonymy and description).

Anomocora marchadi Cairns, 2000: 130–131 (new combination).—Santodomingo *et al.*, 2007: 286 (listed).

Remarks: More than 2000 corallites were collected at Manaure (La Guajira), co-occurring with

antipatharians, sponges, bryozoans and octocorals. No differences were observed between Colombian specimens and those previously described by Cairns (1979; 2000).

Distribution: Atlantic, eastern Pacific and Indian Oceans; from 35 to 229 m depth (Cairns 1979; 2000; Cairns & Zibrowius 1997). In Colombia, *A. marchadi* is common along the northeastern Caribbean coast (La Guajira Peninsula), from off Honda Bay to Palomino, at 50 m depth. It has also been collected around the Rosario and San Bernardo Archipelago, from 94 to 100 m depth.

Material: INV CNI2141, 548 specimens, E238; INV CNI2144, 1012 specimens, E239; INV CNI2145, 1437 specimens, E237; INV CNI2147, 2 specimens, E232; INV CNI2163, 23 specimens, E231; INV CNI2171, 4 specimens, E236; INV CNI2182, 1 specimen, E239; INV CNI2301, 40 specimens, E234; INV CNI2302, 36 specimens, E236; INV CNI2303, 11 specimens, E240; INV CNI2842, 1 specimen, D15; INV CNI2846, 12 specimens, D18.

Coenosmilia arbuscula Pourtalès, 1874

Fig. 4R

Coenosmilia arbuscula Pourtalès, 1874: 39–40, pl. 7, fig. 1.—Cairns, 1979: 130–132, pl. 24, figs. 9–11, Map 36 (synonymy and description).—Rezak *et al.*, 1985: 225 (listed).—Prahl & Erhardt, 1989: 547–548.—Cairns *et al.*, 1991: 47 (listed).—Cairns *et al.*, 1994: 4 (listed).—Reyes *et al.*, 2005: 324 (listed).—Santodomingo *et al.*, 2007: 286 (listed).

Coenosmilia fecunda Zibrowius, 1980: 131 (in part: pl. 68, figs. A–F). [Not *Coelosmilia fecunda* Pourtalès, 1871].

Remarks: Some specimens exhibit combined characteristics with *A. fecunda*, mainly in those stations where both species were collected alive. This mixture of morphological characters could be the result of hybridization and cross-breeding processes between these two species (see also *A. fecunda* remarks). *C. arbuscula* specimens were abundant on hard bottoms of the continental shelf, where azooxanthellate coralline communities develop. Colombian specimens are similar to USNM 80212 (Colombia-Nicaragua border).

Distribution: Amphi-atlantic; from 74 to 622 m depth (Cairns 1979; 2000). In Colombia, *C. arbuscula* has been collected along the Caribbean coast, from La Guajira Peninsula (Prahl & Erhardt 1989) to San Bernardo Islands, between 72 and 218 m depth.

Material: USNM 46558, P-1354; USNM 80221, O-4832; USNM 80212, O-3568; INV CNI401, 3 specimens, E7; INV CNI402, 37 specimens, E8; INV CNI403, 10 specimens, E8; INV CNI404, 86 specimens, E8; INV CNI405, 3 specimens, E8; INV CNI852 E156; INV CNI853, 1 specimen, E125; INV CNI2440, 3 specimens, D12; INV CNI2461, 21 specimens, C3; INV CNI2504, +50 specimens, D3; INV CNI2526, +50 specimens, D12; INV CNI2541, +50 specimens, D28; INV CNI2691, 3 specimens, D31; INV CNI2831, 2 specimens, C2; INV CNI2873, +10 specimens, D36; INV CNI2892, 3 specimens, D28; INV CNI2898, +50 specimens, C2; INV CNI2899, 3 specimens, C2; INV CNI2923, +15 specimens, C3.

Heterocyathus antoniae, new species

Figs. 4S–W

Description: Coralla subcylindrical. Holotype is 10 mm in GCD, 8.8 mm in LCD and 9.0 mm in height. Corallites initially settled on gastropod shells, which are overgrown during the coral development, and in some specimens the coral skeleton practically covered all the mollusc shell. The holotype base (8.1 x 10.6 mm in BD) displays five holes (sipunculid openings): four of them are aligned with the LCD at the middle part of the base (from the right to the left 0.8, 0.7, 0.2 and 0.6 mm in diameter), while the fifth one is located at the end of a conical shaped pipe (1 mm diameter) and it is projected out 2 mm and curved 30 from the thecal wall. Internal walls of the holes are covered by a thin, smooth and porcelain-like layer (0.2 mm thick). In the paratype specimen only two basal pores were observed. Some sabellid polychaete tubes are attached to the

base in the holotype specimen. Base is covered by high, conical, almost cylindrical or bent granules perpendicularly oriented. Ridged costae equal in height and width, prominent. Coarse costal granulation develops from secondary accretion of a central rod-shape element, and flanked by two slender spines diagonally oriented against that central element. Lateral spines of C4 flank the C1-C2, and they are twice or three times higher than the external C4 spines. Intercostal furrows are deep and slender, sometimes with thecal pores connecting to the interior of the coralla. Calicular margin is lanceolated: S1 are the most exsert septa projecting up to 1.2 mm from the calicular margin adjacent to S3. Despite S1 are the most exsert septa, the distance from the thecal edge to the septal lobe is slightly longer for the S3 (S1 up to 1.2 mm, S2 up to 1 mm, S3 up to 1.3 mm). Septal ornamentation is twice to three times its respective septa width.

Septa hexamerally arranged up to five cycles, following a Pourtalès plan (S1=S2=S4>>S3); the fifth cycle incomplete, with two S5 associated to the principal axis. Septal axial edges are smooth and straight; deep and narrow palar notches extend just below the columella. S1 are the only independent septa, reaching the columella. Paliform lobes occur before all septa (P1 to P4), except for the additional S5; P4 composed of up to six palar teeth, gradually smaller while closer to the columella. P3 is composed of one or two lobes, twice the width of S1; P2 is twice to three times the width of P1, and P1 bearing three to four small lobes. Septa-columella junctions are fenestrated. The secondary accretion of septal ornamentation is connected by cylindrical synapticulae to the opposite septal-palar faces near the columella. Septal and palar granulation is laterally fused in carinae, perpendicular to the trabecular axis. Columella is spongy and elliptical (1.8 x 1.1 mm), composed of crispate elements, laterally fused. Fossa is shallow in the holotype, but deep in the paratype. Corallum present a white colour, but some specimens exhibit a brown or purple columella and septal bases.

Remarks: The genus *Heterocyathus* comprises 16 extant and 5 fossil nominal species (Stolarski *et al.* 2001). The extant species were grouped into three valid species by Hoeksema & Best (1991): *H. sulcatus* (Verrill, 1866), *H. aequicostatus* M. Edwards & Haime, 1848 and *H. alternatus* Verrill, 1865. However, Zibrowius (1998) and Cairns (1999b) suggest that a more detailed study should be performed in order to clarify the genus taxonomy. Following Hoeksema & Best (1991), *Heterocyathus* species are differentiated by the septal arrangement, lateral septal projection, and the coloration pattern: *H. sulcatus* is characterized by having a central part of the calices with dark brown or black colour, and short lateral septal projections; *H. aequicostatus* presents a compact corallum, white calices, long lateral septal projections and closely packed pali; and *H. alternatus* has spaced S1, white calices, and closely packed pali. Colombian *Heterocyathus* shares some characters with these three species: for instance, one paratype specimen (INV CNI2076) has a black columella and long lateral septal projections as *H. sulcatus*; on the contrary, the holotype (INV CNI740) presents a completely white corallum, and spaced S1, showing a resemblance to *H. alternatus*. *H. antoniae* is also similar to *H. alternatus* in size (10 mm in GCD, sensu Cairns 1999b), and having a pointed costae granulation (USNM 90410, Indian Ocean, Burma, 80 m depth); but it differs from *H. alternatus* in the presence of additional pairs of S5 associated to the principal S1, a shallow fossa, slender and crispate columella elements, ridged lobe bases product of the palar granulation fusion, and by its subcylindrical coralla. *H. aequicostatus* (USNM 89955, Pacific Ocean, Philippines, 33 m depth) is similar to *H. antoniae* in its granular base and its costae extension up to the base edge; but, it is different in the corallum size and its low and rounded costae granulation. The characteristic of having extra pairs of S5 adjacent to the principal S1 system, is shared with *H. japonicus* (Verrill, 1866) sensu Zibrowius (1998), but they can be differentiated by the costal length; whilst in *H. japonicus* the costae extend until the base center of the corallum, in *H. antoniae* costae extend only to the base edge. *H. antoniae* resembles *H. sulcatus* (USNM 90079, Philippines, 33 m) because both species have subcylindrical coralla and similar calicular aspect, but *H. antoniae* present mainly white calices and equally wide costae. Thus, *H. antoniae* was established as a new species, based on its morphological characteristics and the particular geographic distribution restricted to the northern Caribbean coast of Colombia.

Distribution: *Heterocyathus* species are commonly found on sandy bottoms adjacent to coral reefs of the eastern Pacific and Indian oceans, from Japan to Mozambique (Hoeksema & Best 1991; Cairns & Zibrowius

1997; Zibrowius 1998; Cairns 1999b). It is also known from the Gulf of California (Durham & Barnard 1952). *Heterocyathus* species were only known as fossil for the Atlantic Ocean; the youngest record dates from the Miocene (20–15 MY, Burdigalian) and it was found at the southwestern France (Stolarski *et al.* 2001). The particular distribution of Colombian specimens suggests that the species probably belongs to a relict fauna still present in the Caribbean. In Colombia, *H. antoniae* has been collected in the northeastern Caribbean coast, from Dibulla (La Guajira Peninsula) to Santa Marta; between 20 and 70 m depth.

Etymology: This species is named after the oldest daughter of J. Reyes, Antonia Reyes.

Material: Holotype, INV CNI740, 1 specimen overgrowing a gastropod shell, 10 mm GCD, E118, Colombia (Santa Marta, Neguanje Bay). Paratypes: INV CNI2076, 1 specimen overgrowing a gastropod shell, 9.5 mm GCD, E237, Colombia (La Guajira, off Manaure). Other material: INV CNI739, 1 specimen settled on *Polystira* sp. shell, E105; INV CNI738, 2 specimens settled on a juvenile *Strombus* sp. shell, E105.

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Appendix 1. Station list. (ND) no data available

Station	Project	Date	Locality	Latitude	Longitude	Vessel	Depth
E2	Macrofauna I	2-Oct-98	East off Bocas de Ceniza	11º13'46.8" N	74º39'15" W	B/I Ancón	406 m
E5	Macrofauna I	4-Dec-98	Aguja	11º25'55.2" N	74º11'41.3" W	B/I Ancón	402 m
E7	Macrofauna I	3-Oct-98	Aguja	11º23'25.1" N	74º12'46.1" W	B/I Ancón	218 m
E8	Macrofauna I	3-Oct-98	Aguja	11º23'6.6" N	74º12'3.6" W	B/I Ancón	200 m
E10	Macrofauna I	19-Nov-98	Honda Bay	12º34'18" N	71º49'59.9" W	B/I Ancón	314 m
E13	Macrofauna I	22-Nov-98	Portete Bay	12º29'19.2" N	72º15'29.4" W	B/I Ancón	454 m
E17	Macrofauna I	24-Nov-98	Cabo de la Vela	12º15'13.7" N	72º33'24.5" W	B/I Ancón	318 m
E18	Macrofauna I	24-Nov-98	Cabo de la Vela	12º15'22.7" N	72º32'57.5" W	B/I Ancón	308 m
E25	Macrofauna I	26-Nov-98	Palomino	11º26'17.9" N	73º31'46.2" W	B/I Ancón	304 m
E26	Macrofauna I	26-Nov-98	Palomino	11º26'13.2" N	73º33' W	B/I Ancón	306 m
E30	Macrofauna I	27-Nov-98	Rio Piedras	11º22'27" N	73º46'0.5" W	B/I Ancón	308 m
E32	Macrofauna I	27-Nov-98	Rio Piedras	11º27'23.4" N	73º51'53.3" W	B/I Ancón	492 m
E35	Macrofauna I	2-Dec-98	Neguanje Bay	11º24'59.4" N	74º10'48" W	B/I Ancón	304 m
E36	Macrofauna I	2-Dec-98	Neguanje Bay	11º24'42.5" N	74º9'37.8" W	B/I Ancón	296 m
E37	Macrofauna I	2-Dec-98	Neguanje Bay	11º24'56.4" N	74º12'47.9" W	B/I Ancón	308 m
E38	Macrofauna I	2-Dec-98	Neguanje Bay	11º24'49.7" N	74º11'48" W	B/I Ancón	292 m
E42	Macrofauna I	3-Dec-98	Concha Bay	11º20'12" N	74º16'8.4" W	B/I Ancón	500 m
E45	Macrofauna I	4-Dec-98	Punta Gloria	11º12'10.8" N	74º17'15.6" W	B/I Ancón	276 m
E46	Macrofauna I	4-Dec-98	Punta Gloria	11º11'44.9" N	74º17'33" W	B/I Ancón	282 m
E47	Macrofauna I	6-Dec-98	Cartagena	10º28'7.2" N	75º42'33.5" W	B/I Ancón	280 m
E48	Macrofauna I	6-Dec-98	Cartagena	10º28'44.4" N	75º42'28.8" W	B/I Ancón	282 m
E49	Macrofauna I	6-Dec-98	Bocas de Ceniza	11º5'15.6" N	75º15'19.8" W	B/I Ancón	318 m
E50	Macrofauna I	6-Dec-98	Bocas de Ceniza	11º5'10.7" N	75º15'23.4" W	B/I Ancón	312 m
E51	Macrofauna I	7-Dec-98	Bocas de Ceniza	11º7'44.4" N	75º14'5.3" W	B/I Ancón	480 m
E53	Macrofauna I	7-Dec-98	Bocas de Ceniza	11º6'55.1" N	75º8'15" W	B/I Ancón	490 m
E54	Macrofauna I	7-Dec-98	Bocas de Ceniza	11º7'5.4" N	75º7'46.8" W	B/I Ancón	502 m
E55	Macrofauna I	8-Apr-99	Arboletes	9º2'43.1" N	76º36'46.1" W	B/I Ancón	303 m
E59	Macrofauna I	9-Apr-99	Puerto Escondido	9º16'21" N	76º28'41.4" W	B/I Ancón	315 m
E60	Macrofauna I	9-Apr-99	Puerto Escondido	9º15'49.2" N	76º29'0.6" W	B/I Ancón	288 m
E61	Macrofauna I	9-Apr-99	Puerto Escondido	9º18'51.5" N	76º29'37.2" W	B/I Ancón	490 m
E62	Macrofauna I	9-Apr-99	Puerto Escondido	9º17'59.3" N	76º29'39" W	B/I Ancón	498 m
E63	Macrofauna I	10-Apr-99	La Rada	9º27'41.4" N	76º25'41.4" W	B/I Ancón	286 m
E64	Macrofauna I	10-Apr-99	La Rada	9º27'35.3" N	76º26'7.1" W	B/I Ancón	313 m
E65	Macrofauna I	10-Apr-99	La Rada	9º30'27" N	76º26'45.6" W	B/I Ancón	498 m
E67	Macrofauna I	13-Apr-99	Gulf of Morrosquillo	9º45'21.6" N	76º15'12" W	B/I Ancón	269 m
E68	Macrofauna I	13-Apr-99	Gulf of Morrosquillo	9º45'19.1" N	76º15'44.3" W	B/I Ancón	317 m
E69	Macrofauna I	13-Apr-99	Gulf of Morrosquillo	9º48'58.2" N	76º16'27" W	B/I Ancón	520 m
E70	Macrofauna I	14-Apr-99	Gulf of Morrosquillo	9º49'20.3" N	76º15'33.5" W	B/I Ancón	496 m
E71	Macrofauna I	13-Apr-99	Northwest San Bernardo Is.	9º53'19.2" N	76º13'59.4" W	B/I Ancón	490 m
E73	Macrofauna I	14-Apr-99	Northwest San Bernardo Is.	9º57'40.7" N	76º7'57" W	B/I Ancón	280 m
E74	Macrofauna I	14-Apr-99	Northwest San Bernardo Is.	9º56'42.6" N	76º9'43.2" W	B/I Ancón	284 m

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Station	Project	Date	Locality	Latitude	Longitude	Vessel	Depth
E75	Macrofauna I	15-Apr-99	Rosario Islands	10º9’12.6” N	76º0’24” W	B/I Ancón	296 m
E76	Macrofauna I	15-Apr-99	Rosario Islands	10º9’.6” N	76º0’33” W	B/I Ancón	296 m
E78	Macrofauna I	15-Apr-99	Rosario Islands	10º10’13.8” N	76º1’47.3” W	B/I Ancón	510 m
E81	Macrofauna I	25-Feb-03	Cartagena	10º29’57.2” N	75º41’58.8” W	B/I Ancón	283 m
E82	Macrofauna I	25-Feb-03	Galerazamba	11º5’7.3” N	75º13’22.9” W	B/I Ancón	293 m
E83	Macrofauna I	25-Feb-03	Off Ciénaga Grande Santa Marta	11º8’29.2” N	74º27’55.6” W	B/I Ancón	260 m
E84	Macrofauna I	25-Feb-03	Isla Aguja	11º24’40.5” N	74º12’16.4” W	B/I Ancón	276 m
E85	Macrofauna II	14-Mar-01	Punta Gallinas	12º28’33.9” N	71º42’11.9” W	B/I Ancón	22 m
E88	Macrofauna II	14-Mar-01	Punta Gallinas	12º29’17.9” N	71º43’51.9” W	B/I Ancón	73 m
E89	Macrofauna II	14-Mar-01	Punta Gallinas	12º30’34.9” N	71º44’18.9” W	B/I Ancón	152 m
E91	Macrofauna II	14-Mar-01	Punta Gallinas	12º34’35” N	71º51’16.9” W	B/I Ancón	305 m
E92	Macrofauna II	15-Mar-01	Cabo de la Vela	12º32’.9” N	72º11’30” W	B/I Ancón	493 m
E93	Macrofauna II	15-Mar-01	Cabo de la Vela	12º31’50.9” N	72º12’6” W	B/I Ancón	496 m
E94	Macrofauna II	15-Mar-01	Manaure	12º6’45” N	72º39’48.9” W	B/I Ancón	151 m
E95	Macrofauna II	15-Mar-01	Manaure	12º7’35” N	72º38’48.9” W	B/I Ancón	154 m
E96	Macrofauna II	15-Mar-01	Manaure	12º3’24” N	72º38’17” W	B/I Ancón	70 m
E97	Macrofauna II	15-Mar-01	Manaure	12º3’16.9” N	72º38’17.9” W	B/I Ancón	70.1 m
E98	Macrofauna II	16-Mar-01	Manaure	11º53’4.9” N	72º36’38.9” W	B/I Ancón	21.4 m
E99	Macrofauna II	16-Mar-01	Manaure	11º53’21.9” N	72º37’12” W	B/I Ancón	22 m
E100	Macrofauna II	17-Mar-01	Dibulla	11º25’33.9” N	73º27’39.9” W	B/I Ancón	150 m
E101	Macrofauna II	17-Mar-01	Dibulla	11º25’45.9” N	73º27’9” W	B/I Ancón	153 m
E102	Macrofauna II	17-Mar-01	Dibulla	11º24’23” N	73º28’18” W	B/I Ancón	70 m
E103	Macrofauna II	17-Mar-01	Dibulla	11º24’3.9” N	73º28’1.9” W	B/I Ancón	71.6 m
E104	Macrofauna II	17-Mar-01	Dibulla	11º17’31.9” N	73º27’6” W	B/I Ancón	20 m
E105	Macrofauna II	17-Mar-01	Dibulla	11º17’40.9” N	73º27’57.9” W	B/I Ancón	21 m
E108	Macrofauna II	18-Mar-01	Buritaca	11º18’28” N	73º46’50” W	B/I Ancón	70 m
E109	Macrofauna II	18-Mar-01	Buritaca	11º18’30.9” N	73º46’28.9” W	B/I Ancón	71 m
E110	Macrofauna II	18-Mar-01	Buritaca	11º20’30.9” N	73º46’0” W	B/I Ancón	150 m
E113	Macrofauna II	18-Mar-01	Buritaca	11º22’57” N	73º44’8” W	B/I Ancón	300 m
E115	Macrofauna II	18-Mar-01	Buritaca	11º28’13” N	73º40’14.9” W	B/I Ancón	504 m
E116	Macrofauna II	19-Mar-01	Neguanje Bay	11º20’4.9” N	74º5’25” W	B/I Ancón	35 m
E117	Macrofauna II	19-Mar-01	Neguanje Bay	11º20’26” N	74º5’27.9” W	B/I Ancón	20.4 m
E118	Macrofauna II	19-Mar-01	Neguanje Bay	11º21’29” N	74º6’16.9” W	B/I Ancón	76 m
E122	Macrofauna II	19-Mar-01	Concha Bay	11º23’13.9” N	74º10’50” W	B/I Ancón	150 m
E125	Macrofauna II	19-Mar-01	Concha Bay	11º20’31.9” N	74º10’37.9” W	B/I Ancón	72 m
E127	Macrofauna II	19-Mar-01	Concha Bay	11º18’29” N	74º10’9.9” W	B/I Ancón	39.5 m
E128	Macrofauna II	21-Mar-01	Salamanca Island	11º5’57.9” N	74º40’36.9” W	B/I Ancón	20 m
E129	Macrofauna II	21-Mar-01	Salamanca Island	11º5’45.9” N	74º40’35” W	B/I Ancón	20 m
E140	Macrofauna II	23-Mar-01	Cartagena	10º32’56” N	75º37’19.9” W	B/I Ancón	309 m
E141	Macrofauna II	23-Mar-01	Cartagena	10º31’45.9” N	75º37’6.9” W	B/I Ancón	309 m
E142	Macrofauna II	23-Mar-01	Cartagena	10º32’6” N	75º39’5” W	B/I Ancón	487 m

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Station	Project	Date	Locality	Latitude	Longitude	Vessel	Depth
E143	Macrofauna II	23-Mar-01	Cartagena	10º32’17.9” N	75º39’16.9” W	B/I Ancón	463 m
E149	Macrofauna II	25-Mar-01	San Bernardo Islands	9º47’29” N	76º17’21.9” W	B/I Ancón	507 m
E150	Macrofauna II	26-Mar-01	San Bernardo Islands	9º46’50” N	76º17’44.9” W	B/I Ancón	500 m
E151	Macrofauna II	26-Mar-01	Tolú	9º41’52” N	76º6’38” W	B/I Ancón	70.9 m
E153	Macrofauna II	26-Mar-01	Tolú	9º45’37” N	76º15’19” W	B/I Ancón	270 m
E154	Macrofauna II	26-Mar-01	Tolú	9º44’48.9” N	76º15’38” W	B/I Ancón	280 m
E155	Macrofauna II	26-Mar-01	Tolú	9º47’12” N	75º13’45” W	B/I Ancón	160 m
E156	Macrofauna II	26-Mar-01	Tolú	9º47’9” N	76º14’12” W	B/I Ancón	155 m
E158	Macrofauna II	29-Mar-01	Gulf of Morrosquillo	9º33’9” N	75º40’33.9” W	B/I Ancón	22 m
E159	Macrofauna II	29-Mar-01	Puerto Escondido	9º17’3” N	76º27’29” W	B/I Ancón	158 m
E160	Macrofauna II	29-Mar-01	Puerto Escondido	9º17’52” N	76º27’14” W	B/I Ancón	160 m
E182	Uraba 2003	31-Jan-03	Gulf of Uraba	8º31’5.7” N	76º55’40.3” W	B/I Ancón	10 m
E201	Corpoguajira	1-Apr-05	Riohacha	11º39’.9” N	72º59’3.8” W	B/I Ancón	10 m
E202	Corpoguajira	1-Apr-05	Riohacha	11º38’52.5” N	72º59’35.3” W	B/I Ancón	10 m
E203	Corpoguajira	1-Apr-05	Manaure	11º44’34.1” N	72º35’31.5” W	B/I Ancón	10 m
E204	Corpoguajira	1-Apr-05	Manaure	11º47’55.2” N	72º40’10.4” W	B/I Ancón	10 m
E213	Corpoguajira	1-Apr-05	Portete	12º16’42.7” N	71º58’1” W	B/I Ancón	10 m
E214	Corpoguajira	1-Apr-05	Portete	12º17’31.2” N	71º57’17.2” W	B/I Ancón	10 m
E215	Corpoguajira	1-Apr-05	Honda Bay	12º23’6.6” N	71º46’1” W	B/I Ancón	10 m
E231	Corpoguajira	1-Apr-05	Honda Bay	12º26’22.8” N	71º47’37.3” W	B/I Ancón	50 m
E232	Corpoguajira	1-Apr-05	Portete	12º20’32.3” N	71º58’53” W	B/I Ancón	50 m
E234	Corpoguajira	1-Apr-05	Solipa Point	12º5’25.5” N	72º22’51.7” W	B/I Ancón	50 m
E235	Corpoguajira	1-Apr-05	Solipa Point	12º4’49.2” N	72º23’26.9” W	B/I Ancón	50 m
E236	Corpoguajira	1-Apr-05	Manaure	11º57’37.1” N	72º34’45.3” W	B/I Ancón	50 m
E237	Corpoguajira	1-Apr-05	Manaure	11º57’19.9” N	72º35’41.1” W	B/I Ancón	50 m
E238	Corpoguajira	1-Apr-05	Manaure	11º53’10.3” N	72º46’28.4” W	B/I Ancón	50 m
E239	Corpoguajira	1-Apr-05	Manaure	11º52’40.1” N	72º47’25.2” W	B/I Ancón	50 m
E240	Corpoguajira	1-Apr-05	Guamachito Point	11º30’6.9” N	73º16’40.2” W	B/I Ancón	50 m
E242	Corpoguajira	1-Apr-05	Dibulla	11º24’4.7” N	73º23’7.4” W	B/I Ancón	50 m
E246	MARCORAL	30-Apr-05	Offshore-San Bernardo-B	9º52’58.4” N	76º9’13.6” W	B/I Ancón	107 m
C1	MARCORAL	1-May-05	AMP-CRSB	9º48’53.6” N	76º12’26.9” W	B/I Ancón	108–147 m
C2	MARCORAL	1-May-05	AMP-CRSB	9º46’52.9” N	76º13’29.6” W	B/I Ancón	123–151 m
C3	MARCORAL	1-May-05	AMP-CRSB	9º46’26” N	76º13’53.8” W	B/I Ancón	117–154 m
C4	MARCORAL	2-May-05	Offshore-San Bernardo	9º53’19.2” N	76º10’55.9” W	B/I Ancón	113–160 m
D1	MARCORAL	30-Apr-05	AMP-CRSB	9º51’6.7” N	76º11’4.4” W	B/I Ancón	101–102 m
D3	MARCORAL	1-May-05	AMP-CRSB	9º48’53.1” N	76º12’28.5” W	B/I Ancón	210–217 m
D9	MARCORAL	29-Apr-05	AMP-CRSB	9º44’52.1” N	76º15’50.5” W	B/I Ancón	311 m
D11	MARCORAL	29-Apr-05	AMP-CRSB	9º46’26.1” N	76º14’11.2” W	B/I Ancón	200–202 m
D12	MARCORAL	1-May-05	AMP-CRSB	9º47’5.8” N	76º13’17.2” W	B/I Ancón	182–184 m
D13	MARCORAL	1-May-05	AMP-CRSB	9º48’5.4” N	76º12’38.9” W	B/I Ancón	122 m
D15	MARCORAL	30-Apr-05	AMP-CRSB	9º49’32.7” N	76º11’10.7” W	B/I Ancón	100 m
D16	MARCORAL	30-Apr-05	AMP-CRSB	9º50’19.3” N	76º10’19.2” W	B/I Ancón	98 m

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Station	Project	Date	Locality	Latitude	Longitude	Vessel	Depth
D17	MARCORAL	30-Apr-05	AMP-CRSB	9º49’30.4” N	76º9’35.4” W	B/I Ancón	95 m
D18	MARCORAL	29-Apr-05	AMP-CRSB	9º49’48.8” N	76º10’26.5” W	B/I Ancón	94 m
D19	MARCORAL	29-Apr-05	AMP-CRSB	9º48’4.3” N	76º11’9.0” W	B/I Ancón	95 m
D20	MARCORAL	1-May-05	AMP-CRSB	9º47’16.7” N	76º11’56.0” W	B/I Ancón	98 m
D21	MARCORAL	29-Apr-05	AMP-CRSB	9º46’35.6” N	76º12’48.7” W	B/I Ancón	102 m
D22	MARCORAL	29-Apr-05	AMP-CRSB	9º45’44.7” N	76º13’28.2” W	B/I Ancón	101 m
D23	MARCORAL	29-Apr-05	AMP-CRSB	9º44’51.3” N	76º14’51.7” W	B/I Ancón	191 m
D28	MARCORAL	29-Apr-05	AMP-CRSB	9º46’38.7” N	76º13’51.6” W	B/I Ancón	178–180 m
D30	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º53’35.7” N	76º10’58.4” W	B/I Ancón	197 m
D31	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º52’55.5” N	76º11’18.5” W	B/I Ancón	225 m
D33	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º51’45.3” N	76º10’34.3” W	B/I Ancón	98 m
D34	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º52’54.2” N	76º10’7.1” W	B/I Ancón	121 m
D35	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º54’0” N	76º10’11” W	B/I Ancón	107 m
D36	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º54’1.0” N	76º9’3.0” W	B/I Ancón	105 m
D37	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º52’52.8” N	76º9’2.8” W	B/I Ancón	107 m
D38	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º51’46.0” N	76º9’1.9” W	B/I Ancón	101 m
D46	MARCORAL	30-Apr-05	Offshore-San Bernardo	9º54’1.1” N	76º10’52.8” W	B/I Ancón	262–265 m
D57	MARCORAL	27-Apr-05	Offshore-Rosario	10º2’54.7” N	76º0’42.9” W	B/I Ancón	159 m
D60	MARCORAL	28-Apr-05	Offshore-Rosario	10º2’6.7” N	76º3’5.3” W	B/I Ancón	139 m
D67	MARCORAL	27-Apr-05	Offshore-Rosario	10º2’53.9” N	76º3’55.6” W	B/I Ancón	220–231 m
D68	MARCORAL	27-Apr-05	Offshore-Rosario	10º3’41.8” N	76º3’7.9” W	B/I Ancón	252–270 m
D69	MARCORAL	27-Apr-05	Offshore-Rosario	10º4’25.0” N	76º2’18.9” W	B/I Ancón	159-154 m
D74	MARCORAL	27-Apr-05	Offshore-Rosario	10º4’24.8” N	76º2’3.5” W	B/I Ancón	75 m
D75	MARCORAL	27-Apr-05	Offshore-Rosario	10º2’30.4” N	76º3’36.1”	B/I Ancón	100 m
D76	MARCORAL	27-Apr-05	Offshore-Rosario	10º3’32.2” N	76º2’14.7” W	B/I Ancón	120–127 m
P14E11a115	Macrofauna III	8-Oct-02	Colombian Pacific	5º2’15” N	77º33’59.4” W	ARC Malpelo	272–295 m
P1E22b37	Macrofauna III	11-Oct-02	Colombian Pacific	6º57’ N	77º46’4.1” W	ARC Malpelo	163–168 m
P3E17b27	Macrofauna III	10-Oct-02	Colombian Pacific	6º32’53.4” N	77º21’29.4” W	ARC Malpelo	76–78 m
O-3252	R/V Oregon	27-Apr-61	Florida	29º07’ N	88º05’ W	R/V Oregon	732 m
O-3568	R/V Oregon	21-May-62	Quitasueño Bank	14º14’ N	81º59’ W	R/V Oregon	183–220 m
O-3573	R/V Oregon	22-May-62	Quitasueño Bank	14º18’ N	81º44’ W	R/V Oregon	750–768 m
O-4832	R/V Oregon	12-May-64	Serrana Bank	14º16’ N	80º27’ W	R/V Oregon	220–238 m
O-4834	R/V Oregon	12-May-64	Serrana Bank	14º14’ N	80º29’ W	R/V Oregon	274–293 m
O-4904	R/V Oregon	28-May-64	Off Rosario Islands	10º00’ N	76º05’ W	R/V Oregon	146–183 m
O-4907	R/V Oregon	May-64	Off Rosario Islands	10º4’ N	75º56’ W	R/V Oregon	320 m
O-4911	R/V Oregon	31-May-64	Off Dibulla	11º50’ N	73º3’ W	R/V Oregon	320–348 m
O-4913	R/V Oregon	1-Jun-64	Off Carrizal Point	12º9’ N	72º47’ W	R/V Oregon	183 m
O-5692	R/V Oregon	10-Oct-65	Off Honda Bay	12º31’ N	71º58’ W	R/V Oregon	-
O-5698	R/V Oregon	12-Oct-65	Cabo de la Vela	12º8’ N	72º16’ W	R/V Oregon	59 m
O-5699	R/V Oregon	12-Oct-65	Cabo de la Vela	12º13’ N	72º25’ W	R/V Oregon	68 m
O-10825	R/V Oregon II	1-Dec-69	Lesser Antilles	15º42’ N	61º08’ W	R/V Oregon	640 m
O-11240	R/V Oregon II	4-Nov-70	Off San Bernardo Islands	9º58’ N	76º29’ W	R/V Oregon	1271 m

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Station	Project	Date	Locality	Latitude	Longitude	Vessel	Depth
O-11290	R/V Oregon II	21-Nov-70	Off Cabo de La Vela	12º18' N	72º41' W	R/V Oregon	375 m
P-364	R/V Pillsbury	13-Jul-66	Off San Bernardo Islands	9º29' N	76º34' W	R/V Pillsbury	924–950 m
P-374	R/V Pillsbury	14-Jul-66	Off San Bernardo Islands	9º52' N	76º11' W	R/V Pillsbury	373–434 m
P-388	R/V Pillsbury	15-Jul-66	Off Rosario Islands	10º16' N	76º3' W	R/V Pillsbury	814–1050 m
P-391	R/V Pillsbury	16-Jul-66	Off Rosario Islands	10º03' N	76º27' W	R/V Pillsbury	1222–1748 m
P-392	R/V Pillsbury	16-Jul-66	Gulf of Morrosquillo	9º45' N	76º9' W	R/V Pillsbury	74–78m
P-393	R/V Pillsbury	16-Jul-66	Gulf of Morrosquillo	9º46' N	76º10' W	R/V Pillsbury	87 m
P-394	R/V Pillsbury	16-Jul-66	Off Fuerte Island	9º29' N	76º26' W	R/V Pillsbury	416–634 m
P-407	R/V Pillsbury	18-Jul-66	Colombia-Panamá Limits	9º00' N	77º25' W	R/V Pillsbury	1158–1225 m
P-639	R/V Pillsbury	6-Apr-68	Riohacha	11º39' N	72º45' W	R/V Pillsbury	378–453.6 m
P-768	R/V Pillsbury	28-Jul-68	Off Punta Espada	12º33.4' N	71º10.8' W	R/V Pillsbury	64–68m
P-769	R/V Pillsbury	28-Jul-68	Off Punta Gallinas	12º31' N	71º41' W	R/V Pillsbury	143–146 m
P-772	R/V Pillsbury	29-Jul-68	Off Cabo de La Vela	12º20' N	71º55' W	R/V Pillsbury	54 m
P-773	R/V Pillsbury	12-Jul-68	Off Cabo de La Vela	12º17' N	72º15' W	R/V Pillsbury	60–64m
P-775	R/V Pillsbury	29-Jul-68	Off Cabo de La Vela	12º5' N	72º31' W	R/V Pillsbury	78–82m
P-776	R/V Pillsbury	29-Jul-68	Off Cabo de La Vela (North of Aramtka Point)	12º13' N	72º50' W	R/V Pillsbury	408–576 m
P-913	R/V Pillsbury	18-Jul-66	Off Fuerte Island	9º1' N	76º52'59.9" W	R/V Pillsbury	952–1267m
P-1256	R/V Pillsbury	14-Jul-70	Jamaica, off Walton Bank	17º27' N	78º10' W	R/V Pillsbury	603–655 m
P-1354	R/V Pillsbury	31-Jan-71	Quitasueño Bank	14º21' N	81º55' W	R/V Pillsbury	192–263 m
P-1356	R/V Pillsbury	31-Jan-71	Quitasueño Bank	14º54' N	81º23' W	R/V Pillsbury	296–375 m
P-1357	R/V Pillsbury	-	Nicaragua	15º21' N	82º55' W	R/V Pillsbury	249–256 m
CI-83	R/V Columbus Iselin	9-Mar-1973	USA, Straits of Florida	24º08' N	77º14' W	R/V C. Iselin	640 m
SMR1	BEM	-	Santa Marta	11°14.68' N	74°13.27' W	ND	17 m
SMR2	BEM	-	Santa Marta	11°14.68' N	74°13.27' W	ND	55 m
BEM120	BEM	3-Nov-88	Cinto Bay	11°20.36' N	74°3.74' W	ND	<20 m
BEM916	BEM	2-Sep-87	Granate Bay	11°17.66' N	74°11.62' W	ND	10-20 m
BEM977	BEM	5-Oct-84	Chengue Bay	11°19.68' N	74°7.91' W	ND	<20 m
BEM979	BEM	20-Jan-73	Chengue Bay	11°19.68' N	74°7.91' W	ND	<20 m
BEM1817	BEM	1-Sep-87	Santa Marta Bay	11°14' N	74°13' W	ND	10-15m
BEM1861	BEM	1-Oct-77	Gulf of Uraba	7°56.65' N	76°52.59' W	ND	ND
BEM3629	BEM	1-Mar-73	Turbo	8°4.09' N	76°44.66' W	ND	ND
BEM4133	BEM	9-Apr-99	ND	ND	ND	ND	ND
BEM4292	BEM	1-Feb-03	Gulf of Morrosquillo	9°33.16' N	75°42.11' W	ND	ND
BEM4466	BEM	1-May-77	Bahía de Santa Marta	11°14' N	74°13' W	ND	ND
BEM6842	BEM	2-Feb-73	Punta Betín - Bay of Santa Marta	11°14.99' N	74°13.2' W	ND	ND
BEM6844	BEM	1-Jan-98	Fuerte Island	9°23.53' N	76°12.02' W	ND	ND
BEM-E1003	BEM "Areas Arrecifales"	12-Aug-98	Quitasueño Bank	14°14.14' N	81°8.55' W	B/I Ancón	ND
BEM-E13456	BEM "Areas Arrecifales"	1-Mar-98	Caricari Point, La Guajira	11°24.11' N	73°8.95' W	B/I Ancón	ND