

## A New Species of Antipatharian Coral (Cnidaria: Anthozoa) from the Caribbean Coast of Colombia

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**ABSTRACT.**—A new species of black coral, *Aphanipathes colombiana* (Cnidaria:Antipatharia) from the Caribbean coast of Colombia is described. The species forms small flabellate colonies with anisomorphic polypar spines. It is morphologically similar to the western Atlantic species *A. thyoides* (Pourtales) but its hypostomal polypar spines are not reduced in size. The new species also resembles the Indo-Pacific species *A. reticulata* van Pesch but it has smooth-surfaced polypar spines, whereas in *A. reticulata* these spines have small tubercles on their surface.

**RESUMEN.**—Se describe una nueva especie de coral negro, *Aphanipathes colombiana* (Cnidaria: Antipatharia), de la costa del Caribe de Colombia. Esta especie forma colonias flabeladas pequeñas y con espinas polipares anisomorfas. Es morfológicamente similar a *A. thyoides* (Pourtales), una especie del Atlántico Occidental, pero sus espinas polipares hipostomales no están reducidas en tamaño. La especie nueva también se asemeja a la especie Indopacífica *A. reticulata* van Pesch, pero sus espinas polipares tienen la superficie lisa, mientras que las de *A. reticulata* tienen pequeños tubérculos sobre la superficie.

### INTRODUCTION

Coral reefs along the Caribbean coast of Colombia contain a rich diversity of anthozoan coelenterates. This is particularly true for the Rosario Archipelago, which is currently maintained by the Colombian government as a National Park. In the past few years the second author has surveyed the coral communities off Isla del Tesoro, one of the small sandy cays located in the archipelago, and nearby deeper bank reefs (see Ortiz and Sánchez, 1992; Sánchez, in press). During these surveys numerous antipatharian corals were collected, including several small colonies that upon closer examination were found to represent an undescribed species. The same species was also collected by the second author off Bahía de Granate and Punta de Betin, Santa Marta, Colombia. The holotype and three paratypes of the new species have been deposited in the National Museum of Natural History (USNM), Smithsonian Institution,

Washington, D.C. One paratype is deposited in the collections of the Instituto de Investigaciones Marinas y Costeras (INVEMAR), in Santa Marta, Colombia, and two are in the collections of the Museo de Historia Natural, Instituto de Ciencias Naturales (ICN-MHN), Universidad Nacional, Santafé de Bogotá, Colombia.

*Aphanipathes colombiana* sp. nov.  
(Figs. 1-2)

**Holotype.**—Colombia, Santa Marta, Bahía de Granate, 20 m, J. Sánchez, July 31, 1995, USNM 96512 (in alcohol).

**Paratypes.**—Colombia, Islas del Rosario, off Isla del Tesoro, 60 m., J. Sánchez, Nov. 4, 1992, USNM 94390.—Colombia, Islas del Rosario, off Isla del Tesoro, 45 m., K. Dunlap, August 2, 1980, USNM 92983.—Colombia, Islas del Rosario, off Isla del Tesoro, 60 m., J. Sánchez, April 11, 1992, INVEMAR 295.—Colombia, Punta de Betin, off Santa Marta Bay, 22 m., J. Sánchez, December 26, 1995, USNM 96583.—Colombia, Punta de Betin, off Santa Marta Bay, 18 m., J. Sánchez, January 6, 1996, ICN-MHN-CO-066 and ICN-MHN-CO-067.

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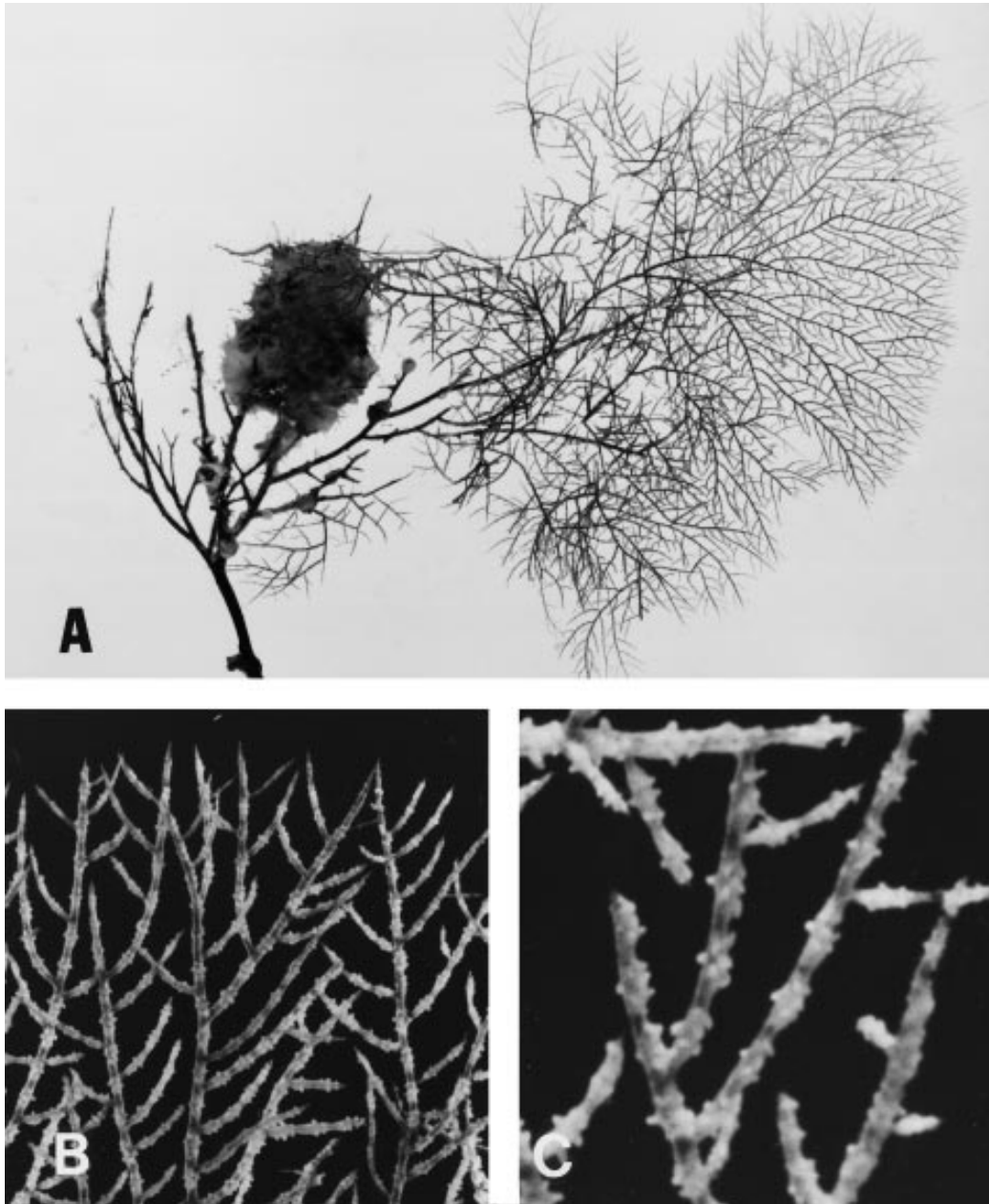


FIG. 1. *Aphanipathes colombiana*, n. sp., holotype, USNM 96512; (A) entire corallum, height about 10 cm, (B) outer edge of corallum showing the arrangement of the branchlets, about  $\times 4$ , and (C) branchlets with polyps,  $\times 10$ .

*Diagnosis.*—Corallum flabellate, branched to 9th order or more in one or more parallel planes; maximum recorded height about 25 cm. Major branches distinct, relatively long (up to one-half or more of total height of

corallum); irregularly curved or sinuous; occasionally overlapping and adhering. Highest order, unbranched branchlets arranged bilaterally, usually irregularly alternate, occasionally uniserial, rarely subop-

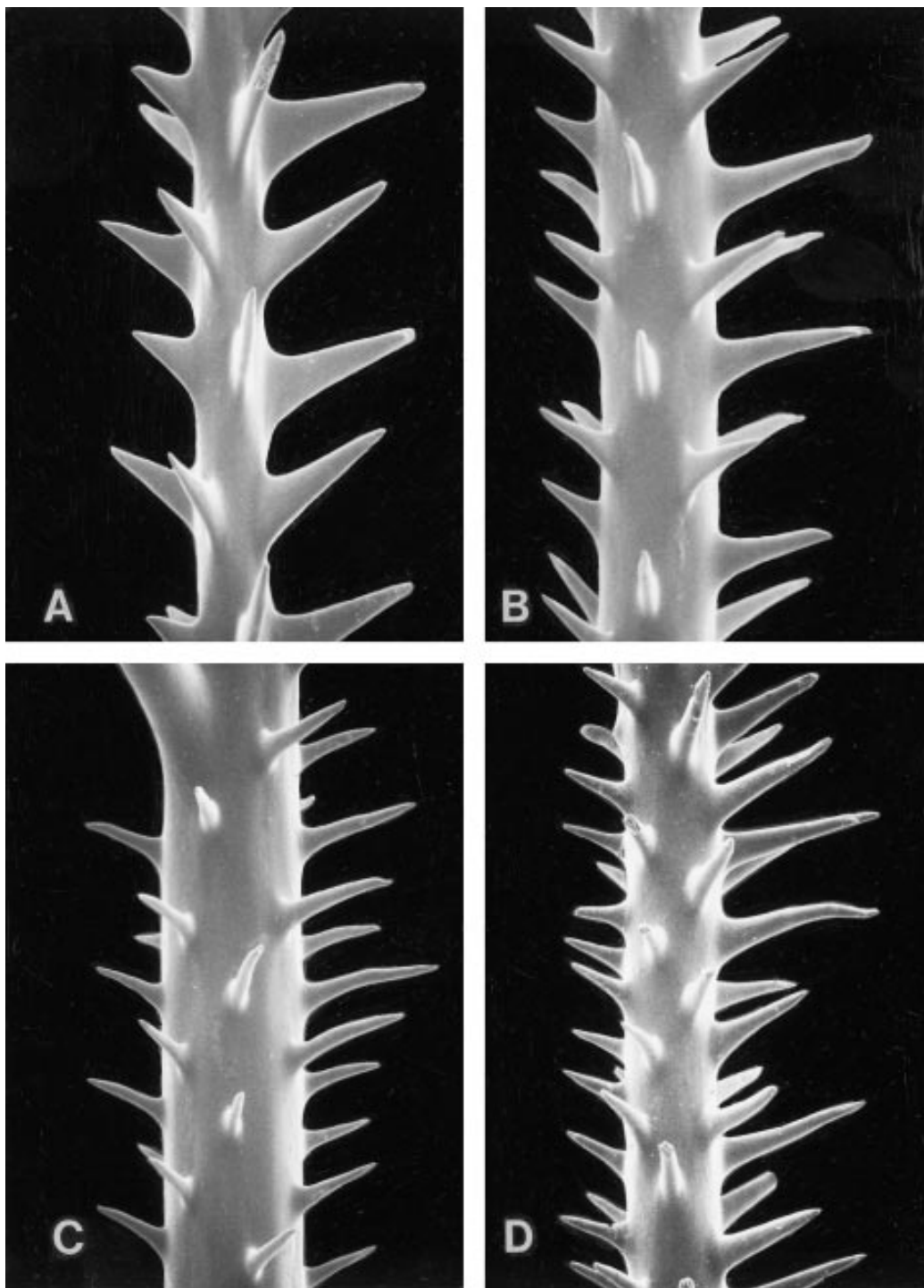


FIG. 2. *Aphanipathes colombiana*, n. sp. A–C, holotype, USNM 96512; (A) spines near distal end of branchlet,  $\times 150$ , (B) spines near basal end of branchlet,  $\times 100$ , and (C) spines on higher order branch,  $\times 80$ . (D) paratype, USNM 92983, spines on higher order branch,  $\times 75$ .

posite; usually 8–10/cm; inclined distally, straight or curved; some projecting slightly out of polyp side of corallum; typically 3–6 mm in length and spaced 1–9 mm apart.

Spines long, needle-like, acute, smooth; unequal in size around circumference of axis. Polypar spines on branchlets typically 0.20–0.30 mm from midpoint of base to apex; abpolypar spines 0.10–0.18 mm. Polypar spines anisomorphic, i.e., slightly larger in the area of the polyps. Spines generally decreasing in size on larger branches and stem. Spines on branchlets spaced 0.18–0.31 mm apart (4–6 per millimeter) and arranged in 7–8 axial rows around circumference of axis.

Polyps small, usually 0.55–0.65 mm in transverse diameter (from proximal side of proximal lateral tentacles to distal side of distal lateral tentacles) and spaced 0.27–0.36 mm apart. Polyps on branchlets arranged in single row on one side of corallum, usually with 9–10 per cm. Polyps on larger branches and stem less crowded and arranged less regularly.

*Description of Holotype.*—Holotype (Fig. 1A) approximately 10 cm high and about 12 cm wide. Much of one side of colony missing—estimated width of complete colony about 25 cm. Diameter of stem above basal plate 1.5 mm. Larger branches up to 7 cm long. Smallest branches (i.e., those near top of corallum and possessing only simple branchlets) 1–3 cm long; adjacent ones often nearly parallel to one another (Fig. 1B). Unbranched branchlets usually not more than 6 mm in length, a few as long as 9 mm, mostly 0.08–0.14 mm in diameter near base (excluding spines). Branchlets placed at varying intervals on lateral sides of branches; average distance apart 2–3 mm, with 8–10 branchlets per centimeter (total for both sides). Branchlets inclined upward (distal angles 60–80°); straight or curved toward branch from which they arise. Tips of some branchlets project slightly out of polyp side of corallum.

Spines on branchlets up to 0.27 mm, as measured from middle of base to apex; acicular, acute, slightly inclined distally, and usually simple (Fig. 2A–B). Polypar spines on lower parts of branchlets and on higher order branches (Fig. 2B–C) often an-

isomorphic, i.e., slightly longer in area of polyps; largest slightly crooked or bent and sometimes forked at apex. Polypar spines less than 0.2 mm on larger branches and only 0.07–0.08 mm on lower portions of stem. Abpolypar spines on branchlets relatively uniform in size, usually 0.10–0.11 mm; distinctly smaller and more distally inclined than polypar spines. Spines reduced in size at tips of branchlets, but relatively large even on small branchlets; i.e., 0.14 mm on branchlet only 0.05 mm in diameter.

Spines arranged in axial rows, 4–5 of which can be seen in lateral view, with 7–8 around entire circumference of branchlets. Branchlets, on average, with about 5 spines per millimeter in each axial row. Density of spines on larger branches not appreciably different from that on branchlets. Spines present on all parts of stem, but less clearly arranged in rows, particularly near basal plate.

Polyps on branchlets and higher-order branches arranged in single, but not always straight row confined to one side of corallum. Polyps on branchlets slightly elongated in direction of axis; usually 0.55–0.65 mm (rarely up to 0.9 mm) in transverse diameter as measured from proximal side of proximal lateral tentacles to distal side of distal lateral tentacles; interpolypar space 0.27–0.36 mm. Sagittal tentacles of alcohol-preserved polyps measure about 0.2 mm; laterals as much as 0.3 mm. Polyp density on branchlets and small branches 9–10 per centimeter. On largest branches, polyps less crowded, often with fewer than 8 per centimeter, and arranged less uniformly than those on branchlets; i.e., individual polyps occur laterally and occasionally on posterior side of corallum, sometimes with two polyps present at same location but on different sides of branch axis.

*Remarks.*—Most of the specimens of *A. colombiana* examined or observed in the field were less than 12 cm in height; however, specimens found at Punta de Betin commonly reached 18–20 cm in height and one of the paratypes is 25 cm tall. In addition, the specimens from Punta de Betin often were profusely and densely branched in several parallel planes. Although the

specimens in the type series are similar in the length and density of the unbranched branchlets (i.e., generally 3–6 mm long and 8–10 per centimeter), the colonies differ somewhat in the thickness of the branchlets and size of the axial spines. On USNM 94390, the branchlets are mostly 0.06–0.09 mm in diameter at their base, excluding spines, whereas many of the branchlets on USNM 92983 are greater than 0.10 mm thick and some are as much as 0.15 mm in diameter. The branchlets in the holotype are 0.08–0.012 mm in diameter. The polypar spines on the holotype and most of the paratypes are rarely more than 0.25 mm tall, whereas those on USNM 92983 are occasionally greater than 0.3 mm. In addition, the spines on the stem of USNM 92983 are also relatively larger (0.2 mm versus less than 0.1 mm in the holotype). The polypar spines in USNM 92983 (Fig. 2d) are more noticeably anisomorphic than those on the holotype, whereas those in USNM 94390 are less distinctly anisomorphic and in places appear nearly uniform in size.

*Comparisons.*—In general appearance, *A. colombiana* resembles a colony of *Antipathes expansa* Opresko and Cairns (1992); however, the polypar spines of *A. expansa* are uniform in size, usually 0.18–0.20 mm tall and tuberculate, whereas those of *A. colombiana* are anisomorphic, usually 0.2–0.3 mm, and smooth-surfaced. *Aphanipathes colombiana* also differs in spination from the two common flabellate species in the western Atlantic, *Antipathes atlantica* Gray (1857) and *A. gracilis* Gray (1860), in that the branchlet spines in the latter two species are triangular, compressed and usually not more than 0.1 mm in size.

Considering the shape of its corallum and the morphology of its spines, *A. colombiana* resembles the Caribbean species *Aphanipathes thyoides* (Pourtales, 1880; see Opresko, 1972 for illustration and description). In *A. thyoides*, the corallum is flabellate and the spines are acicular, up to 0.6 mm tall, larger in the area of the polyps, and extremely reduced or absent in the hypostomal region of the polyps. In *A. colombiana* the hypostomal spines are not reduced in size.

The new species appears to be most sim-

ilar to the IndoPacific species *Aphanipathes reticulata* van Pesch (1914). The latter is a flabellate species with anisomorphic polypar spines reaching a maximum size of 0.27 mm, about the same as those in *A. colombiana*. The size and density of the branchlets (2–5 mm long and 2–4 mm apart), and the density of the axial spines (0.3 mm apart and in 6 axial rows viewed from one aspect) in *A. reticulata* are also not substantially different from *A. colombiana*. However, the species differ in that most of the larger polypar spines in *A. reticulata* are to a slight degree tuberculate, i.e., with small knobs on their surface, particularly near the apex. In addition, in van Pesch's illustration, many of the largest polypar spines appear crooked or sinuous. In *A. colombiana*, the polypar spines are not tuberculate, and only a few appear crooked or sinuous.

The morphology of the spines of *A. colombiana* and *A. reticulata* (i.e., polypar spines anisomorphic but hypostomal spines not atrophied) suggests that these two species are intermediate between two species complexes currently retained in the genus *Aphanipathes*. As recognized by van Pesch (1914), *Aphanipathes* contains a diverse assemblage of species having in common only the single feature of large polypar spines. The species in this genus appear to segregate themselves into three natural groupings; those with subequal polypar spines, those with anisomorphic polypar and unmodified hypostomal spines, and those with anisomorphic polypar spines and atrophied hypostomal spines. These groupings probably merit subgeneric or generic status.

*Distribution.*—Western Atlantic; known only from coral reefs and rocky littoral zones off the Atlantic coast of Colombia.

*Field Notes.*—The holotype was collected in a sheltered spot on a vertical rock wall at a depth of 20 m. In this area the dominant organisms on the substrate are sponges, ahermatypic corals, encrusting coralline algae and hydroids. The color of the holotype when alive was dark yellow or ocher (LRRRI Color Chart No. 920). The paratypes were collected off Tesoro Island in the Rosario Archipelago and at Punta de Betin off Santa Marta Bay. At Tesoro Island numer-

ous black corals can be found at depths greater than 15 m, especially growing under large plate corals (mainly *Montastrea franksi* and *Agaricia* spp.) and in other sheltered areas; the wire black coral *Stichopathes lutkeni* (Brook, 1889) is the most common species. The laminar scleractinian corals provide dark sheltered sites that are ideal for settlement of antipatharian larvae (Ortiz and Sánchez, 1992; Sánchez, in prep.). Many antipatharian species also occur among the big reef buttresses where dense communities of *Antipathes gracilis*, *A. atlantica*, *A. pennacea* Pallas, and *A. caribbeana* Opresko (1996) can be found. In situ observations of colonies of *A. colombiana* at this locality indicated that all were orientated in relation to the direction of the prevailing current, i.e., with the plane of branching of the colony positioned at right angles to the current and with the polyps located on the down-current side of the corallum. Several species of gorgonians, including *Swiftia exserta*, *Lytria plana*, and *Calliacis nutans*, were also found in the same area and were also orientated with the current.

Many of the specimens of *A. colombiana* collected off Santa Marta were relatively large compared to those collected near Tesoro Island, and several were also profusely branched in several planes. The larger size of these colonies might be explained by differences in environmental conditions at the two locations. The waters near Tesoro Island are oligotrophic and oceanic whereas those off Santa Marta Bay are strongly influenced by both local upwelling (caused by strong trade winds) and outwelling (runoff) which occurs during the rainy season. Consequently, the waters off Santa Marta are usually high in nutrients and seston. Because antipatharian corals are aposymbiotic suspension-feeding animals, the growth rates of these corals can be expected to be higher in areas rich in zooplankton (Birkeland, 1988). In contrast, the growth rates of zooxanthellated corals are less likely to be affected by nutrient conditions. Although the littoral zone off Santa Marta is colonized by some hermatypic corals, the benthos is dominated by a profuse growth of sponges, gorgonians (Zea, 1993) and antipatharians. The turbid water conditions in

this location also result in decreased light penetration and this, in turn, allows for the settlement of the antipatharian planulae in shallower water than normal. The combination of nutrient enrichment and light attenuation along this section of the Colombian coast probably explain why this area has the most luxuriant growth of black corals, both in terms of density and size of individual colonies (Sánchez, unpublished data). Similar observations on the effects of nutrients and light on the distribution, population density, and morphology of black corals have been made by Warner who studied black corals at several locations along the coast of Trinidad (Warner, 1981).

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