

Lectotype description. The colony is 26 cm in height and 16 cm in width (Fig. 19A, B). Stout branches arise from a 30 mm long stem, slightly flattened at the base, 7 mm in diameter, it gives off three main branches basically in one plane, that subdivide in an irregular or pseudodichotomous style (sensu Alderslade 1998) forming fasciculate clusters; a lateral branch is loosely pinnate, and one of the pinnae rebranches in a dichotomous manner (Fig. 19B). Branches are mostly cylindrical, thick and rigid, 3.25–4.0 mm in diameter throughout, and slightly tapered to produce pointed ends. Unbranched twigs reach up to 90 mm in length. Colony is deep purple with polyp apertures surrounded by bright yellow rings. Distinct bright yellow longitudinal grooves occur along the thick branches, and near the base they form several thin strips that continue along the remains of the holdfast (Fig. 14A, B). The polyps are retracted into the coenenchyme leaving small circular apertures (around 0.25 mm in diameter). Polyp-apertures are distributed all around the branches, and crowd the surface. The stem is devoid of polyp-apertures. Sclerites of the coenenchyme are deep purple and bright yellow (Fig. 19E). They are mostly capstans, reaching up to 0.09 mm in length and 0.05 mm in width (Figs. 19E, 20). Spindles are long, up to 0.13 mm in length, and 0.05 mm in width, with 3–7 whorls of tubercles (Fig. 20). Some long spindles have a slightly curved axis. Anthocodial sclerites are yellow, lobed rods up to 0.08 in length, and 0.03 in width (Figs. 19E, 20).

Other material. Colonies examined range in length from 5 cm to 37 cm, and 4 cm to 22 cm in width. Colonies are upright and bushy. Branching is sparse in small colonies, to profuse in larger ones. Branches arise from a single basal stem that is usually flattened, and conspicuously marked by longitudinal bands of dark purple and dark yellow coenenchyme. Stems reach up to 40 mm long, and up to 4 mm in diameter, they give off 2–4 main branches in one plane, or they spread at angles of about 45° in respect to the stem. The branches subdivide mostly in a pseudodichotomous style producing pinnate clusters (Fig. 19A–C). Branches are mostly cylindrical, but in large colonies they are somewhat flattened near to the stem. They are thick and rigid, 3.0–4.0 mm in diameter throughout, including the pinnae, some are slightly tapered to produce pointed ends. Unbranched terminal twigs or pinnae can be up to 120 mm in length. Most of the colonies examined are of a deep purple colour with polyp apertures surrounded by bright yellow rings, but a variety is also found where the rings are purple and the coenenchyme appears more tinted with yellow throughout. Distinct bright yellow longitudinal grooves occur along the thick branches, very marked at the base and following a sinuous path diffusing up to the distal branches. The polyps retract completely into the coenenchyme leaving small circular apertures (around 0.2–0.3 mm in diameter); they are distributed all around the branches, and crowd the surface. Polyps are white, with a thin ring (2 or 3 rows) of rods at the base of the tentacles. Sclerites of the coenenchyme are mostly as in the lectotype, but some variation is observed in a few specimens where the occurrence of spindles is higher. Anthocodial sclerites are as in the lectotype, some colonies have rods of a pink colour, but we have not found the two colours in the rods of the same colony.

Distribution. Cape San Lucas, Baja California, Mexico: type locality. San Salvador, El Salvador (Verrill 1868b); along the Pacific coasts of Panama and Costa Rica (Table 2, Fig. 21).

Remarks. In 1864 Verrill described *Leptogorgia rigida* with specimens from Mexico (Acapulco, collected by A. Agassiz and D. B. Vanbrunt, Cape San Lucas, Baja California by J. Xantus) and Panama (collected by J. H. Sternberg). His description was vague, mentioning that the specimens were “very variable in form and colour”. Verrill probably had a mixture of specimens, which he later separated as *L. alba*, *L. cuspidata*, and *Leptogorgia exigua* (Verrill 1868b, 1870). Verrill (1868b) made a meticulous redescription of *L. rigida*, excluded Panama from the type localities, and added San Salvador (that should be somewhere along El Salvador coast) instead. The syntype series of *L. rigida* also includes specimens that agree more with *L. cuspidata* (e.g. MCZ 4058 (MCZ 349), YPM 1648b). Although Verrill’s description (1868b) is meticulous, the lack of illustration, and the lack of a holotype designation produced confusion. For these reasons, we herein designate a lectotype, MCZ 4059, to fix the identity of *L. rigida*, and a lectotype, MCZ 4061 (MCZ 263), to establish the identity of *L. cuspidata*.

Leptogorgia cuspidata is similar to *L. rigida*, *L. exigua*, and *L. californica* in the type of branching, but the yellow or purple oval rings around the polyp-mounds are sufficient to recognise and separate *L. cuspidata* from the others (Table 1).

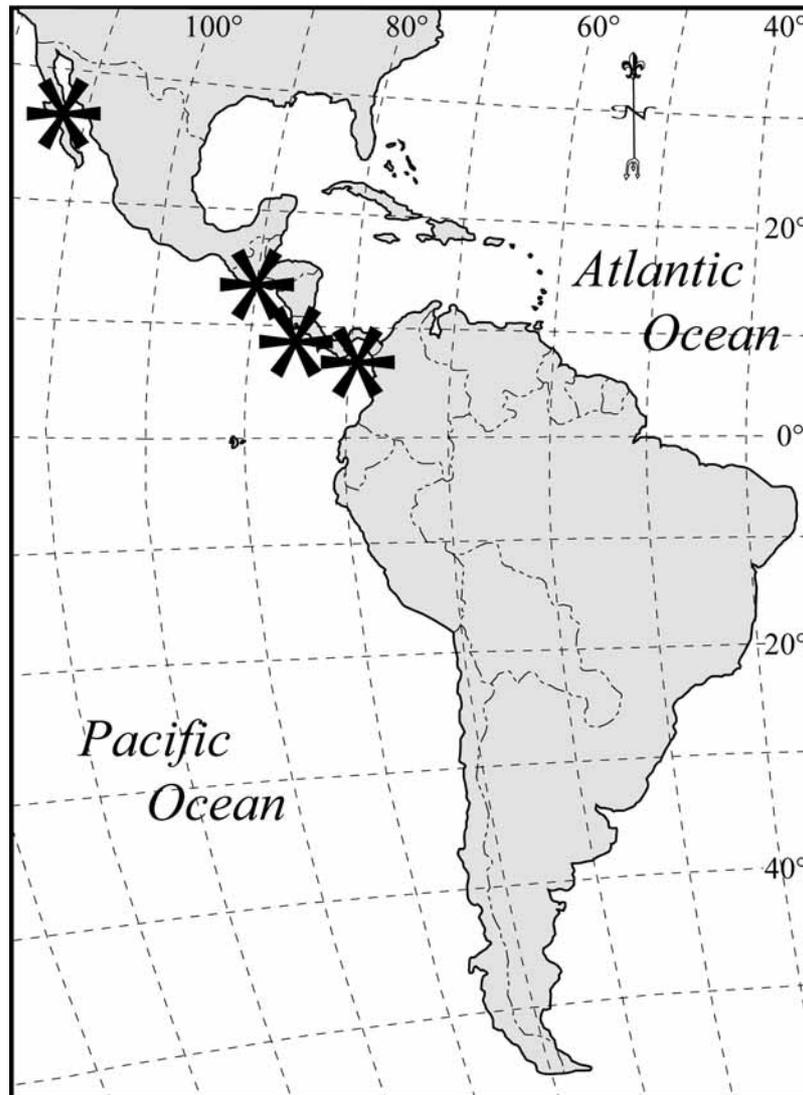


FIGURE 21. Geographical distribution of *Leptogorgia cuspidata* and *Leptogorgia rigida*.

***Leptogorgia diffusa* (Verrill, 1868)**

(Figs. 22–25)

Litigorgia diffusa Verrill, 1868a: 397 (1st. ed.).

Gorgonia (Litigorgia) diffusa Verrill, 1868: 415.

Leptogorgia diffusa Verrill, 1868b: 397; 1869b: 421; Nutting 1910: 5; Bielschowsky 1918: 30; 1929: 112; Kükenthal 1919: 771; Kükenthal 1924: 329–330; Hickson 1928: 413–414; Stiasny 1938: 29.

Not *Leptogorgia diffusa* Stiasny 1951: 71 (Guyane Française, Ile Royale) (= *Leptogorgia punicea* (Milne Edwards & Haime), 1857 (see Bayer 1961)).

Leptogorgia rubra Bielschowsky, 1918: 29 [Nomen Nudum]; 1929: 92–94; Kükenthal 1919: 911–912; 1924: 325.

Lophogorgia rubra Harden 1979: 85.

Lophogorgia diffusa Harden 1976: 73; Prahel *et al.* 1986: 21.

Material examined. Lectotype (here designated): YPM 1659, dry, Archipelago Las Perlas, Panama, depth not given, F. H. Bradley, 1866–1867. Paralectotypes: MCZ 7081, dry, Golfo de Nicoya, Costa Rica, no depth given, collected by pearl divers, J. A. Mc. Neil, 1866–1867; YPM 5151, preserved, Golfo de Nicoya, no depth given, J. A. Mc. Neil, 1866–1867.

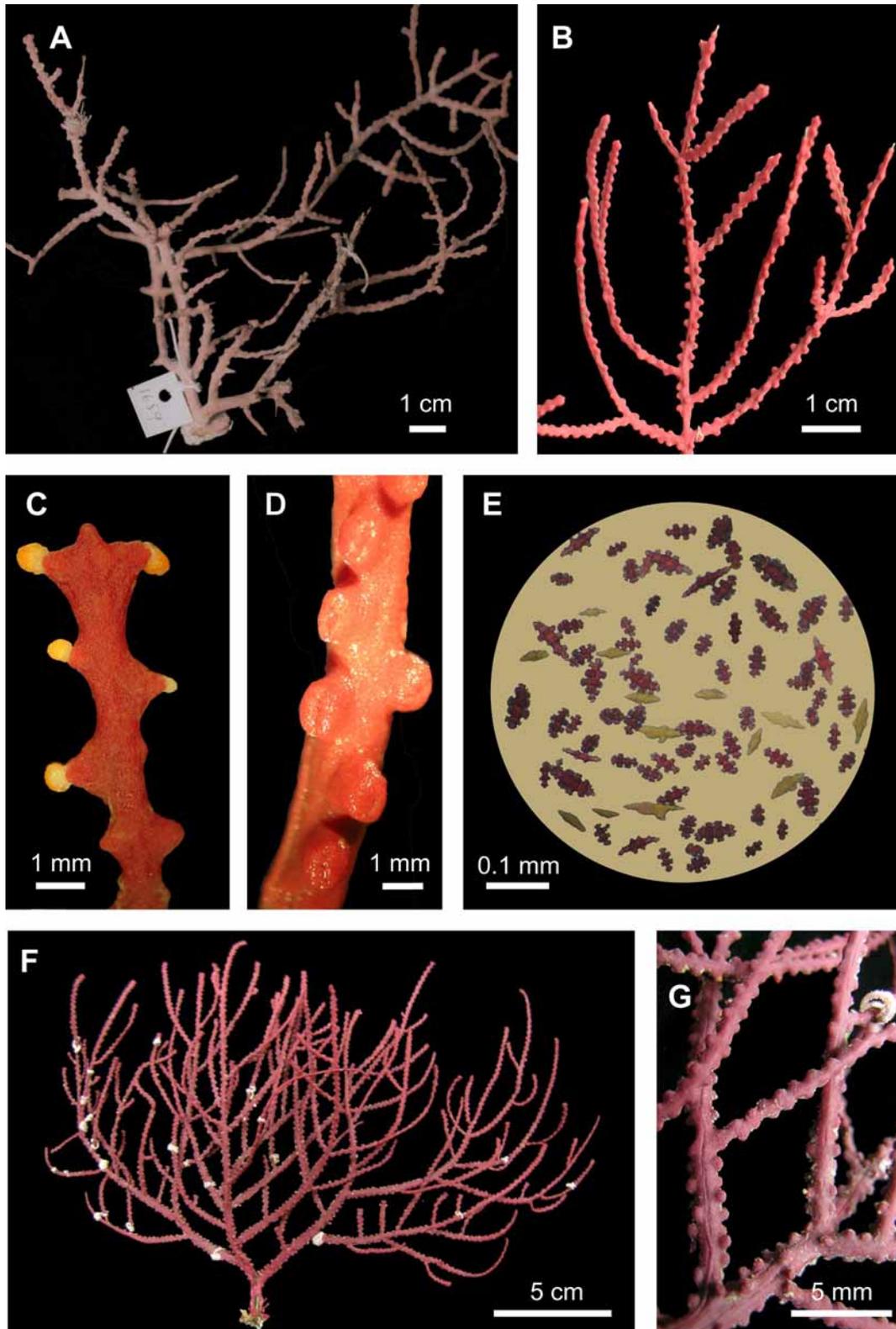


FIGURE 22. *Leptogorgia diffusa* A, YPM 1659, lectotype; B, ZMHC 2244, colony fragment; C, UCR 1586, tip of a branch; D, polyp-mounds (ZMHC 2244); E, light micrograph of sclerites (YPM 1659, lectotype); F, UCR 1584; G, detail of branches (UCR 1584).

Other material examined: CALIFORNIA: CASIZ 97890, dry, San Diego off shore, J. Stewart, 1965. COSTA RICA: UCR 1551, preserved, Punta Aguja, Golfo de Nicoya, 15 m, O. Breedy & J. Cortés, 22 November 2002; UCR 1582, dry, Isla Tolinga, Islas Tortuga, 15 m, 23 March 2002, A. Segura; UCR 1583, preserved, Isla Chora, 18 m, 31 March 1998, H. Guzman & O. Breedy; UCR1585 (2), preserved, Marino Ballena National Park, Costa Rica, 26 m, 27 April 2002, O. Breedy; UCR 1584, preserved, Punta Matapalito, 17 m, 12 March 2004, O. Breedy; UCR 1586, preserved, Punta Matapalito, 18 m, 15 March 1998, O. Breedy. EL SALVADOR: ZMHC 2244, 2245, 3134 (id. *L. rubra*), preserved, Acajutla, no further data. GUYANE FRANÇAISE: MNHN, Ile Royale, , 28 February, no further data. PANAMA: BM 1946.1.14.58, preserved, Taboga Island, Panama, 7–9 m, C. Crossland; STRI 387, dry, Isla Jicarita, Golfo de Chiriqui, 30 m, 8 August 2002, H. Guzman & C. Guevara; STRI 409, dry, Isla Seca Grande, Golfo de Chiriqui, 20 m, H. Guzman & O. Breedy, 26 August 2002; STRI 462, 487, dry, Bajo Foul, Península de Azuero, 15 m, H. Guzman & C. Guevara, 11 April 2003; YPM 1659a, b, preserved, Archipiélago Las Perlas, no depth given, F. H. Bradley, 1866–1867 (not this species).

Lectotype description. The lectotype is a small, lax colony 11 cm in height and 12.5 cm in width. Branches arise from a single basal stem, 3.0 mm in diameter, it forks near the base into two branches, 2.0–3.0 mm in diameter, which branch pinnately. Pinnae separated at distances of 1–3 cm, they are slightly flattened, 1.0–2.0 mm in diameter, and arise almost perpendicular to the main branches reaching up to 7–8 cm in length, before they subdivide again into secondary pinnate branching, or just extend unbranched. Unbranched terminal twigs reach up to 4 cm in length. Colony is of a dull orange colour. Polyp-mounds are sparsely distributed, they are raised and project about 0.5–0.8 mm from the surface of the coenenchyme with slit-like apertures, up to 0.5 mm in diameter (Fig. 22A). The polyp-mounds are mostly arranged in two alternating rows on each side of the branches, and in a single row on each edge of the branchlets. Sclerites of the coenenchyme are red and pink, mostly large spindles, and small capstans (Fig. 22E). The anthocodial sclerites are light orange and are distinctly large, and wide. The coenenchymal sclerites are long, up to 0.15 mm in length and 0.05 mm in width, with warts in girdles (Figs. 22E, 23). Most of these sclerites in the lectotype have acute ends (Figs. 22E, 23). Some spindles are slightly bent. Capstans reach up to 0.09 mm in length and 0.06 mm in width (Figs. 22E, 23). The anthocodiae mostly contain long, somewhat flattened rods, up to 0.14 mm in length, and 0.04 mm in width, smooth, or with short lobed-like marginal projections (Figs. 22E, 24).

Other material. The specimens examined reach up to 20 cm in height and up to 25 cm in width. Colonies are ramose and lax, and a main stem may be present, especially in some small specimens. When it exists it is cylindrical and reaches up to 2.0–3.0 mm in length; however, it is mostly absent, thus the branches emerge directly from the holdfasts. Main branches are somewhat flattened and about 4.0–5.0 mm in diameter and they spread in a single plane. Branching is openly pinnate and irregular. Pinnae are flat, around 1.0 mm thick and up to 25 mm long. They are sparsely arranged at distances of 1–3 cm, and arise more-or-less perpendicular to the main branches, but then, in most of the examined specimens, branches turn upwards. Pinnae often rebranch giving off secondary pinnae or just extend unbranched up to 12 cm in length (Fig. 22B, F). Tips of the twigs are mostly tri-lobed and pointed (Fig. 22C). Polyps are sparsely distributed, and retract into mound-like protuberances, projecting about 0.5–1.0 mm from the surface of the coenenchyme with slit-like apertures, up to 0.5 mm in length (Fig. 22C, D, G). The polyp-mounds are mostly arranged in two alternating rows on each side of the thicker branches, and in a single row on each edge of the branchlets. In the lower part of the branches, polyp-mounds are blunt and the appearance of the branch is crenulated. In some cases, polyps are concentrated on one side of the branch (Fig. 22D, G). In general, the upper part of the branches shows a more undulating, and delicate contour (Fig. 22B, C). This arrangement of polyp-mounds on the branches gives a zig-zag appearance to the colony (Fig. 22F). Longitudinal grooves appear in some places along the bare space between the rows of polyps (left side Fig. 22D). Colonies are red, when preserved, or alive, and fade to a lighter hue when dry (Fig. 22A, B, F). Coenenchymal sclerites are as in the lectotype. The anthocodial rods are closely set in points below the polyp tentacles; this gives a light orange colour to the polyps. Anthocodial

rods are light orange, dark pink, or both; they are large and conspicuous.

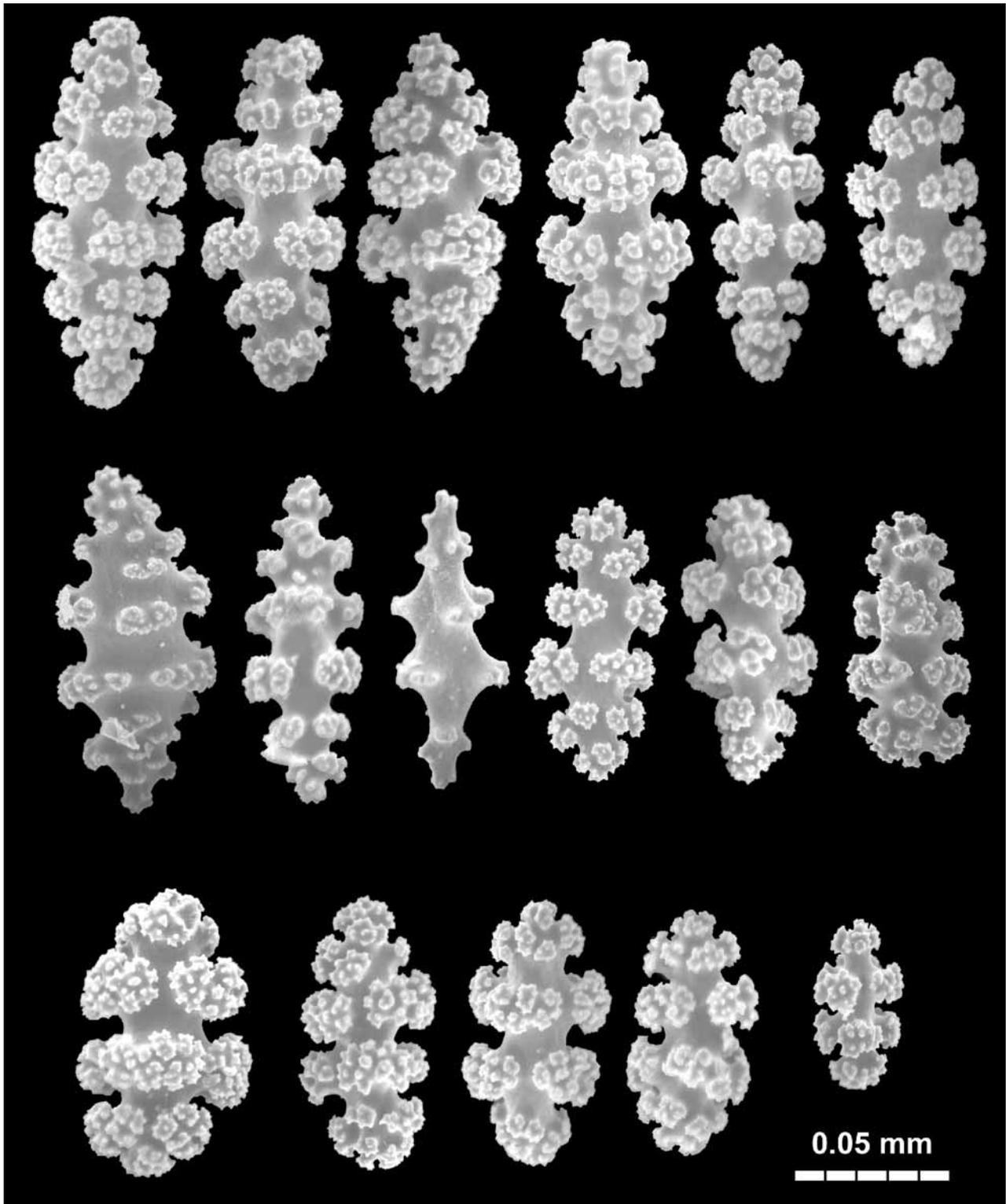


FIGURE 23. *Leptogorgia diffusa* (YPM 1659, lectotype), SEM of coenenchymal sclerites.

Distribution. Archipelago Las Perlas (Panama); Golfo de Nicoya (Costa Rica): type localities. Iscuandé, Punta Ardita, Punta Mulatos, Colombia (Prahl *et al.* 1986); Port Acajutla, El Salvador; Canal de Sarmiento, Chile; Brockway Point, Isla Santa Rosa, California; (?) Bahía (Bielschowsky 1929) (Table 2, Fig. 25).

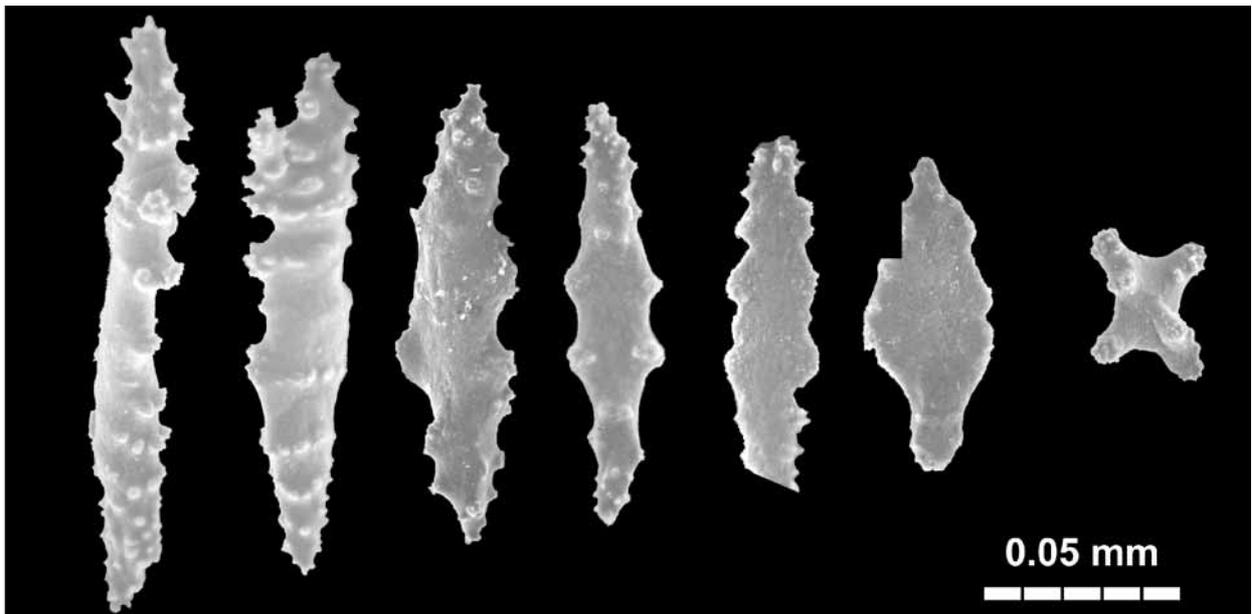


FIGURE 24. *Leptogorgia diffusa* (YPM 1659, lectotype), SEM of anthocodial rods.



FIGURE 25. Geographical distribution of *Leptogorgia diffusa*.

Remarks. Verrill (1868b) described this species with specimens from the Archipelago Las Perlas, Panama, and Golfo de Nicoya, Costa Rica. There is a type series in the YPM, which consists of two specimens from Panama and one from Costa Rica; the latter is not labeled as a type (YPM 5151) but it matches the description of the species and the locality. The specimen YPM 1659, a dry colony, not only agrees with Verrill description, but also one of the branches fits the figured specimen. However, specimens YPM 1659a, b, small colonies preserved in alcohol, marked as types, do not agree with this species. Specimen MCZ 7081, however, clearly belongs to this species. Bielschowsky (1929), made reference to 4 specimens from Acajutla, El Salvador similar to *Leptogorgia purpurea* Wright & Studer, 1889, which she described as a new species, *Leptogorgia rubra*. After studying her syntypes we found that they agree with *L. diffusa*, which was previously described by Verrill (1868c). Consequently, *L. rubra* is a new synonym of *L. diffusa*. Verrill's and Hickson's descriptions of this species agree closely with our observations.

The specimen illustrated in Stiasny (1951) perfectly matches *L. diffusa*, however, the locality given is Ile Royale, Guyane Française, which is very improbable. In order to avoid confusion we designate YPM 1659 as the lectotype of *L. diffusa*.

The large and conspicuous anthocodial rods, and the lax, pinnate style of branching, with prominent polyp-mounds that produces the zig-zag appearance of the colony differentiate this species from the others (Table 1).

***Leptogorgia exigua* Verrill, 1870**

(Figs. 26–28)

Leptogorgia rigida (pars) Verrill, 1864: 32.

Leptogorgia exigua (pars) Verrill, 1870: 552; (?)Bielschowsky 1929: 141.

Material examined. Lectotype (here designated): YPM 4602, dry, Guaymas, Sonora, Mexico, no depth given, E. Palmer, no date. Paralectotypes: MCZ 4057 (MCZ 186) (3 specimens), dry, Acapulco, Mexico, no depth given, A. Agassiz, no date; YPM 789, dry, Panama, no depth given, F. H. Bradley, 1866–1867; YPM 1614 (2 specimens), dry, Tumbes Department, Zorritos, Peru, no depth given, F. H. Bradley, 1866–1867; YPM 4601, dry, Oaxaca State, Golfo de Tehuantepec, no depth given, Sumichrast, no date; YPM 4621, dry, Panama, no depth given, J. A. McNeil, no date; YPM 5153, 5154, dry, Corinto, Nicaragua, no depth given, J. A. Mc. Neil, no date; YPM 5155, dry, Golfo de Nicoya, no depth given, J. A. Mc. Neil, no date.

Lectotype description. The colony is 6.2 cm in height and 5.0 cm in width. Two short stems, about 9.5 mm long and 4–5 mm in width, give off thick irregularly pinnate branches. They are flattened at the base, 3–4 mm in diameter, more cylindrical, and slightly tapered at the ends, with rounded tips, and about 2 mm in diameter. Branching is somewhat bushy. Unbranched terminal twigs reach up to 14 mm in length. Colony is deep brownish red throughout, with a yellowish hue to some branches (Fig. 26A, B). Several longitudinal grooves occur along the thick branches, and near the base. A small part of the holdfast is preserved. The polyps are evenly distributed all around the branches (Fig. 26B). Polyp-apertures are small, around 0.25 mm in diameter, and crowd the surface (Fig. 26B). Polyp-mounds are slightly raised. Colours of the coenenchymal sclerites are red, pink, light orange, pale yellow and a characteristic mixture of these in various proportions in the same sclerite (Fig. 26C). They are mostly capstans reaching up to 0.10 mm in length and 0.05 mm in width (Figs. 26C, 27). Spindles are long, up to 0.13 mm in length, and 0.05 mm in width, with 4 whorls of tubercles (Figs. 26C, 27). No anthocodial sclerite were found for examination.

Other material. Colonies examined range in length from 4 cm to 15 cm, and 1.5 cm to 14 cm in width. Branching is irregularly pinnate, and in almost one plane. Branches arise directly from the holdfast or from short, thick and slightly flattened stems, up to 4 mm in length, and 10 mm in width. Thick branches are also somewhat flattened at the base and cylindrical, up to 4 mm in diameter, at the ends, which are rounded.

Unbranched terminal twigs are generally short and 10–15 mm long, but in some specimens they can reach up to 20 mm in length. Colour of the colonies is of a deep brownish red to a dark orange, and this is very characteristic of the species. A close examination of the surface shows a mixture of purplish red and deep orange sclerites. In some cases, thin orange rings surround the polyp-apertures (e.g. MCZ 4057). Distinct purplish red longitudinal grooves occur along the branches, although in some cases they are deep orange. Polyps are distributed all around the branches, and crowd the surface. Polyp-mounds are slightly raised, with round apertures 0.2–0.3 mm in diameter. Sclerites of the coenenchyme are mainly as in the lectotype (Fig. 27), with some variation in colours with brighter hues occurring or with a higher occurrence of light orange sclerites instead of pale yellow.

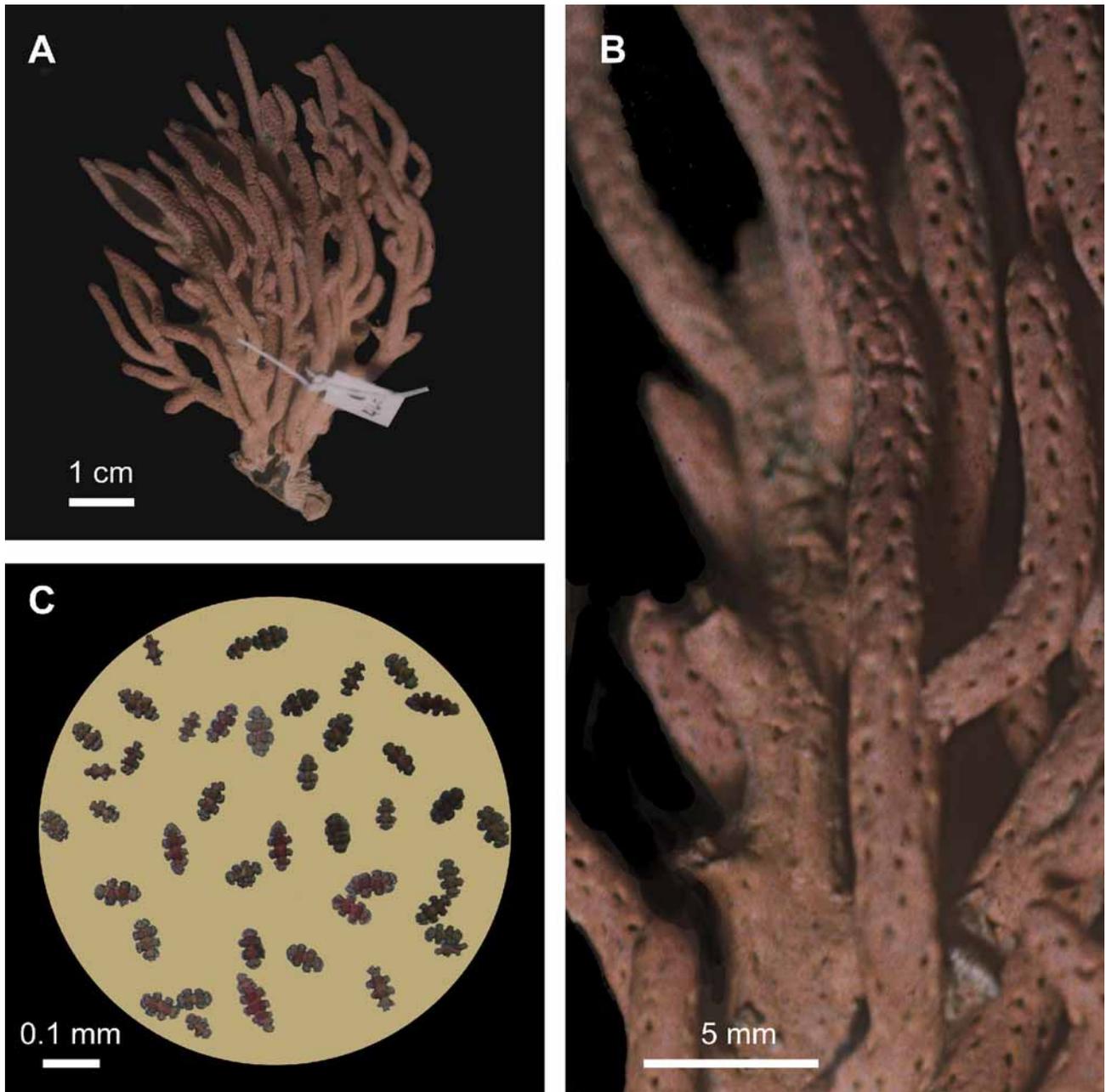


FIGURE 26. A, *Leptogorgia exigua*, YPM 4602, lectotype; B, detail of branches; C, light micrograph of sclerites.

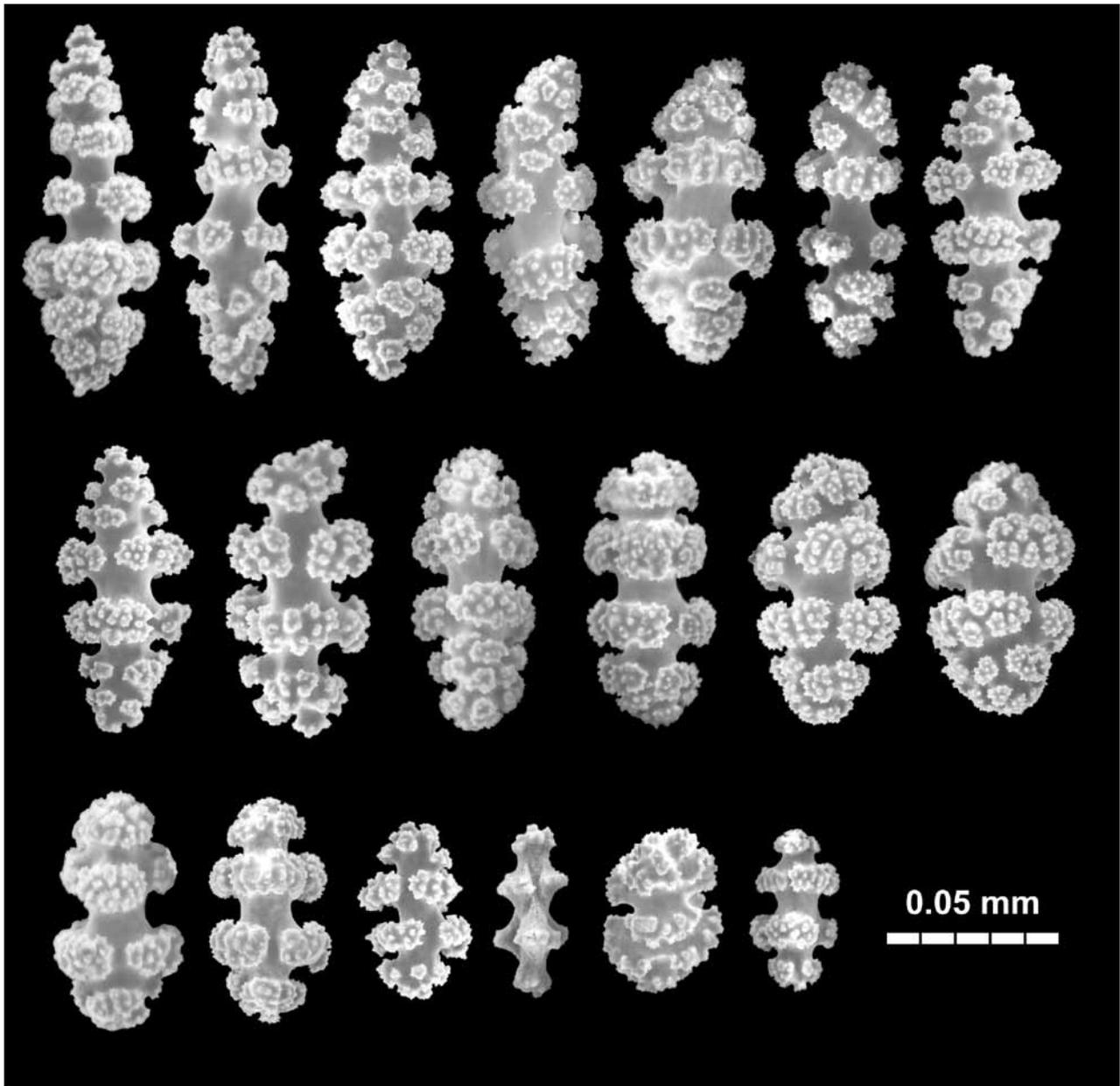


FIGURE 27. *Leptogorgia exigua* (YPM 4602, lectotype), SEM of coenenchymal sclerites.

Distribution. Acapulco, Tehuantepec, and Guaymas, Mexico: type localities. Nicaragua, Costa Rica, Panama and Peru (Verrill 1870) (Table 2, Fig. 28).

Remarks. Verrill (1870) described this species from specimens that he formerly regarded as a “dwarf variety” of *L. cuspidata*. He made his decision based on the typical colour pattern that he described as sometimes being a mixture of purplish red and yellow in varying proportions (the yellow sclerites more or less concentrated around the polyp-apertures, and often tinging the whole surface), or sometimes being of red or purple sclerites, producing a purplish colony. No illustration was provided and the description of the branching pattern, and sclerites could well fit specimens of *L. cuspidata* or *L. rigida*, for example, MCZ 4057 (MCZ 186) is a syntype of *L. rigida*, but better matches *L. exigua*. We acknowledge the specimens from Mexico (Guaymas, Tehuantepec and Acapulco) found at YPM collection as the representatives of this species. To establish the identity of *L. exigua* we designate YPM 4602 as the lectotype.

Even though Peru was not listed in the type localities by Verrill (1870), two specimens from there (YPM

1614 a, b) that are labeled as “types” fit this species. *L. exigua* has not been found in recent extensive collections in Costa Rica and Panama. The small yellowish specimens from Golfo de Nicoya (Costa Rica), and Corinto (Nicaragua) labeled as syntypes, do not accurately match the description of the species.

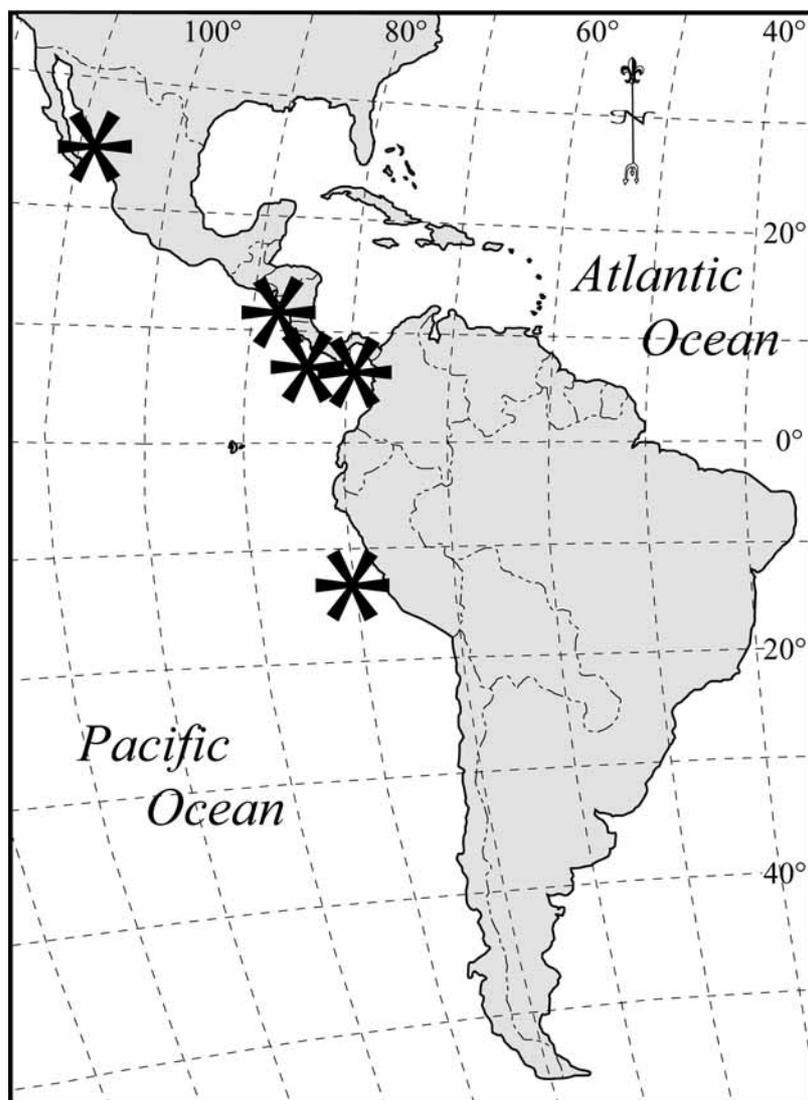


FIGURE 28. Geographical distribution of *Leptogorgia exigua*.

The species is similar to *L. californica*, *L. rigida* and *L. cuspidata* in the style of branching, but its branches are thicker and with very small polyp-mounds. These species also have a similar dominant type and size of sclerites, but differ in the shapes, e.g. in *L. rigida*, they are mostly wide capstans, different from the capstans of the others, and in *L. californica* and *L. exigua*, there are bent sclerites that are not in *L. rigida*, or in *L. cuspidata* (Table 1).

***Leptogorgia flexilis* (Verrill, 1868)**
(Figs. 29–31)

Gorgonia (Eugorgia) flexilis Verrill, 1868: 415
Litigorgia flexilis Verrill, 1868a: 400 (1st. ed.).

Leptogorgia flexilis Verrill, 1868b: 400; 1869b: 421; Nutting 1910: 5; Bielschowsky 1918: 29; 1929: 96; Kükenthal 1919: 771; 1924: 326; Bielschowsky 1929: 96; Hickson 1928: 414–416; Stiasny 1943: 82.

Material examined. Syntype series: YPM 1553a, b, MCZ 4123 (722), dry, Archipelago Las Perlas, Panama, 11–15 m, F. H. Bradley, 1866.

Other material examined: CALIFORNIA: CASIZ 096811, dry, Channel Islands, off south end Santa Catalina Island, Fransworth, 24–30 m, J. G. Vedder, September 1963; CASIZ 096813, Channel Islands, Santa Catalina Island, 11 m, E. Hochberg, 1967; CASIZ 097887, dry, Los Angeles County, off Redondo, no depth given, H. N. Lowe, July 1970. PANAMA: BM 1946.1.14.74, preserved, off Taboguilla Island, 5.4 m, T. Mortensen, 1915.

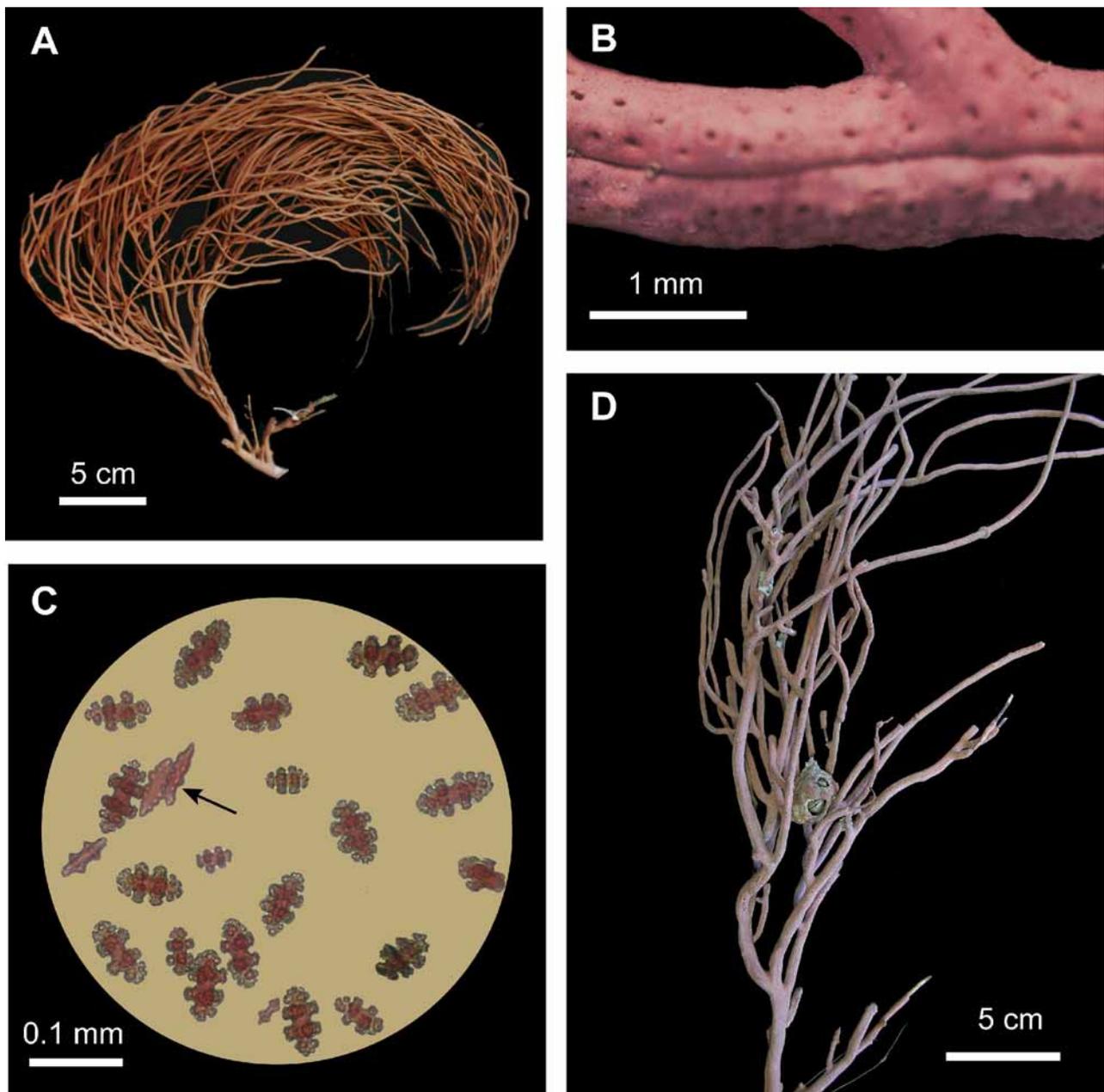


FIGURE 29. *Leptogorgia flexilis*, **A**, YPM 1553b; **B**, detail of a branch (YPM 1553b); **C**, light micrograph of sclerites (YPM 1553b), the arrow shows the anthocodial sclerites; **D**, MCZ 4123.

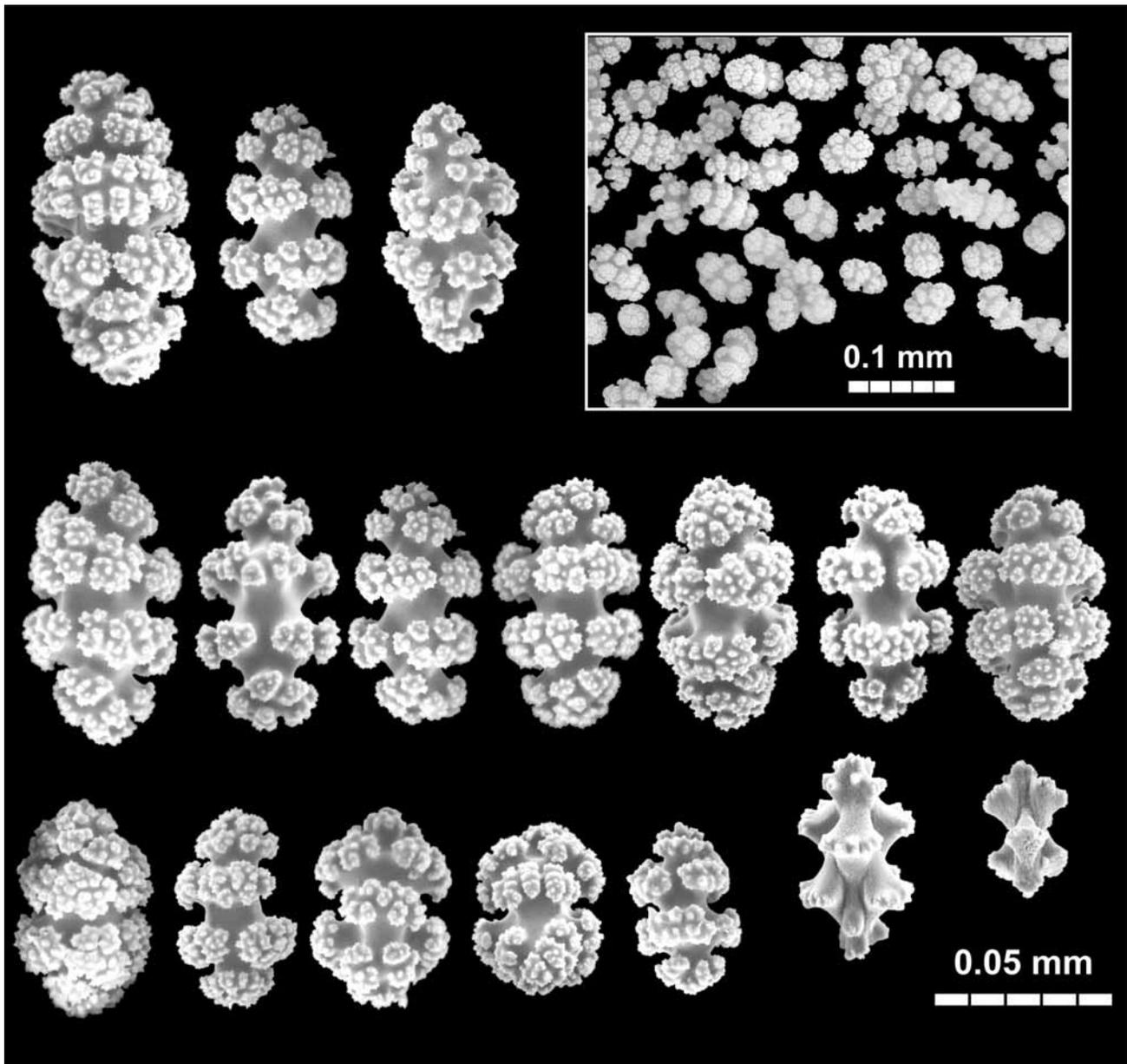


FIGURE 30. *Leptogorgia flexilis* (YPM 1553b), SEM of coenenchymal sclerites; upper inset, unsorted sample of coenenchymal sclerites.

Description of syntypes. The examined specimens reach up to 40 cm in height and up to 30 cm in width. Colonies are lank, bushy with long, slender, and flexible branches. In small specimens, branches are more upright, drooping slightly at the ends. The main stem is cylindrical; or somewhat flattened, up to 8.0 mm in diameter, and up to 2.5 cm long before it gives off irregularly spaced (2.5 to 25 cm) large, primary branches (4.0 to 6.0 mm thick), which arise mostly at acute angles (40–45°); they give off secondary branches in the same way. These branches produce some very long, lax, slender, cylindrical branchlets (1.0–1.5 mm thick), which extend unbranched up to 20 cm in length, giving a flexible appearance to the colony (Fig. 29A, D). Tips of the branchlets are pointed. Almost nothing is preserved of the holdfasts. Polyps are sparsely distributed, and retracted completely in to the coenenchyme into very low, oval polyp-mounds leaving small (about 0.8 mm) oval apertures (Fig. 29B). These are arranged in four to five irregular longitudinal rows on each side of the thicker branches, and in two or three rows on each edge of the thinner branches. According to Hickson (1928) the expanded anthocodiae are about 1.0 mm in height, and there are few scattered anthocodial sclerites

at the base of the tentacles, not showing any special arrangement. Several longitudinal grooves occur along the bare space between the rows of polyps (Fig. 29B). Dry colonies are reddish-brown throughout (Fig. 29A, B, D). Sclerites of the coenenchyme are mostly dark red, and some are red with a characteristic bright yellow halo on the periphery (Fig. 29B). They are mostly capstans (Figs. 29B, 30, 30 inset), up to 0.09 mm in length and 0.05 mm in width (Figs. 29B, 30). Spindles are up to 0.09 mm in length, and 0.06 mm in width (Figs. 29B, 30). Anthocodial sclerites are red, somewhat flattened rods, up to 0.08 mm in length, and 0.02 mm in width. They are smooth, or have short lobe-like marginal projections (Fig. 29C, arrow). Hickson (1928) stated that they are 0.07 mm in length, dark red in colour, and usually pointed with two pairs of irregular tubercles. The illustrated specimen (YPM1553b) is the largest of the syntype-series (Fig. 29A). It is a reddish-brown colony, with curved branches, perhaps from the drying process. Stretched out, it is almost about 40 cm in height and about 25 cm in width. The main stem reaches about 1.0 cm before it branches in to several main branches, only one of which is unbroken. This branch shows the characteristic ramification of the species. The sclerites do not show variation among all the syntypes.

Distribution. Archipelago Las Perlas: type locality. Taboguilla Island, Panama; El Salvador; Santa Catalina Island, California. We have not found any specimen of this species in our recent collections from Panama, including the Archipelago Las Perlas (Table 2, Fig. 31).

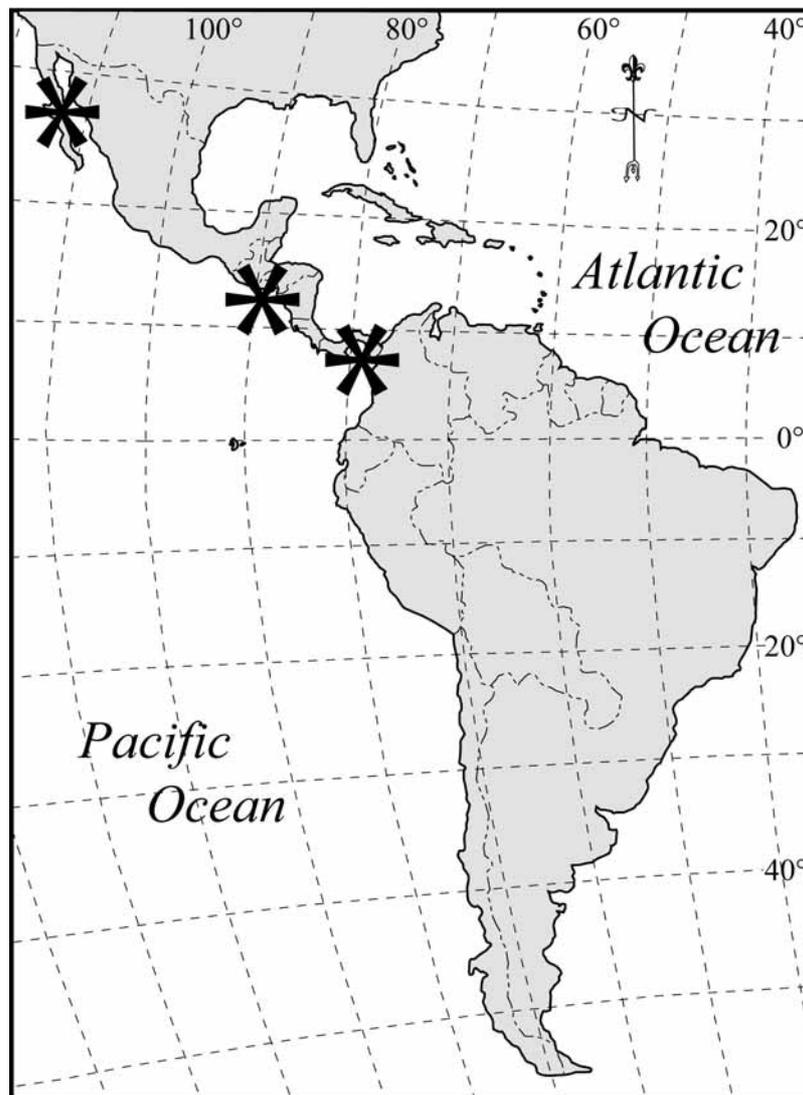


FIGURE 31 . Geographical distribution of *Leptogorgia flexilis*.

Remarks. This species was described by Verrill (1868b), and he mentioned specimens from Panama, and from San Salvador (El Salvador), but from the latter locality no material was found in the collections. Verrill did not designate a holotype, and presented poor illustrations of three sclerites.

As Hickson (1928) noticed, Verrill (1868b) remarked that the polyp-mounds (“cells”) are “rather large for the genus”, however, the polyp-mounds in this species measure less than 1.0 mm, which is considered small in the genus. Verrill also, reported the occurrence of large spindles, slender, acute with three-four whorls of separated nearly simple warts. Though some spindles with acute ends and three whorls of tubercles appear in the sclerites preparations, they are not large for the genus (up to 0.06 mm in length, and 0.04 mm in width); and no spindle with four defined whorls occur in this species. In some cases, a possible fourth whorl in a spindle is almost merged into knobby, complex tuberculate ends. Additionally, no crosses were found in the samples examined, although Verrill (1868b) said they occur occasionally.

Except from some similarity with *L. chilensis* that was discussed above, this species differs from the others in the lax, and abundant drooping branches.

***Leptogorgia florum* (Verrill, 1868)**

(Figs. 32–35)

Litigorgia florum Verrill, 1868a: 387–388 (1st. ed.).

Gorgonia (*Litigorgia*) *florum* Verrill, 1868: 415.

Leptogorgia florum Verrill, 1868b: 387–388; 1869b: 421; ?Nutting 1909: 722–723; Nutting 1910: 5; Bielschowsky 1918: 31; 1929: 121–122; Kükenthal 1919: 771; 1924: 333; Hickson 1928: 410–411.

Material examined. Syntype series: MCZ 718 (4 specimens), 1175, dry, Archipelago Las Perlas, Panama, no depth given, F. H. Bradley, 1866–1867; MCZ 4006, preserved, Archipelago Las Perlas, no depth given, F. H. Bradley, 1866–1867; YPM 1175 a–n, dry, YPM 1533, preserved, YPM 1638, 3 specimens, preserved, Archipelago Las Perlas, no depth given, F. H. Bradley, 1866–1867; YPM 1775, YPM 1575, dry, Archipelago Las Perlas, no depth given, F. H. Bradley, 1866–1867; YPM 570, dry, Panama, no depth given, F. H. Bradley, 1866–1867.

Other material examined: PANAMA: BM 1946.1.14.55, preserved, Station Balboa 2; Pacific Cruise, no depth given, C. Crossland, 1923–1924; BM 1930.6.17.15, preserved, no depth given, Station Balboa 3 (Pacific entrance to Panama Canal docks, tidal, half mile from sea), St. George, Scientific Expedition, Research Association, Pacific Cruise, C. Crossland, 1923–1924.

Description of syntypes. The examined specimens reach up to 15 cm in height and 24 cm in width. The colonies are flabelliform, broad, and pinnately branched. Main stems are 1.5–2.0 mm in diameter, and are very short (up to 10 mm long) or almost absent, so the branches emerge directly from the holdfasts. The main branches are about 1.5 mm in diameter, the pinnae, around 1.0 mm in diameter and up to 20 mm long, they are irregularly arranged and closely spaced (Fig. 32A, B, D). Branching angles are usually 35–50°, but can be 90°. Some of the pinnae may rebranch giving off secondary pinnae. Unbranched terminal twigs reach up to 20 mm in length. Tips of the twigs are tridentate formed by two lateral polyps and a pointed end between them (Fig. 32B). Polyps are colourless, sparsely distributed, and retract into raised mounds, with small bilabiate apertures and diffuse yellow spots. The polyp-mounds are distinct and arranged in pairs in longitudinal rows, on the external part of the branches, but form only single marginal row on the terminal branchlets (Fig. 32B). Colonies are bright red when preserved, sometimes slightly tinged with yellow, and deep orange, more yellowish, when dry (Fig. 32A, D). Some of the main branches have yellow, thin longitudinal grooves that are more evident on dry specimens. Sclerites of the coenenchyme are mostly red spindles; a few are bicoloured with pale yellow (Fig. 32C). Spindles are long, some slightly curved, up to 0.13 mm in length and 0.05 mm in width (Figs. 32C, 33). Few spindles present a characteristic bent end. The less abundant capstans are mostly

pale yellow, with some bicoloured with red, and up to 0.09 mm in length, and 0.05 mm in width (Figs. 32C, 34). The anthocodiae mostly contain long, yellow, somewhat flattened rods, up to 0.10 mm in length, and 0.03 mm in width, with several lobed-like marginal projections (Figs. 32C, 34). The anthocodial rods are arranged in points below the polyp tentacles.

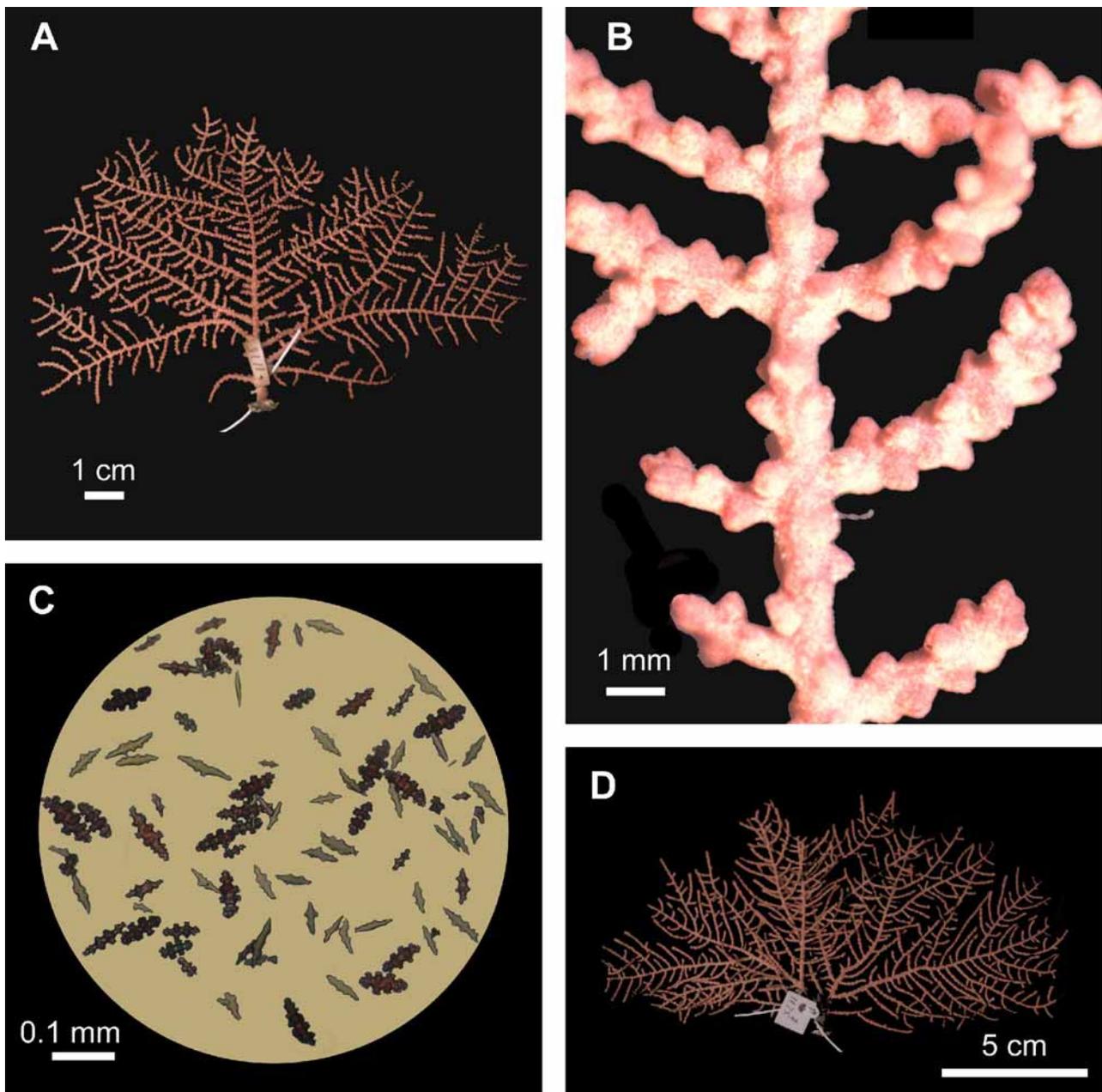


FIGURE 32. *Leptogorgia floriae*, **A**, YPM 1175b; **B**, detail of a branch (YPM 1175b); **C**, light micrograph of sclerites (YPM 1175b); **D**, YPM 1175g.

The illustrated specimens, part of the syntypes (YPM1175b, 1175g), are 8 cm in height, 12.4 cm in width, and 8 cm in height, 16 cm in width, respectively (Fig. 32).

Distribution. Archipelago Las Perlas, Golfo de Panama, Panama: type localities. We have not found any specimen of this species in our recent collections from Panama, including Archipelago Las Perlas (Table 2, Fig. 35).

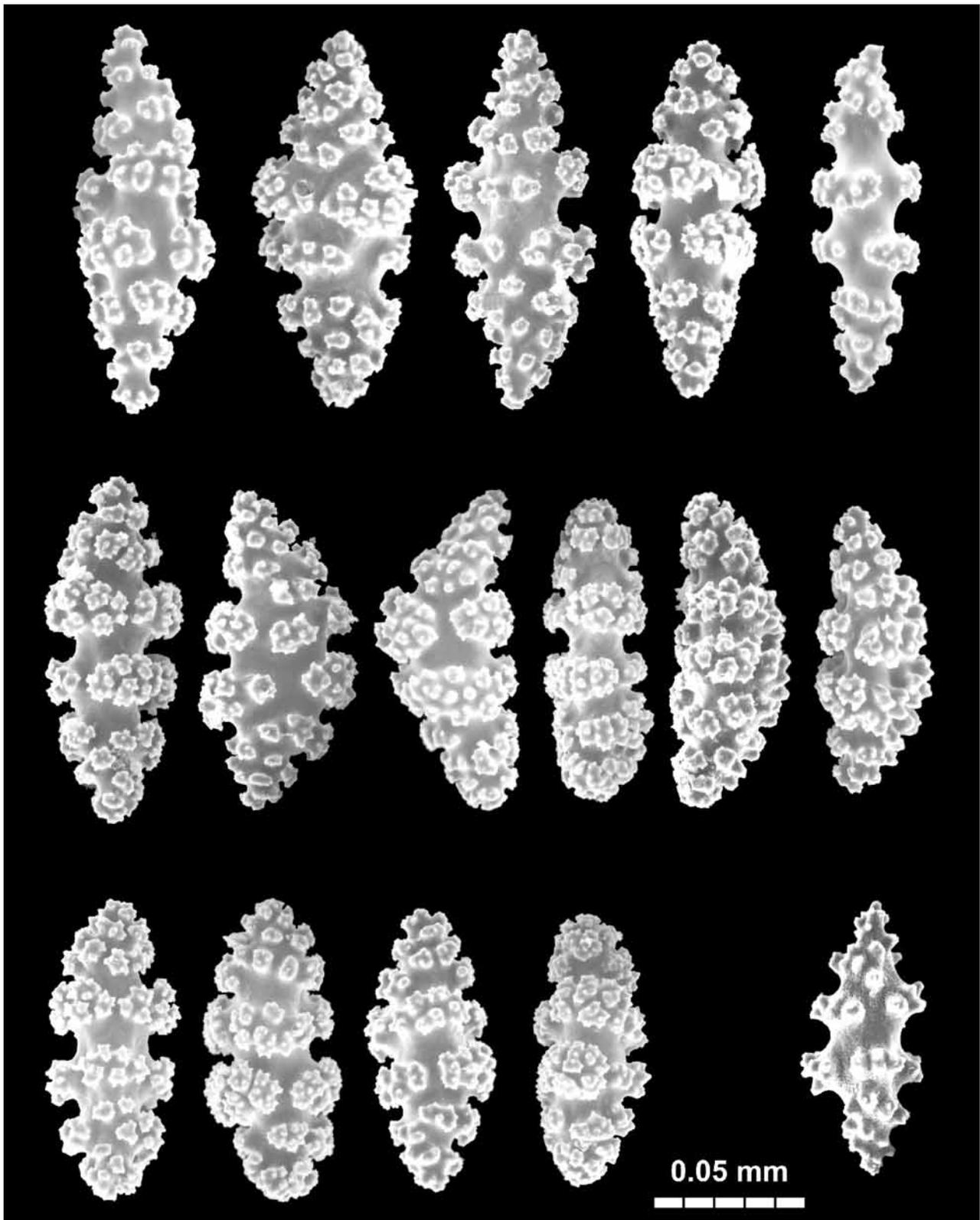


FIGURE 33. *Leptogorgia florae* (YPM 1175b), SEM of spindles.

Remarks. This species was described by Verrill (1868b), he did not designate a holotype, but the material deposited in the YPM and MCZ collections agrees with all aspects of Verrill's description, to which a few details are added here.

This species differs from the others mainly in the pinnate style of branching, which is more irregular in other species like *L. aequatorialis*, *L. parva*, and *L. taboguilla* (Table 1).

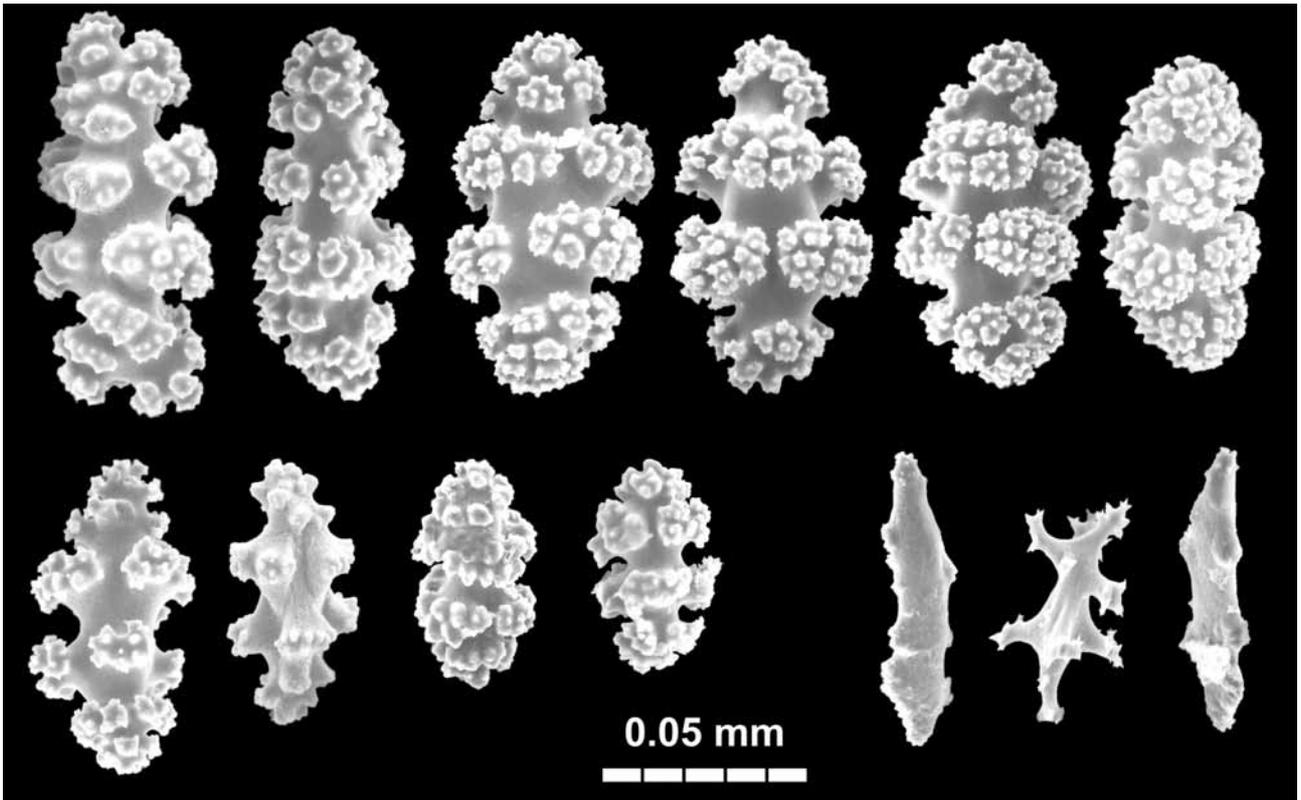


FIGURE 34. *Leptogorgia florae* (YPM 1175b), SEM of capstans, and anthocodial rods.

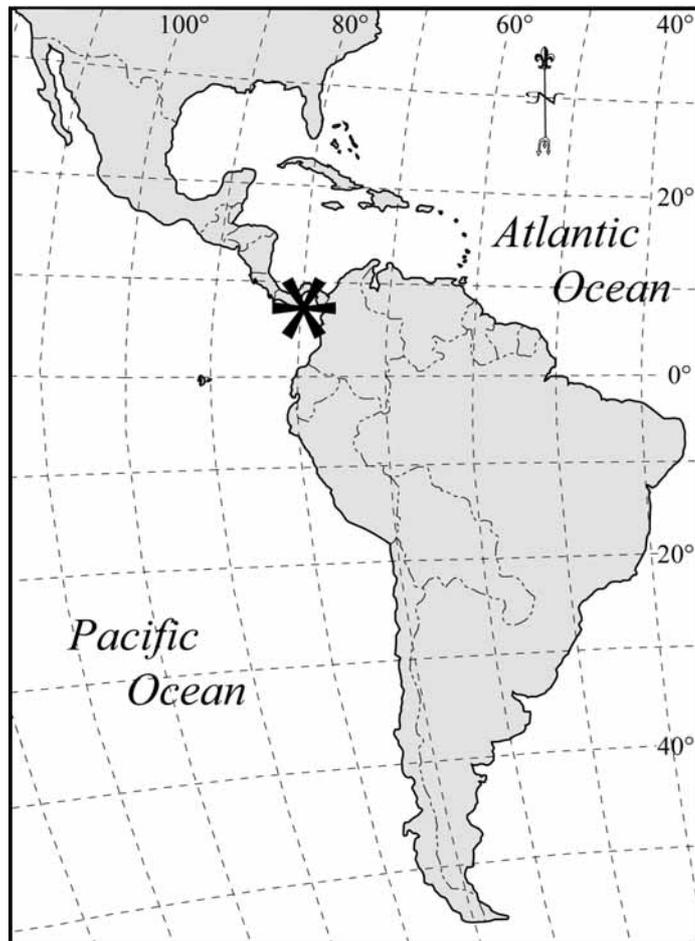


FIGURE 35. Geographical distribution of *Leptogorgia florae*, *Leptogorgia fruticosa*, and *Leptogorgia parva*.

***Leptogorgia fruticosa* Hickson, 1928**

(Figs. 35, 36B, 37)

Leptogorgia fruticosa (pars) Hickson, 1928: 407–408; Stiasny 1943: 80–81.

Material examined. Syntypes. BM 1946.1.14.72, off Taboga Island, Panama, 7–9 m, C. Crossland, Pacific Cruise 1923–1924; ZMUC-ANT 129 q, s, u, v, Taboguilla Island, Panama, 5 m, T. Mortensen, 2 November 1915.

Description. Syntypes. The species is represented by a fragment 7.3 cm in height and 4 cm in width (Fig. 36B). Branching is irregular, not planar, with some branchlets arising out at right angles. Main branches are 1.5–2.0 mm in diameter; branchlets are 1.0–1.5 mm in diameter. Unbranched terminal twigs are blunt and up to 9.0 mm in length. Polyps are pale yellow when contracted, but light brown when expanded, with anthocodial rods arranged in points below the polyp tentacles. They are sparsely distributed all around the branches, and retract in slightly raised polyp-mounds. Colour of the colony is greyish-white. Coenenchymal sclerites are pale yellow and mostly capstans. Spindles are up to 0.10 mm in length, and 0.03 mm in width, with 4–6 whorls of tubercles (Fig. 37). Capstans reach up to 0.07 mm in length, and 0.04 mm in width (Fig. 37). Anthocodial sclerites are colourless, long flat rods, up to 0.10 mm in length, and 0.02 mm in width with regular margins, some with lateral projections on the margins (Fig. 37).

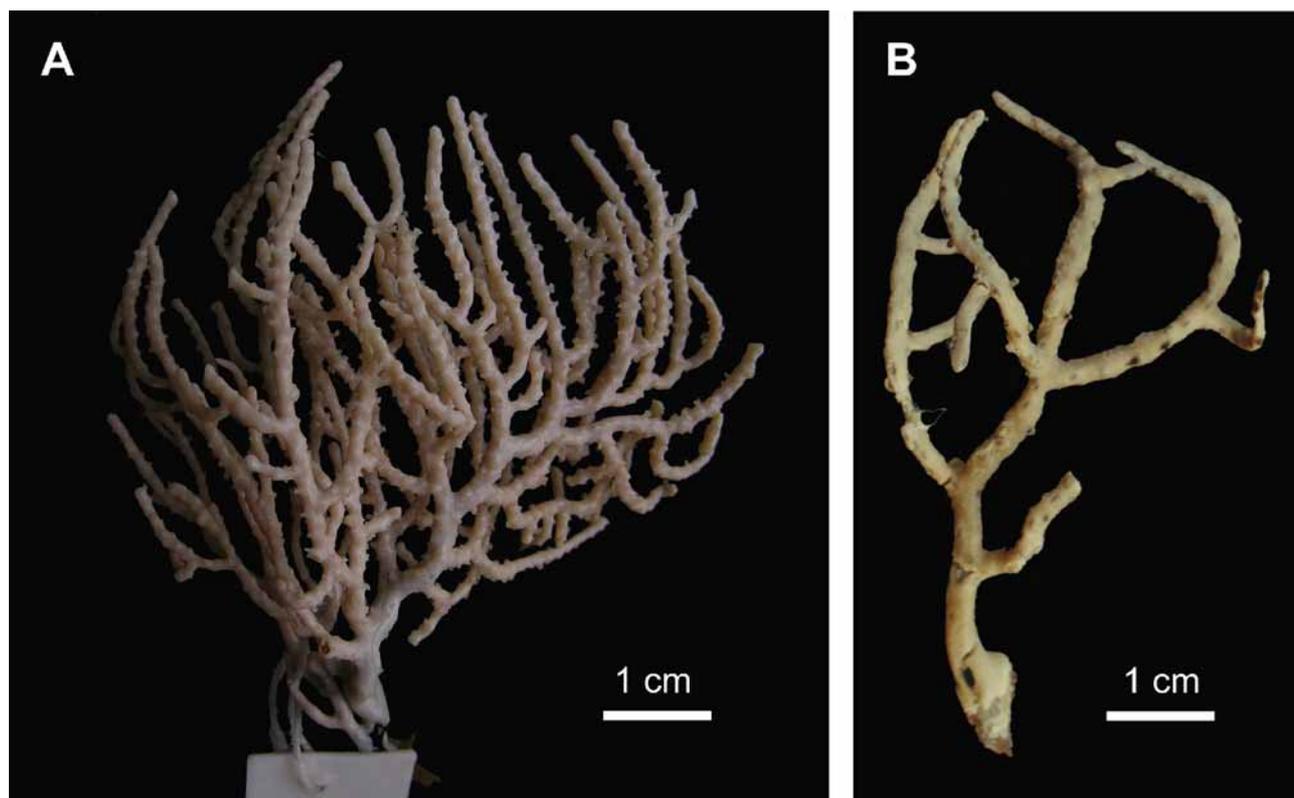


FIGURE 36. A, *Leptogorgia cofrini* (ZMUC ANT 129); B, *Leptogorgia fruticosa* (BM 1946.1.14.72).

Distribution. Only from the type locality: Taboga and Taboguilla Islands, Golfo de Panama, Panama (Table 2, Fig. 35).

Remarks. Hickson (1928) described six species of *Leptogorgia* from the C. Crossland collection made during the voyage of the *S. Y. St. George*, in the Panama region, and from T. Mortensen's collection from the same region (Hickson 1928). Three of these species he incorrectly placed in the genus *Euplexaura* Verrill,

1869 (family Plexauridae). Stiasny (1941, 1943) revised Hickson's species, but apart from the addition of some details for the descriptions, he did not make any new contribution. In the description of *L. fruticosa*, Hickson (1928) listed 5 specimens from off Taboguilla Island, and another small specimen from Taboga Island. We found 4 small specimens in the ZMUC collection marked as "cotypes" from off Taboguilla; the larger specimens cited by Hickson (1928), 90 mm x 100 mm, and 70 x 40 mm were not found. A small fragment from Taboga Island was found in the BM together with a small fragment of *L. laxa*. Hickson's description of *L. fruticosa* disagrees in some aspects with the ZMUC specimens, especially in the sclerites, but is more accurate for the BM fragment marked as type. In addition, the microscopic slides made by Hickson for the description of the species match the BM fragment. The ZMUC specimens that do not match the description of *L. fruticosa* were included in *L. cofrini* by Breedy and Guzman (2005) (see the description of *L. cofrini* in this paper).

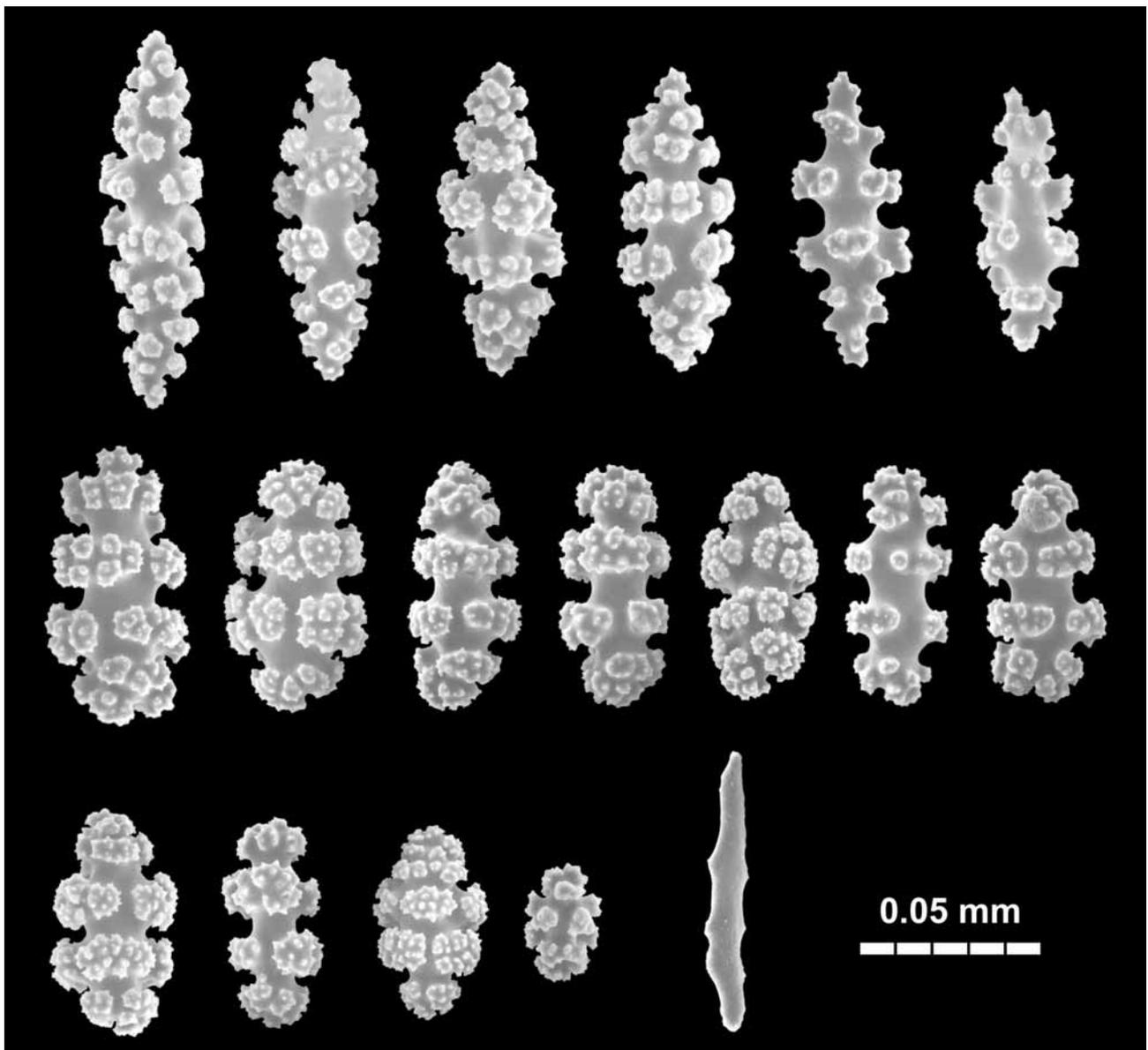


FIGURE 37. *Leptogorgia fruticosa* (BM 1946.1.14.72), SEM of coenenchymal sclerites, and anthocodial rod.

Leptogorgia labiata Verrill, 1870

(Figs. 38–40)

Leptogorgia ramulus (pars) Verrill 1868b: 394–396

Leptogorgia labiata Verrill, 1870: 552; Nutting 1910: 5; Kükenthal 1919: 772; 1924: 336; Bielschowsky 1929: 135.

Lophogorgia labiata Harden 1979: 74.

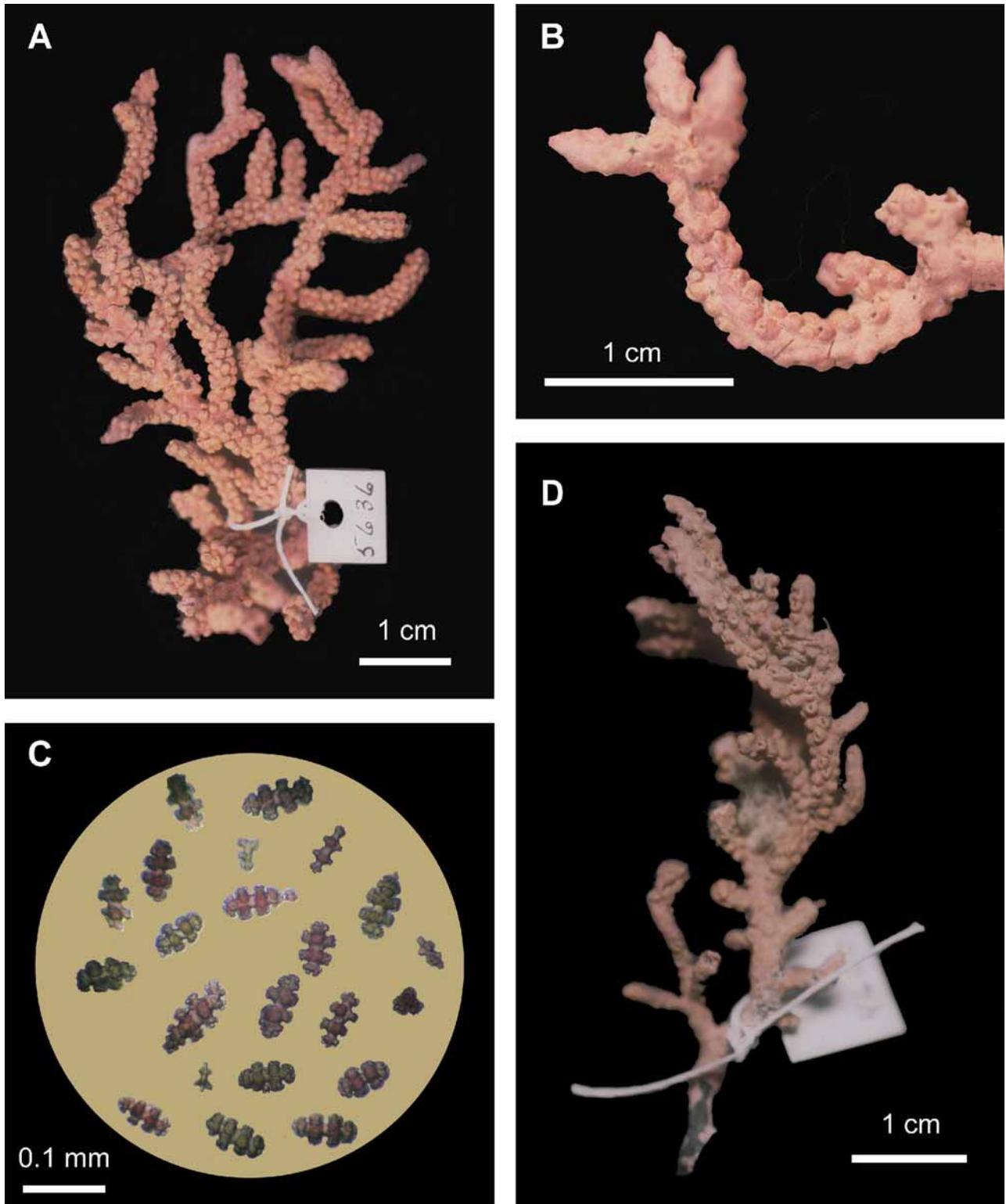


FIGURE 38. *Leptogorgia labiata*, **A**, YPM 5636; **B**, detail of a branch (YPM 4600, lectotype); **C**, light micrograph of coenenchymal sclerites (YPM 4600, lectotype); **D**, YPM 4600, lectotype.

Material examined. Lectotype (here designated): YPM 4600, dry, Oaxaca State, Golfo de Tehuantepec, Mexico, no depth given, G. Sumichrast, 1866–1867. Paralectotype: YPM 5636, dry, Mexico, no depth given, A. Dugès, donor: National Museum, probably 1880 (E. Lazo-Wasem, pers. comm.).

Other material examined. MEXICO: CASIZ 097881(2 specimens), dry, Mazatlan, H. N. Lowe, no further data. PANAMA: BM 1930.6.17.14, preserved, Station Balboa 3 (Pacific entrance to Panama Canal docks, tidal, half mile from sea), no depth given, St. George; Scientific Expedition, Pacific Cruise, C. Crossland, 1923–1924.

Lectotype description. The colony fragment consists of a thick, slightly flattened branch 5.5 cm in length, and 1.3 cm in width, that ramifies in short rigid branchlets, 2 mm in diameter, in an irregularly pinnate manner. Free branchlets extend up to 10 mm in length; they are finger-like and pointed (Fig. 38B, D). Colour is pink ochre throughout, with a yellowish not very marked concentration around the polyp-mounds (Fig. 38B, D). The polyps are closely arranged in about 4 rows along the branches and more laterally distributed at the ends. Polyp-mounds are conspicuously elevated and dome-shaped, with oval, labiate apertures around 0.3–0.4 mm in diameter (Fig. 38B, D). Coenenchymal sclerites are rose red to pink, pale yellow to colourless, and bicoloured (Fig. 38C). They are mainly capstans measuring up to 0.08 mm in length and 0.06 mm in width, (Figs. 38C, 39). Spindles are scant, with 3–4 whorls of tubercles, reaching up to 0.10 mm in length and 0.05 mm in width (Figs. 38C, 39). Anthocodial sclerites are small, yellow rods, 0.05 mm in length and 0.02 mm in width, biscuit-shaped, or with short lobes. Very few anthocodial rods appear in the samples.

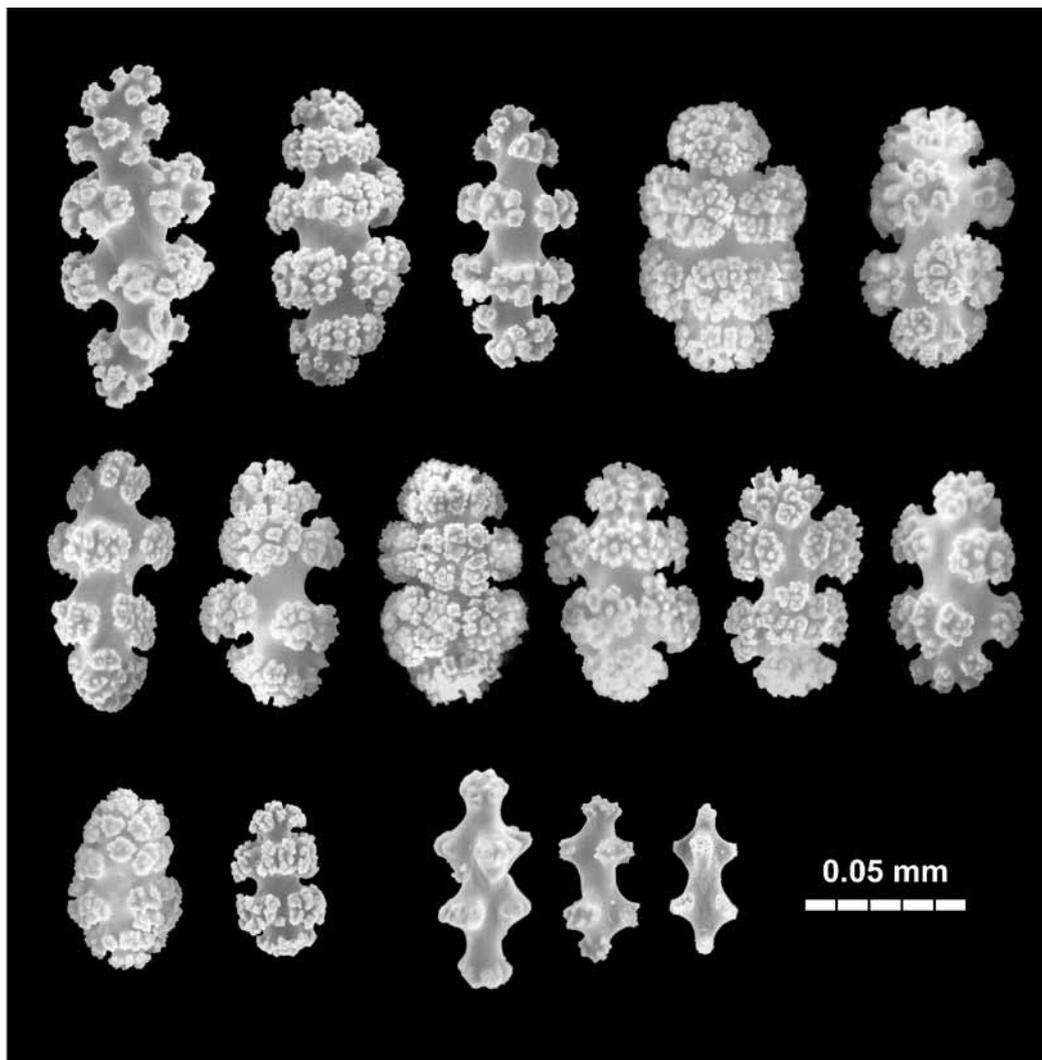


FIGURE 39. *Leptogorgia labiata*, (YPM 4600, lectotype), SEM of sclerites.

The paralectotype, YPM 5636, is a fragment 6 cm in height, and 4 cm in width; it matches the lectotype in all features (Fig. 38A).

Distribution. Golfo de Tehuantepec, Mexico: type locality. Mazatlan (Sinaloa, Mexico) and Panama. No specimen of *L. labiata* has been found in our recent collections from Panama (Table 2, Fig. 40).

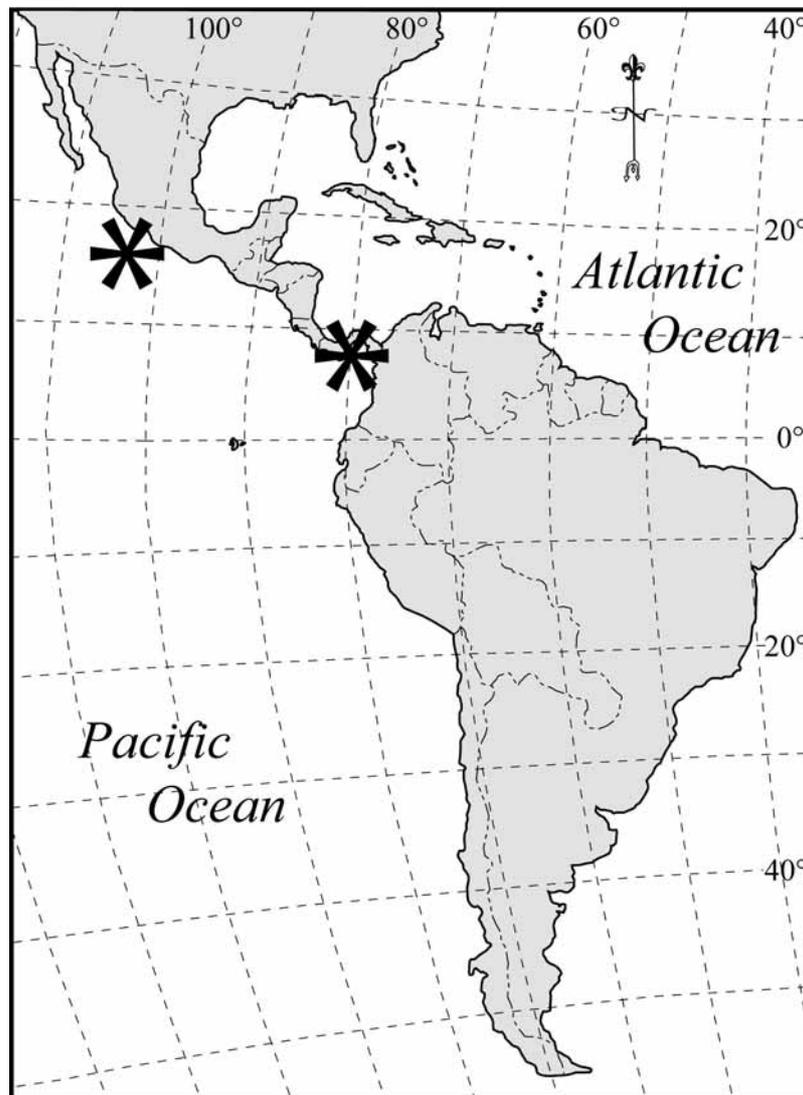


FIGURE 40. Geographical distribution of *Leptogorgia labiata*.

Remarks. In Verrill's description of *L. ramulus* (Milne Edwards & Haime, 1857) (1868b), he recognised a pink variety of *L. ramulus* and briefly described specimens from Acapulco and Cape San Lucas that he considered very different from those of Panama. Later Verrill (1870) established a new species, *L. labiata* for that group of specimens, but added in the type localities Golfo de Tehuantepec (Mexico) and Corinto (Nicaragua). However, the only material marked as "type" that we found is a fragment, YPM 4600, from Golfo de Tehuantepec. Another fragment, YPM 5636, from Mexico, was correctly identified by Verrill as *L. labiata* but was not marked as "type". Verrill did not provide any illustration, or designate any holotype, the only trustable sample YPM 4600 is herein designated the lectotype for this species to fix its identity, YPM 5636 becomes the paralectotype.

The species is similar to *L. pumila*, and *L. ramulus*, and differences are discussed under *L. ramulus* (Table 1).

Leptogorgia laxa Hickson, 1928

(Figs. 41–44)

Leptogorgia laxa (pars) Hickson, 1928: 405–406; Stiasny 1943: 78–79.

Material examined. Lectotype (here designated): ZMUC ANT-121, preserved, Taboguilla Island, Panama, 9 m, 16 December 1915, T. Mortensen, Pacific Expedition 1915–1916. Paralectotypes: BM 1946.1.14.60 (4 fragments), preserved, Taboguilla Island; ZMUC ANT-122-T (marked cotype), preserved, off Taboguilla Island, 5.5 m, 2 November 1915, T. Mortensen, Pacific Expedition 1915–1916, ZMUC ANT-122-R (marked cotype), preserved, off Taboguilla Island, 5.5 m, 2 November 1915, T. Mortensen, Pacific Expedition 1915–1916.

Other material examined. COSTA RICA: USNM 50615, dry, Golfo de Nicoya, no depth given, January 1952, D. S. Erdman. MEXICO: M 568, dry, Isabel Island, E. Lopez, voucher collection, no further data. PANAMA: UCR 1064, dry, Isla Santa Cruz, Golfo de Chiriqui, 5–20 m, H. Guzman, 10 December 2001; UCR 1163, 1165, 1169, dry, Roca Niagara, Golfo de Chiriqui, 5–20 m, H. Guzman, 13 December 2001; STRI 880, dry, Isla Pedro Gonzalez, Archipelago Las Perlas, 3–10 m, H. Guzman, 24 May 2004.

Lectotype description. The colony is 15.0 cm in height and 7.0 cm in width and arises from a circular holdfast attached to a shell fragment. A short stem, 15 mm long, and 2 mm in diameter divides into three main branches, 1.0–1.5 mm in diameter. Some of the branches produce secondary branches in an irregular, dichotomous, very lax style of branching. The branching angle is almost perpendicular (Fig. 41A). Unbranched terminal twigs are pointed, about 3.0 cm in length (Fig. 41A). Polyps are colourless and alternating in two rows on each side of the branches, about 1 mm apart. Polyp-mounds are slightly raised around the circular apertures (Fig. 41B, C). Colour of the colony is white (Fig. 41A–C) and the coenenchymal sclerites are colourless (Fig. 41D). The largest are spindles, up to 0.18 mm in length and 0.07 mm in width, have 4–8 whorls of compound tubercles (Figs. 41D, 42, 43). Capstans are up to 0.08 mm in length and 0.05 mm in width (Figs. 41D, 43). Anthocodial sclerites are colourless, long flat rods, up to 0.1 mm in length, and 0.02 mm in width with dentate or lobed margins (Fig. 43).

Other material. The examined specimens reach up to 25 cm in height and 17 cm in width and arise from a spreading holdfast. The stems are up to 10 mm in length, and the subsequent branching is planar, sparse, and irregularly dichotomous, producing relatively long, thin, flexible ramifications. The stems are up to 2 mm in diameter and the branches are mostly 1–1.5 mm in diameter. Unbranched terminal twigs are pointed and around 3–5 cm in length. Polyps can be arranged in alternating biserial rows, as in the lectotype, or are evenly placed around the branches at distances of about 1.0 mm apart. Sclerites are as in the lectotype with some variation in the abundance of spindles in the samples. The BM syntypes have smaller spindles reaching up to 0.15 mm in length (Fig. 41C).

Distribution. Taboguilla Island, Panama: type locality (Hickson 1928). Golfo de Chiriqui, Panama; Golfo de Nicoya, Costa Rica; Isabel Island, Mexico (Table 2, Fig. 44).

Remarks. Hickson (1928) described this species from a mixture of species; for example, ZMUC ANT-122, a specimen labeled as cotype, is a specimen of *L. alba*, not *L. laxa* where Hickson placed it. We could not find all of the colonies described in his paper, and no specimen at hand matches the figured specimen. To establish the identity of this species, we herein designate ZMUC ANT-121 the lectotype of *L. laxa*.

The lax ramification with branchlets sticking out at angles of 90° is the main feature to identify this species, and distinguishes it from *L. alba*. In addition, the anthocodials are smaller, and fewer spindles occur in samples of *L. laxa* than in *L. alba* (Table 1).

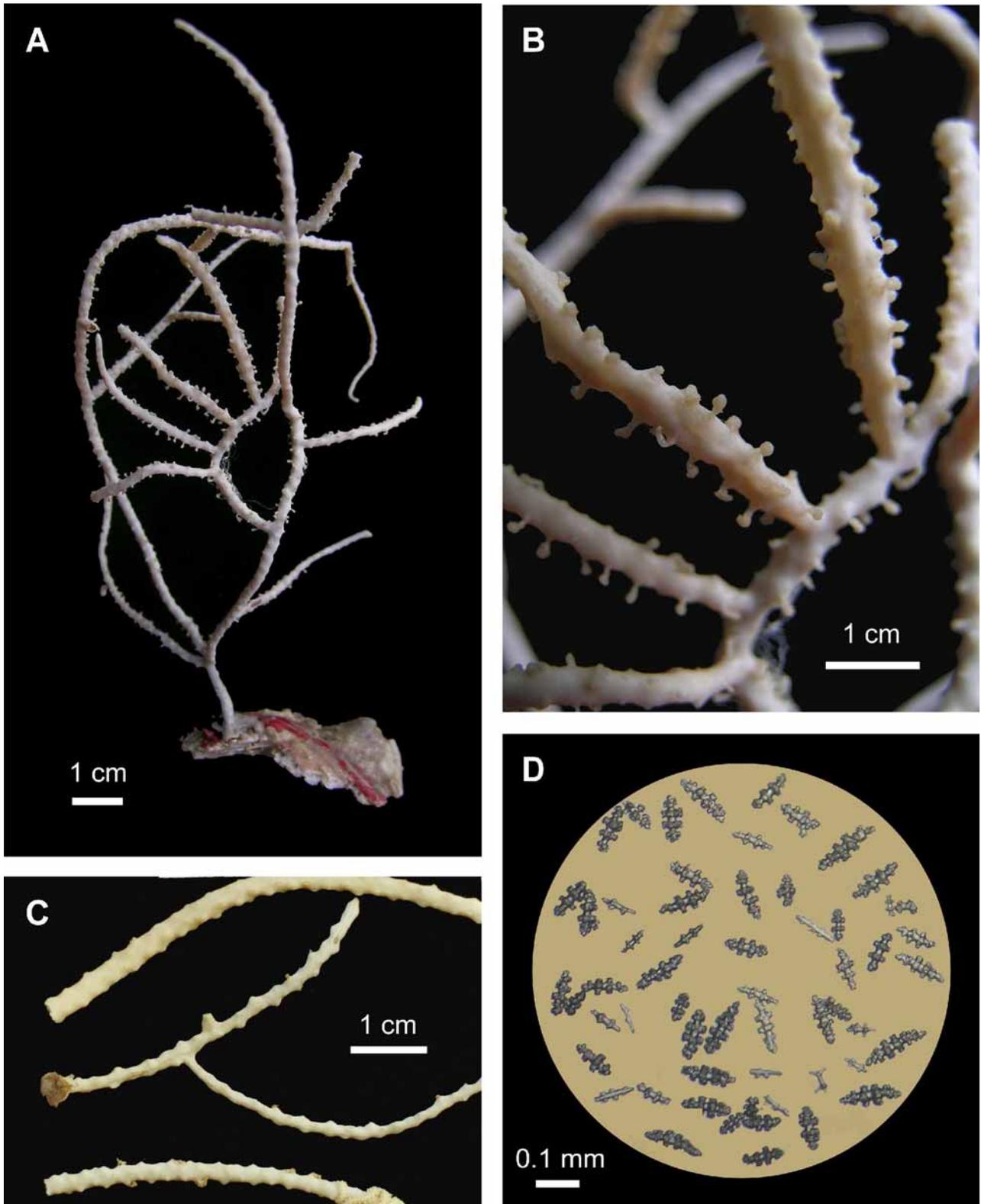


FIGURE 41. *Leptogorgia laxa*, A, ZMUC ANT 121; B, detail of branches (ZMUC ANT 121); C, BM 1946.1.14.60; D, light micrograph of coenenchymal sclerites (ZMUC ANT 121).

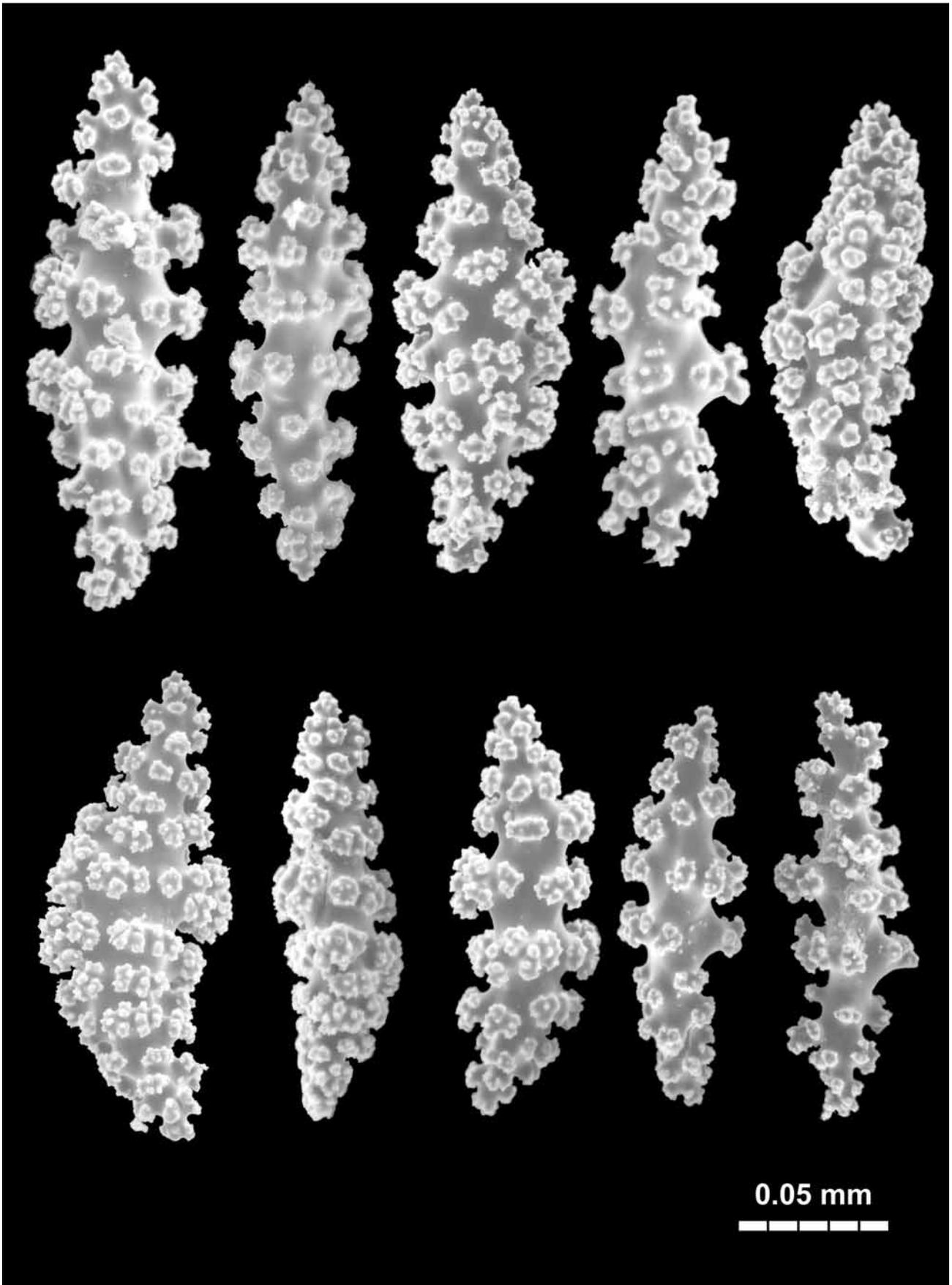


FIGURE 42. *Leptogorgia laxa*, lectotype, SEM of spindles.

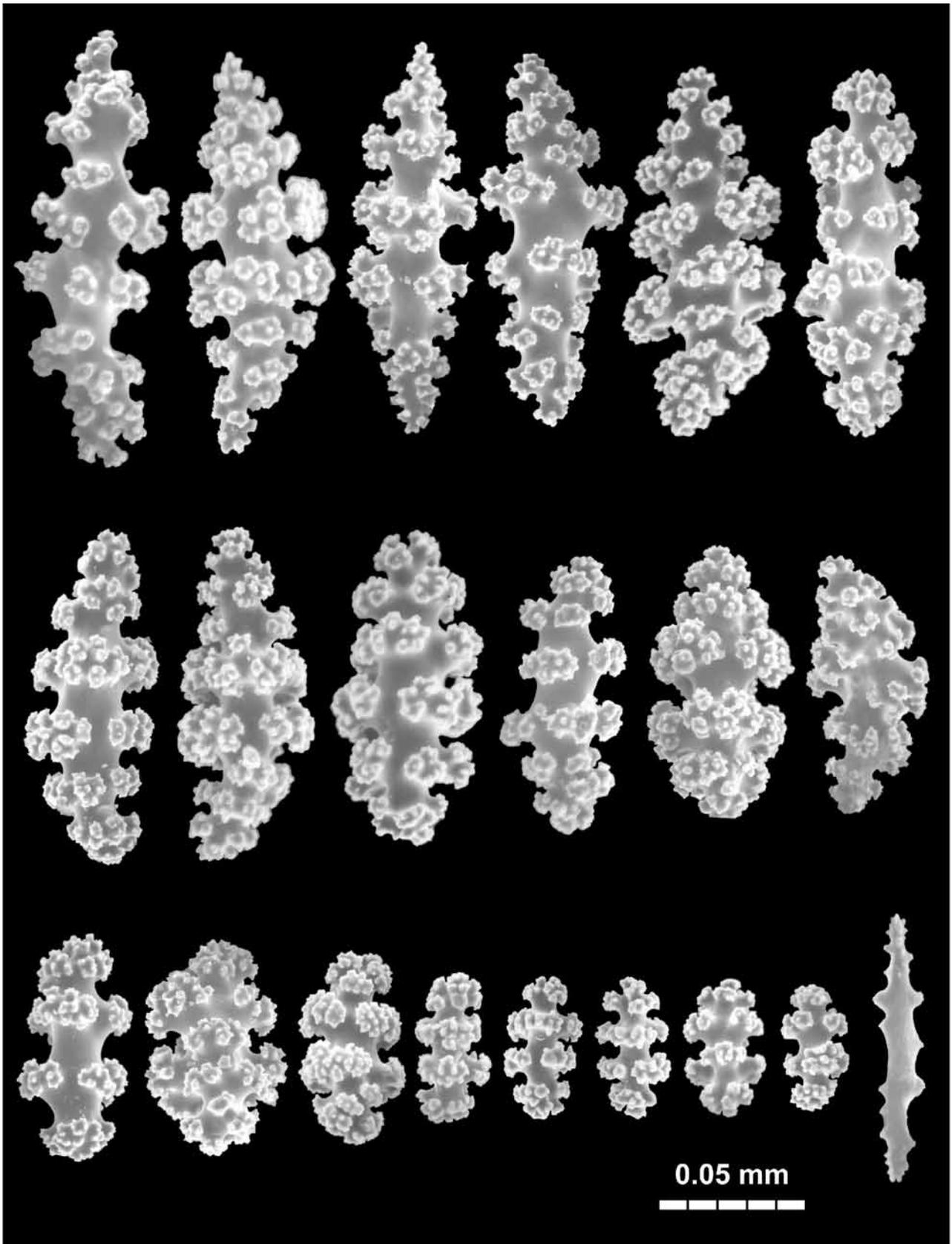


FIGURE 43. *Leptogorgia laxa*, lectotype, SEM of coenenchymal sclerites, and anthocodial rod.

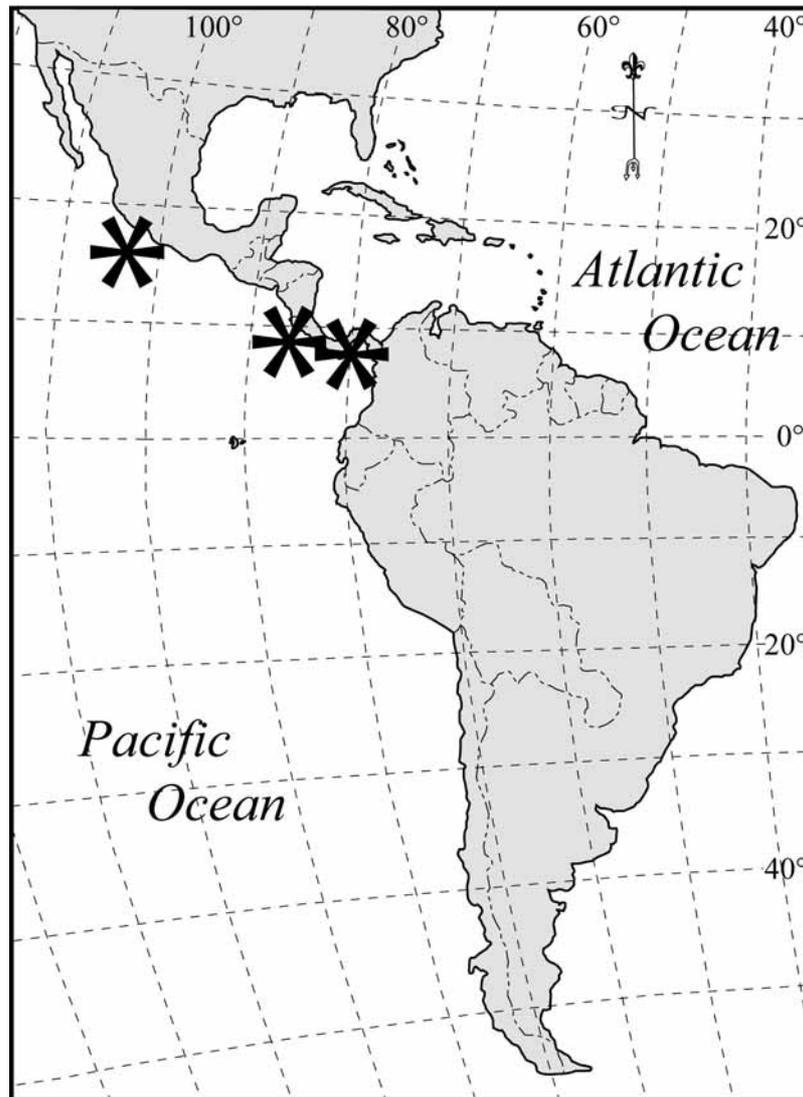


FIGURE 44. Geographical distribution of *Leptogorgia laxa*.

***Leptogorgia obscura* Bielschowsky, 1929**

(Figs. 3, 45–46)

Leptogorgia obscura Bielschowsky, 1918: 31 [Nomen nudum]; 1929: 119–120; Kükenthal 1919: 914; 1924: 332.
Lophogorgia obscura Harden 1976: 76.

Material examined. Holotype. ZMHC 4880, Caraguez Bay, Ecuador, 4–5 m, no further data.

Holotype description. The colony is 4 cm in height and the same in width. It arises from a circular hold-fast, 13 mm in diameter, with a very short stem that subdivides into three branches, 1.5–2 mm in diameter, that branch in an irregularly pinnate style (Fig. 45A, B). Free branchlets are up to 13 mm in length, 1–1.5 mm in diameter, with blunt or acutely pointed ends. Colour is dark violet (Fig. 45A, B). Polyps are arranged in 2 lateral rows along the branches separated by longitudinal grooves; they are more scattered and irregularly distributed on the thicker branches. Polyp-mounds are prominent, around 0.5 mm in diameter, dome-shaped with circular, small apertures (Fig. 45B). Coenenchymal sclerites are violet and pink (Fig. 45C), and are mostly capstans up to 0.08 mm in length, and 0.05 mm in width (Figs. 45C, 46). Spindles reach up to 0.12 mm in length and 0.05 mm in width, with 3–5 whorls of tubercles (Figs. 45C, 46). Anthocodial rods are from pale

orange to amber, and some are rose. They are closely set in 2–3 rows below the polyp tentacles and they reach up to 0.06 mm in length, and 0.02 mm in width, with wide lobed margins (Figs. 45C, 46).

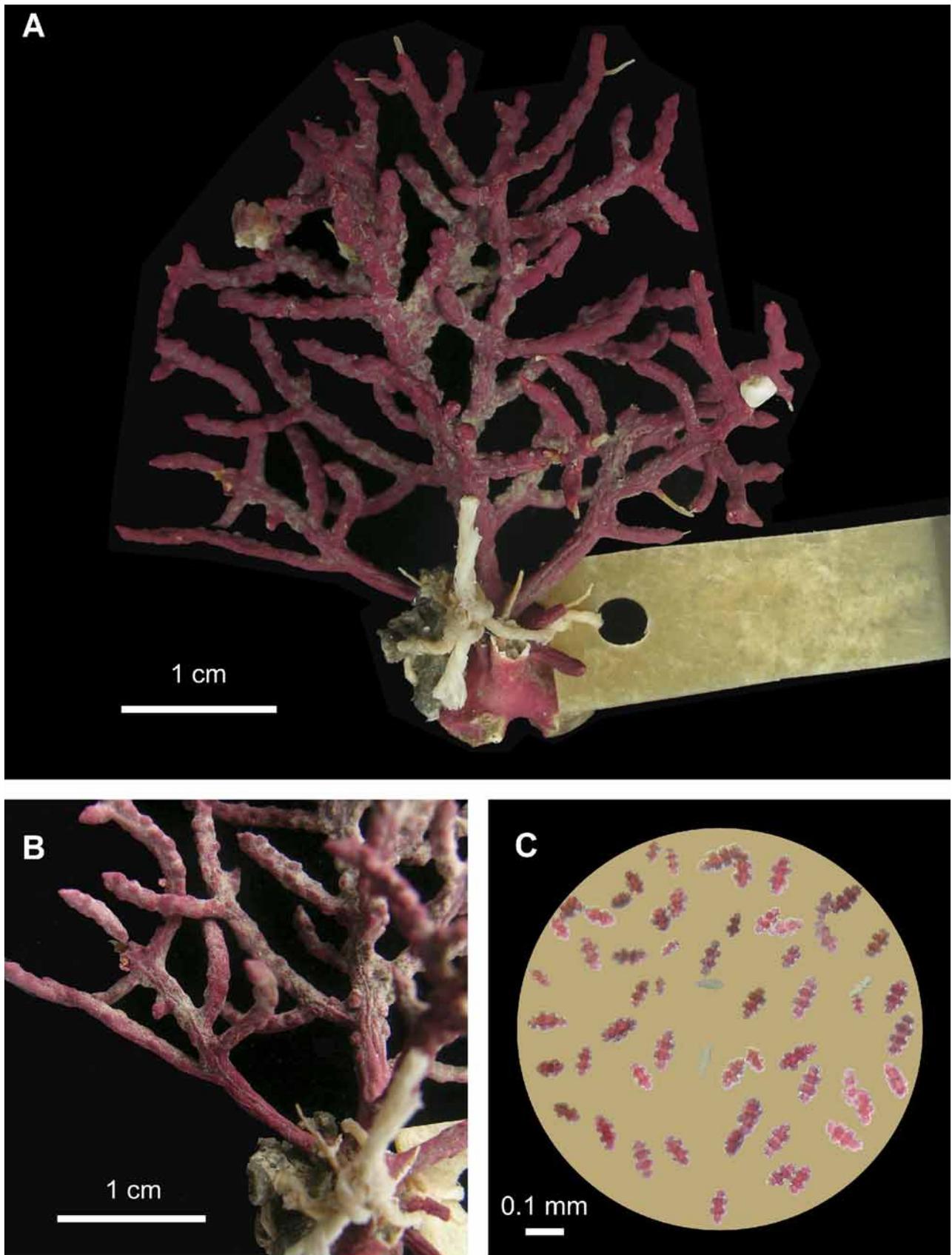


FIGURE 45. A, *Leptogorgia obscura*, holotype (ZMHC 4880); B, detail of branches; C, light micrograph of sclerites.

Distribution. Known only from the type locality: Caraguez Bay, Ecuador. Harden (1979) reports this species in various localities along Baja California, but we could not study his specimens (Table 2, Fig. 3).

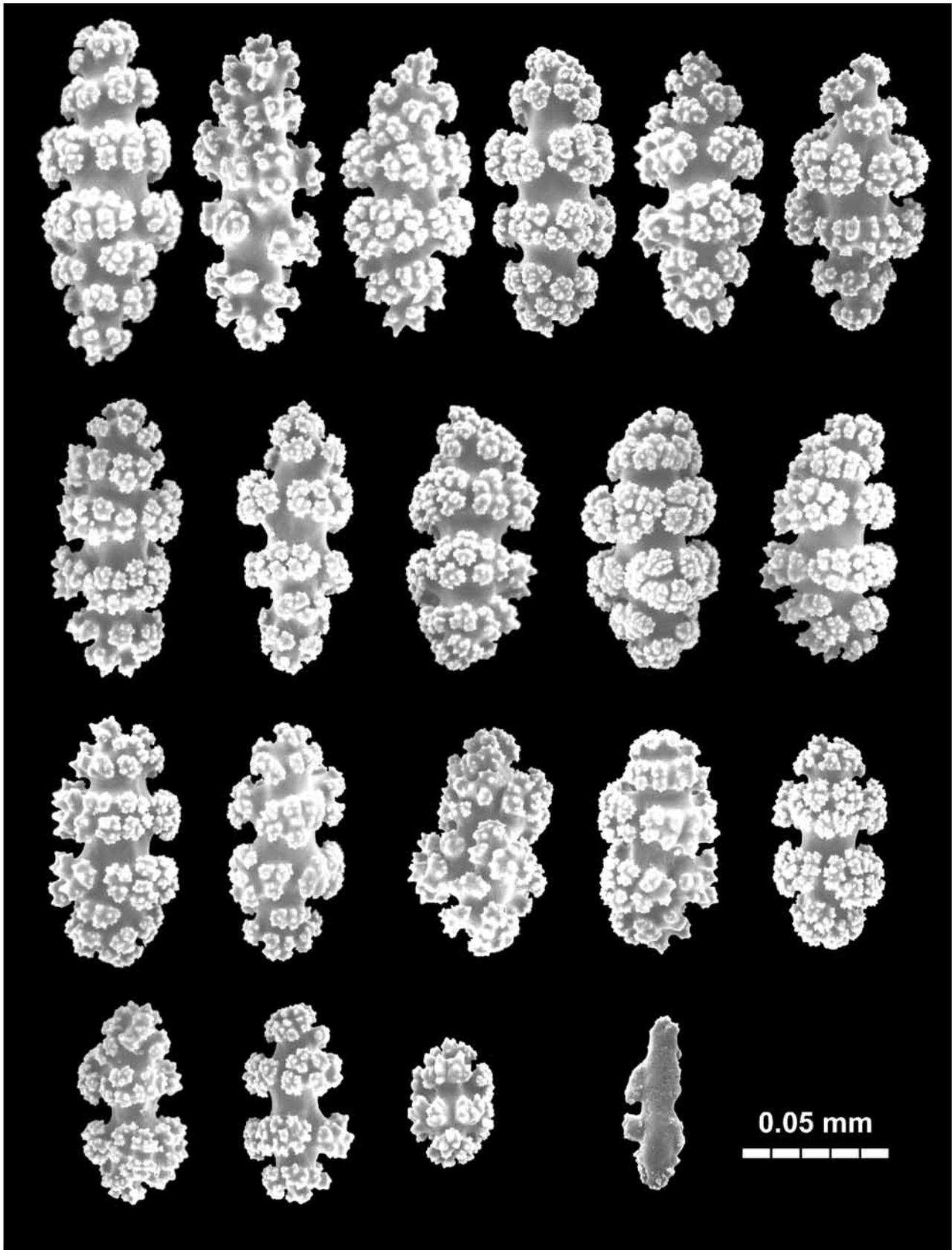


FIGURE 46. *Leptogorgia obscura*, holotype (ZMHC 4880), SEM of coenenchymal sclerites, and anthocodial rod.

Remarks. Similarities between this species and *L. aequatorialis*, and *L. parva* were discussed under *L. aequatorialis* ((Table 1).

***Leptogorgia parva* Bielschowsky, 1929**

(Figs. 35, 47–48)

Leptogorgia parva Bielschowsky, 1918: 31 [Nomen nudum]; 1929: 116–118; Kükenthal, 1919: 913–914; 1924: 331.
Lophogorgia parva Harden 1976: 80.

Material examined. Syntypes: ZSM 20043890 preserved, no depth given, Panama, Amerika, Hassler Expedition, A. Kölliker, 1904 (figured specimen, Bielschowsky 1929); ZSM 20043889, preserved, no depth given, Panama, Hassler Expedition, A. Kölliker, 1904.

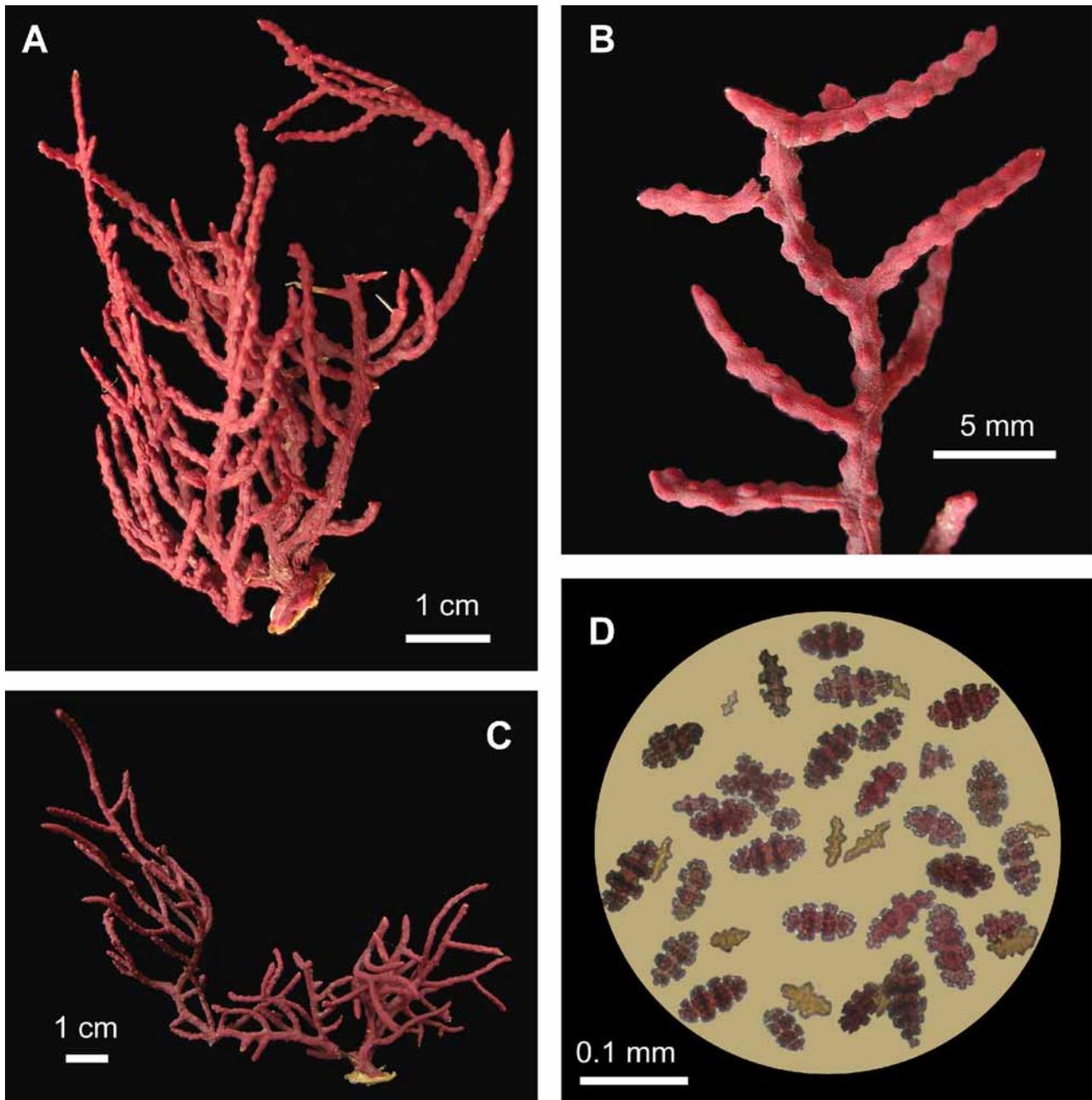


FIGURE 47. *Leptogorgia parva*, **A**, ZSM 20043890; **B**, detail of branches (ZSM 20043890); **C**, ZSM 20043889; **D**, light micrograph of sclerites (ZSM 20043890).