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Abstract

The species of the widespread gorgoniid genus *Leptogorgia,* which occur along the eastern Pacific, are taxonomically revised based on original type material of all species described until now and reference specimens from recent surveys and expeditions along the Pacific coast of Panama, and Costa Rica. As a result, 21 species are recognized as valid and one as dubious. Lectotypes are assigned for eight species in order to establish their taxonomic status. All the species are

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described and illustrated. The fauna herein reported does not represent overall diversity or geographical range of each species but adds new reports. The present count is 16 species for Panama, 11 for Costa Rica, 7 for Mexico, 6 for El Salvador, 4 for Peru, 4 for Ecuador, 3 for Colombia, 2 for California, 2 for Nicaragua, and 2 for Chile.

Key words: Cnidaria, Coelenterata, Costa Rica, eastern Pacific, gorgonian, octocoral, *Leptogorgia*, sea fans, Panama, soft corals, taxonomy

Introduction

The genus *Leptogorgia* Milne Edwards & Haime, 1857, (Gorgoniidae) comprises approximately 54 valid species. It is distributed throughout most of the Panamic Province, the Atlantic Ocean, the Caribbean, the Mediterranean seas, around southern Africa, and one species is found in the subantarctic (Williams & Lindo 1997). Bayer (2000) described one species from deeper waters (> 1900 m) of the East Pacific Rise. Regarding the Indo-Pacific species, Williams & Vennam (2001) consider them in the genus *Pseudopterogorgia* Kükenthal, 1919.

A number of authors from the last two centuries dealt with the shallow water octocoral fauna of the eastern Pacific including Valenciennes (1846, 1855), Milne Edwards and Haime (1857), Horn (1860), Duchassaing and Michelotti (1864), Verrill (1864, 1865, 1868a,b, 1869a,b, 1870), Hickson (1928), Bielschowsky (1918, 1929), Kükenthal (1919, 1924), Stiasny (1941, 1943), Prahl *et al*. (1986), Breedy (2001), Breedy & Guzman (2002, 2003a,b, 2004, 2005a,b), and Williams & Breedy (2004). Verrill made the most significant contributions to the knowledge of the eastern Pacific octocoral fauna (Breedy & Guzman 2002).

Leptogorgia is one of the most abundant genera of the shallow water octocoral fauna in the eastern Pacific. About 30 nominal species were described in this genus, for the region, but not without problems. Most of the authors failed to provide detailed illustrations with the species descriptions, delineations are not clear and in most cases holotypes were not designated or were subsequently lost. In some cases, the type material is represented just by one specimen, or by a small fragment, or it has been lost. Consequently, a complete evaluation of the genus with the available type material as well as recent collections is needed to establish the taxonomic status of the species (Prahl *et al*. 1986; Williams & Lindo 1997; Breedy & Guzman 2002). Several of the species treated in this paper occur frequently and have a wide geographical distribution while for others only a few specimens are known, and some species have been found just in one locality. We record the distribution of species known at the present, which will probably expand if more extensive surveys are conducted.

This study represents the second contribution in a series proposed to reevaluate the genera of gorgonians reported for the shallow eastern Pacific waters. The first contribution (Breedy & Guzman 2002) revised the genus *Pacifigorgia*. Herein, we revise the genus *Leptogorgia*.

Abbreviations

BM: The Natural History Museum (former British Museum), London, UK; CASIZ: California Academy of Science, Invertebrate Zoology, San Francisco, USA; CIMAR: Centro de Investigación en Ciencias del Mar y Limnología, Universidad de Costa Rica, San Jose, Costa Rica; CIEMIC: Centro de Investigación en Estructuras Microscópicas, Universidad de Costa Rica; CDRS: Charles Darwin Research Station, Galapagos, Ecuador; ICZN: International Code of Zoological Nomenclature; MZUT: Museo Regionale di Scienze Naturali, Torino, Italy; MZUF: Museo Zoologico dell'Università di Firenze, Firenze, Italy; MNHN: Muséum National d'Histoire Naturelle, Paris, France; MCZ: Museum of Comparative Zoology, Harvard University, Boston, USA; SEM: Scanning Electron Microscopy; STRI: Smithsonian Tropical Research Institute, Panama; UCR: Museo de Zoología, Escuela de Biología, Universidad de Costa Rica; USNM: National Museum of Natural History (former United States National Museum), Smithsonian Institution, Washington, USA; YPM: Yale

Peabody Museum of Natural History, New Haven, USA; ZMHC: Zoologisches Institut und Zoologisches Museum, Hamburg, Germany; ZMUC: Zoologisk Museum Kobenhavn, Copenhagen, Denmark; ZSM: Zoologische Staatssammlung München, Munich, Germany.

Materials and Methods

Type specimens and comparative reference material used in this study were analyzed during visits to museums or acquired on loan from the BM, CASIZ, MCZ, MNHN, MZUT, MZUF, USNM, YPM, ZMHC, ZMUC, and ZSM. In addition, specimens recently collected from along the Pacific coast of Costa Rica and Panama, deposited in the UCR and STRI, were examined. This material was collected by scuba diving down to a depth of 40 m.

Specimens were prepared for SEM following the protocol described in Breedy and Guzman (2002). For light microscope photography, sclerites were mounted in water or glycerine. Abundance of sclerites, forms and colours are given in terms of occurrences in unsorted sclerite samples observed under the light microscope. Measurements of the sclerites were obtained from pictures or directly using a light microscope with an optical micrometer. Length and maximum width of the sclerites were measured and the longest measurements are reported here. The type specimens were mostly dry, only a few were preserved in ethanol; for this reason, measurements of the diameter of stems and branches included the polyp-mounds (wet or dry). According to Hickson (1928), presence of longitudinal grooves along the branches of the colonies is an artefact of the drying process of the colony. We, however, believe this is a valid character since it is also observed in living animals.

Data on geographical distribution provided here are from collections, museum catalogues, published monographs and our personal observations. Lectotypes have been designated to establish the identity of some species to avoid future confusions.

Terminology

Taxonomy of *Leptogorgia*, as in most gorgonians, is based on the combination of the morphology and colour of both the colony and the sclerites. In this study, for the description of the species we followed the terminology proposed by Bayer, Grasshoff and Verseveldt (1983). However, in some cases, the introduction of new terms or modifications of older ones applied to the genus *Leptogorgia* were considered appropriate, and are given here.

Longitudinal grooves. Narrow, sinuous furrow extending along two sides of the main stems which correspond to the primary stem canals (Bayer *et al*. 1983). In dry specimens they are conspicuous grooves, and in wet specimens they are like a bare longitudinal row, which in some species is slightly raised, as in a quill.

Main branches. Thick branches in which the stem immediately divides or individual branches that sprout close together directly from the holdfast.

Points. A chevron or inverted "V" arrangement of the anthocodial sclerites below the polyp tentacles.

Polyp-mounds. Protuberances resulting from polyps retracting into the coenenchyme. These are accentuated during the preservation process, but the general characteristic (prominent, flat, and slightly raised) proved to be consistent through specimens of the same species preserved or dry.

Stem. Basal part of the colony attached to the holdfast, from which branches subdivide.

Unbranched terminal twigs. Final portion of the branches that do not ramify, free ends, or terminal twigs (Grasshoff 1988).

Family Gorgoniidae Lamouroux, 1812

Genus *Leptogorgia* Milne Edwards & Haime, 1857

Gorgonia (pars) Pallas, 1766: 160; Milne Edwards & Haime 1857: 157.
Leptogorgia Milne Edwards & Haime, 1857: 163; Verrill 1868b: 387; Verrill 1869: 420; Kükenthal 1924: 324; Bielschowsky 1929: 81; Stiasny 1943: 87; Bayer 1961: 214; Grasshoff 1988: 97; Grasshoff 1992: 54; Williams 1992: 231; Williams & Lindo 1997: 500; Breedy & Guzman 2005: 2.
Lophogorgia Milne Edwards & Haime, 1857: 167; Kükenthal 1924: 322; Bielschowsky 1929: 73; Bayer 1956: 212; Bayer 1961: 194.
Filigorgia Stiasny, 1937: 309; 1939: 301; Bayer 1956: 206.

Type species. *Gorgonia viminalis* Pallas, 1766 (from the Mediterranean Sea), by subsequent designation, Verrill 1869: 420.

Diagnosis. Gorgoniids with variable branching patterns: pinnate, dichotomous, or filiform. Branch anastomosis absent in all except two species, *Leptogorgia gilchristi* (Hickson, 1904) and *Leptogorgia bayeri* Williams & Lindo, 1997. Axis horny, with a cross-chambered central core with a network of organic filaments frequently mineralized. Colonies may be found with a holdfast attaching them to hard substrates, or just lying on the substrate. Polyps are fully retractile into the coenenchyme, which may be slightly raised, mound-like, around the apertures. Coenenchymal sclerites are capstans and/or spindles. Capstans have two whorls of tubercles and blunt or elongated ends with various arrangements of complex tubercles. Spindles have several whorls of tubercles; some have bent ends, with symmetrically or asymmetrically complex tuberculation. In some species, the warts are fused into incomplete disks. The ends of the spindles can be acute, blunt, or one of each. Anthocodial sclerites usually flat rods and platelets. Colour variable: white, yellow, orange, red, violet, or brownish, and bicoloured (based on Grasshoff 1988; Grasshoff 1992; Williams & Lindo 1997; Breedy & Guzman 2005).

Distribution. Eastern Pacific (from southern California to Chile), Atlantic Ocean, western and southern Africa, Caribbean Sea, Mediterranean Sea, and one record for the subantarctic (Williams & Lindo 1997).

Remarks. Milne Edwards & Haime (1857) in their "Histoire naturelle des coralliaires" described the genus *Leptogorgia* along with the genus *Lophogorgia*. The genus *Lophogorgia* was established for just one species: *Lophogorgia palma* (from Cape of Good Hope). Milne Edwards & Haime made very short descriptions based only on the external morphology of the colonies. Verrill (1868b) examined the sclerites of several species of *Leptogorgia* and designated *Leptogorgia viminalis* (from Islas Canarias) as the type of *Leptogorgia* and included the monotypic *Lophogorgia* in *Leptogorgia* thus synonymizing the two genera (see Grasshoff 1988). Later the two genera were separated again with uncertainty until Bayer in 1956 and 1961 gave a clear delineation: *Lophogorgia* with symmetrical sclerites and *Leptogorgia* with symmetrical and asymmetrical sclerites, the latter kind with flat tubercles fused into disks. This definition worked well for the West Indies fauna but not for the American Pacific; although the distinction in some species was not clear, suggesting a "continuum" (according to Grasshoff 1988). Grasshoff (1988) in his revision of West African gorgoniid fauna found transitional forms between the two genera, which made the "continuum" more obvious. Consequently, Grasshoff (1988) once more decided to synonymize both genera.

***Leptogorgia aequatorialis* Bielschowsky, 1929**
(Figs. 1–3)

Leptogorgia aequatorialis Bielschowsky, 1918: 31 [Nomen nudum]; Kükenthal 1919: 914; Kükenthal 1924: 331. Bielschowsky 1929: 118–119
Lophogorgia aequatorialis Harden 1976: 67.

Material examined. Holotype: ZMHC 4872, preserved, Bahia de Caraguez, Ecuador, 4–5 m, no more data available.

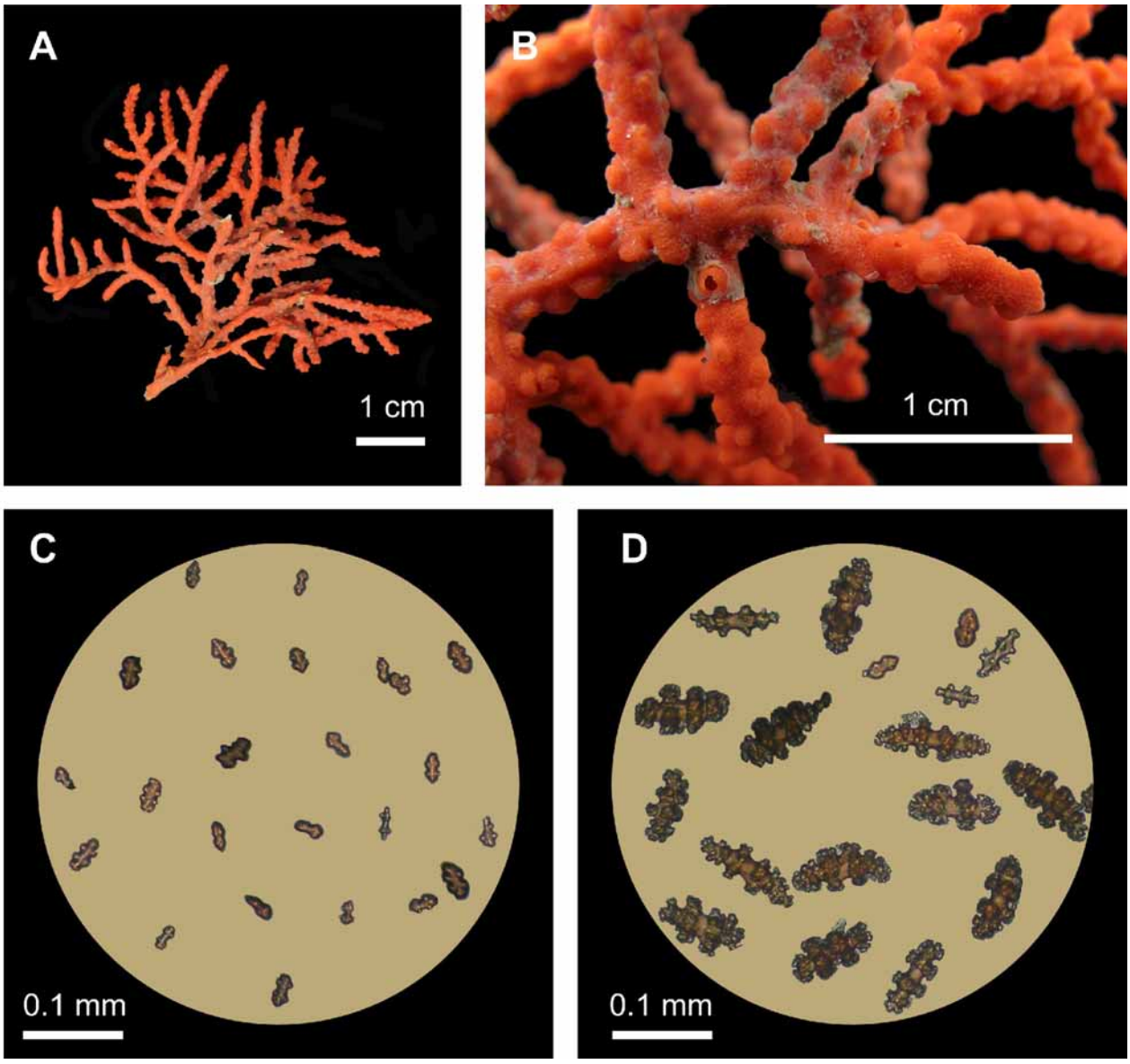

FIGURE 1. A, *Leptogorgia aequatorialis* (ZMHC 4872, holotype); **B**, detail of branches; **C**, light micrograph of anthocodial rods; **D**, light micrograph of coenenchymal sclerites.

Holotype description. The specimen is a fragment of the original colony which was 70 mm in height, and 70 mm in width (Bielschowsky 1929, figured specimen). What remains is a 50 mm by 50 mm piece of colony. Branching is irregularly pinnate with alternating pinnae, some subdivide again producing short branchlets. Branches are squarrish (in cross section), 2.5–3.0 mm in diameter, and pinnae have the same appearance, about 2.0 mm in diameter. Free branchlets are up to 15 mm in length, with a pointed tip (Fig. 1A–B). Polyps are whitish, distributed all around the branches. Quill-like folds of coenenchyme are formed in the naked space between the polyp-rows of some branches. Polyp-mounds are prominent, dome-shaped, around 1.0 mm in diameter, with labiate apertures. Colour is deep orange. Coenenchymal sclerites are all orange. They are mostly capstans, that reach up to 0.08 mm in length, and 0.045 mm in width (Figs. 1D, 2). There are also spin-

dles that reach up to 0.10 mm in length, and 0.045 mm in width, with 3–4 whorls of tubercles. Some have bent ends. Crosses measuring up to 0.06 mm by 0.06 mm are also present (Fig. 2). Anthocodial rods are small, biscuit-shaped, and of a reddish-pink colour. They form a ring of an untidy arrangement below the polyp tentacles; they reach up to 0.04 mm in length, and 0.03 mm in width, with smooth, or lobed margins (Figs. 1C, 2).

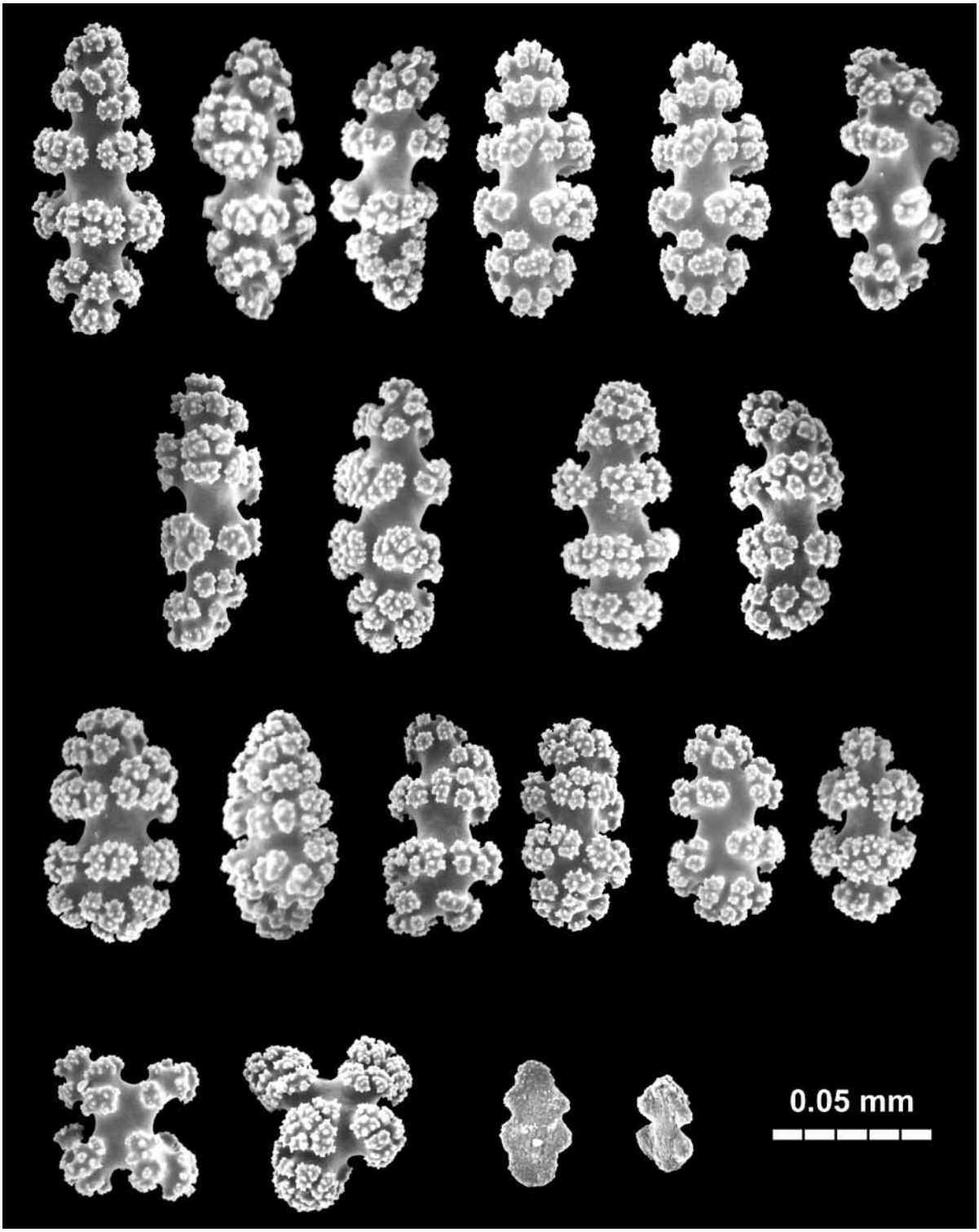

FIGURE 2. *Leptogorgia aequatorialis* (ZMHC 4872, holotype), SEM of coenenchymal sclerites and anthocodial rods.

Distribution. Only known from the type locality: Caraguez Bay, Ecuador (Table 2, Fig. 3).

Remarks. Bielschowsky (1918, 1929) made a revision of the Gorgoniidae overlooking early type designations which in some cases affected concepts of nomenclature. These were later revised and emended by

Bayer (1951). Bielschowsky (1918, 1929) described six new species of *Leptogorgia* from various localities in the eastern Pacific without designating holotypes. Herein we consider valid only three of them; *L. aequatorialis*, *L. obscura* and *L. parva* Bielschowsky, 1929, and have synonymized the other three species (see below). Of the material Bielschowsky examined, only a fragment of *L. aequatorialis*, two colonies of *L. parva*, and one small colony of *L. obscura* remain.

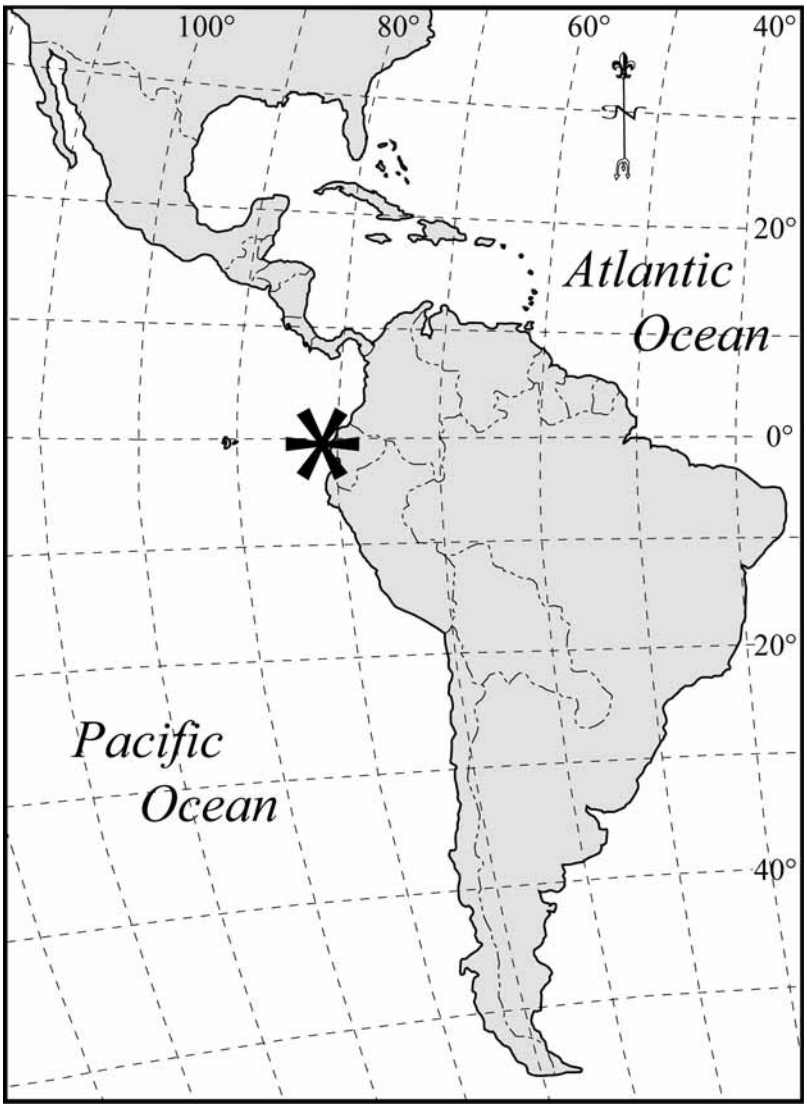

FIGURE 3 . Geographical distribution of *Leptogorgia aequatorialis* and *Leptogorgia obscura*.

These three species are similar in the style of branching (irregular pinnate), the prominent polyp-mounds, and also the size of the known specimens is similar, but they differ in the colour of the colonies, the colour of the sclerites and the sclerite composition. *Leptogorgia aequatorialis* is of a distinct deep bright orange colour, with orange coenenchymal sclerites, *L. obscura* is dark violet, with violet and pink coenenchymal sclerites, and *L. parva* is purplish red, with red, pink and yellow coenenchymal sclerites (all of these specimens are preserved in ethanol); the spindles in *L. aequatorialis* are smaller than in the other two species. In *L. parva* and *L. obscura* the longest spindles reach 0.12 mm, but the occurrence of spindles with acute ends in *L. parva* is higher than in *L. obscura* (Table 1). The small (up to 0.04 mm) biscuit-like anthocodial rods of *L. aequatorialis* differentiate this species from the other two. In *L. parva* anthocodial rods are orange and measure up to 0.05 mm, in *L. obscura* they are pale orange, amber, and pink, and measure up to 0.06 mm.

TABLE 1. Comparative characteristics of the eastern Pacific species of *Leptogorgia* Milne Edwards & Haime, 1857.

species	colour	type of branching	polyp-mounds	dominant sclerite type	sclerites colours	anth. rods colour	bi-coloured sclerites	sclerite max. length	spindles >0.1 mm	anth. rods =0.1mm	bent sclerites
L. aequatorialis	deep orange	irregular /pinnate	promi-nent	blunt spindles	orange	reddish-pink		0.10 mm			X
L. alba	white	dichoto-mous/ irregu-lar	slightly raised/ flat	spindles	colourless	colourless		0.18 mm	X	0.15	X
L.californica	reddish ochre	irregular/ pinnate	flat	capstans	red/pink/ light yellow	pale orange		0.13 mm	X		X
L. chilensis	light orange	lax, dichoto-mous	flat	capstans	pale orange	pale orange		0.12 mm	X		
L. clavata	reddish-pink	pinnate (?)	slightly raised	capstans	reddish-pink	pale pink		0.10 mm		0.16	
L. cofrini	white	bushy, irreg-ular	flat	blunt spindles	colourless	colourless		0.12 mm	X	0.14	
L. cuspidata	deep purple/ deep yellow with yellow/ purple bands and yellow/pur-ple oval rings	irregular/ pinnate	flat	capstans	deep purple/ yellow	yellow/ pink		0.13 mm	X		
L. diffusa	red	lax, pinnate	promi-nent	spindles	red/pink	light orange/ pink		0.15 mm	X	0.14	
L. exigua	brownish red and thin orange oval rings	irregular/ pinnate	slightly raised	capstans	red/ pink/ light orange/ pale yellow		X	0.13 mm	X		X
L. flexilis	reddish brown	lax, dichoto-mous/ irregu-lar	flat	capstans	dark red	red	X	0.09 mm			
L. florae	bright red	pinnate	promi-nent	spindles	red	yellow	X	0.13 mm	X	0.10	X
L. fruticosa	greyish-white	irregular	slightly raised	capstans	pale yellow	colourless		0.10 mm		0.10	
L. labiata	pink ochre	irregular/pin-nate	promi-nent	capstans	rose-red/ pink/ pale yellow	yellow	X	0.10 mm			X
L. laxa	white	lax, dichoto-mous/ irregu-lar	slightly raised	spindles	colourless	colourless		0.18 mm	X	0.10	X
L. obscura	dark violet	irregular/pin-nate	promi-nent	capstans	violet/ pink	pale orange/ amber/pink		0.12 mm	X		X
L. parva	purplish red	irregular/pin-nate	promi-nent	capstans	red/pink/ yellow	orange	X	0.12 mm	X		
L. peruviana	white	bushy, irreg-ular	flat	capstans	colourless			0.10 mm			
L. pumila	light purple/ pink	irregular/pin-nate	promi-nent	spindles	pink/ light yellow	orange/ amber	X	0.15 mm	X	0.15	

..... continued on the next page

TABLE 1 (Continued)

species	colour	type of branching	polyp-mounds	dominant sclerite type	sclerites colours	anth. rods colour	bi-coloured sclerites	sclerite max. length	spindles >0.1 mm	anth. rods =0.1mm	bent sclerites
L. ramulus	white	irregular/pin-nate	promi-nent	capstans	pale yellow/ colouless	light orange		0.11 mm	X		
L. ramulus (pink morph)	red-rose	irregular/pin-nate	promi-nent	capstans	red-rose	light orange		0.11 mm	X		
L. regis	dark orange/ pale pink	bushy, irregular	promi-nent	spindles	pale orange/ yellow/ whitish	light yel-low		0.14 mm	X	0.12	X
L. rigida	dark bluish purple	irregular /pinnate	slightly raised	capstans	deep bluish red	pink		0.12 mm	X		
L. taboguilla	reddish purple	irregular /pinnate	promi-nent	capstans	purplish red	orange		0.11 mm	X	0.14	

TABLE 2. Geographical distribution of the eastern Pacific species of *Leptogorgia* Milne Edwards & Haime, 1857. Country of the type locality is marked in bold.

Species	Type localities	Distribution
L. aequatorialis	Bahia de Caraguez	**Ecuador**, not Galapagos
L. alba	Panama	Costa Rica, Colombia, Ecuador, El Salvador, Galapagos, Mexico, **Panama**
L.californica	Baja California	Mexico
L. chilensis	Chile	California, **Chile**
L. clavata	unknown	Mexico (?)
L. cofrini	Golfo de Nicoya	**Costa Rica**, Panama
L. cuspidata	Baja California	Costa Rica, El Salvador, **Mexico**, Panama,
L. diffusa	Golfo de Nicoya, Archipielago Las Perlas	California, Chile, Colombia, **Costa Rica**, El Salvador, **Panama**
L. exigua	Acapulco, Tehuantepec, Guaymas	Costa Rica, Nicaragua, **Mexico**, Panama, Peru
L. flexilis	Archipielago Las Perlas	California, El Salvador, **Panama**
L. florae	Archipielago Las Perlas	Panama
L. fruticosa	Islas Taboga, Taboguilla	Panama
L. labiata	Isla Taboguilla	Mexico, **Panama**
L. laxa	Isla Taboguilla	Costa Rica, Mexico, **Panama**
L. obscura	Bahia de Caraguez	Ecuador
L. parva	Panama	Panama
L. peruana	Callao	Peru
L. pumila	Zorritos	Costa Rica, Mexico, Panama, **Peru**
L. ramulus	Panama	Costa Rica, Colombia, El Salvador, Nicaragua, **Panama**, Peru
L. ramulus (pink morph)	Panama	**Panama**, Peru
L. regis	Archipielago Las Perlas	Costa Rica, **Panama**
L. rigida	Baja California, Acapulco, El Salvador	Costa Rica, **El Salvador, Mexico**, Panama
L. taboguilla	Isla Taboguilla	Costa Rica, **Panama**

***Leptogorgia alba* (Duchassaing and Michelotti, 1864)**
(Figs. 4–9)

Lophogorgia alba Duchassaing and Michelotti, 1864: 19; Rossi 1956: 198; Harden 1976: 68; Prahl, *et al*. 1986: 17; Volpi & Benvenuti 2003: 58.
Gorgonia (*Leptogorgia*) *rigida* var. *laevis*, Verrill, 1866: 327 [Nomen nudum].
Gorgonia (*Litigorgia*) *laevis* Verrill, 1868: 415.
Litigorgia levis (misspelled) Verrill, 1868b: 398.
Lophogorgia laevis Harden 1979: 75.
Leptogorgia alba Verrill 1868b: 398–399; Verrill 1869b: 421; Studer 1894: 68; Bielschowsky 1918: 30; 1929: 107–108; Kükenthal 1919: 771; 1924: 329; Hickson 1928: 400–405.
Leptogorgia alba var. *sulcata* Bielschowsky, 1929: 108–110; Kükenthal 1919: 771; 1924: 329.
Euplexaura lemasti Hickson, 1928: 349–351; Stiasny 1941: 266–267; 1943: 63.
Leptogorgia fasciculata Bielschowsky 1918: 29 [Nomen nudum]; 1929: 94–96; Kükenthal 1919: 912;1924: 326; Stiasny 1951: 60.
Lophogorgia fasciculata Harden 1976: 74.

Material examined. Lectotype: MZUF c163, (figured specimen Duchassaing & Michelotti 1864), dry, Isla Flamenco, Golfo de Panama, Panama, no more data available. Paralectotype: MSNT 164, dry, Panama, no more data available.

Syntypes of *L. fasciculata*: ZSM 20044789, ZSM 20044790, preserved, no depth given, Panama, Hassler Expedition, A. Kölliker, 1904. Syntypes of *L. alba* var. *sulcata*: ZMHC 4496, ZMHC 5615, ZMHC 4580, preserved, Panama, no further data. Syntypes of *L. laevis*: MCZ 5416, dry, Archipielago Las Perlas, Golfo de Panama, no depth given, F. H. Bradley, 1866; MCZ 7008, dry, Golfo de Nicoya, Costa Rica, no depth given, F. H. Bradley, 1866; YPM 1639, preserved, Archipielago Las Perlas, no depth given, F. H. Bradley, 1866.

Other material examined. COSTA RICA: UCR 1471 (4 specimens), preserved, Punta Burica, 1 m, O. Breedy, 12 February 2002; UCR 1537, preserved, Bolaños Island, Salinas Bay, 3 m, J. Cortés, 1st February 2006; UCR 1542, preserved, Punta S-E, Caño Island, 18 m, O. Breedy, 14 September 1996; UCR 1543, preserved, Bajo El Diablo, Caño Island, 18 m, O. Breedy, 11 February 2000; UCR 1545 (3 specimens), preserved, Manuel Antonio National Park, Costa Rica, 18 m, O. Breedy, 6 April 2006; UCR 1546 (5 specimens), preserved, Isla Serrucho, Manuel Antonio National Park, 10 m, O. Breedy, 5 April 2006; UCR 1547, preserved, Punta Descartes, Salinas Bay, 6 m, O. Breedy, 9 June 2005; UCR 1553, preserved, Caño Island, 12 m, O. Breedy, 4 September 1996; UCR 1555, preserved, Tombolo oeste, Marino Ballena National Park, Costa Rica, 4 m, O. Breedy, 25 April 2002; UCR 1556, preserved, NE Isla Ballena, Marino Ballena National Park, 7 m, O. Breedy, 27 April 2002; UCR 1560, dry, Peñón Abrazo de la Muerte, Archipielago Murcielago, 25–30 m, O. Breedy & J. Cortes, 12 April 1996; UCR 1561, dry, Punta Matapalito, Peninsula de Osa, 18 m, O. Breedy & A. Fonseca, 15 March 1998; UCR 1661, preserved, Puertas de la Catedral, Archipielago Murcielago, 18 m, O. Breedy, 2 December 2003; UCR 1662, preserved, Nacascolito, Culebra Bay, 7 m, O. Breedy, 23 April 2002. ECUADOR: CDRS 02–25, preserved, Darwin Island, Galapagos Archipelago, 21–30 m, C. Hickman, 18 May 2002; CDRS 597, preserved, Wolf Island, Galapagos Archipelago, 13 m, C. Hickman, 12 November 2003. PANAMA: STRI 465, dry, Bajo Foul, Peninsula de Azuero, 5–20 m, H. Guzman, 9 December 2003; STRI 750, dry, Roca Trollope, Golfo de Panama, 10–20 m, H. Guzman, 6 August 2003; STRI 814, dry, Isla del Rey, Archipielago Las Perlas, 4 m, H. Guzman, 6 April 2004; STRI 850, dry, Isla Pacheca, Archipielago Las Perlas, 3m, H. Guzman, 20 April 2004; UCR 1035, 1036, 1039, 1041, 1502, dry, Islote Frailes, Península de Azuero, 10–30 m, H. Guzman, 9 December 2001; UCR 1047, 1057, dry, Isla Canal Afuera, Golfo de Chiriqui, 3–12 m, H. Guzman, 10 December 2001; UCR 1063, 1065–1066, dry, Isla Santa Cruz, Golfo de Chiriqui , 5–20 m, H. Guzman, 10 December 2001; UCR 1110–1112, dry, Roca Prosper, Golfo de Chiriqui, 10–30 m, H. Guzman, 11 December 2001; UCR 1125, 1126, 1161, dry, Islote Frailes, 5–20 m, H. Guzman, 12 December 2001; UCR 1132, 1134, 1136, 1139, dry, Isla Barca, Golfo de Chiriqui, 5–10 m, H. Guzman, 18 April 2002; UCR 1167, dry, Roca Niagara, Golfo de Chiriqui, 5–20 m, H. Guzman, 13

December 2001; UCR 1191, dry, Isla Jicaron, Golfo de Chiriqui, 5–10 m, H. Guzman, 18 April 2002; UCR 1193, 1195, 1197, 1199, 1201, dry, Isla Saboga, Golfo de Panama, 1–5 m, H. Guzman, 14 December 2001; UCR 1245, 1289, dry, Isla Jicarita, Golfo de Chiriqui, 10–12 m, H. Guzman, 19 April 2002; UCR 1323, dry, Islote Punta Soledad, Golfo de Chiriqui, 10 m, H. Guzman, 20 April 2002; UCR 1327–1328, dry, Isla Passage, Golfo de Chiriqui, 15 m, H. Guzman, 20 April 2002; UCR 1351, dry, Isla Piedra Hacha, Golfo de Chiriqui, 10–25 m, H. Guzman, 22 April 2002; UCR 1382–1383, dry, Bajo La Viuda, Golfo de Chiriqui, 30 m, H. Guzman, 23 April, 2002; UCR 1447, dry, Isla Otoque, Golfo de Panama, 5–10 m, H. Guzman, 9 May 2002; UCR 1460, 1463, Taboguilla Island, Golfo de Panama, 5–10 m, H. Guzman, 9 May 2002; USNM 49362, dry, 7° 55'N, 81° 38'W, 11 March 1948, no further data.

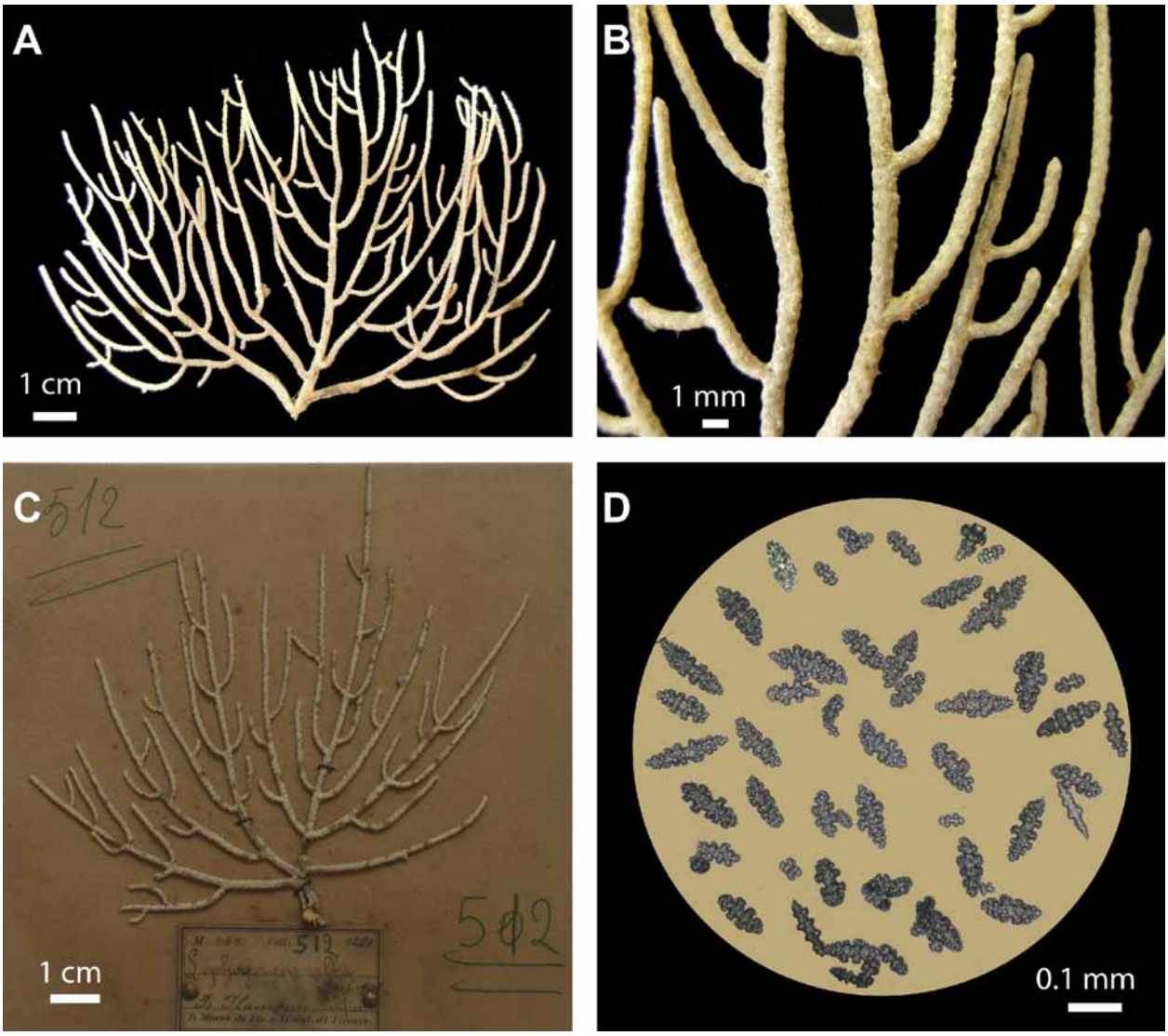

FIGURE 4. *Leptogorgia alba* **A**, paralectotype (MSNT c164); **B**, detail of branches (MSNT c164); **C**, lectotype (MZUF c163); **D**, light micrograph of sclerites (MZUF c163).

Lectotype Description. The lectotype is a flabellate colony 9.5 cm in height and 11.0 cm in width (Fig. 4C). Three primary branches sprout from a short stem, 7 mm long, producing secondary branches in an irregular, openly pinnate sequence. The stem is 3 mm in diameter, it is wider at the base and is devoid of sclerites; the holdfast is lacking. Main branches are 1.0–1.5 mm in diameter, and the pinnae are around 1.0 mm. Unbranched terminal twigs are pointed, mostly 3.0 cm or less in length. Longitudinal grooves that extend along the main branches are very distinct at the base. Polyps are arranged in two rows on each side of the branches, not crowding the branches, fully retractile into the coenenchyme, which is slightly raised around the

apertures (Fig. 4B). Colour of the colony is white. Coenenchymal sclerites are nearly all colourless; a few are pink (Fig. 4D). They are mostly long spindles, up to 0.18 mm in length, and 0.04–0.06 mm in width, with acute ends, and 4–10 whorls of complex tubercles (Figs. 4D, 5). The spindles are mostly straight, or have a slightly bent end; some have curved axes. Capstans reach up to 0.06 mm in length, and 0.03 mm in width (Figs. 4D, 6). Anthocodial sclerites are colourless, flat, long rods up to 0.15 mm in length and 0.03 mm in width, with scalloped margins or with few short, lateral projections (Figs. 4D, 6).

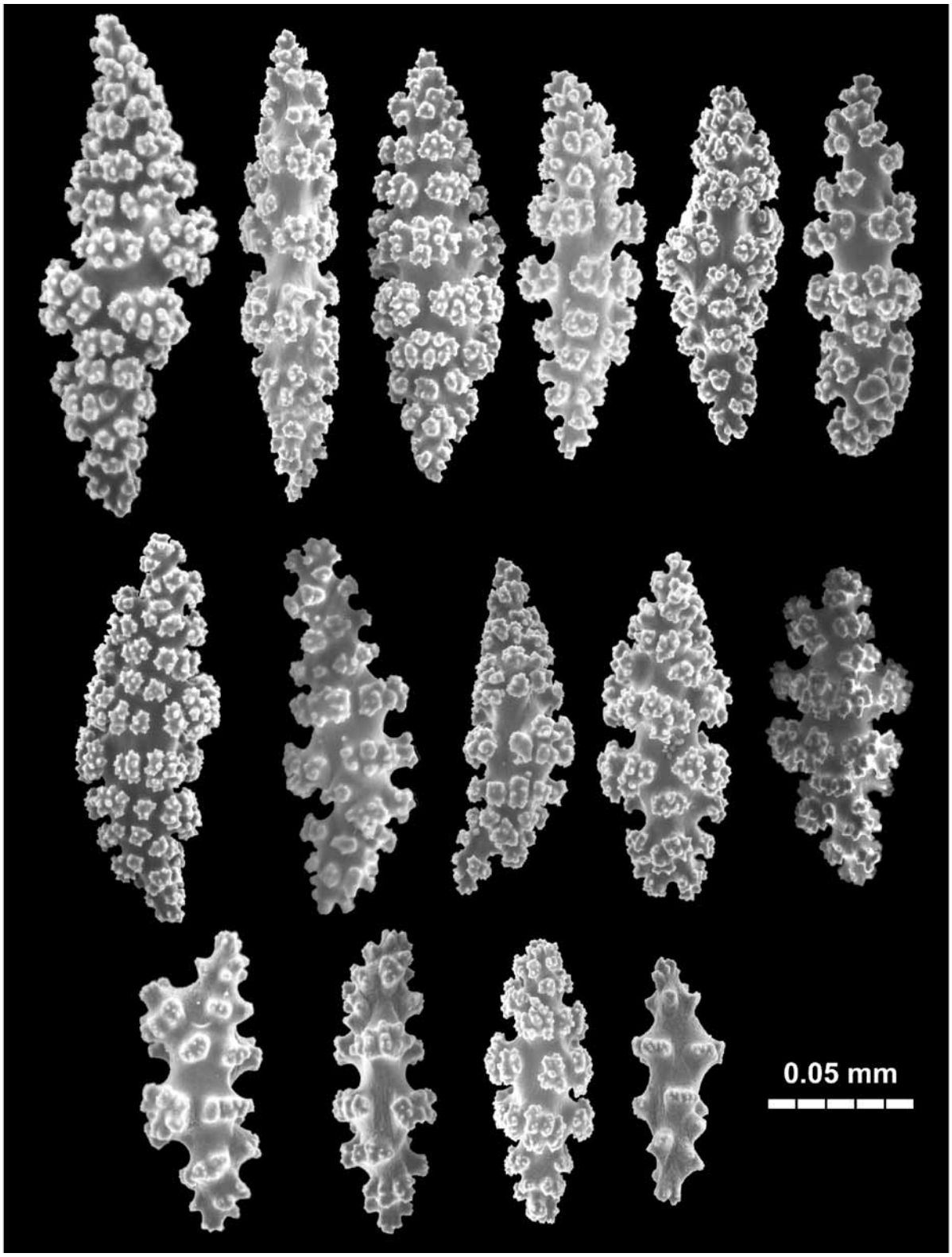

FIGURE 5. *Leptogorgia alba* (MZUF c163, lectotype), SEM of spindles.

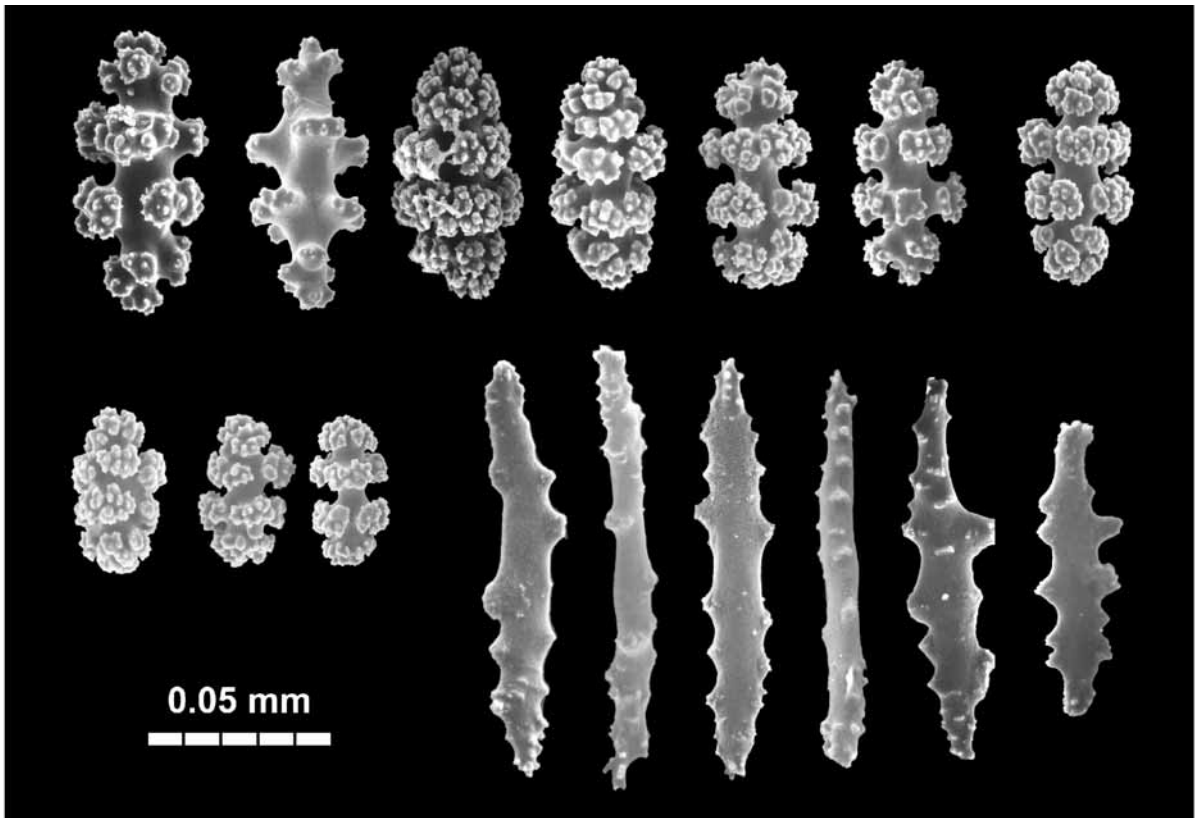

FIGURE 6. *Leptogorgia alba* (MZUF c163, lectotype), SEM of capstans, and anthocodial rods.

Other material. Examined colonies reach up to 60 cm in height, and 60 cm in width. The morphology of the colonies is basically flabelliform, irregularly dichotomous or with long, slender pinnate branches, and short, (Figs. 4A, C, 7A) or long, drooping pinnae (Fig. 7B). Colonies mostly branch from short stems, up to 2 cm in height, and up to 20 mm in diameter, mostly in one plane, but other branching arrangements can occur. Holdfasts are spreading and thick in large colonies and thin, round or oval in small colonies. Main branches are nearly round in cross-section, or sometimes flattened, reaching up to 1.5–2 mm in diameter. Pinnae are up to 1–1.5 mm in diameter, with round or pointed tips. Unbranched terminal twigs range from 2 to 16 cm long, depending on the dominant short-pinnae or long-pinnae pattern. Retracted polyps may retract completely into the coenenchyme leaving oblong openings, or form small, slightly raised polyp-mounds (Fig. 4B). They are mostly arranged in two rows on each side of the branches, sparsely distributed on the thin branches, but more close together on the thick branches. Polyps are whitish, or colourless. The anthocodial rods are arranged in points below the polyp tentacles. Colour of the dry colonies is white, but when alive the colony and polyps are light pink. Coenenchymal sclerites are very variable. In small colonies they are often as in the lectotype, where the spindles are the dominant type of sclerite, reaching up to 0.17 mm in length. In large specimens long spindles are scarce to absent, small capstans being the dominant type, e.g. UCR 1057 (40 cm in height, and 55 cm in width). However, we could not establish a relationship between the size of the colony or the branching pattern and the relative abundance of any type of sclerites, since intermediate patterns were observed. For example, UCR 1039 is a large colony (52 mm in height, and 40 cm in width), some acute spindles and blunt spindles are found in the samples along with the capstans which are the dominant type; this colony has the long-pinnae pattern of ramification which is not the case in UCR 1057, which has the normal short-pinnate pattern of the lectotype. In UCR 1057, coenenchymal sclerites are mainly small capstans, up to 0.06 mm in length, and 0.04 mm in width, with a very low occurrence of blunt spindles, and asymmetric spindles, when found they reach up to 0.08 mm in length, and 0.04 mm in width (Figs. 7C, 8A). In UCR 1039, coenenchymal sclerites are mostly capstans, but larger, 0.07 mm in length, and 0.04 mm in width, and with a

higher occurrence of spindles with acute or blunt ends and asymmetric spindles; they reach up to 0.10 mm in length, and 0.04 mm in width (Figs. 7D, 8B). Anthocodial rods are very consistent in size and shape in the examined specimens, they are long and conspicuous.

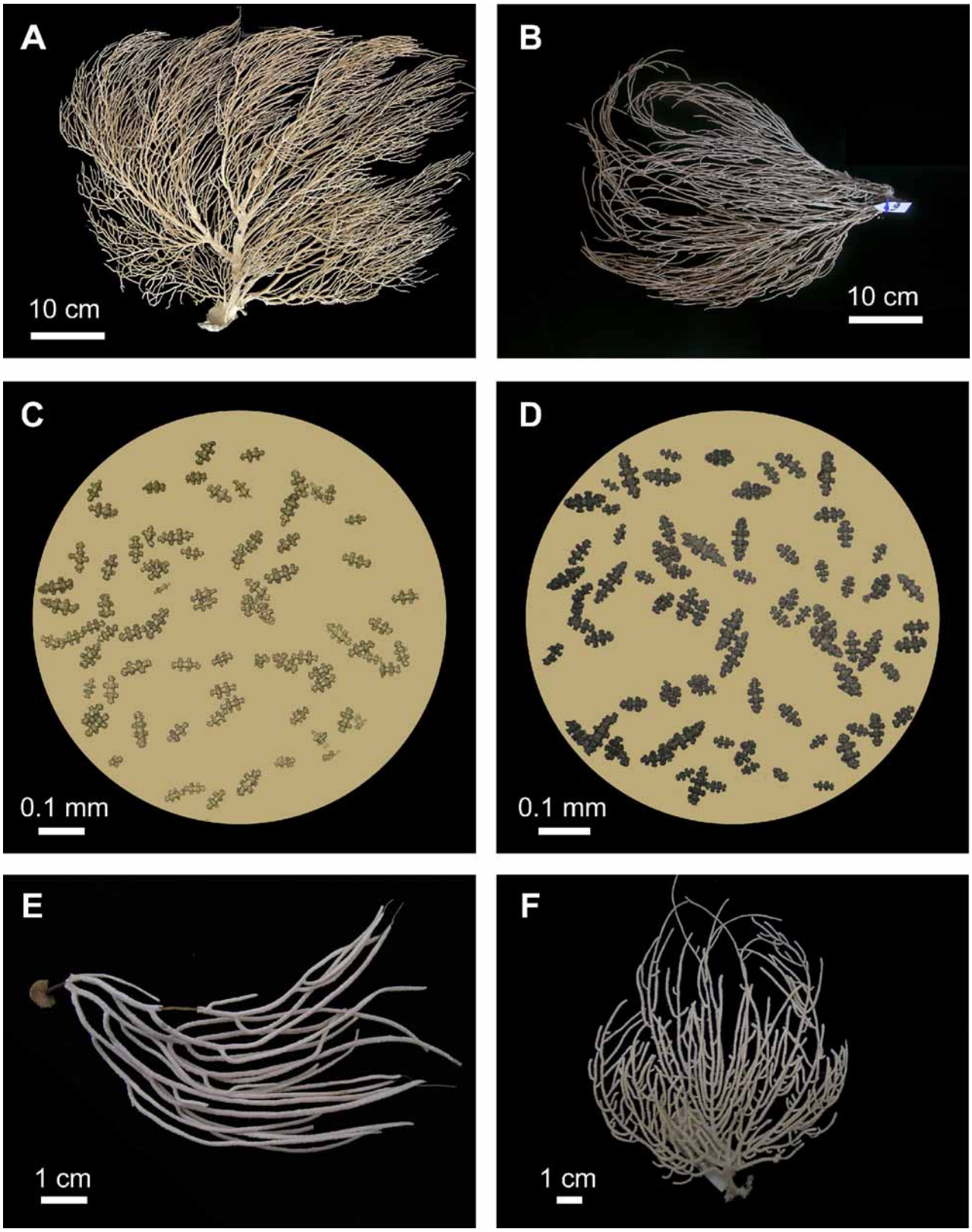

FIGURE 7. Morphology variation of *Leptogorgia alba* **A**, UCR 1057; **B**, UCR 1039; **C**, light micrograph of sclerites (UCR 1057); **D**, light micrograph of sclerites (UCR 1039); **E**, ZSM 20044790; **F**, UCR 1528.

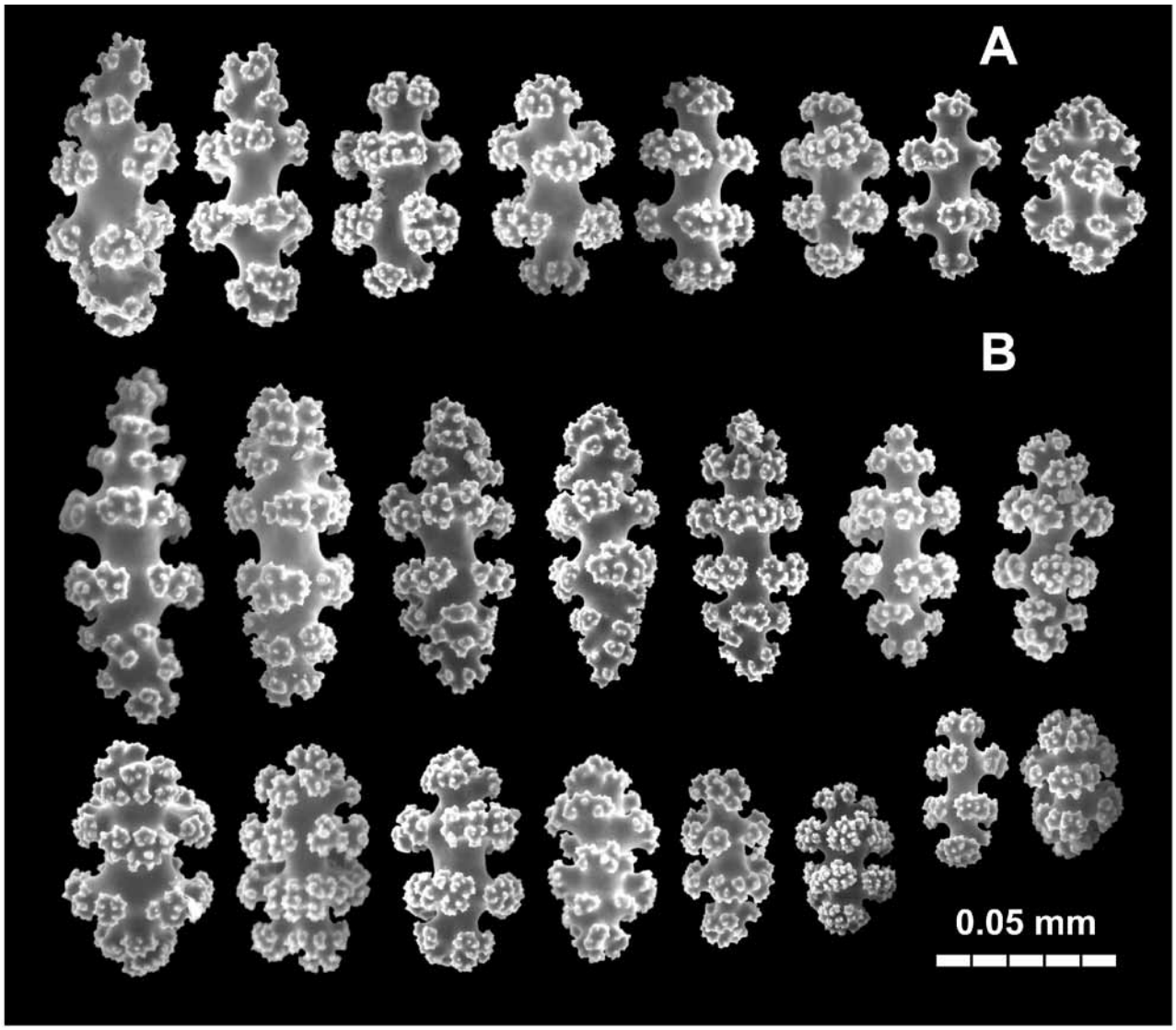

FIGURE 8. *Leptogorgia alba*, **A**, UCR 1057, SEM of coenenchymal sclerites; **B**, UCR 1039, SEM of coenenchymal sclerites.

Distribution. Isla Flamenco, Panama: type locality (Duchassaing & Michelotti 1864); all along the Pacific coast of Panama, and Costa Rica; San Salvador, Acajutla, Ecuador (Bielschowsky 1929); Malaga Bay, Punta Ardita, Gorgona Island, Colombia (Prahl *et al*. 1986); Darwin Island, Wolf Island, Galapagos Archipelago; San Carlos Bay, Mazatlan, Baja California, Isabel Island, Mexico (Table 2, Fig. 9).

Remarks. In 1860 and 1864 Duchassaing and Michelotti published two monographs dealing with species of Coelenterata from the Caribbean region in which they described a number of new species. In their 1864 work, they included two new species from the Pacific of Panama, *Lophogorgia panamensis* and *Lophogorgia alba.* The specimen of *L. panamensis* was analyzed in our study and identified as a species of the genus *Eugorgia* Verrill, 1868b.

In their description of *Leptogorgia alba* Duchassaing and Michelotti gave a brief diagnosis, but illustrated accurately only one of their two specimens. Based on the figured specimen, Volpi and Benvenuti (2003) designated the lectotype of this species. It seems that nobody before us, had access to the type material because there has been historical confusion around this species, which is evident from the synonymy list. Verrill (1868b) redescribed *L. alba* using specimens from Panama and other Central American localities. He was

unable to determine whether his specimens, deposited in YPM and MCZ, were the same as *L. alba* described by Duchassaing and Michelotti (1864). Hickson (1928) described *Euplexaura lemasti*, which was later reassigned to *L. alba* by Stiasny (1941). Bielschowsky (1929) described two species *L. fasciculata* (ZSM 20044789, ZSM 20044790), and *L. alba* var. *sulcata* (ZMHC 4496, ZMHC 5615, ZMHC 4580). She separated these species from *L. alba* without any examination of the types. After studying her specimens, we did not find any reason to retain them as different species. Consequently, we decided to make them synonyms of *L. alba*.

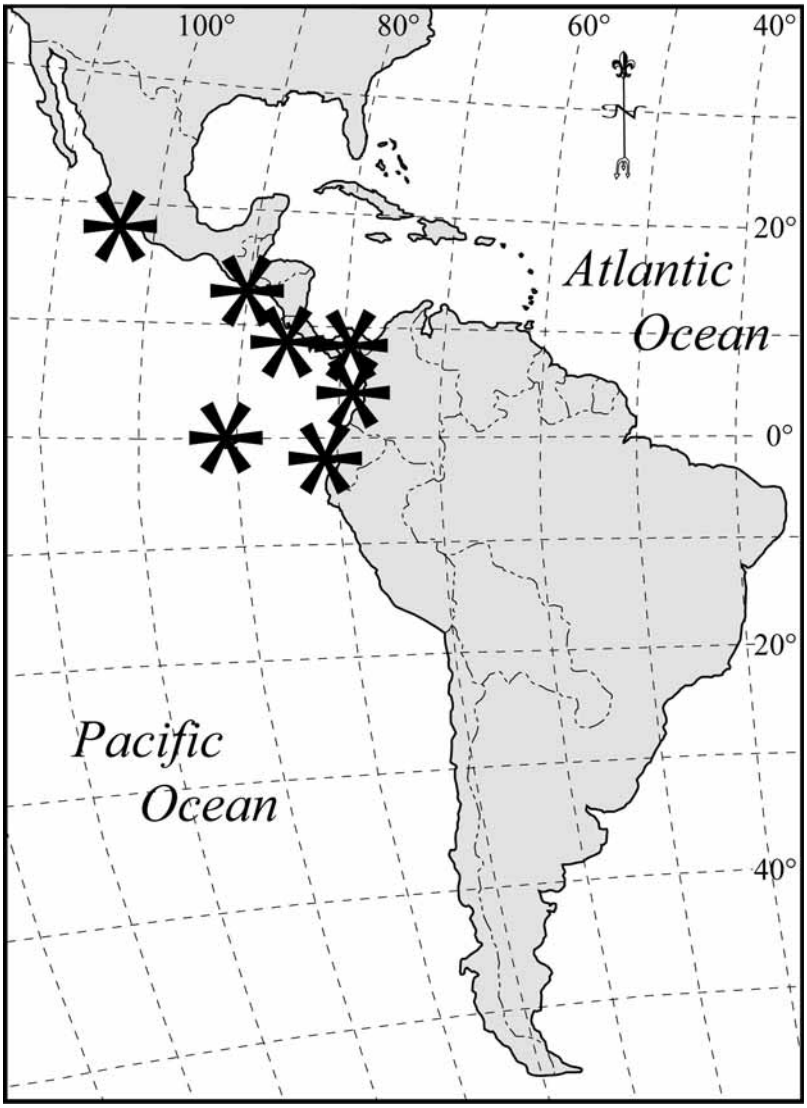

FIGURE 9. Geographical distribution of *Leptogorgia alba.*

Leptogorgia alba is one of the most difficult species to define. We observed basically three types of branching, pinnate (as in the lectotype) (Fig. 4C), the long-pinnate drooping style, as in UCR 1039 (Fig. 7B), and a more dichotomous pattern, as in ZSM 20044789 and ZSM 20044790, formerly identified as *L. fasciculata* (Fig. 7E). However, we could not determine any relationship between the branching patterns and the types of sclerites. In addition, we observed both patterns in the same colony UCR 1528 (Fig. 7F), one at the base and the other at the top. The lack of consistent patterns among the many examined specimens shows the plasticity of this species; perhaps in response to several environmental factors such as currents, wave action, depth, or habitat.

Five species of the eastern Pacific *Leptogorgia* are white and similar to *L. alba* (Table 1). *Leptogorgia ramulus* is separated from the group basically for its type of branching and the prominent polyp mounds. *Leptogorgia cofrini*, *L. fruticosa*, and *L. peruviana* are small, bushy colonies, different from the other two species. *Leptogorgia laxa* differs from the other species of this group in the lax style of branching, and the slender branches. Sclerite size and composition in *L. laxa* is similar to *L. alba* (typical form), but differs by having the highest occurrence of long spindles with acute ends (Table 1).

***Leptogorgia californica* (Verrill, 1868)**
(Figs. 10–12)

Litigorgia californica Verrill, 1868a: 398 (1st. ed.).
Leptogorgia californica Verrill, 1868b: 398; Verrill 1869b: 421; Nutting 1910: 5; Kükenthal 1919: 772 (spec. dub); Kükenthal 1924: 334.
Not *Leptogorgia californica* Hickson 1928: 412–413 (= *L. labiata*).
Not *Lophogorgia californica* Harden 1979: 69 (= *L. labiata*).

Material examined. Lectotype (here designated): YPM 1713, dry, Sonora State, Magdalena Bay, Mexico, depth not given, A. Garret, no date, donor MCZ ("type fragment").

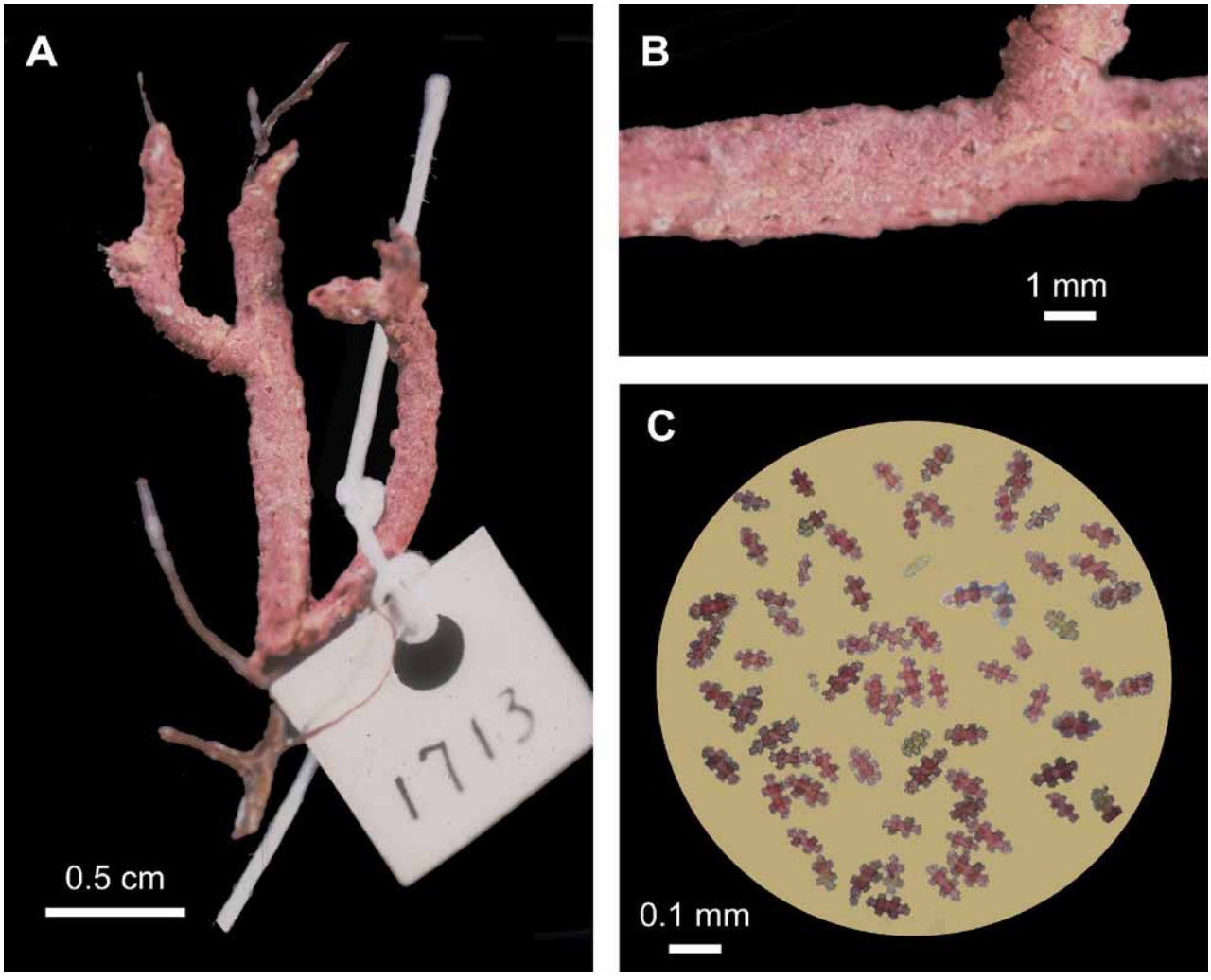

FIGURE 10. A, *Leptogorgia californica* (YPM 1713, lectotype); **B**, detail of a branch; **C**, light micrograph of sclerites.

Other material examined: MEXICO: CASIZ 097881(2), dry, Sinaloa, 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 lectotype is a small, dry fragment 2.5 cm in length, and 1.3 cm in width (Fig. 10A). According to Verrill (1868b) the form of the colonies is "somewhat flabelliform, subpinnately branched, branches ascending, not coalescent". Branches are around 2 mm in diameter. Polyps are arranged in about three rows around the branches, they retract into nearly flat protuberances in the coenenchyme leaving slit-like apertures (Fig. 10A, B). Colour is reddish purple, and yellow longitudinal grooves appear in some parts along the branches. Sclerites of the coenenchyme are mostly red and pink, some are yellow, and some bicoloured; they are mostly capstans (Fig. 10C), which reach up to 0.10 mm in length, and 0.05 mm in width (Figs. 10C, 11). Spindles occur in minor proportions; some of them with one end bent. The spindles reach up to 0.13 mm in length and 0.05 mm in width (Fig. 10C, 11). Crosses up to 0.08 by 0.07 mm occasionally occur; they have short rays with blunt warty ends (Fig. 11). The anthocodial sclerites are slender, pale orange, somewhat flattened rods, up to 0.07 mm in length, and 0.02 mm in width, with lobed margins (Figs. 10C, 11).

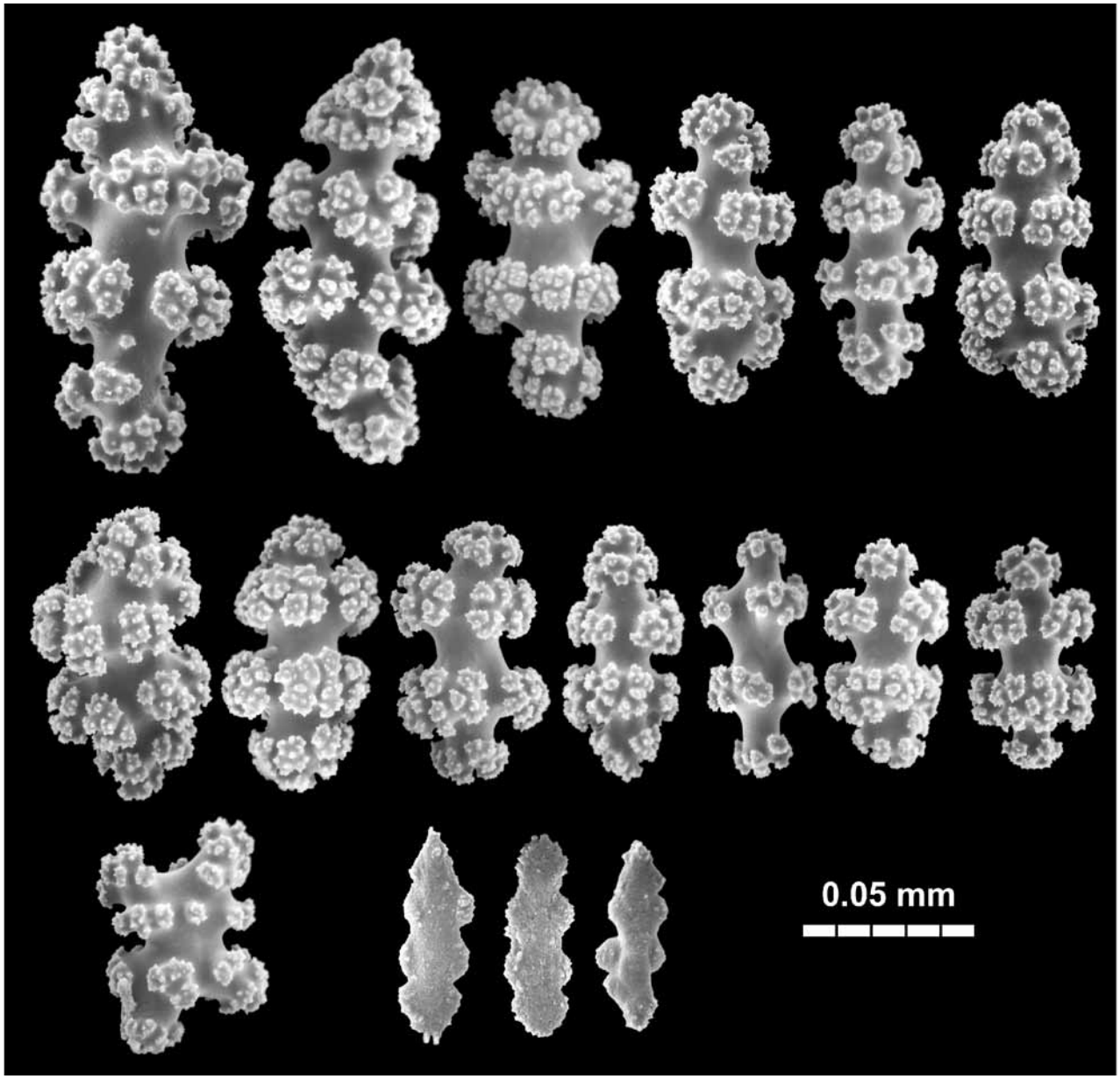

FIGURE 11. *Leptogorgia californica* (YPM 1713, lectotype), SEM of coenenchymal sclerites, and anthocodial rods.

Distribution. Only from the type locality: Baja California, Mexico (Table 2, Fig. 12).

FIGURE 12. Geographical distribution of *Leptogorgia californica*.

Remarks. Verrill (1865–1870) described 12 species of *Leptogorgia*, without designating any holotypes. Nevertheless, we found original syntype material in all but two cases. Verrill (1868b, 1870) provided illustrations of branches for two species, and of sclerites for seven, however, they are not adequate for identification purposes, since only two or three types of sclerites were presented. For *Leptogorgia chilensis* and *Leptogorgia caryi* no syntypes were found.

Leptogorgia californica was described by Verrill (1868b) with a specimen 15 cm in height and 10 cm in width, from Margarita Bay or from Cape San Lucas. The only type material found is a fragment 2.5 cm in height, and 1.3 cm in width from Magdalena Bay collected by A. Garret, marked as syntype. Verrill did not illustrate the colony, and besides drawings of two sclerites, no other additional material is available for comparison purposes. The chosen type fragment is consistent with Verrill's description; however, details of colony morphology are difficult to infer. Since YPM 1713 is the only type material available, and it comes from Margarita Island, Magdalena Bay (Margarita Bay does not exist), we designate this specimen as the lectotype of *L. californica* to establish the identity of this species and avoid future misinterpretation.

The specimen BM 1930.6.17.14, described by Hickson (1928) from Balboa, Panama, as well as CASIZ 097881, identified by Harden (1979) from Mazatlan, Sinaloa, Mexico as this species, fit *Leptogorgia labiata* better (see below).

This species is similar to *L. labiata* in the colour of the colony, and the sclerites, but in *L. californica* the sclerites are larger than in previous. *Leptogorgia labiata* has very prominent polyp-mounds, which is not the case in *L. californica* where the polyp-mounds are flat (Table 1).

***Leptogorgia chilensis* (Verrill, 1868)**
(Figs. 13–15)

Plexaura rosea Philippi, 1866: 118 (junior homonym)
Litigorgia (?) *chilensis* Verrill, 1868a: 406.
Leptogorgia (?) *chilensis* Verrill, 1868b: 406.
Leptogorgia rosea Philippi, 1892: 7 (non *L. rosea* Milne Edwards & Haime, 1857: 134 (=*L. viminalis* (Pallas, 1766), Atlantic ocean).
Leptogorgia chilensis Kükenthal 1919: 772; 1924: 335; Bielschowsky 1929: 132; Harden 1979.

Material examined. CALIFORNIA: CASIZ 097770, preserved, Isla Santa Catalina, Channel Islands, Big Fisherman`s Cove, 9 m, M. Wicksten, 1972; CASIZ 098028, preserved, Isla Santa Catalina, 11 m, M. Wicksten, 1971; MCZ 71317, Isla Santa Cruz, Smugglers Cove, 21 m, B. Scronce, M. Conboy, D. Sprong, G.E. & McGinitie, 24 January 1963; UCR 1596 (fragments), dry, Los Angeles, breakwater, San Pedro, 8 m, M. Wicksten, 29 September 1973; USNM 50191 (3 specimens), dry, Scripps Canyon, north branch, south wall, ¼ mile north of Scripps, La Jolla, no depth given, Parker, 4 March 1954; USNM 5988, dry, Isla Santa Catalina, no further data.

Description. Colonies examined reach up to 35 cm in length, and 30 cm in width; they are lank, bushy with long, slender, and flexible branches. Stems can reach 4 cm long, and up to 3 mm in diameter (Figs. 13A, D). Branching is irregularly dichotomous, branches are mostly cylindrical, up to 2.8 mm in diameter (Figs. 13C, D), unbranched terminal twigs could reach up to 80 mm in length, and have pointed ends. The polyps retract completely into the coenenchyme leaving oblong apertures around 0.5 mm long (Fig. 13C). Polyp-mounds are flat and sparsely distributed around the branches. Several longitudinal grooves appear along the bare spaces between the polyps (Fig. 13C). Colour of the colonies is light orange, darker when preserved (Figs. 13A, C, D). Sclerites of the coenenchyme are pale orange (Fig. 13B). The largest are spindles reaching up to 0.12 mm in length and 0.03 mm in width, with 4–8 whorls of tubercles (Fig. 13B, 14). In the specimens where the capstans are more abundant than the spindles, the spindles do not reach more than 0.09 mm. Capstans reach up to 0.08 mm in length, and 0.04 mm in width (Fig. 13B, 14). Some crosses up to 0.06 by 0.06 mm are found in the samples (Fig. 14). Anthocodial sclerites are pale orange, biscuit-like, small rods, up to 0.04 mm in length, and 0.01 mm in width.

One of the illustrated specimens is a fragment 22 cm in length and 7 cm in width that was found at the MCZ (Fig. 13A, C), the other is a large colony deposited in the USNM (Fig. 13D).

Distribution. Algarrobo, south of Valparaiso (Philippi 1892), Chile; Channel Islands, Los Angeles, San Francisco, California (Table 2, Fig. 15).

Remarks. Philippi (1866) poorly described *Plexaura rosea* with a specimen from Valparaiso present in the Museo de Zoologia de Chile. Later in 1892, he once more described *L. rosea* with the same specimen as mentioned in the "Posdata" of that paper. His descriptions in both instances were very poor and could fit any other species; even the drawing of *L. rosea* is very schematic and without any detail (Philippi 1892, pl. 2, Fig. 1). As Philippi's material seems to be lost and no recently collected material from Chile resembling this species was available, we used specimens from California for the description. We do not exclude the possibility the material from California actually represents another species, but so far it most resembles Philippi's description.

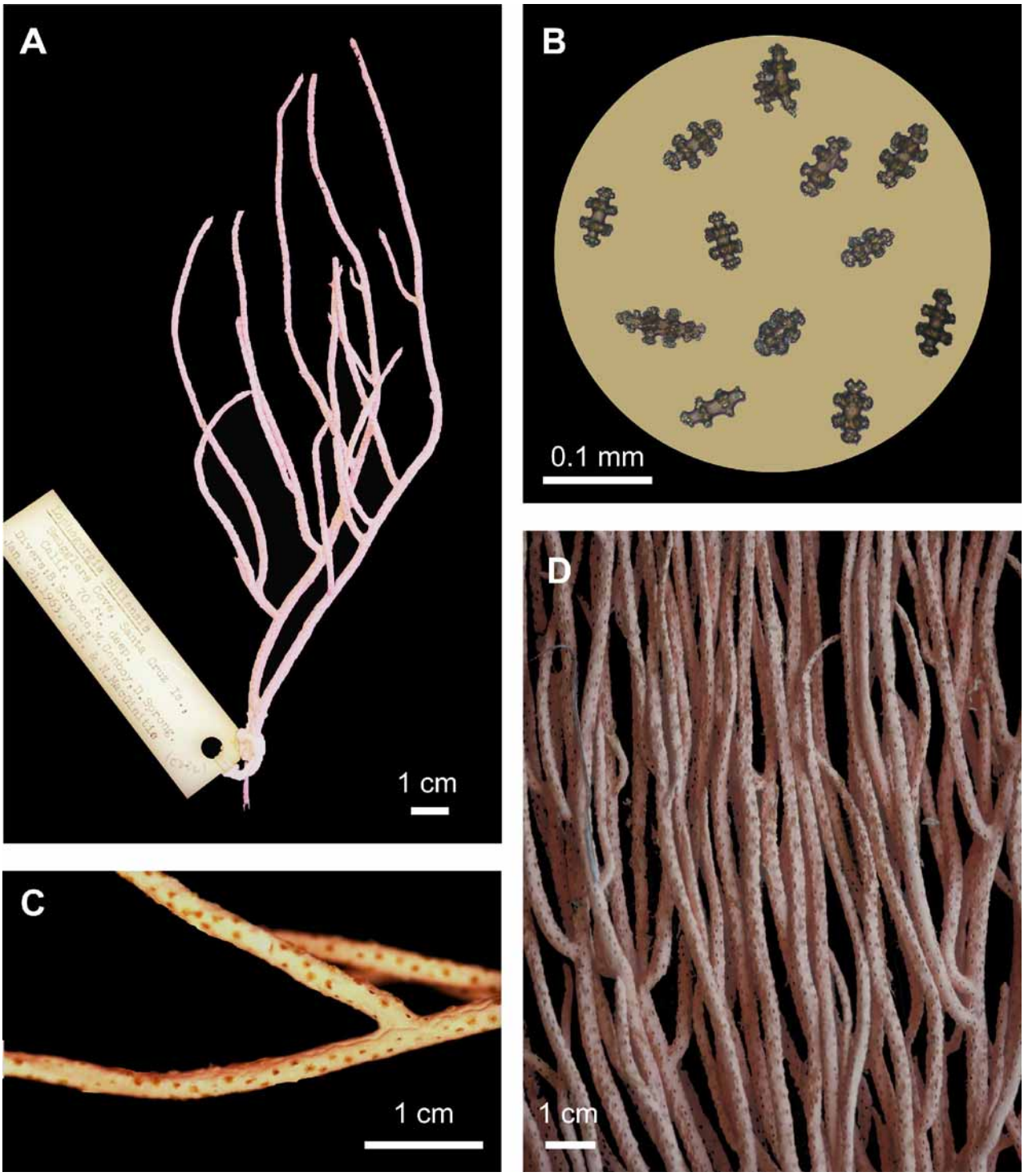

FIGURE 13. A, *Leptogorgia chilensis* (MCZ 71317); **B**, light micrograph of sclerites (MCZ 71317); **C**, detail of a branch (MCZ 71317); **D**, branches of USNM 50191.

The name *Leptogorgia chilensis* appears for the first time in Verrill 1868b with a "?", and *Plexaura rosea* (non *L. rosea* Milne Edwards & Haime) in the synonymy. Verrill (1868b) renamed *L. rosea* of Philippi as *L. chilensis* to avoid homonymy with *L. rosea* of Milne Edwards and Haime.

Verrill (1968c) described *L. caryi* with one specimen from California, near San Francisco, that was supposedly deposited in the MCZ, but we found neither it nor any other specimen identified by Verrill under this

species. The drawings provided by Verrill of two sclerites could well fit any other species. The only specimen that we discovered labeled as *L. caryi* was USNM 5988 (not a type) from Isla Santa Catalina, California, which agrees in all aspects with *L. chilensis*. Therefore, we consider *L. caryi* as a dubious species.

The species is similar to *L. flexilis* in the lax dichotomous branching and the colour of the colony, but differs in the size and colours of the sclerites, especially in the anthocodial rods, which are larger, and darker in *L. flexilis* (Table 1).

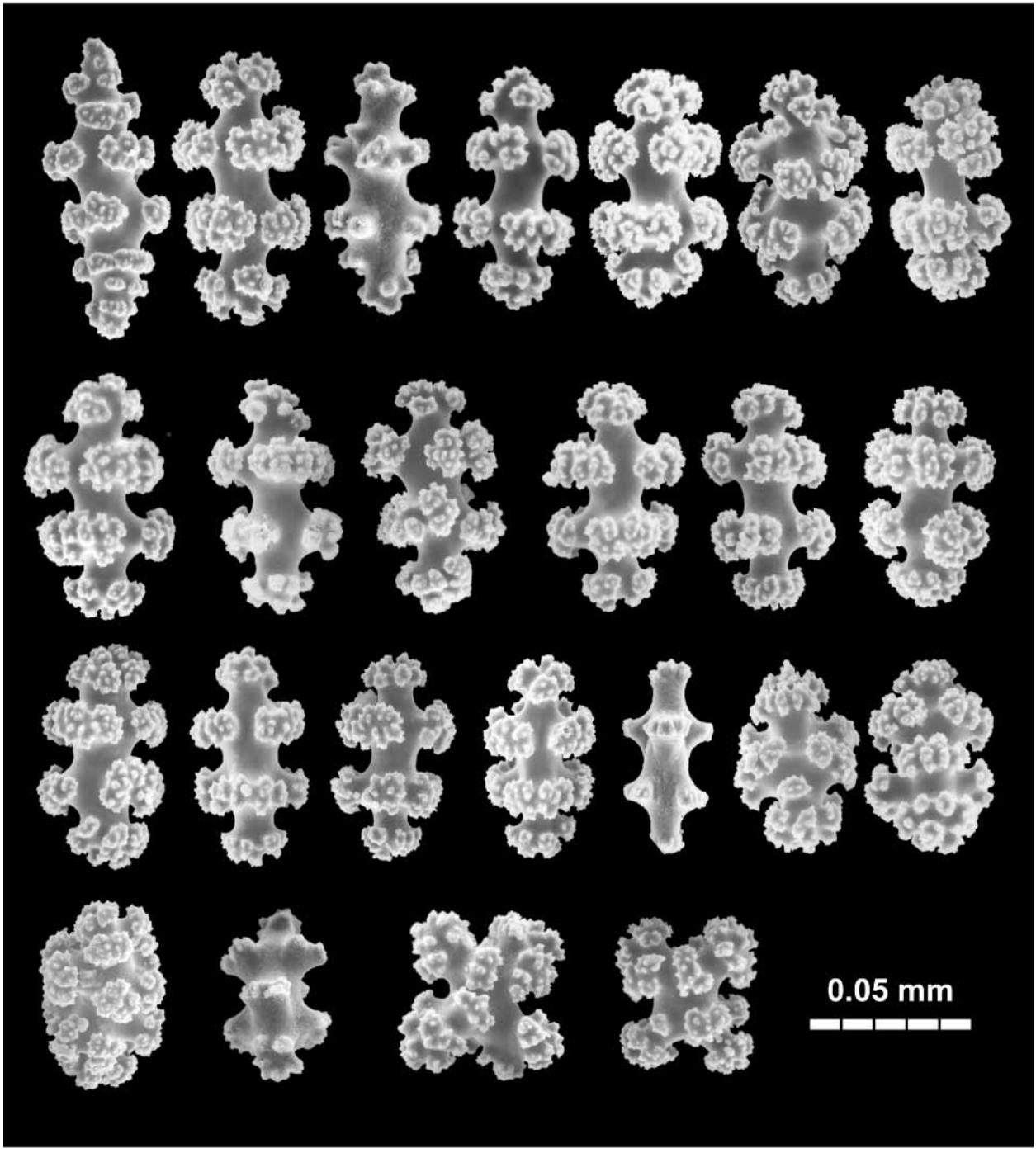

FIGURE 14. *Leptogorgia chilensis* (MCZ 71317), SEM of coenenchymal sclerites.

FIGURE 15. Geographical distribution of *Leptogorgia chilensis*.

***Leptogorgia clavata* (Horn, 1860)**
(Figs. 16–18)

Lophogorgia clavata Horn, 1860: 233.
Leptogorgia clavata Verrill 1869b: 423.

Material examined. Syntype: YPM 2268, 3 dry fragments, locality unknown (purchased), depth not given, donor A. E. Verrill (syntype of G. H. Horn, obtained from Philadelphia Academy), no further data.

Syntype Description. The syntype consists of 3 small fragments, measuring 45, 15, and 10 mm. The largest one is slightly flattened, 4.0 mm in diameter, several stumps along the branch suggest that the branching was pinnate as Horn (1860) pointed out (Fig. 16A). Polyp-mounds are small, slightly raised, and numerous, arranged all around the branches. Colour of the colony is dull reddish-pink. All the coenenchymal sclerites are reddish-pink, and mostly capstans (Fig. 16B). They reach up to 0.075 mm in length, and 0.04 mm in width (Fig. 16B, 17); some are densely tuberculated, barrel-like capstans (Fig. 16B, 17). Spindles reach up to 0.10 mm in length, and 0.05 mm in width, with 3–4 whorls of complex tubercles (Fig. 17). Anthocodial sclerites are conspicuous, pale pink, long rods, up to 0.16 mm in length, and 0.03 mm in width with scalloped margins, some with bent axes (Fig. 16B, 17).

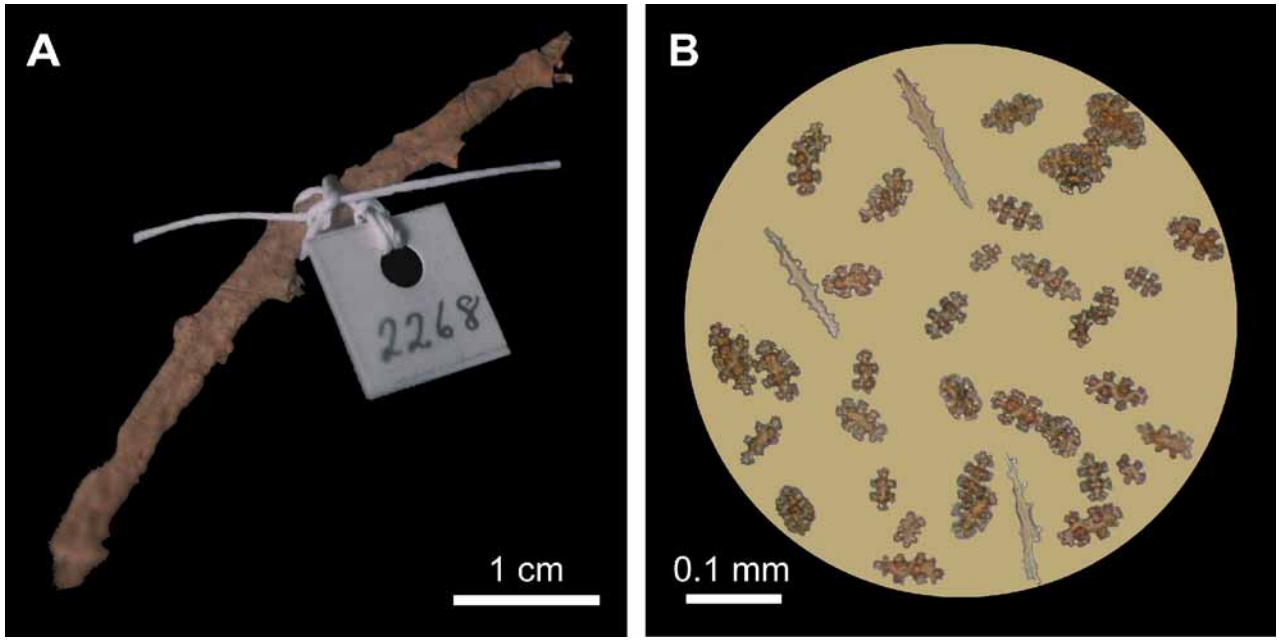

FIGURE 16. A, *Leptogorgia clavata* (YPM 2268), **B**, light micrograph of sclerites.

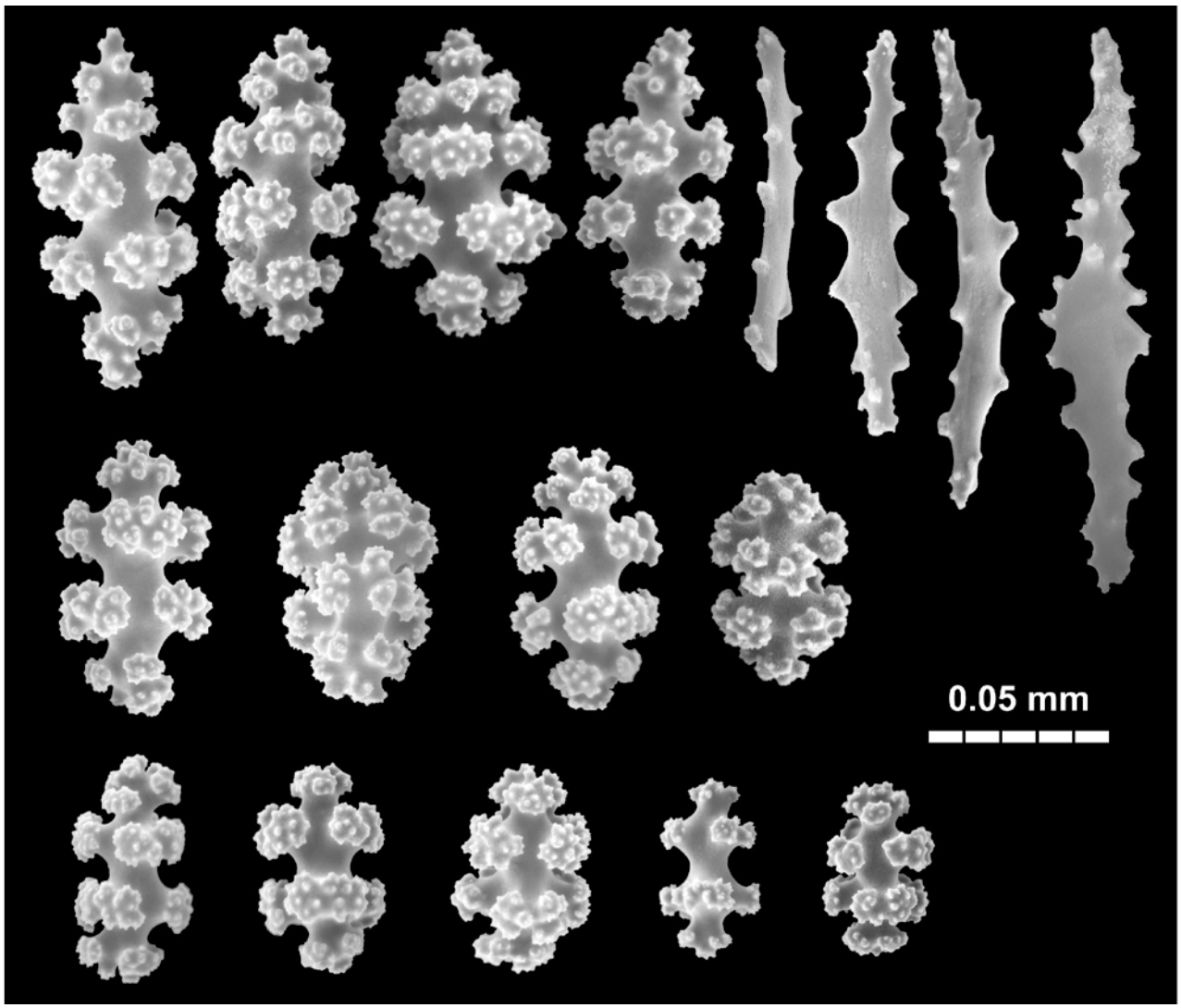

FIGURE 17. *Leptogorgia clavata* (YPM 2268), SEM of coenenchymal sclerites, and anthocodial rods.

Distribution. The syntype was probably found in Mazatlan, Mexico, and no other specimens of this species were available for examination (Table 2, Fig. 18).

FIGURE 18. Geographical distribution of *Leptogorgia clavata*.

Remarks. Horn (1860) described two species of *Lophogorgia* from unknown localities (*L. aurantiaca*, and *L. clavata*), and one species of *Rhipidigorgia* (now *Pacifigorgia englemanni*), however, only a small fragment of *P. englemanni* and some fragments of *L. clavata* were found at YPM. It seems that the fragments of *L. clavata* were given to A. E. Verrill by the Philadelphia Academy, and he donated them to YPM (Breedy & Guzman 2002). None of the Horn's complete specimens was found. The specimen of *P. englemanni* was the only one with collecting site recorded as Mazatlan, thus, Verrill (1868b) assumed that the other two were from the same locality. Because of the scant nature of the type material and the lack of any other specimen that matches Horn's description, it is not possible to validate the taxonomic status of *L. clavata*. Herein we describe the type fragments for reference until new material that fits this species is collected.

It is not possible to tell much about similarities of *L. clavata* with other species, but the conspicuous long anthocodial rods distinguish it at present (Table 1).

***Leptogorgia cofrini* Breedy & Guzman, 2005**
(Fig. 36A, 65)

Leptogorgia cofrini. Breedy & Guzman, 2005: 3–9.

Material examined. Holotype: UCR 398A, preserved, Islas Tortugas, Golfo de Nicoya, Costa Rica, 1.5 m, J. Cortés, 18 July 1985.

Other material examined: PANAMA: ZMUC-ANT 129 q, s, u, v , Taboguilla Island, 5 m, T. Mortensen, 2 November 1915.

Diagnosis (according to Breedy & Guzman 2005)**.** Small, white colonies, up to 7 cm in length, and 5 cm in width. Axis cylindrical. Growth form upright, branching abundant, and in multiple planes with a single stem, reaching up to 3 mm in height before branching, or multiple stems (up to 4). Polyps sparsely placed all around branches, fully retractile. Sclerites colourless, and mostly capstans, up to 0.09 mm in length, and spindles, up to 0.12 mm in length, and long anthocodial rods up to 0.14 mm in length. The illustrated specimen is a colony 7.0 cm in length, and 6.0 cm in width.

Description. Full description in Breedy & Guzman 2005.

Distribution. Islas Tortugas, Golfo de Nicoya: type locality. Commonly found along the Pacific coasts of Costa Rica, and Panama (Table 2, Fig. 65).

***Leptogorgia cuspidata* Verrill, 1865**
(Figs. 19–21)

Leptogorgia rigida (pars) Verrill, 1864: 32.
Leptogorgia cuspidata Verrill, 1865: 186; 1868b: 403; 1869b: 421; Nutting 1910: 5; Bielschowsky 1918: 29; 1929: 132; Kükenthal 1919: 772; 1924: 335.
Gorgonia (*Eugorgia*) *cuspidata* Verrill, 1868: 415.
Litigorgia cuspidata Verrill, 1868a: 403 (1st. ed.).
Lophogorgia cuspidata Harden 1979: 71.

Material examined. Lectotype (here designated): MCZ 4061 (MCZ 263), Cape San Lucas, Baja California, no depth given, donor: Smithsonian Institution, J. Xantus, 1869–1861. Paralectotypes: MCZ 4058 (MCZ 349) (2), dry, Acapulco, no depth given, D.V. Vanbrunt, 1863; YPM 954, 1709, Baja California Sur, Cape San Lucas, no depth given, J. Xantus, 1869–1861; USNM 1676 (2 specimens), dry, Baja California Sur, Cape San Lucas, no depth given, J. Xantus, 1869–1861.

Other material examined**:** COSTA RICA: UCR 628–633, preserved, Isla Chora, Bahía Sámara, 7 m, H. Guzman, 18 March 1984; UCR 755 (3 specimens), preserved, Islote Chancha, Punta Salsipuedes, 1–3 m, VH1, Victor Hensen Expedition, 22 January 1984; UCR 773, preserved, S Isla Colorada, 3 m, J. Cortés, 5 March 1994; UCR 789, preserved, Archipielago Murcielago, 27 m, J. Cortés, 4 March 1994; UCR 790, preserved, Los Pedrones, Cape Blanco, 7 m, L. Mena, 18 April 1999; UCR 1510, preserved, San Pedrito, Archipielago Murcielago, 20 m, O. Breedy, 10 April 1996; UCR 1541, preserved, Peñon Palmitas W, Culebra Bay, 5 m, C. Jimenéz, 28 August 1997; UCR 1523 (2 specimens), preserved, Palmitas W, Culebra Bay, 5 m, E. Ruiz, 27 August 1997; UCR 1525, preserved, Isla Chora, 10–12 m, O. Breedy & H. Guzman, 30 May 1997; UCR 1527 (2 specimens), preserved, NE Cabeza de Mono, Culebra Bay, 9 m, E. Ruiz, 24 May 1997; UCR 1528, preserved, Peñón Cabeza de Mono, 10 m, O. Breedy, 26 June 1997; UCR 1530 (2 specimens), preserved, S Islote El Muerto, Salinas Bay, 15 m, O. Breedy, 9 July 2002; UCR 1534, preserved, Cabeza de Mono, 20 m, O. Breedy, 21 November 1997; UCR 1664 (2 specimens), preserved, Bajo Sámara, Bahía Sámara, 18 m, O. Breedy & H. Guzman, 1 March 1998; UCR 1665, preserved, Roca Afuera, Punta Descartes, 20 m, O. Breedy, 9 June 2005; UCR 1666 (3 specimens), preserved, Playa Nacascolito, Culebra Bay, 15 m, O. Breedy, 23 April

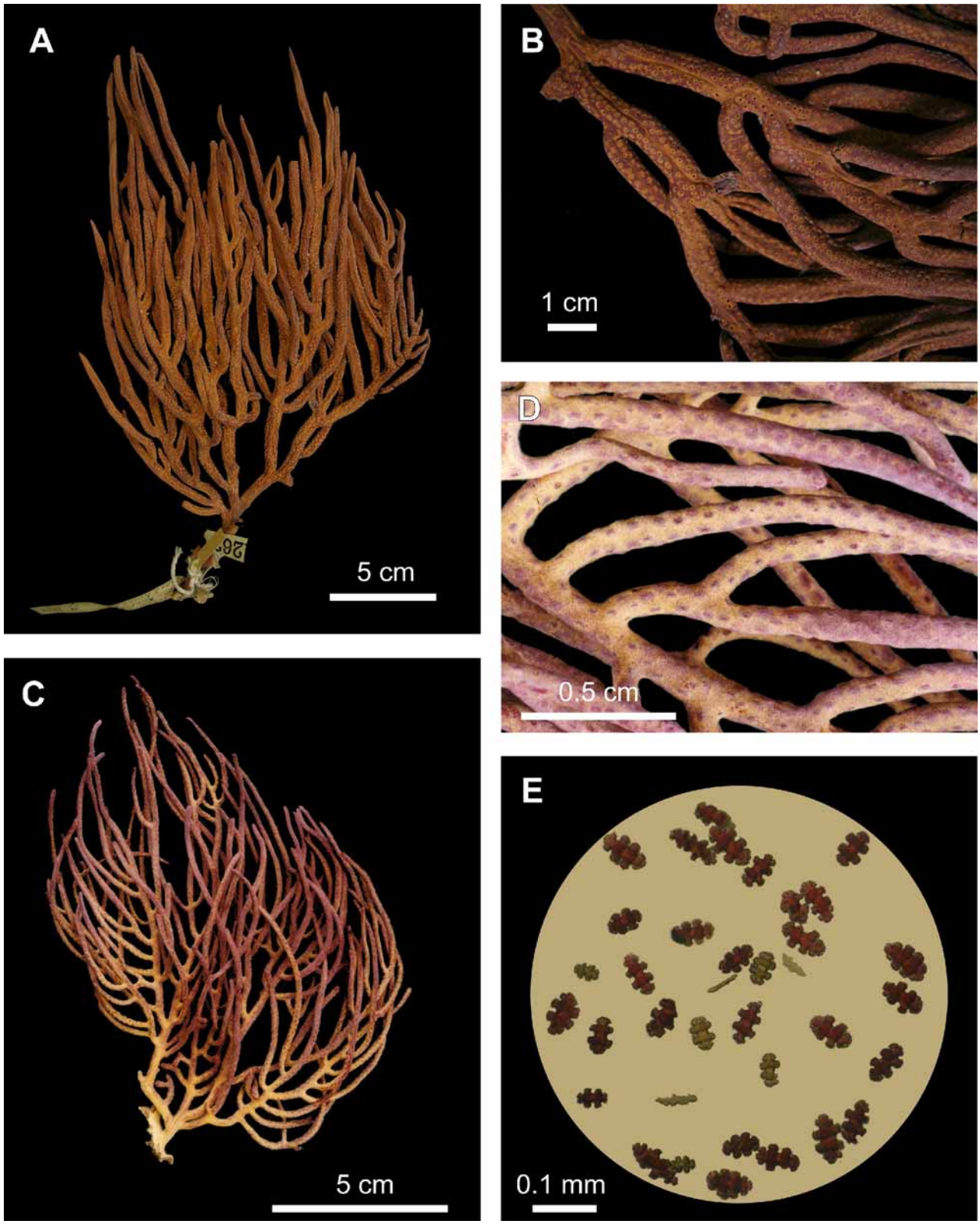

FIGURE 19. *Leptogorgia cuspidata* **A**, MCZ 4061, lectotype; **B**, detail of branches (MCZ 4061, lectotype); **C**, UCR 1528; **D,** detail of branches (UCR 1528); **E**, light micrograph of sclerites (MCZ 4061, lectotype).

2002. PANAMA: STRI 457, dry, Isla Roncadores, Golfo de Chiriqui, 10–20 m, H. Guzman, 30 August 2002; STRI 554, dry, Isla Bolañito, Golfo de Chiriqui, 6 m, H. Guzman, 16 April 2003; STRI 669, dry, Isla Pacora, Golfo de Chiriqui, 6 m, H. Guzman, 7 May 2003; STRI 713, dry, Los Octavios, Golfo de Chiriqui, 7 m, H. Guzman, 7 July 2003; UCR 1044, 1051, 1055, 1056, dry, Isla Canal Afuera, 3–12 m, H. Guzman, 10 Decem-

ber 2001; UCR 1107–1109, dry, Roca Prosper, 10–30 m, H. Guzman, 11 December 2001; UCR 1196, dry, Isla Jicaron NE, 5–10 m, H. Guzman, 18 April 2002; UCR 1313, dry, Islote Punta Soledad, 10 m, H. Guzman, 20 April 2002; UCR 1397–1398, dry, Islote Santa Cruz, 5–10 m, H. Guzman, 24 April 2002; UCR 1437, dry, Islote Almohada, Golfo de Chiriqui, 5–15 m, H. Guzman, 29 April 2002; UCR 1524, preserved, Isla Canal Afuera, 3–12 m, H. Guzman, 10 December 2001; UCR 1540, preserved, Roca Prosper, 10–20 m, H. Guzman, 11 December 2001.

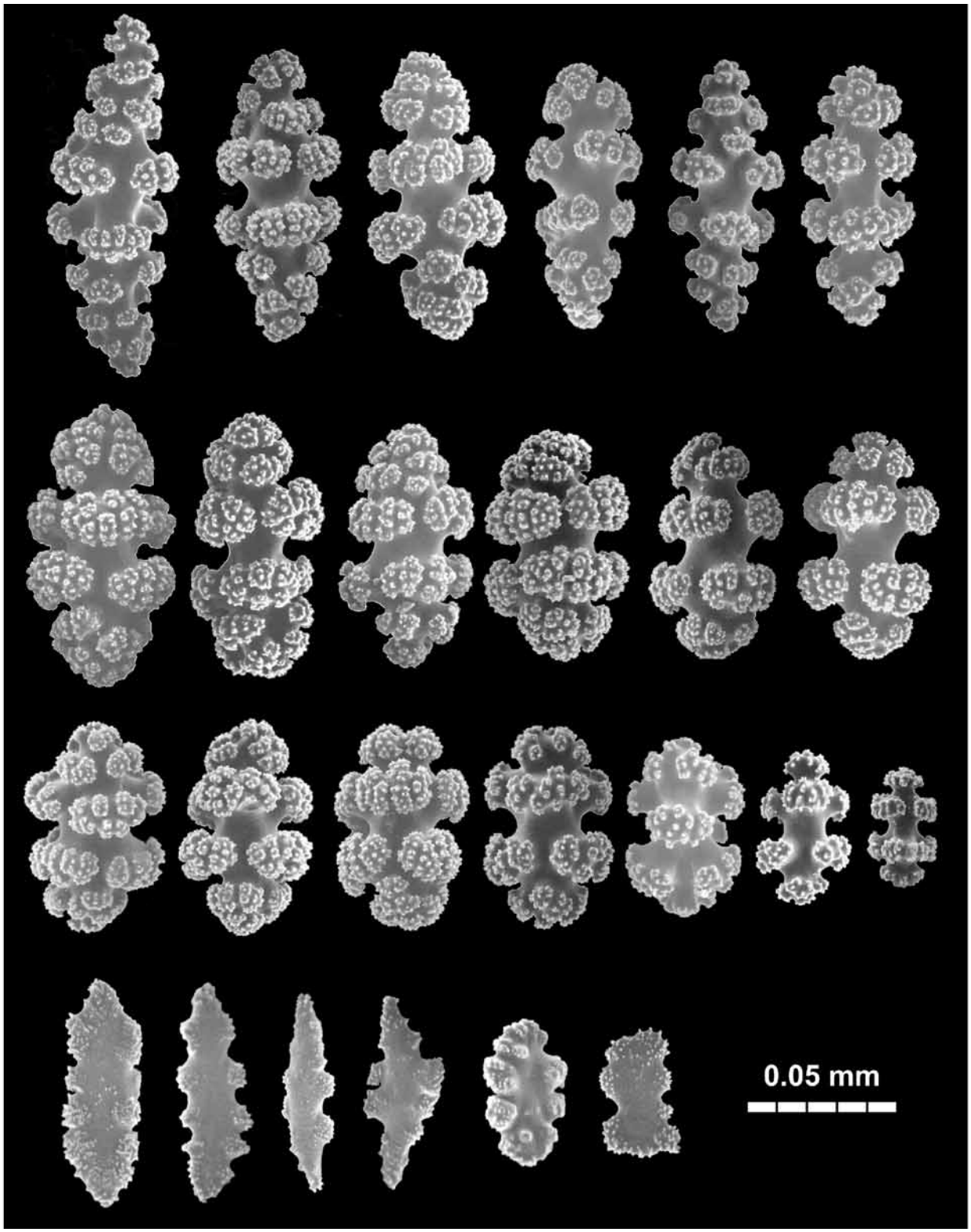

FIGURE 20. *Leptogorgia cuspidata* (MCZ 4061, lectotype), SEM coenenchymal sclerites, and anthocodial rods.