

A NEW SPECIES OF *LEPTOGORGIA* (CNIDARIA: ANTHOZOA: OCTOCORALLIA) FROM THE MEXICAN PACIFIC COAST

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ABSTRACT

The gorgoniid genus *Leptogorgia* is found along the Pacific coast of Mexico; 10 species have been reported from Baja California and Acapulco. *Leptogorgia ena* sp. nov. is a new shallow-water species found at 5–12 m depth at various high energy rocky sites along the coast of San Pedro Pochutla District, Oaxaca. Specimens of the new species were collected by scuba diving and the morphological characters were analyzed and illustrated under light and scanning electron microscopy. The new species can be distinguished from the others by the very small colony, dominance of wide capstans, barrels and double heads, low occurrence of spindles, spindles measuring < 0.10 mm, and presence of tentacular sclerites. With this report, the genus *Leptogorgia* increases to 11 species for Mexico and 26 for the eastern Pacific.

The gorgonian genus *Leptogorgia* (family Gorgoniidae) is characterized by having variable and irregular branching patterns: pinnate-like, lateral, dichotomous, or filiform; branch anastomosis is rare, and normally absent. The colonies have a horny axis, which has a narrow cross-chambered central core with a network of organic filaments frequently mineralized with deposits of carbonate hydroxylapatite forming microspheres of different sizes (Breedy and Guzman 2007). The polyps are fully retractile into the coenenchyme, forming mound-shaped protuberances that may be slightly raised, or prominent around the polyp apertures. The coenenchymal sclerites are basically capstans and/or spindles, and derivatives of them; anthocodial sclerites usually are flat rods and platelets. The color of the colonies and sclerites is variable: white, yellow, orange, red, violet, brownish, or mixtures of them, and also bicolored (Breedy and Guzman 2007).

There are 25 valid species from the eastern Pacific, which have been divided according to external morphology into three species groups (Guzman and Breedy 2008): the *Leptogorgia alba*-group, the *Leptogorgia rigida*-group, and the *Leptogorgia pumila*-group. The genus is commonly found along the Pacific coast of Mexico. Ten species have been reported primarily from Baja California and Acapulco (Verrill 1868, Harden 1979, Sinsel-Duarte 1991, Reyes-Bonilla et al. 1997, Breedy and Guzman 2007).

Herein, we describe a new species from San Pedro Pochutla District, Oaxaca, which is necessary for ecological studies and represents a contribution to the knowledge of the Mexican octocoral fauna.

MATERIALS AND METHODS

Sixteen localities along the coast of San Pedro Pochutla district, Oaxaca, between the borders of the municipalities of Tonameca (15°52'10.48"N, 97°06'44.13"W) and Santa María Colotepec (15°41'29.52"N, 96°14'13.38"W) were surveyed as part of an ongoing research to determine octocoral diversity and bathymetric distribution along the south Mexican Pacific.

Specimens were collected by scuba diving to 12 m depth. Samples were preserved in 75% ethanol. Sclerites were prepared for light and scanning electron microscopy (SEM) following the standard techniques for structural analysis (Bayer 1961, Breedy and Guzman 2002). Comparison among species is based on the characteristics of holotypes and lectotypes (Breedy and Guzman 2007, Guzman and Breedy 2008, Breedy and Cortés 2011). The holotype and paratypes were deposited in the Museo de Zoología, Universidad de Costa Rica (MZUCR, former UCR).

RESULTS

Subclass Octocorallia Haeckel, 1866

Order Alcyonacea Lamouroux, 1812

Family Gorgoniidae Lamouroux, 1812

Genus *Leptogorgia* Milne-Edwards and Haime, 1857

Leptogorgia ena new species

(Figs. 1–3)

Holotype.—MZUCR 2137, dry specimen, El Faro, Oaxaca, R Abeytia (scuba), 5–10 m, 2009.

Paratypes.—MZUCR 2136, 2138–2146, dry specimens, Secretario, Oaxaca, Mexico, R Abeytia (scuba), 5–12 m, 17 June, 2011; STRI 1137, 5 dry specimens; STRI 1148, 7 ethanol preserved specimens, same data as in the holotype.

Description.—Holotype 1.8 cm in height and 3.0 cm in width, small colony. Stem very short, about 2 mm long and 3 mm diameter, subdividing close to the substrate producing 6 stout, finger-like branches, 3 of which subdivide in secondary stout branchlets, up to 1.0 cm long. All branches 2–3 mm diameter, with tips tapered and/or bi-lobed (Fig. 1A). Holdfast encrusting, oval, 6 mm diameter. Polyps retracted completely within lobed mounds rising up to 0.5 mm from branches, having thick lip-like apertures. Polyp-mounds sparsely arranged, up to 2 mm apart, in no apparent order on all sides of branches (Fig. 1A,C). Polyps with a thick, point-like arrangement of rods at tentacles base (Fig. 2). Tentacles with fingerbiscuit and thin platelets arranged horizontally along each side. Polyps colorless, but with a violet hue given by the color of anthocodial and tentacular sclerites (Fig. 2). Sclerites all violet with various hues from dark violet to pink (Fig. 1B). Coenenchymal sclerites mostly wide capstans, barrels, and double heads up to 0.086 mm long and 0.05 mm wide, with very warty tubercles (Fig. 3B). Spindles scarce, up to 0.108 mm long and 0.048 mm wide, with 4 whorls of warty tubercles, or with other complex ornamentation (Fig. 3A). Crosses around 0.05 by 0.07 mm long (Fig. 3C). Anthocodial rods flat, up to 0.09 mm long and 0.025 mm wide, with margins lobed or indented (Fig. 3D), and sparsely covered with low warts. Tentacular rods fingerbiscuit and platelets up to 0.03 mm long and 0.01 mm wide (Fig. 3E).

Colony color dark violet, both alive and preserved.

Variability.—The examined colonies were all small, no colony being > 3 cm tall. Even though most of the colonies are uniformly dark violet, frequently with dark yellow tips (Figs. 1A, 2), there are color variants. The more common is yellow with

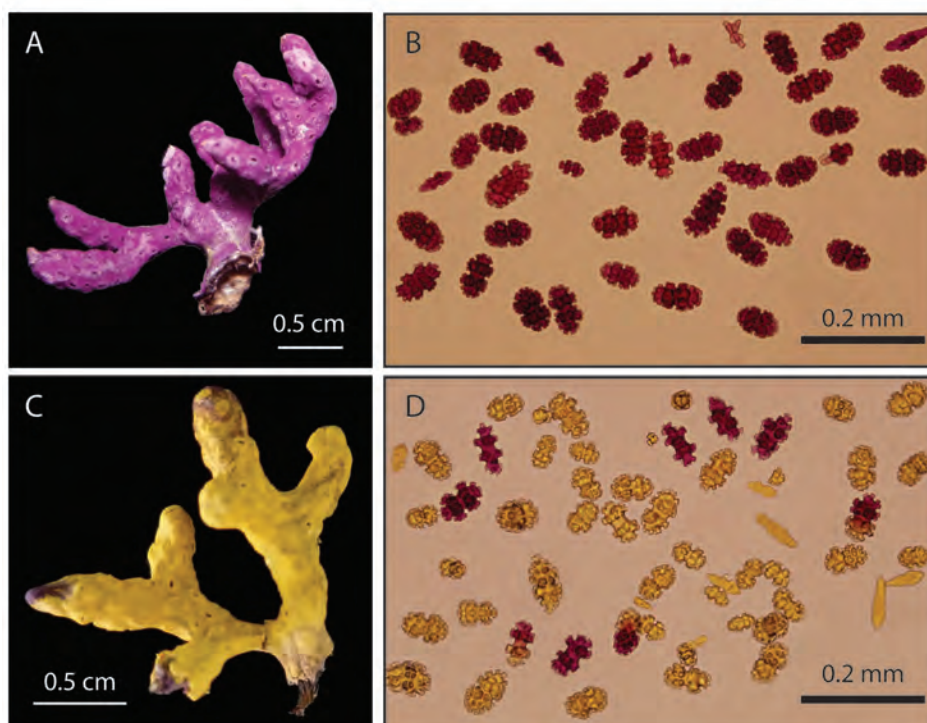


Figure 1. *Leptogorgia ena* sp. nov. (A,B) holotype; (A) entire colony; (B) sclerites; (C,D) yellow variety, paratype MZUCR 2139; (C) entire colony; (D) sclerites.

yellow sclerites or with a mixture of yellow, dark violet, and bicolor (Fig. 1C,D). But some specimens are dark violet with dark yellow anthocodial sclerites, giving an orange color to the polyps. The colony morphology and sclerites of these varieties are very consistent with the holotype.

According to the external morphology, *L. ena* fits in the *L. pumila*-group. In Table 1, we compare the new species with members of the same group, and of other *Leptogorgia* species recorded for Mexico.

Habitat.—*Leptogorgia ena* has been found patchily distributed within rock crevices, together with calcareous algae, hydroids, and sponges. The new species and *Leptogorgia cupidata* Verrill, 1865 were the most abundant octocoral species found at a range of 5–12 m depth in the studied area, providing suitable habitat for several other species (e.g., snails, crabs, ophiuroids) as well as serving as a potential indicator of community change for being in a range susceptible to fluctuation in water temperature. Most of the collected specimens have sponges growing at their bases and up to their branches. It was common to observe several colonies of *L. ena* under larger colonies of gorgonians. Other octocorals, such as *Leptogorgia alba* (Duchassaing and Michelotti, 1864) and *Leptogorgia rigida* Verrill, 1864, occur in the area; small number of colonies of *Leptogorgia exigua* Verrill, 1870, *Pacifigorgia rutila* (Verrill, 1868), *Pacifigorgia stenobrochis* (Valenciennes, 1846), and *Muricea austera* Verrill, 1868, are also present.



Figure 2. *Leptogorgia ena* sp. nov., in situ photograph, El Faro, 12 m depth.

Etymology.—From Greek ένα, number one, in allusion to the species reference name given in the field during the ecological studies (Lepto1).

Distribution.—Various sites along the coast of Oaxaca, from La Dona, Puerto Escondido to Tijera, Puerto Angel. Its occurrence toward the north is suspected but has to be confirmed.

DISCUSSION

Eleven species of *Leptogorgia*, including the new one are reported for the shallow waters of Mexico. Most of them belong to the *L. pumila*-group that seems to contain the more comparative species to the new one. However, the combination of the following features segregate *L. ena* from the other species in the group: the small colony, the dominance of wide capstans, barrels and double heads, the low occurrence of spindles, the maximum length of spindles 0.10 mm, and lastly, the presence of tentacular sclerites. The tentacular sclerites have been reported for *Leptogorgia tricolorata* Breedy and Cortés, 2011, which is similar to the new species in having a small colony that raises a small number millimeters from the substrate, but it is different in many other features, especially regarding the coenenchymal sclerites (Breedy and Cortés 2011).

The conspicuous dark violet color of *L. ena* is similar to the bluish-violet color reported for *Leptogorgia violetta* Grasshoff, 1988 which also present a bright yellow morphotype (Garasshoff 1988, 1992), and as *L. ena* both inhabit shallow water, high energy environments and consequently, are small colonies often with

Table 1. Comparative features of the new species with the *Leptogorgia pumila*-group and with the other *Leptogorgia* species in the Pacific coast of Mexico.

Species	Color			Polyp			Growth			Sclerites					
	colony	sclerites	anthocodials	bicolored	mounds	arrangement	tendency	type of branching	branches	max # of bifurcation	dominant	spindles > 0.1	max length	bent spindles	anth. rods max length
<i>Leptogorgia</i>															
<i>L. aequatorialis</i>	do	o	lo		p	cp	bu	lat	st	3	s		0.10	×	0.04
<i>L. alba</i> *	w	w	w		sr	sp	fla	lat	st	4	s	×	0.18	×	0.15
<i>L. californica</i> *	rpu	r, p, y	lo	p, y	f	sp	asc	lat	st	?	c	×	0.13	×	0.07
<i>L. christiae</i>	lo	lo	lo		p	sp	fla	pi	st	6	c	×	0.13	×	0.08
<i>L. cuspidata</i> *	pu/y	pu, dy	y	pu, dy	sr	cp	bu	lat	st	5	c	×	0.13		0.08
<i>L. diffusa</i> **	r	r, p	lo, p		p	sp	fla	spar-lat	sl	4	s	×	0.15		0.14
<i>L. exigua</i> *	br	r, p, y		r, y	sr	cp	bu	lat	st	2	c	×	0.13	×	
<i>L. florae</i>	r	r, ly	y	r, ly	p	cp	fla	pi	st	3	s	×	0.13	×	0.10
<i>L. labiata</i> **	p	p, y	y	p, y	p	cp	bu	lat	st	3	c		0.10	×	0.05
<i>L. laxa</i> *	w	w	w		sr	sp	asc	spar-lat	sl	2	s	×	0.18	×	0.10
<i>L. obscura</i> **	dv	v, p	ly		p	sp	bu	lat	st	3	c	×	0.12	×	0.06
<i>L. parva</i>	rpu	r, ly	o	r, ly	p	sp	bu	lat	st	3	c	×	0.12		0.08
<i>L. pumila</i> **	p	p, ly	o	p, ly	p	cp	bu	lat	st	3	s	×	0.15		0.15
<i>L. regis</i>	p, w	p, w	w		p	sp	bu	irr	st	4	s	×	0.14	×	0.12
<i>L. rigida</i> *	pu	pu	p		sr	sp	bu	lat	st	4	c	×	0.12		0.08
<i>L. taboquillae</i>	rpu	r	o		p	sp	fla	spar-lat	st	4	c	×	0.11		0.14
<i>L. tricolorata</i>	y	y	y	y, o	p	sp	bu	lat	st	4	s	×	0.20	×	0.11
<i>L. eta</i> sp. nov.**	dv/y	dv, p, y	p/y	dv, y	p	sp	cl	lat	st	3	c		0.10		0.09

(*) species reported for Mexico.

(**) species in the *L. pumila*-group and reported for Mexico.

color—bp, bright purple; br, brownish red; do, dark orange; dv, dark violet; dy, dark yellow; lo, light orange; light yellow, ly; o, orange; p, pink; pu, purple; r, red; rpu, reddish purple; y, yellow; w, white.

polyp—mounds: f, flat; p, prominent; sr, slightly raised; *arrangement*: cpl, closely placed; spl, sparsely placed.

growth—tendency: asc, ascending; bu, bushy; cl, cluster; fla, flabellate, fan-shaped, *type of branching*: irr, irregular, untidy; lat, lateral; pi, pinnate; spar-lat, sparse lateral, *branches*: sl, slim; st, stout.

sclerites—c, capstan; s, spindle

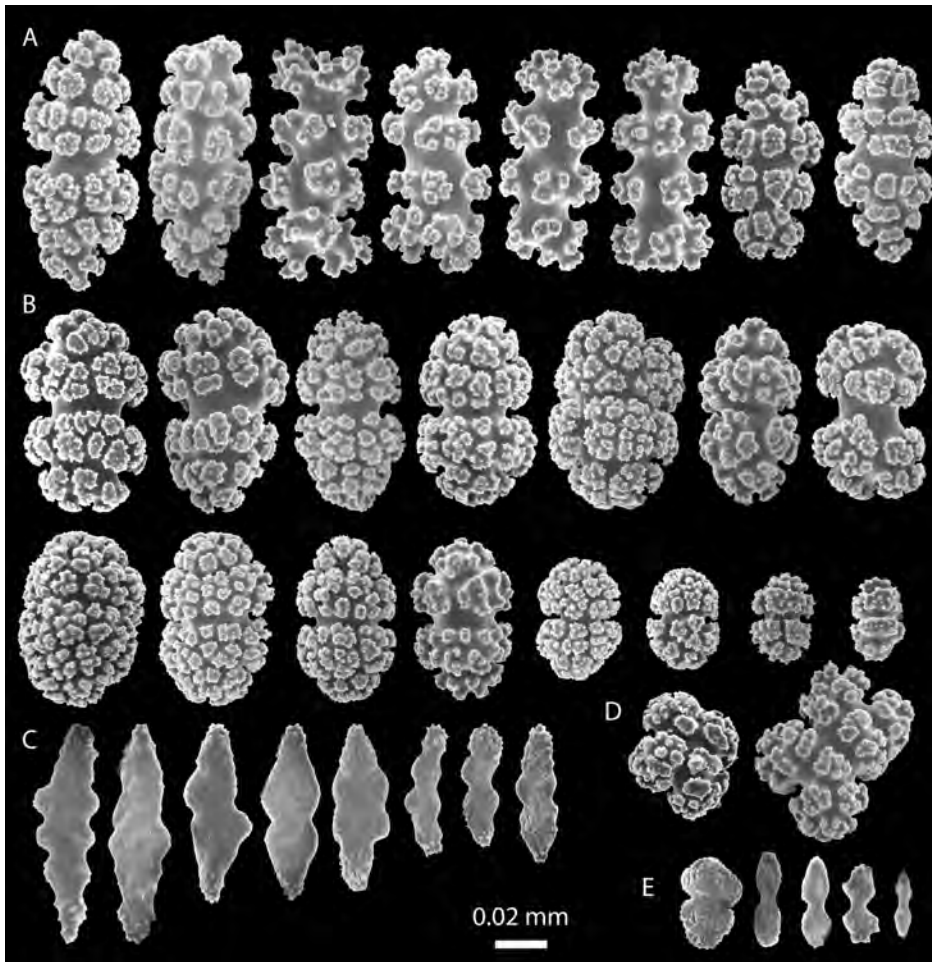


Figure 3. *Leptogorgia ena* sp. nov., holotype. (A–C) coenenchymal sclerites; (D,E) anthocodial rods.

robustly-developed, short branches. However, *L. violetta* is bushy (similar to *L. cuspidata*), reaches up to 10 cm tall, and the sclerites are mainly spindles (Garasshoff 1988, 1992) and much longer (up to 0.19 mm) than those of *L. ena*. *Leptogorgia violetta* was described from the Senegalese coast of West Africa; presently, *L. ena* is only reported for the western coast of Mexico.

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