Octocorals (Cnidaria, Anthozoa) from Reunion, with a description of two new species of the genus *Sinularia* May, 1898 and notes on the occurrence of other species

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**KEY WORDS**

**ABSTRACT**
This article is based on a recent octocoral survey conducted on the reefs of Reunion Island and on re-examination of part of an older collection (early 1970s) from there. It provides a systematic list of the octocorals and evaluates their abundance. The study describes two new species of the genus *Sinularia* May, 1898. *Sinularia shlagmani* n. sp. is characterised by relatively small clubs with a central wart and a colony with densely placed crest-like lobes. It was compared to other species of its clade featuring polyps without sclerites and clubs with distinct central wart, and found to differ from all of them in the shape of the lobes. *Sinularia tessieri* n. sp. belongs to a clade with collaret, points and tentacle-rods, and clubs with an indistinct central wart, and features an encrusting growth form. It differs from the previously described species featuring similar growth form in having distinctly longer clubs on the surface of the lobules. Based on the description of *Sarcophyton subviride* Tixier-Durivault, 1958, a discussion is provided on this species. The survey yielded in total 34 species of the families Alcyoniidae Lamouroux, 1812, Subergorgiidae Gray, 1859 and Xeniidae Ehrenberg, 1828, among which 28 are new zoogeographical records for Reunion.

**RÉSUMÉ**
Étude des octocoralliaires (Cnidaria, Anthozoa) de La Réunion avec la description de deux nouvelles espèces du genre *Sinularia* May, 1898 et des notes sur la présence d’autres espèces.

Cet article s’appuie sur une étude récente des octocoralliaires des récifs de l’île de La Réunion et sur le réexamen d’une partie d’une collection plus ancienne (du début des années 1970) originaire du même endroit. Nous fournissons ici une liste des octocoralliaires et évaluons leur abondance. L’étude contient la
INTRODUCTION

The Island of Reunion is located in the southwest of the Indian Ocean, 21°06’S and 55°32’E, north of the tropic of Capricorn, 700 km from Madagascar to the west and 180 km from Mauritius to the northeast (Fig. 1). Reunion is the southernmost of the Mascarene Islands and has fringing reefs, covering part of its leeward western littoral side (Spalding et al. 2001). The 1998 coral bleaching event had some impact on these reefs, but the recovery was good in almost all areas, reaching a stony coral cover of 30-50% after the bleaching (Goreau et al. 2000). The coral reefs there are impacted by both direct and indirect influences of the increasing human population, and are formally protected within a marine park that is routinely monitored (Tessier et al. 2008).

The octocorals of several Indian Ocean reefs have been surveyed and have so far yielded numerous new species and new zoogeographical records, such as those of the Laccadives (Van Ofwegen & Vennam 1991; Vennam & Van Ofwegen 1996), Madagascar (e.g., Verseveldt 1968, 1969, 1970, 1973), Mozambique (Benayahu & Schleyer 1996; Benayahu et al. 2003), Mauritius (Vennam & Parulekar 1994), Seychelles (Verseveldt 1976; Malyutin 1992; Van Ofwegen & Slierings 1994; Van Ofwegen 2001), South Africa (e.g., Benayahu 1993; Benayahu & Schleyer 1995) and Tanzania (Van Ofwegen & Benayahu 1992). These studies have undoubtedly demonstrated the prevalence of octocorals throughout the entire Indian Ocean reef systems.

Prior to the current study the only publication dealing with the octocorals of Reunion was that by Tixier-Durivault (1972), based on a collection conducted there in the early 1970s, and which listed 18 species. The list comprised species of the family Alcyoniidae Lamouroux, 1812: Lobophytum sarcophytoides Moser, 1919, L. variatum Tixier-Durivault, 1957, Sarcophyton ehrenbergi Von Marenzeller, 1886, S. spongiosum Thomson & Dean, 1931, Sinularia leptoclados (Ehrenberg, 1834), S. polydactyla (Ehrenberg, 1834), S. rigida var. amboinensis Burchardt, 1903 valid as S. rigida (Dana, 1846), S. simpsoni Tixier-Durivault, 1945 valid as S. erecta Tixier-Durivault, 1945, S. triaena Kolonko, 1926 valid as S. brassica May, 1898, and S. venusta Tixier-Durivault, 1970 (amendments on Sinularia species following Verseveldt 1980); Nephtheidae Gray, 1859 (four species): Stereonephthya unicolor Gray, 1862; Xeniidae Wright & Studer, 1889, parmi lesquelles 28 sont nouvellement signalées de La Réunion.

description of a new species of the genus Sinularia May, 1898. Sinularia shlagmani n. sp. se distingue par des massues relativement petites, dotées d’une verrue centrale, et une colonie avec des lobes en forme de crête densément répartis. Elle est comparée à d’autres espèces de son clade ayant des polypes sans sclérite et des massues avec une verrue centrale distincte, et en diffère par la forme des lobes. Sinularia tessieri n. sp. appartient au clade possédant une couronne, des doubles rangées et des bâtonnets sur les tentacules, des massues avec une verrue centrale indistincte et représente une forme de croissance de type encroûtant. Elle diffère des autres espèces précédemment décrites possédant des formes de croissance similaires par la taille bien plus longue des massues présentes sur la surface des lobules. Une discussion de cette espèce est fournie sur la base de la description de Sarcophyton subviride Tixier-Durivault, 1958. L’étude a permis d’identifier au total 34 espèces appartenant aux familles Alcyoniidae Lamouroux, 1812, Subergorgiidae Gray, 1859 et Xeniidae Wright & Studer, 1889, parmi lesquelles 28 sont nouvellement signalées de La Réunion.
Octocorals from Reunion

(Milne-Edwards & Haime, 1857) and Calyptrhophora japonica Gray, 1886. The subsequent taxonomic literature, however, has referred to only some of these species. Verseveldt (1977) indicated that S. rigida is known from Reunion, without referring to Tixier-Durivault’s (1972) publication. Verseveldt’s (1980, 1982, 1983) respective revisions of the genera Sinularia May, 1898, Sarcophyton Lesson, 1834 and Lobophytum Von Marenzeller, 1886 acknowledged Tixier-Durivault’s (1972) records from Reunion for some species, but not for others. Specifically, the former publications did not include Reunion as part of the geographical distribution of S. brasica, S. leptocladus, S. polydactyla, L. variatum and S. ehrenbergi. Verseveldt (1980) referred to the list of Tixier-Durivault (1972), but for some reason omitted Reunion as part of the geographical distribution of S. erecta. Notably, Verseveldt (1982) argued that Tixier-Durivault (1972) had incorrectly identified S. spongiosum. Verseveldt’s revisions referred to Tixier-Durivault (1972), with an indication that Reunion is part of the geographical distribution of S. venusta and L. sarcophytoides. The above-mentioned data indicate that there is scant information available on Reunion octocorals, as well as inaccurate data or even a complete lack of awareness of this fauna.

The present article is based on both an octocoral survey carried out in Reunion during 2006-2008, and on the re-examination of part of the original old collection from there (see Tixier-Durivault 1972). It presents a systematic list of octocorals for Reunion with reference to their abundance and distribution at the different sites. Underwater photographs are presented for most of the species. The study includes a discussion of Sarcophyton subviride Tixier-Durivault, 1958 as well as a description of two new Sinularia species, S. shlagmani n. sp. and S. tessieri n. sp.

MATERIAL AND METHODS

Material was collected, using SCUBA, by YB on a field trip conducted in April 2008 (seven days). It yielded a total of c. 140 specimens of octocorals, encompassing the variety of taxa occurring at the 11 explored sites (Fig. 1). All samples were preserved in 70% alcohol and sub-samples were removed and preserved in absolute alcohol and DMSO for future molecular studies. An additional 13 specimens that were collected at another five sites by Prof. M. Aknin (Université de La Réunion) during 2006-2008 (Fig. 1), and sent to Tel Aviv University, are also included in the current study. All collection sites are listed below, totaling 16 reefs, with their coordinates, depth surveyed, type of reef and indication of those surveyed by Aknin:

1) Saint-Paul, Pointe des Aigrettes (21°02.58’S, 55°13.00’E), 23 m;
2) Saint-Paul, Pain de Sucre (Maharani);
3) Saint-Paul, Tours de Boucan;
4) Saint-Paul, Planch’ Alizés (21°05’58.61’S, 55°13’48.81’E), 14-19 m, reef slope;
5) Saint-Paul, l’Ermitage face au ponton au kiosque (21°04’10.33’S, 55°13’26.41’E), 20-29 m, reef slope;
6) Saint-Leu, Récif des Colimaçons (21°01’02.90’S, 55°14’15.49’E), 17 m, reef slope;
7) Saint-Paul, Cap la Houssaye (21°01’02.90’S, 55°14’15.49’E), 17 m, reef slope;
8) Saint-Leu, Pointe au Sel;
9) Saint-Pierre, Terre Sainte;
10) Saint-Leu, Pointe des Châteaux;

Fig. 1. — Map of Reunion showing locations of study sites:
1, Saint-Paul, Pointe des Aigrettes; 2, Saint-Paul, Pain de Sucre (Maharani); 3, Saint-Paul, Tours de Boucan; 4, Saint-Paul, Planch’ Alizés; 5, Saint-Paul, l’Ermitage face au ponton au kiosque; 6, Saint-Leu, Récif des Colimaçons; 7, Saint-Paul, Cap la Houssaye; 8, Saint-Leu, Pointe au Sel; 9, Saint-Pierre, Terre Sainte; 10, Saint-Leu, Pointe des Châteaux; 11, Saint-Leu, Récif Pointe au Sel; 12, Passe de l’Ermitage; 13, l’Ermitage, 30 km from St-Denis; 14, Grande Ravine; 15, Saint-Leu, Place Arche; 16, Anse des Cascades.
In total, the study of the recent collections (2006-2008) and re-examination of the old one (Tixier-Durivault 1972) have yielded 34 species of the families Alcyoniidae, Subergorgiidae Gray, 1859 and Xeniidae, including Sinularia shlagmani n. sp. and S. tessieri n. sp.

Re-examination of MNHN specimens revealed that six had been erroneously identified by Tixier-Durivault (1972). The original identifications have been corrected as follows: L. sarcophytoides and L. variatum to L. depressum Tixier-Durivault, 1966; S. spongiosum to L. crassum Von Marenzeller, 1886; S. polydactyla to S. shlagmani n. sp.; S. venusta to S. hirta (Pratt, 1903) and X. elongata to Xenia lilieae Roxas, 1933. The identification of S. erecta has been confirmed (see above).

SYSTEMATICS

In total, the study of the recent collections (2006-2008) and re-examination of the old one (Tixier-Durivault 1972) have yielded 34 species of the families Alcyoniidae, Subergorgiidae Gray, 1859 and Xeniidae, including Sinularia shlagmani n. sp. and S. tessieri n. sp.

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Order ALCYONACEA Lamouroux, 1812
Family ALCYONIIDAE Lamouroux, 1812
Genus Sarcophyton Lesson, 1834

Sarcophyton subviride Tixier-Durivault, 1958
(Figs 2-4; 14E, F)

MATERIAL EXAMINED. — ZMTAU Co 34408 and 4 microscope slides, Co 34411 (2 colonies), Saint-Paul, l’Ermitage face au ponton au kiosque (21°04’10.33’S, 55°12’58.46’E), reef slope, 12-17 m, reef slope;

9) Saint-Pierre, Terre Sainte (21°20’52.25’S, 55°28’49.62’E), 1 m, reef flat;
10) Saint-Leu, Pointe des Châteaux (21°09’04.39’S, 55°16’12.47’E), 14-20 m, reef slope;
11) Saint-Leu, Récif Pointe au Sel (Cimetière) (21°11’26.29’S, 55°16’59.27’E), 16-20 m, reef slope;
12) Passe de l’Ermitage (21°05.190’S, 55°13.239’E), 17 m (M. Aknin);
13) L’Ermitage, 30 km from St-Denis (21°05.586’S, 55°13.239’E), 15-20 m (M. Aknin);
14) Grande Ravine (21°07.922’S, 55°16.095’E), reef slope, 16-20 m (M. Aknin);
15) Saint-Leu, Place Arche (21°12.364’S, 55°16.818’E), 26 m (M. Aknin);

An inquiry to the MNHN yielded eight specimens, out of the 18 listed by Tixier-Durivault (1972) for Reunion. They were re-examined and are included in the current study. In order to identify all the material, sclerites from different parts of the colony were obtained by dissolving the tissues in 10% sodium hypochlorite, followed by rinsing in fresh water. When appropriate, they were prepared for scanning electron microscopy as follows: the sclerites were carefully rinsed with double-distilled water, dried at room temperature, coated with gold and examined with a Jeol 6480LV electron microscope, operated at 10 kV.

Identification of species was facilitated by comparisons with permanent sclerite preparations of type material kept in the ZMTAU and the RMNH. The material is deposited at ZMTAU, RMNH and MNHN as indicated below. A few members of the family Nephtheidae as well as of the genus Metalcyonum Pfeffer, 1889 and Carioja Müller, 1867 were also collected and are still being examined.

ABBREVIATIONS

MNH MUSÉUM NATIONAL D’HISTOIRE NATURELLE, PARIS;
RMNH NATURALIS BIODIVERSITY CENTER (NBC), FORMERLY RIJKSMUSEUM VAN NATUURLIJKE HISTORIE, LEIDEN;
ZMTAU ZOOLOGICAL MUSEUM, DEPARTMENT OF ZOOLOGY, TEL AVIV UNIVERSITY.
Surface of polyparium with clubs, smallest 0.09 mm long and longest up to 0.30 mm (Fig. 3C). Clubs featuring ill-defined head and tubercular prominences, also along handles. Interior polyparium with slender tubercular spindles, some slightly curved, up to 0.58 mm long (Fig. 3D).

Surface of base with tubercular clubs, 0.11-0.16 mm long (Fig. 4A) and spindles 0.10-0.17 mm long featuring zoned tubercles (Fig. 4B). Interior of base containing tubercular spindles, including stout and oval ones, up to 0.41 mm long (Fig. 4C).

**Colour**
In alcohol, preserved specimen beige with light brown stalk.

**Living features**
Colonies with beige-yellowish polyps; folded margins evident (Fig. 14E, F).

**Variability**
The paratypes differ in size: RMNH Coel 40121 with a maximum cross-section of 6 × 6 cm and a height of up to 3 cm; ZMTAU Co 34461: 2 colonies, 4.5 × 2.5 × 2.5 cm and 3 × 2.5 × 2 cm respectively; ZMTAU Co 34411: 2 colonies, 5 × 4 × 2 cm and 5.5 × 4.5 × 2.4 cm respectively.

**Remarks**
Verseveldt (1982) redescribed the type of *S. subviride*. The colony shape of the type therein (pl. 22, fig. 2) resembles the currently examined colonies, although many of the polyps are not retracted. The redescription referred to flat tentacle rods and additional rods, arranged en chevron, corresponding to the polyp points (p. 78), but neither type of sclerites was depicted by Verseveldt (1982). We examined polyp mounts of the types deposited at RMNH and confirmed that the polyp sclerites there correspond to those depicted in the current description (Fig. 3A, B). Unfortunately, most taxonomists examining *Sarcophyton* species have overlooked the polyp sclerites and therefore excluded them from the original descriptions. This also applies to Verseveldt’s 1982 revision of the genus, with the exception of *S. pulchellum* (Tixier-Durivault, 1957) (fig. 26 therein). Later descriptions of new *Sarcophyton* species indicated an absence of polyp sclerites (e.g., *S. nanwanensis* Benayahu & Perkol-Finkel, 2004 and *S. tumulosum* Benayahu & Van Ofwegen, 2009). These sclerites might be an important taxonomic feature, as has been proven for the speciose genus *Sinularia* (e.g., Van Ofwegen 2008).

The sclerites of the examined material are in general agreement with the description of the type of *S. subviride* (see Verseveldt 1982: 78, 79). However, in the surface of the base we found clubs, up to 0.16 mm long (Fig. 4A); whereas, according to Verseveldt, in the type they are up to 0.30 mm long. Similarly, the spindles of the base (Fig. 4C) are shorter compared to the type (up to 0.41 vs 0.6 mm, respectively). We consider these differences as reflecting intra-specific variation within *S. subviride*. Notably, our material constitutes the second finding of *S. subviride* since the collection of the type in Aldabra Island (north of Madagascar); and with its current finding in Reunion, it seems to have a bi-equatorial Indian Ocean distribution.

Genus *Sinularia* May, 1898

*Sinularia shlagmani* n. sp.
(Figs 5-7; 16E)

*Sinularia conferta* – Tixier-Durivault 1945: 61; 1951: 45 (Mascate).

*Sinularia polydactyla* – Tixier-Durivault 1972: 60 (Reunion; see begin of Systematics).
Fig. 3. — *Sarcophyton subviride* Tixier-Durivault, 1958 (ZMTAU Co 34408): A, scale- and rod sclerites of tentacle; B, point sclerites of polyp; C, D, sclerites of polyparium; C, clubs of surface layer; D, tubercular spindles of interior. Scale bars: 0.10 mm.
Fig. 4. — Sarcophyton subviride Tixier-Durivault, 1958 (ZMTAU Co 34408): A-C, sclerites of base; A, tubercular clubs of surface; B, spindles with zoned tubercles of surface; C, tubercular spindles and ovals of interior. Scale bars: 0.10 mm.
Not *Sinularia conferta* (Dana, 1846): 621.


Not *Sinularia polydactyla* (Ehrenberg, 1834): 58.


**Type Locality.** — Reunion, Saint-Paul, Récif des Colimaçons.


**Etymology.** — The species is named after Alex Shlagman, collection manager, Zoological Museum, Tel Aviv University, in appreciation of his dedication and professional curatorial work, particularly in the octocoral collection.

**Description.** Holotype: an encrusting colony, split into two parts, with a maximum cross-section 12 × 9 cm and height up to 4 cm (Fig. 5). Polyparium consisting of rather short, laterally flattened and closely-set crest-like lobes. All polyps retracted. Colony with a hard texture.

Surface layer of the lobes containing sclerites with tubercles, up to 0.06 mm long (Fig. 6A) and
Fig. 6. — *Sinularia shlagmani* n. sp., holotype (ZMTH Co 34418): **A-C**, sclerites of surface layer of lobules; **A**, sclerites with tubercles; **B**, clubs with central wart; **C**, intermediate forms to spindles; **D**, spindles of interior lobe; **E-G**, tubercles on spindles; **E**, simple tubercle; **F**, complex tubercle; **G**, sparsely placed. Scale bars: **A-C**, 0.10 mm; **D**, 1 mm.
clubs with a central wart and tubercles on handle, up to 0.09 mm long (Fig. 6B). Additionally, with longer clubs, intermediate forms to spindles, up to 0.25 mm long (Fig. 6C).

Interior of the lobes with spindles, some branched, up to 3 mm long (Fig. 6D), with simple tubercles (Fig. 6E), or complex ones, either densely (Fig. 6F) or sparsely (Fig. 6G) placed.

Surface layer of base of colony containing clubs, mostly with central wart, similar to those of lobes, but wider, some with tubercles on handle, 0.07-0.10 mm long (Fig. 7A), also with spindles, up to 0.21 mm long (Fig. 7B).

Interior of the base with spindles, the small ones branched, up to 2.2 mm long (Fig. 7C), with large tubercles (Fig. 7D), or smaller ones (Fig. 7E).

**Colour**

Preserved holotype grey-beige.

**Living features**

The colony is beige in colour (Fig. 16F).

**Variability**

Paratypes differ in size: ZMTAU Co 34417 maximum cross-section of 7 × 7.5 cm and height of up to 5 cm; ZMTAU Co 34447: 2 colonies, 12 × 9.5 × 6.5 cm and 9 × 9 × 7 cm; and ZMTAU Co 34470 7 × 6 × 5 cm respectively.

**Remarks**

*Sinularia shlagmani* n. sp. belongs to *Sinularia* clade 4C and 4D of McFadden et al. (2009): polyps without sclerites, clubs with central wart distinct. This clade includes, among others, species with encrusting colonies and most clubs in the surface layer of the polyparium < 0.10 mm, similar to the holotype and the paratypes of *S. shlagmani* n. sp. Among the previously described species with these features are *S. crebra* Van Ofwegen, 2008, *S. gibberosa* Tixier-Durivault, 1970, *S. nanolobata* Verseveldt, 1977 and *S. ovispiculata* Tixier-Durivault, 1970 (for the second and the latter species see Verseveldt 1980). These species have knob-shaped lobules, and thus differ from *S. shlagmani* n. sp. The following encrusting species feature finger-like lobes: *S. acetabulata* Verseveldt & Turch, 1979, *S. deformis* Tixier-Durivault, 1969, *S. pavida* Tixier-Durivault, 1970, *S. scabra* Tixier-Durivault, 1970 (for the last three species see Verseveldt 1980) and they also differ from *S. shlagmani* n. sp.

Similarly, *S. siaesensis* Van Ofwegen, 2008 and *S. microclavata* Tixier-Durivault, 1969 (for the latter see Verseveldt 1980) feature compound lobes that also differ from the newly-described species. *Sinularia compressa* Tixier-Durivault, 1945 and *S. inflata* Tixier-Durivault, 1970 have small lobules, either finger-like or knob-shaped (see Verseveldt 1980).

*Sinularia conferta* has long branched lobes (see Verseveldt 1980: pl. 6), but unfortunately the type has not been found, leading to various misleading conclusions in this species’ diagnosis (see Verseveldt 1980: 31-35). Until Dana’s type will be appropriately described, its taxonomic position, including its clade allocation, remains in doubt. Nonetheless, the clear difference between the lobes of *S. conferta* and *S. shlagmani* n. sp. (long branched lobes vs densely placed crests) leads to the conclusion that the two are separate species. It is thus evident that *S. shlagmani* n. sp. differs from all previously described *Sinularia* species of clade 4C and 4D in the shape of the lobes.

We have re-examined the two specimens from Tanzania identified as *S. “conferta”* by Van Ofwegen & Benayahu (1992). They show polyp sclerites and belong to clade 5B of McFadden et al. (2009): polyps with collaret and point sclerites, tentacles with rods, clubs with central wart distinct. In this clade we could not find a species with the characteristics of the Tanzanian specimens and we now regard these specimens as belonging to a yet undescribed species.

**Sinularia tessieri** n. sp.

(Figs 8-11; 16F, G)

**Type material.** — Holotype: ZMTAU Co 34502 and 4 microscope slides, Saint-Leu, Récif Pointe au Sel (Cimetière) (21°11'26.29"S, 55°16'59.27"E), reef slope, 16-20 m, 11.IV.2008.

**Paratype:** RMNH Coel 40120, same data as holotype.

**Type locality.** — Reunion, Saint-Leu, Récif Pointe au Sel (Cimetière).
Fig. 7. — Sinularia shlagmani n. sp., holotype (ZMTAU Co 34418): A, B, sclerites of surface layer of base; A, clubs; B, spindles; C, spindles of interior base; D, E, tubercles on spindles; D, large tubercles; E, small tubercles. Scale bars: A, B, 0.10 mm; C, 1 mm.
poorly developed club-heads and up to 0.17 mm long (Fig. 9B). Collaret consisting of spindles, the longer ones slightly bent, up to 0.20 mm long (Fig. 9C).

Surface layer of the lobules containing clubs with warty heads and tubercles on handle, 0.07-0.16 mm long (Fig. 9D) and with a few crosses (Fig. 9E). In addition with spindles, up to 0.26 mm long, mostly with simple or, less commonly, complex tubercles (Fig. 9F).

Surface layer of base of colony containing clubs, similar to those of lobules, but wider, 0.10-0.20 mm long (Fig. 10A). Also spindles, up to 0.26 mm long (Fig. 10B).

Interior of the lobules with branched stout spindles, up to 2.70 mm long (Fig. 11A), with complex tubercles (Fig. 11B), or with simple ones (Fig. 11C). Interior of base with slightly longer spindles,

DISTRIBUTION. — So far known only from the type locality.

ETYMOLOGY. — The species is named after Dr Emmanuel Tessier, Manager, Association Parc marin de La Réunion, in appreciation of his initiative to conduct the octocoral survey in Reunion and his support during the field work and afterwards.

DESCRIPTION

Holotype: an encrusting colony, with maximum cross-section of 7 × 4 cm and height up to 4 cm (Fig. 8A). Polyparium consisting of short lobes and a few longer ones that may branch off once. Lobes and lobules mostly flattened, or occasionally knob-shaped, and in part tending to bend down towards each other. Colony with a hard texture.

Polyps with tentacle rods and some collaret and point sclerites (Fig. 9A-C). Tentacle rods up to 0.08 mm long (Fig. 9A). Point sclerites with...
Fig. 9. — *Sinularia tessieri* n. sp., holotype (ZMTAU Co 34502): A-C, polyp sclerites; A, tentacle rods; B, point sclerites; C, collaret spindles; D-F, sclerites of surface layer of lobules; D, clubs with wart heads; E, crosses; F, spindles. Scale bar: 0.10 mm.
Paratype RMNH Coel 40120 differs in size of colony: maximum cross section $6 \times 5$ cm and height of up to 2 cm (Fig. 8B).

**Variability**

Preserved holotype dark brown, almost black.

**Remarks**

*Sinularia tessieri* n. sp. belongs to *Sinularia* clade 2 of McFadden *et al.* (2009): polyps with collaret, points and tentacle rods; clubs with an indistinct occasionally branched, up to 3.30 mm long (Fig. 11D), with complex tubercles (Fig. 11E).

**Colour**

Preserved holotype dark brown, almost black.

**Living features**

The colony is light-grey in colour, expanded polyps are light-beige.
Fig. 11. — *Sinularia tessieri* n. sp., holotype (ZMTAU Co 34502): A, spindles of interior lobules; B, C, tubercles on spindles of interior lobules; B, complex tubercles; C, simple tubercles; D, spindles of interior base; E, complex tubercles on spindle of interior base. Scale bar: 1 mm.
features clubs up to 0.25 mm long. Moreover, the stalked species of that clade differ from *S. tessieri* n. sp. *Sinularia grandilobata* Verseveldt, 1980 has clubs up to 0.10 mm long compared to up to 0.17 mm in the newly-described species. The clubs of *S. capricornis* Dautova, Van Ofwegen & Savinkin, 2010 are up to 0.18 mm long and the species features un-branched spindles in the interior of the lobes, as opposed to the stout and heavily branched ones of *S. tessieri* n. sp. (Fig. 11A). Notably, the latter stout spindles of *S. tessieri* n. sp. are not found in any of the species of clade 2. It is thus concluded that *S. tessieri* n. sp. differs from all previously-described species of clade 2.

**FURTHER NOTES**

The taxonomic results (given below) enabled analysis of octocoral abundance and distribution on the Reunion reefs. Table 1 presents the generic affiliation of the identified octocorals and the abundance estimates of the various genera on the reefs following the categories presented in Benayahu (1995) (for the latter, Tixier-Durivault’s 1972 material is excluded), assigned to one of the four categories: rare, sporadic, abundant or dominant. The results indicate that the vast majority of the species on the reefs are of *Sinularia*, followed by *Sarcophyton* and *Lobophytum* (family Alcyoniidae).

The reef sites surveyed in 2006-2008 (Fig. 1) varied in respect to their number of octocoral species (Table 2). Although these collections were qualitative, it was anticipated that they would encompass all the taxa encountered during the dives, thus allowing us to identify sites with a relatively high octocoral diversity. Each of the following sites featured at least 10 species: Saint-Leu, Pointe des Châteaux (19 species), Saint-Paul, Planch’ Alizés (12) and Saint-Paul, Pain de Sucre (Maharani) (11).

**CLASSIFICATION**

Family **Alcyoniidae** Lamouroux, 1812  
Genus **Cladiella** Gray, 1869

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Table 1. — Generic affiliation and abundance estimates of the octocoral genera of Reunion.

<table>
<thead>
<tr>
<th>Genus</th>
<th>Nb of species</th>
<th>Abundance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anella Gray, 1858</td>
<td>1</td>
<td>Rare</td>
</tr>
<tr>
<td>Cladiella Gray, 1869</td>
<td>3</td>
<td>Sporadic</td>
</tr>
<tr>
<td>Klyxum Alderslade, 2000</td>
<td>2</td>
<td>Rare</td>
</tr>
<tr>
<td>Lobophytum von Marenzeller, 1886</td>
<td>5</td>
<td>Abundant</td>
</tr>
<tr>
<td>Rhizisma Alderslade, 2000</td>
<td>1</td>
<td>Rare</td>
</tr>
<tr>
<td>Sarcophyton Lesson, 1834</td>
<td>6</td>
<td>Abundant</td>
</tr>
<tr>
<td>Sinularia May, 1898</td>
<td>14</td>
<td>Dominant</td>
</tr>
<tr>
<td>Subergorgia Gray, 1857</td>
<td>1</td>
<td>Rare</td>
</tr>
</tbody>
</table>

Table 2. — Number of octocoral species recorded at the respective sites.

<table>
<thead>
<tr>
<th>Location</th>
<th>Nb of species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Saint-Paul, Pointe des Aigrettes</td>
<td>4</td>
</tr>
<tr>
<td>2. Saint-Paul, Pain de Sucre (Maharani)</td>
<td>11</td>
</tr>
<tr>
<td>3. Saint-Paul, Tours de Boucan</td>
<td>7</td>
</tr>
<tr>
<td>4. Saint-Paul, Planch’ Alizés</td>
<td>12</td>
</tr>
<tr>
<td>5. Saint-Paul, L’Ermitage face au ponton kiosque</td>
<td>8</td>
</tr>
<tr>
<td>6. Saint-Leu, Récif des Colimaçons</td>
<td>1</td>
</tr>
<tr>
<td>7. Saint-Paul, Cap la Houssaye</td>
<td>9</td>
</tr>
<tr>
<td>8. Saint-Leu, Pointe au Sel</td>
<td>10</td>
</tr>
<tr>
<td>9. Saint-Pierre, Terre Sainte</td>
<td>1</td>
</tr>
<tr>
<td>10. Saint-Leu, Pointe des Châteaux</td>
<td>19</td>
</tr>
<tr>
<td>11. Saint-Leu, Récif Pointe au Sel (Cimetière)</td>
<td>15</td>
</tr>
<tr>
<td>12. Passe de l’Ermitage</td>
<td>4</td>
</tr>
<tr>
<td>13. L’Ermitage, 30 km from St-Denis</td>
<td>6</td>
</tr>
<tr>
<td>14. Grande Ravine</td>
<td>9</td>
</tr>
<tr>
<td>15. Saint-Leu, Place Arche</td>
<td>1</td>
</tr>
<tr>
<td>16. Anse des Cascades</td>
<td>1</td>
</tr>
</tbody>
</table>

Central wart. Both the holotype and paratype are encrusting (i.e. lack a stalk). The previously described three species (*S. parva* Tixier-Durivault, 1970, *S. muqebiae* Verseveldt & Benayahu, 1983 and *S. soongi* Benayahu & Van Ofwegen, 2011) with encrusting growth form in this clade have distinctly longer and differently-shaped clubs on the surface of their lobules than in *S. tessieri* n. sp. In *S. parva* the clubs are up to 0.30 mm and some are even 0.40 mm long (see Verseveldt 1980). Similarly, *S. muqebiae* has clubs up to 0.32 mm, with narrow head, and a more slender and pointed handle compared to those of *S. tessieri* n. sp. The recently described *S. soongi*, which also belongs to *Sinularia* clade 2,
**Fig. 12.** — Live colonies of: **A**, *Cladiella australis* (Macfadyen, 1936); **B**, *Cladiella kashmani* Benayahu & Schleyer, 1996; **C**, *Cladiella krempfi* (Hickson, 1919); **D**, *Klyxum adii* Benayahu & Perkol-Finkel, 2010; **E**, *Klyxum flaccidum* Tixier-Durivault, 1966; **F**, *Lobophytum crassum* Von Marenzeller, 1886.

**Cladiella australis** (Macfadyen, 1936) 
(Fig. 12A)

*Material examined.* — ZMTAU Co 34402 (2 colonies), Saint-Paul, Planch’ Alizés (21°05’58.61”S, 55°13’48.81”E), reef slope, 14-19 m, 7.IV.2008.

**Cladiella kashmani** Benayahu & Schleyer, 1996 
(Fig. 12B)

*Material examined.* — ZMTAU Co 34413, Saint-Paul, l’Ermitage face au ponton au kiosque (21°04’10.33”S, 55°12’58.46”E), reef slope, 14-19 m, 7.IV.2008.
**Lobophytum depressum** Tixier-Durivault, 1966 (Fig. 13A, B)


**Genus Klyxum** Alderslade, 2000

**Klyxum adii** Benayahu & Perkol-Finkel, 2010 (Fig. 12D)

**Material examined.** — ZMTAU Co 34488 (4 colonies), Saint-Leu, Récif Pointe au Sel (Cimetière) (21°11’26.29” S, 55°16’59.27” E), reef slope, 16-20 m, 11.IV.2008.

**Klyxum flaccidum** Tixier-Durivault, 1966 (Fig. 12E)


**Genus Lobophytum** Von Marenzeller, 1886

**Lobophytum crassum** Von Marenzeller, 1886 (Fig. 12F)


**Lobophytum latilobatum** Verseveldt, 1971 (Fig. 13C, D)


**Lobophytum patulum** Tixier-Durivault, 1966

**Material examined.** — ZMTAU Co 33853, l’Ermitage, 30 km from St-Denis (21°05’58.61” S, 55°13’23.9” E), 15-20 m, XII.2006, leg. M. Aknin.

**Lobophytum pauciflorum** (Ehrenberg, 1834) (Fig. 13E)

**Material examined.** — ZMTAU Co 34498, Saint-Leu, Récif Pointe au Sel (Cimetière) (21°11’26.29” S, 55°16’59.27” E), reef slope, 16-20 m, 11.IV.2008. — ZMTAU Co 34381 (2 colonies), Saint-Paul, Tours de Boucan (21°01’30.87” S, 55°13’26.41” E), reef slope,
Genus *Rhytisma* Alderslade, 2000

*Rhytisma fulvum fulvum* (Forskål, 1775)

(Fig. 13F)

Material examined. — ZMTAU Co 34419, Saint-Paul,


Fig. 13. — Live colonies of: **A, B**, *Lobophytum depressum* Tixier-Durivault, 1966; **A**, with extended polyps; **B**, with retracted polyps; **C, D**, *Lobophytum latilobatum* Verseveldt, 1971; **C**, with extended polyps; **D**, with retracted polyps; **E**, *Lobophytum pauciflorum* (Ehrenberg, 1834); **F**, *Rhytisma fulvum fulvum* (Forskål, 1775).

**Sarcophyton flexuosum** Tixier-Durivault, 1966

*(Fig. 14A)*


**Sarcophyton roseum** Pratt, 1903

*(Fig. 14D)*

*Material examined.* — ZMTAU Co 34422, Co 34428, Saint-Paul, Cap la Houssaye (21°01'02.90"S, 55°14'15.49"E), reef slope, 7-17 m, 8.IV.2008.

**Sarcophyton subviride** Tixier-Durivault, 1958

*(Fig. 14E)*


**Sarcophyton infundibuliforme** Tixier-Durivault, 1958

*(Fig. 14C)*


**Genus Sarcophyton** Lesson, 1834

**Sarcophyton cherbonieri** Tixier-Durivault, 1958


**Genus Sinularia** May, 1898

**Sinularia brassica** May, 1898

*(Fig. 15A)*

*Material examined.* — ZMTAU Co 34375 (2 colonies), Saint-Paul, Pointe au Sel (21°12'17.54"S, 55°16'12.47"E), reef slope, 11 m, 3.IV.2008.
Sinularia compressa Tixier-Durivault, 1945

Material examined. — ZMTAU Co 34468, Saint-Leu, Pointe des Châteaux (21°09’04.39”S, 55°16’12.47”E), reef slope, 14-20 m, 10.IV.2008.

Sinularia densa Whitelegge, 1897
(Fig. 15B)

Material examined. — ZMTAU Co 34380 (2 colonies), Saint-Paul, Tours de Boucan (21°01’30.87”S, 55°13’26.41”E), reef slope, 14-20 m, 10.IV.2008.
Benayahu Y. & Van Ofwegen L. P

**Sinularia hirta** (Pratt, 1903) (Fig. 15E)

**Material examined.** — ZMTAU Co 34379 (2 colonies), Saint-Paul, Pain de Sucre (Maharani) (21°01'22.33'S, 55°13'40.95'E), reef slope, 20-29 m, 4.IV.2008. — ZMTAU Co 34382, Co 34425 (2 colonies), Saint-Leu, Pointe au Sel (21°12'17.54'S, 55°16'48.90'E), reef slope, 14-20 m, 10.IV.2008. — ZMTAU Co 33854, l’Ermitage, 30 km from St-Denis (21°05.586’S, 55°13.239’E), 15-20 m, XII.2006, leg. M. Aknin. — MNHN, Saint-Pierre, lagoon, leg. G. Faure.

**Sinularia birta** (Pratt, 1903) (Fig. 15F)


**Sinularia nanolobata** Verseveldt, 1977 (Fig. 16B)

**Material examined.** — ZMTAU Co 34469 (2 colonies), Saint-Leu, Pointe des Châteaux (21°01'02.90’S, 55°14'15.49’E), reef slope, 7 m, 8.IV.2008.
Octocorals from Reunion

XII.2006, leg. M. Aknin. — ZMTAU Co 34382 (3 colonies), Co 34385 (2 colonies), Saint-Paul, Tours de Boucan (21°01′30.87″S, 55°13′26.41″E), reef slope, 20-29 m, 4.IV.2008. — ZMTAU Co 34376 (3 colonies), Saint-Paul, Pain de Sucre (Maharani) (21°01′22.33″S, 55°13′40.95″E), reef slope, 5 m, 3.IV.2008. — ZMTAU Co 34415 (2 colonies), Saint-Paul, l’Ermitage face au ponton au kiosque (21°04′10.33″S, 55°12′58.46″E),

Material examined. — ZMTAU Co 34479, Co 34500, Co 34483, Saint-Leu, Récif Pointe au Sel (Cimetière) (21°11′26.29″S, 55°16′59.27″E), reef slope, 16-20 m, 11.IV.2008. — ZMTAU Co 33860, l’Ermitage, 30 km from St-Denis (21°05′58.6″S, 55°13′23.9″E), 15-20 m, XII.2006, leg. M. Aknin. — ZMTAU Co 34382 (3 colonies), Co 34385 (2 colonies), Saint-Paul, Tours de Boucan (21°01′30.87″S, 55°13′26.41″E), reef slope, 20-29 m, 4.IV.2008. — ZMTAU Co 34376 (3 colonies), Saint-Paul, Pain de Sucre (Maharani) (21°01′22.33″S, 55°13′40.95″E), reef slope, 5 m, 3.IV.2008. — ZMTAU Co 34415 (2 colonies), Saint-Paul, l’Ermitage face au ponton au kiosque (21°04′10.33″S, 55°12′58.46″E),

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**Sinularia numerosa** Tixier Durivault, 1970

(Fig. 16C)

Material examined. — ZMTAU Co 34479, Co 34500, Co 34483, Saint-Leu, Récif Pointe au Sel (Cimetière) (21°11′26.29″S, 55°16′59.27″E), reef slope, 16-20 m, 11.IV.2008. — ZMTAU Co 33860, l’Ermitage, 30 km from St-Denis (21°05′58.6″S, 55°13′23.9″E), 15-20 m, XII.2006, leg. M. Aknin. — ZMTAU Co 34382 (3 colonies), Co 34385 (2 colonies), Saint-Paul, Tours de Boucan (21°01′30.87″S, 55°13′26.41″E), reef slope, 20-29 m, 4.IV.2008. — ZMTAU Co 34376 (3 colonies), Saint-Paul, Pain de Sucre (Maharani) (21°01′22.33″S, 55°13′40.95″E), reef slope, 5 m, 3.IV.2008. — ZMTAU Co 34415 (2 colonies), Saint-Paul, l’Ermitage face au ponton au kiosque (21°04′10.33″S, 55°12′58.46″E),
Fig. 16. — Live colonies of: A, Sinularia muralis May, 1899; B, Sinularia nanolobata Verseveldt, 1977; C, Sinularia numerosa Tixier-Durivault, 1970; D, Sinularia peculiaris Tixier-Durivault, 1970; E, Sinularia shlagmani n. sp.; F, G, Sinularia tessieri n. sp.; F, with extended polyps; G, with retracted polyps.

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Sinularia peculiaris Tixier-Durivault, 1970
(Fig. 16D)


Sinularia peculiaris n. sp.
(Fig. 16E)


Sinularia tessieri n. sp.
(Fig. 16F, G)


Sinularia variabilis
Tixier-Durivault, 1945


Family SUBERGORGIIDAE Gray, 1859
Genus Annella Gray, 1858

Annella reticulata
Ellis & Solander, 1786
(Fig. 17A)

Material examined. — ZMTAU Co 34384 (2 colonies), Saint-Paul, Tours de Boucan (21°01’30.87’S, 55°13’26.41’E), reef slope, 20-29 m, 4.IV.2008.
Genus *Subergorgia* Gray, 1857

*Subergorgia suberosa* (Pallas, 1766)  
(Fig. 17B)

**Material examined.** — ZMTAU Co 34383, Saint-Paul, Tours de Boucan (21°01’30.87”S, 55°13’26.41”E), reef slope, 20-29 m, 4.IV.2008. — ZMTAU Co 34423 (2 colonies), Saint-Paul, Cap la Houssaye (21°01’02.90”S, 55°14’15.49”E), reef slope, 17 m, 8.IV.2008.

Family Xeniidae Wright & Studer, 1889  
Genus *Xenia* Lamarck, 1816

*Xenia lillieae* Roxas, 1933  

**Material examined.** — MNHN, 1971, leg. G. Faure.

**DISCUSSION**

Based on both the recent (2006-2008) and the old (Tixier-Durivault 1972) collections, the current study provides for the first time a comprehensive account of the octocorals of Reunion. It yielded two new species, *S. shlagmani* n. sp. and *S. tessieri* n. sp. Prior to the current survey, the list provided by Tixier-Durivault (1972) offered the only report on the octocoral fauna there; a report that, unfortunately was found to be erroneous. The revised identification of the MNHN material comprised five species (*L. depressum*, *L. crassum*, *S. erecta*, *S. hirta* and *S. shlagmani* n. sp.), all also found in the recent collections (Table 1), thus bringing to 28 the total number of new zoogeographical records from Reunion.

The findings revealed *Simularia* as the most speciose genus on the Reunion reefs (Table 1: 14 species), albeit fewer than in the Red Sea (38), East Africa (33) and Madagascar (23) (Van Ofwegen 2002). The remote geographical position of Reunion, in the southwest Indian Ocean, 700 km from Madagascar to the west and 180 km from Mauritius to the northeast, could be the reason for the relatively low *Simularia* diversity found there. At present there is no information on the octocoral fauna of Mauritius or Rodrigues, the adjacent islands at the southern end of the Mascarene Ridge, and therefore it is still too speculative to posit the zoogeographical patterns of octocorals in that region. Nonetheless, the discovery of the two new species in the current study indicates the need to explore the region further, including deeper habitats. A recent collection conducted by M. Schleyer at the underwater lava flows of Reunion (unpublished data) revealed two additional new records, *Simularia humesi* Verseveldt, 1968 (ZMTAU Co 35490) and *Ovabunda biseriata* (Verseveldt & Cohen, 1971) (ZMTAU Co 35432). These findings further indicate that comprehensive surveys of Reunion and of the Indian Ocean reefs, along with the re-examination of previous collections, if available, would help to elucidate the zoogeographical patterns of octocorals, and in particular their possible endemism to remote islands.

**Acknowledgements**

This study was made possible due to a grant to YB from the “Conseil régional de La Réunion” and “Association Parc marin de La Réunion” in order to conduct the survey. We thank E. Tessier, director “Parc marin de La Réunion” for his enthusiastic support. We are grateful to B. Cauvin, Y. Clain and the team of guards of the “Association Parc Marin de La Réunion” for help during the field work. We wish to thank C. Bourmaud, J. P. Quod, M. Aknin and D. Huchon for help and advice. We also wish to thank V. Wexler for graphic assistance, M. Weis for technical assistance and A. Shlagman for curatorial skills. N. Paz is acknowledged for skillful editorial assistance. We are grateful to G. Williams, anonymous reviewer and A. Ohler for their useful comments on the manuscript. This research was in part supported by The Israel Cohen Chair in Environmental Zoology to YB.

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Submitted on 6 February 2012, accepted on 19 July 2012.