A study of the Xeniidae (Octocorallia, Alcyonacea) collected on the "Tyro" expedition to the Seychelles with a description of a new genus and species

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Key words: Cnidaria; Coelenterata; Octocorallia; Alcyonacea; Xeniidae; soft corals; *Anthelia*; *Xenia*; *Heteroxenia*; *Cespitularia*; *Ovabunda*; *Fasciclia*.
An examination of xeniid octocorals was carried out on specimens held in the National Museum of Natural History, Naturalis, Leiden, Netherlands. Samples collected during the Tyro expedition to the Seychelles Islands in the Western Indian Ocean were identified. Six species belong to the genera *Cespitularia, Heteroxenia,* and *Ovabunda* are described; five of these are new records for this location. Three new species belonging to the genera *Anthelia*, *Cespitularia* and *Ovabunda* are illustrated. In addition, a new genus belonging to the family Xeniidae is introduced accompanied by scanning electron micrographs of its sclerites. Gross morphology and the ultra-structure of the sclerites indicate there are some similarities in this new genus with *Anthelia*. However, the colonial morphology is distinct enough to make this genus unique among the Xeniidae and thus the new genus *Fasciclia* is introduced.

Introduction

This survey examines species belonging to the family Xeniidae collected from the coral reefs of the Seychelles Island group (fig. 1), located between 3° South and 6° South latitude in the in the Western Indian Ocean. These specimens are part of a larger collection of alcyonacean octocorals that were acquired during the Tyro Oceanic Reefs Expedition to the Seychelles organized by the Netherlands Geosciences Foundation from 1992 to 1993. Specimens from the genus *Sinularia* in this collection received a brief review (Ofwegen & Slierings, 1994) shortly after the end of the expedition. With the exception of this study, the remaining material of approximately 500 specimens located at The National Museum of Natural History, Naturalis has not yet been thoroughly examined.

There are very few taxonomic accounts of the octocoral fauna occurring in the Seychelles. Thomson & Mackinnon (1910) give the earliest record of Alcyonacea specimens, which were collected by Mr. Gardiner in 1905. Among these they document species of the family Xeniidae belonging to the genera *Anthelia, Cespitularia*, *Sympodium*, and *Xenia*. Later, *Heteroxenia elizabethae* was identified from another collection of Seychelles material (Verseveldt, 1976). A list of the xeniid genera present in the collection from the Tyro Oceanic Reefs Expedition is given in table 1.

A group of previously undescribed xeniids was discovered in this collection during the course of the investigation. The morphology of these octocorals has similarities with both *Anthelia* and *Xenia*. Low power examination of the sclerites revealed shapes that were previously unknown among octocorals. Scanning electron microscopy of the sclerites revealed their unique structural features. A new genus, *Fasciclia* is introduced here along with species that have been assigned to it.

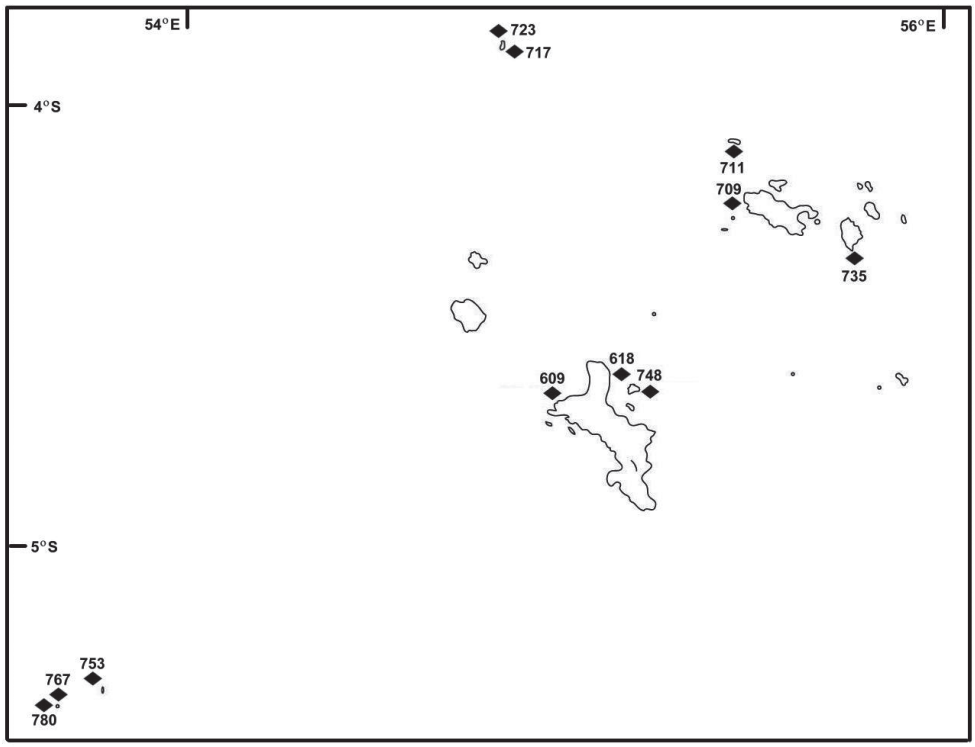

Fig. 1. Map of the Seychelles Islands with collection stations sited in this review.

Material and Methods

The corals examined in this survey are deposited in the National Museum of Natural History, Naturalis (RMNH), Leiden, Netherlands. Live colonies were collected by means of snorkeling and at scuba diving depths from the coral reefs of the Seychelles Islands. Most alcyonacean octocorals occurred at depths of 10 meters or less (Ofwegen & Slierings, 1994). Specimens were fixed in 70% ethyl alcohol immediately after collection.

Initial morphological examination of the xeniids was preformed and they were photographed under a dissecting microscope at 20 power. An examination of the polyps including the number of pinnule rows and the number of pinnules along the outermost aboral row for each specimen was carried out. Measurements of colonies, tentacles, and pinnule sizes were taken with the use of a micrometer to the nearest 0.01 mm. Sclerites were isolated from the tissue using the method outlined below. Permanent mounts on microscopic slides were made with Durcupan AMC Fluka (Fabricius & Alderslade, 2001; Janes & Wah, 2007) for light microscopy examination. The sclerites were measured to the nearest 0.005 mm on a compound microscope fitted with a Filar Micrometer. Compound microscope observations were made at 100-power, which consisted of 10-power oculars combined with a 10-power objective.

Scanning electron micrographs of sclerites were made from some of the examined specimens. Colonies were prepared for SEM examination following the method given

Table 1. Station data for sites where xeniids were collected.

Station	Locality	Position		Date	Depth	Genera
609	Mahé, NW coast, Vista Do Mar	04°34′S	55°26′E	11-12-1992	9 m	*Anthelia, Fasciclia, Heteroxenia*
618	Mahé, NE coast, North East Point	04°35′S	55°28′E	14-12-1992	12 m	*Fasciclia*
709	SW coast Praslin Island	04°17′S	55°41′E	17-12-1992	< 3 m	*Ovabunda*
711	S coast of Aride Island	04°13′S	55°40′E	18-12-1992	< 20 m	*Anthelia, Cespitularia*
717	E coast of Bird Island	03°43′S	55°13′E	20-12-2007	< 20 m	*Ovabunda*
723	N coast of Bird Island	03°42′S	55°12′E	21-12-2007	8-30 m	*Ovabunda*
735	La Digue Island, S coast	04°23′S	55°50′E	23-12-1992	8-16 m	*Ovabunda*
748	Saint Anne Is., E coast	04°36′S	55°31′E	25-12-1992	17 m	*Anthelia, Heteroxenia*
753	St. Joseph Atoll, NW rim	05°25′S	53°19′E	26-12-1992	< 20 m	*Ovabunda*
780	Poivre Atoll, W rim	05°46′S	53°18′E	01-01-1993	< 20 m	*Fasciclia*

by Alderslade (1998) with slight modification. Tissue samples approximately 2 mm^2 were taken from specific regions on a colony, typically the tentacles, polyp stem below the polyp head, stalk, and basal attachment areas for this examination. Each sample was placed in a 15 ml vial to which sodium hypochlorite was added. Once the tissue had dissolved it was rinsed three times with de-ionized water. The water was decanted off leaving the sclerites at the bottom. After rinsing, one milliliter of neutrally buffered hydrogen peroxide was added to the vial. An effervescent reaction between the hydrogen peroxide and residual sodium hypochlorite facilitated in neutralizing the remaining solution in the vial. Once the foam had subsided the sclerites were rinsed an additional four times in de-ionized water and then in 95% ethanol. Using a pipette, droplets of clean sclerites in 95% ethanol were placed on glass microscope slides and dried at 43° C on a hot plate until the ethanol had evaporated.

An aluminum SEM stub approximately 1.2 cm in diameter was coated with a black adhesive disc for each of the sample regions. With the SEM stub placed under a dissecting microscope a fine, camel's hair brush was used to gently whisk the dry sclerites onto the adhesive surface of the stub. Airborne sclerites would land onto the stub in random orientations. The stubs were coated with approximately 1.5 nm of gold using a Polaron E5100 vacuum sputter unit. They were then examined using a JEOL 6480LV Scanning Electron Microscope at 10 kV. Images were captured and selected for both their quality and accurate representation of the sclerites.

Histological preparations were made from of some of the sample material. Two different methods were used to section the samples. In the first method, selected tissue samples were decalcified with a basic decalcifying solution (Peters, 2000) to remove the sclerites before being dehydrated, cleared and embedded with paraffin into wax blocks. Ribbons of tissue were cut from the blocks on a microtome to a thickness of 0.005 mm at 0.025 to 0.030 mm intervals. The ribbons were placed on glass microscope slides and dried at 40°C for approximately 1 hour. Paraffin in the tissue was removed with a clearing agent, and then stained with Hematoxylin and Eosin. Additional slides were stained with Mason's Trichrome Green for comparison. In the second method, in order to section tissue samples with sclerite inclusions, the tissue was embedded in the resin medium glycol methacrylate and blocked. Blocks were sectioned at a thickness of 0.005 mm and

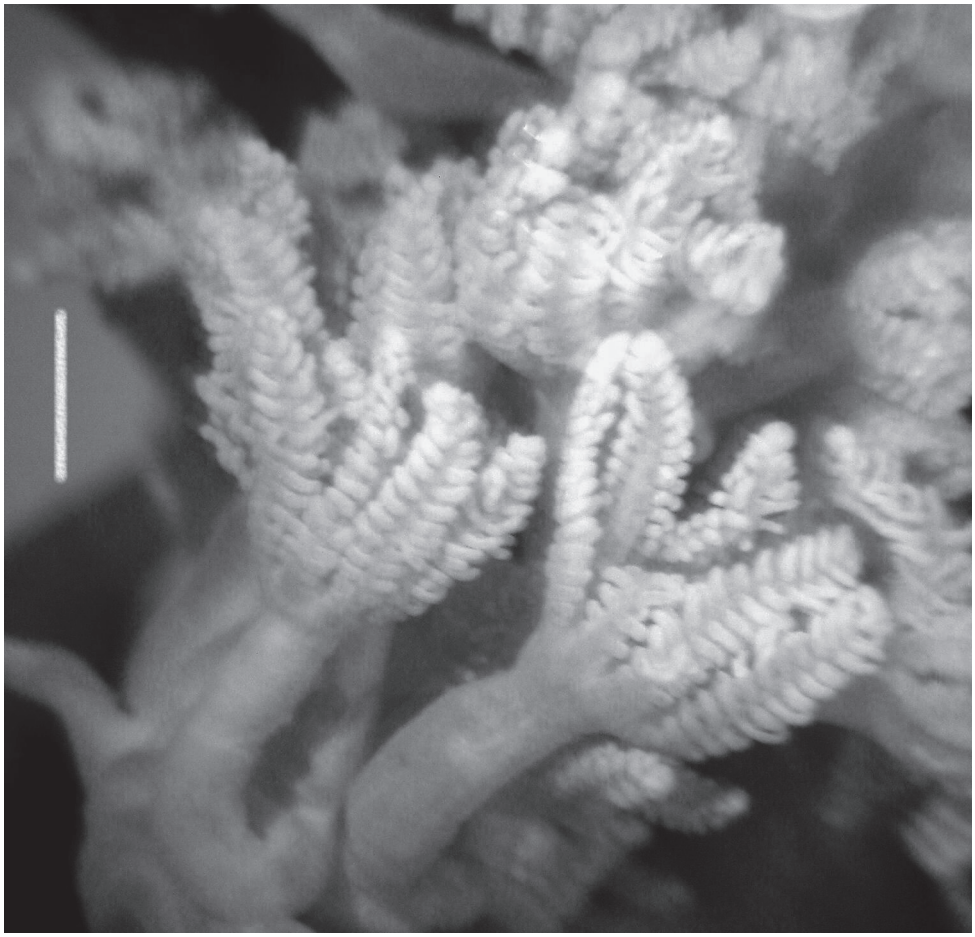

Fig. 2. Holotype colony of *Anthelia mahenensis* spec. nov., Sta. 609. Scale 2 mm.

placed on glass microscope slides. They were then stained with Sanderson's Rapid Bone Stain™ (Sanderson et al., 1997). Photomicrographs were prepared from regions of tissue that best illustrated the micro-anatomical components of the Xeniidae specimens.

Family Xeniidae Wright & Studer, 1889
Genus *Anthelia* Lamarck, 1816
Anthelia mahenensis spec. nov.
(figs 2-3)

Material.— Holotype: NW Coast of Vista Do Mar (04°34'S; 55°26'E), Mahé, Seychelles. Depth 9 meters. 11.xii.1992 (RMNH Coel. 38668, Station 609). Paratypes: Southern coast of Aride Island (04°13'S; 55°40'E), Seychelles. Depth <20 meters. 18.xii.1992 (RMNH Coel. 38669, Station 711). Eastern coast of Saint Anne Island (04°36'S; 55°31'E), Seychelles. Depth 17 meters. 25.xii.1992 (RMNH Coel. 38670, Station 748).

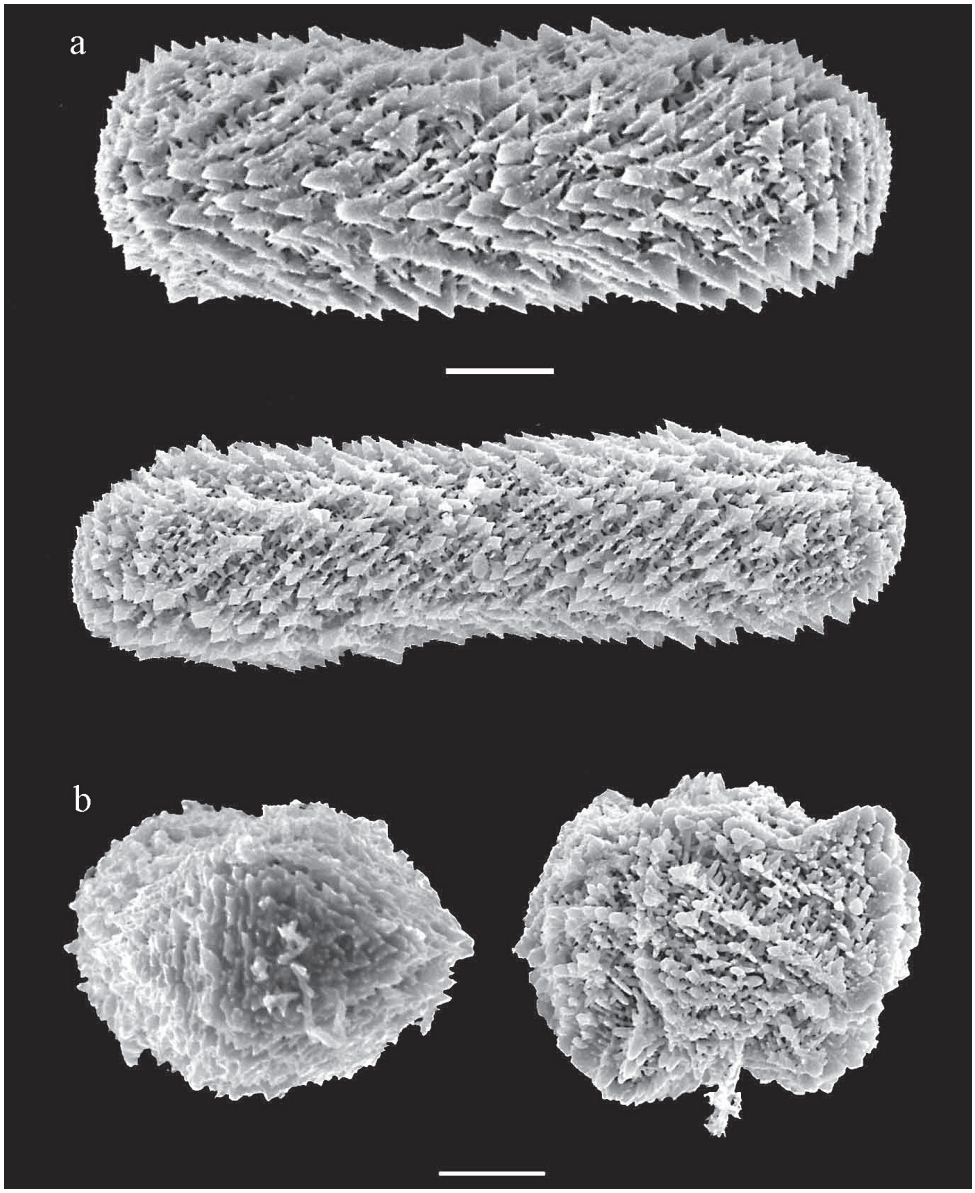

Fig. 3. *Anthelia mahenensis* spec. nov., holotype, scanning electron micrographs of sclerites; a) longitudinal views, scale 0.005 mm, b) end views, scale 0.002 mm.

Description.— Colonies are up to 3 cm in diameter. A thin, encrusting basal membrane approximately 1.5 mm thick with an irregularly shaped perimeter encrusts dead scleractinian substrate. Firm, cylindrical polyp bodies 1.5 to 2.0 mm in diameter rise from the basal membrane. The polyp stems below the tentacles range from 5 to 7 mm high preserved (fig. 2). Polyp tentacles are slightly wider near the base and taper to a

soft point at the distal end. They are 0.75 mm wide at the oral end and measure 2.5 to 3.0 mm long. The tentacles are slightly flattened on the oral side. There are two rows of closely spaced pinnules on each side of the tentacle. There are 10 to 12 pinnules in the aboral row and 6 to 9 pinnules in the oral row. The cylindrical, evenly spaced pinnules measure up to 0.8 mm long by 0.2 mm wide. The length and number of pinnules gives the tentacles a feather-like appearance under magnifications less than 20 power.

Sclerites.— There is a dense concentration of sclerites in the basal membrane. Sclerites are less numerous in the polyp body but increase in density within the tentacles. All of the sclerites are flattened, elongated, cigar shaped rods. The basal sclerites are slightly larger than those in other regions. Sclerites measure on average 0.030 mm long by 0.007 mm wide. A coarse, herringbone-like surface structure (fig. 3) is a generic level trait of *Anthelia*. This structure is made up of radial arrangements of calcite rods that are visible with scanning electron microscopy.

Colour.— The preserved colonies range from off-white to light tan in colour. Abundant zooxanthellae.

Variability.— Among the three different sampling sites where this species was collected there was almost no difference in the size of the sclerites. There was a slight variability in the pinnule size between the holotype and paratypes. In some polyps of the paratypes the pinnules were 1.0 to 1.1 mm long compared to 0.8 mm long in the holotype. The width of the pinnules in the paratypes measured from 0.015 to 0.080 mm wide.

Etymology.— The name is derived from the capital island Mahé, one of the locations where this species was discovered.

Remarks.— There are only a few species of *Anthelia* with tentacles containing two rows of pinnules on each side of the tentacle. Among them, *A. philippinense* (Roxas, 1933) described from the Philippines is the most similar to the new species, *A. mahenensis*, however these two species differ in the distribution of pinnules, basal membrane thickness, polyp length, and pinnule size. *A. philippinense* contains 8 to 10 widely spaced pinnules in a row that are 2 mm long compared to the 10 to 12 closely spaced pinnules in the outer row of *A. mahenensis*, which are up to 0.8 mm long. The polyps of *A. philippinense* were also recorded as being 28 to 35 mm long, large than the 7 to 10 mm long polyps found in *A. mahenensis*. The basal membrane thickness of *A. mahenensis* was 1.5 mm thick compared to *A. philippinense*, which has a basal membrane 3 to 4 mm thick.

Genus *Cespitularia* Milne-Edwards & Haime, 1857
Cespitularia robusta Tixier-Durivault, 1966
(fig. 4)

Cespitularia robusta Tixier-Durivault, 1966: 355.

Material.— Southern coast of Aride Island (04°13'S; 55°40'E), Seychelles. Depth <20 meters. 18.xii.1992 (RMNH Coel. 38672, Station 711).

Description.— A single, large, colony that is comprised of more than 10 upright and branched lobes attached to coral rock. Each lobe ranges from 10 mm to 25 mm high and the bases of the lobes are between 5 and 8 mm wide. As in other *Cespitularia* species, expanded polyps are irregularly positioned along the lobes from bellow the

mid-portion and along the branches to the distal ends (fig. 4). Polyps have tentacles that measure 1.2 mm long by 0.3 mm wide at the base. Along each side of the tentacle there are two rows of pinnules. There are between 10 and 13 pinnules in the aboral rows. The pinnules are small and slightly pointed at the tip, measuring 0.4 mm long and 0.08 mm wide at the base.

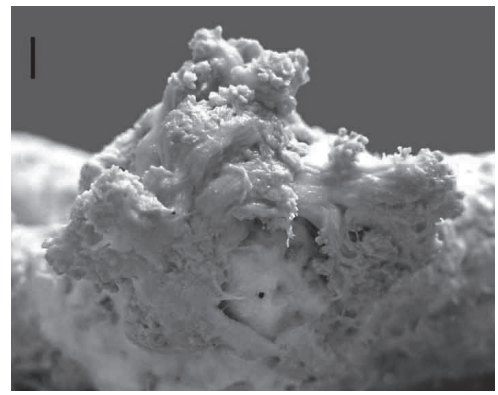

Fig. 4. *Cespitularia robusta* colony from Aride Island, Seychelles. Sta. 711. Scale 10 mm.

Sclerites.— Throughout the colony there are many sclerites. Under 100-power magnification the sclerites are oval flattened platelets with a slightly grainy surface appearance. Polyp sclerites measure 0.016 to 0.020 mm in diameter. In the lower portions of the lobes located close to the area of basal attachment the sclerites are up to 0.050 mm in diameter.

Colour.— The upright lobes appear light yellow with tan coloured polyps in a preserved state.

Distribution. — This species was originally described from Comore Island off the coast of Africa (Tixier-Durivault, 1966). Its identification in this collection from Aride Island is a new record.

Remarks.— There was a slight difference in the colour of this specimen, which is light yellow and the whitish cream colour described by Tixier-Durivault in the original description. Also, the type specimen of *Cespitularia robusta* is noted as having smaller sclerites in the tentacles that are on the order of 0.004 to 0.010 mm in diameter, compared to the 0.016-0.020 mm diameter observed in this specimen. Sclerites of the small size range expressed by Tixier-Durivault are not typical in octocorals so it is quite possible that these published values were for zooxanthellae and not sclerites (Y. Benayahu, personal communication). The Aride Island specimen agrees well with the colony size, row and number of pinnules given by Tixier-Durivault (1966).

Cespitularia schlichteri spec. nov.

Material.— Holotype: Southern coast of Aride Island (04°13'S; 55°40'E), Seychelles. Depth <20 meters. 18.xii.1992 (RMNH Coel. 38671, Station 711).

Description.— A single colony measuring 25 mm high by 15 mm wide was collected by removing it from the substrate. The colony is lobed with expanded polyps arising at different levels on the terminal branches. Very short polyp stems up to 0.8 mm long are present below the polyp heads. Polyp tentacles are small, measuring 1.5 mm in length by 0.5 mm wide at the base. Small, pointed pinnules, each 0.3 mm long, are arranged in two rows on either side of the tentacles. The aboral row contains from 13 to 15 pinnules.

Sclerites.— Sclerites are nearly absent in the polyps, and those that are present are flattened oval discs with a slightly irregular perimeter. These sclerites measured up to

0.03 mm in diameter. All of the sclerites have a dark, granular surface when viewed under a compound microscope at 100 power. The stalk of the colony contains very few, oval shaped sclerites. Stalk sclerites were slightly larger, measuring up to 0.04 mm in diameter.

Colour.— The main body and branches are cream coloured. The tentacles of the upper polyps are lavender to light purple in colour. The purple pigment is contained within the tissue and is not associated with the sclerites.

Etymology.— This species is named after retired octocoral researcher, Dr Dietrich Schlichter, University of Koeln, Germany.

Remarks.— Initial observations of the size of the colony, sclerites, tentacles, and pinnules showed a significant similarity to *Cespitularia mollis* (Brundin, 1896). It is worth noting that in his original description Brundin (1896) assigned this species to a new genus *Suensonia*. His specimen was collected at a depth of 120 meters off the coast of Korea. Later, the species was moved from *Suensonia* to the genus *Cespitularia* by May (1899: 77) based on a "Sterile stalk and fertile branch ends not clearly offset from each other" referring to the polyp covered branches that are closely growing together. Subsequent authors (Gohar, 1940: 81; Tixier-Durivault, 1966: 353) retained the species *mollis* in the genus *Cespitularia*. However, the sclerites are originally described as "Bisquetform" yet in the drawings given by Brundin (1896: table 2, fig. 1) the sclerites are pinched in the middle or lobed at the ends. Given that this species was collected at 120 meters, has a sclerite shape that is not the typical xeniid platelet, and that no other xeniids have been recorded from Korea or at these depths this species should be re-assigned back to the genus *Suensonia*. The specimens of *Cespitularia mollis* described by Tixier-Durivault (1966: 353) from Praslin Island, Seychelles should also be re-examined.

There are two *Cespitularia* species that have been described as containing sclerites and have two rows of pinnules on either side of the tentacles, *C. stolonifera* and *C. robusta*. *C. schlichteri* is distinguished from these two species by the number of pinnules per row. *C. stolonifera* contains 22 to 27 pinnules in a row and *C. robusta* has 10 to 13 pinnules per row. *C. robusta* also has higher density of sclerites in all regions of the colony than *C. schlichteri*.

Cespitularia simplex Thomson & Dean, 1931
(fig. 5)

Cespitularia simplex Thomson & Dean, 1931: 33-34; Macfadyen, 1936: 27; Verseveldt, 1971: 62.

Material.— Southern coast of Aride Island (04°13'S; 55°40'E), Seychelles. Depth <20 meters. 18.xii.1992 (RMNH Coel. 38673, Station 711).

Description.— Multiple colonies of upright, branched lobes are attached to dead stony coral substrate. The lobes measure on average 17 mm high by 8 mm wide and are clustered in areas growing on the substrate. Other clusters of lobes are connected via a thin, elongated portion of basal tissue material. Some of the lobes and secondary branches are moderately flattened. Longitudinal grooves are present throughout the upper portion of the lobes in the colonies. Expanded polyps line the lobes on all sides and are irregularly spaced from bellow the mid-section, along branches to the distal

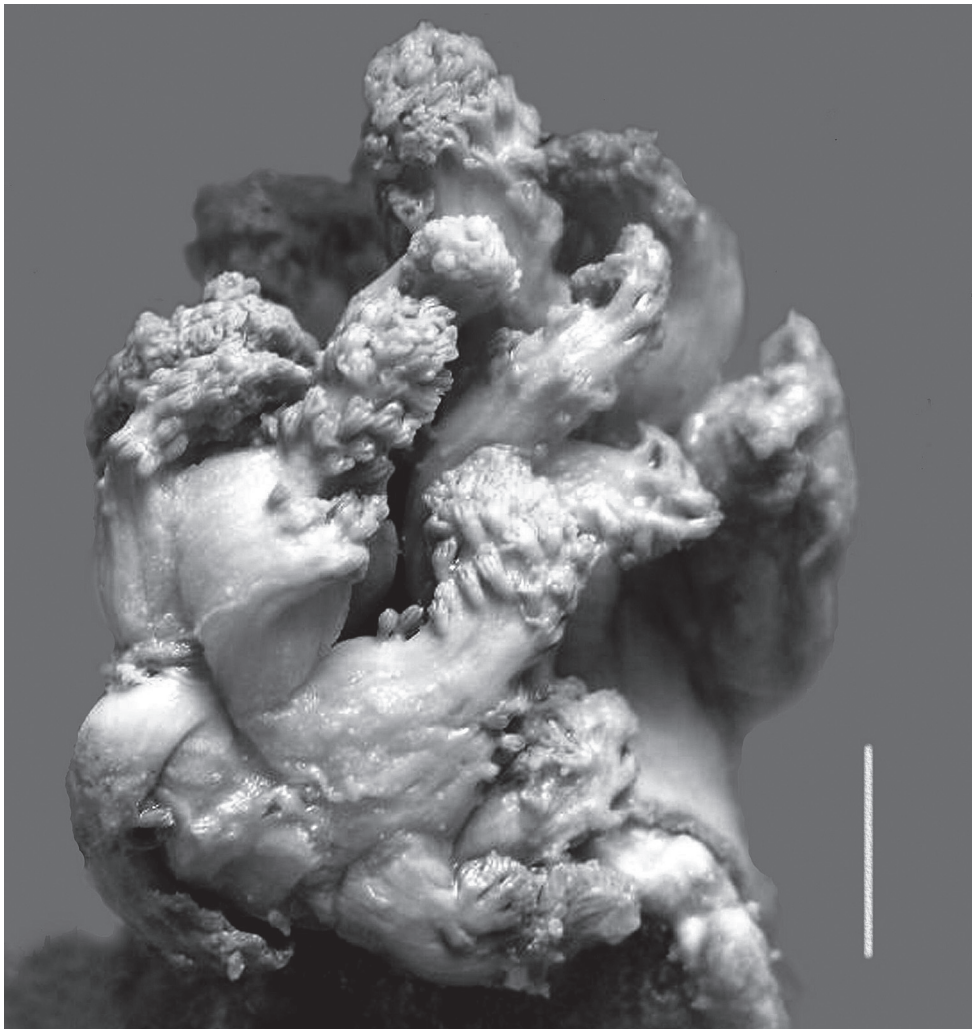

Fig. 5. Colony of *Cespitularia simplex* from station 711. Scale 5 mm.

end. The lower regions of the lobes are smooth, lacking polyps (fig. 5). Tentacles are slightly conical with a pointed tip. They measure 1.8 mm long by 0.5 mm wide at the base. One row of 10 to 12 pinnules lines the tentacles on either side. They are thin and narrow in a preserved state with pointed tips. The pinnules measure 0.4 mm in length by 0.1 mm wide at the base.

Sclerites.— Two types of sclerites are present in the polyps. Very small, flat, clear rods and oval flattened discs. The rods measure 0.016 mm long by 0.005 mm wide. Oval sclerites have a fine, granular surface at 100 power and some of these exhibit irregular shaped edges on occasion. These sclerites are 0.016 mm to 0.026 mm in diameter. Notably the lobes contain only the oval sclerite type and have relatively fewer sclerites than what are found in the polyps.

Colour.— The colony is light tan preserved in alcohol.

Variability.— There was little difference between colonies, except in size.

Distribution.— This species has been previously recorded from Kawassang, Indonesia and the Great Barrier Reef, Australia.

Remarks.— These colonies compare well with the original description with respect to size, colour, general form and pinnule characteristics. Regarding the shape of *Cespitularia simplex*, Thomson & Dean (1931) place an emphasis on the lateral flattening of the colony, which is most probably derived from the fixation process and storage. Some specimens from Aride Island exhibited a similar flattened shape in some of the stalks and secondary branches (fig. 5). There were also many longitudinal grooves in these specimens, which were not mentioned in the description of the type specimen.

Three descriptions of the sclerites were found in the literature. Both Thomson & Dean (1931) and Macfadyen (1936) gave a similar account of the shape and distribution of the sclerites. They also presented the size of the sclerites as 0.010 mm in diameter. Later, a reexamination of the type specimen of *C. simplex* showed the sclerites ranged in size from 0.015 to 0.021 mm (Verseveldt, 1971). In all of these reports there is no distinction as to where the sclerites were sampled from within the colony. Though, Verseveldt (1971) does mention "oblong" sclerites, which could be the rod-shaped sclerites observed in the Aride Island specimens.

Genus *Heteroxenia* Kölliker, 1874
Heteroxenia elizabethae Kölliker, 1874
(fig. 6)

Heteroxenia elizabethae Kölliker, 1874: 16; Ashworth, 1899: 284, 1900: 524; Thomson & Henderson, 1906: 413; Hiro, 1937: 237; Utinomi, 1950: 86; Tixier-Durivault, 1966: 368; Verseveldt, 1971: 63, 1976: 499; Malyutin, 1992: 2; Reinicke, 1997: 52.

Material.— NW Coast of Vista Do Mar (04°34'S; 55°26'E), Mahé, Seychelles. Depth 9 meters. 11.xxi.1992 (RMNH Coel. 38675, Station 609). Eastern coast of Saint Anne Island (04°36'S; 55°31'E), Seychelles. Depth 17 meters. 25.xii.1992 (RMNH Coel. 38676, Station 748).

Description.— Colonies with a large, wide, smooth stalk that are 3 cm high and 2.5 cm wide. A convex polypary or capitulum with densely spaced polyps arises from the distal ends of the stalks. The autozooids measure up to 10 mm long by 1.2 to 2 mm wide. The tentacles of the autozooids are 4.5 mm long and 0.5 mm wide at the base with a slightly conical shape. Pinnules on these tentacles are also slightly tapered and are up to 0.6 mm long by 0.05 mm wide. They are closely spaced in three rows on each side of the tentacle, sometimes with a partial fourth row present on the oral side. There are between 18 and 23 pinnules in the outer, aboral row. The siphonozooids range between 0.5 to 1.0 mm long and 0.1 to 0.3 mm wide. Their tentacles are knob shaped, smooth and void of pinnules.

Sclerites.— The transparent tissue of the autozooid tentacles reveals a high concentration of sclerites. They are biscuit-like flat, oval platelets with a granular surface texture. Largest sclerites occur in the stalk. These measure from 0.019 to 0.022 mm long by 0.014 to 0.016 mm wide. Autozooid sclerites are only slightly smaller, measuring 0.018 to 0.021 mm long and 0.012 to 0.013 mm wide. The smallest sclerites were found in the

siphonozooids. These are slightly elongated and narrower than in other areas of the colony, measuring from up to 0.016 mm long and are 0.008 to 0.010 mm wide.

Scanning electron microscope examination reveals the sclerites are comprised of branched rods that project from the interior outwards (fig. 6a). In fractured sclerites these rods appear to be fused and aggregate forming a honeycomb network of spaces between them (fig. 6b).

Colour.— In a preserved state both colonies exhibit white siphonozooids. Stalks are off-white to light tan in colour and the polyps are a darker tan colour.

Variability.— The colony collected from Mahé and the one from Saint Anne Island are similar in size, however the Saint Anne Island specimen is about 10 mm wider. Both colonies have nearly identical sclerite sizes and pinnule counts. There was very little difference between the two specimens.

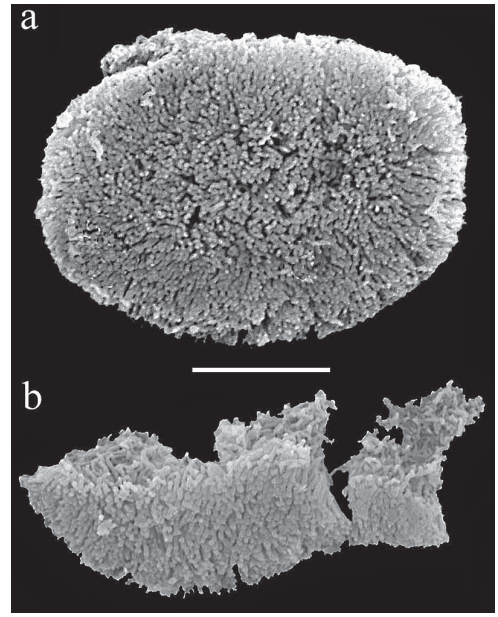

Fig. 6. *Heteroxenia elizabethae*, Sta.748, scanning electron micrographs of sclerites; a) top view of sclerite, b) fractured sclerite showing composition detail, scale 0.005 mm

Distribution.— The geographical range of *Heteroxenia elizabethae* includes Zanzibar, Madagascar, and the Red Sea. The type specimen was described from the Great Barrier Reef with additional records from Taiwan, Philippines, and the Caroline Islands.

Remarks.— *Heteroxenia elizabethae* has been mentioned from the Seychelles before in species lists (Verseveldt, 1976; Malyutin, 1992) where it was found between 2 and 15 m. The specimens from Mahé and Saint Anne Island were collected in a similar depth range. Unfortunately, neither of these two previous collections gave a detailed account of their specimens.

There are many descriptions of *H. elizabethae* in the literature from the late nineteenth to mid twentieth century, among which Ashworth (1899) gave a very detailed account of Kölliker's type specimen. The specimens in the current collection agree well in size, shape, and pinnule counts with those given in Ashworth's type description. There is also a high degree of similarity in the sclerite sizes and their distribution throughout the colony found in these specimens with published values (Ashworth, 1899; Tixier-Durivault, 1966; Reinicke, 1997).

Genus *Ovabunda* Alderslade, 2001
Ovabunda benayahui (Reinicke, 1995)
(figs 7, 17b)

Xenia benayahui Reinicke, 1995: 51; 1997: 29.
Ovabunda benayahui; Alderslade, 2001: 51.

Material.— Northwest rim of St. Joseph Atoll (05°25′S; 53°19′E). Depth <20 meters. 26.xxi.1992 (RMNH Coel. 38677, Station 753).

Description.— Multiple colonies 20 mm high by 5 mm to 7 mm wide are growing attached to dead stony coral substrate with epizoic sponge. Polyps develop at the distal end of the stalk forming a polypary or capitulum. The polyps are on average 8 mm in length and 1.5 to 2 mm wide at their base. Tentacles are slightly conical, up to 5 mm long and 0.5 mm wide at the base. There is one row of 6 to 8 pinnules on each side of the tentacles. The pinnules are short, knob-like with blunt ends and measure 0.6 mm long by 0.3 mm wide. They are widely spaced along the tentacles.

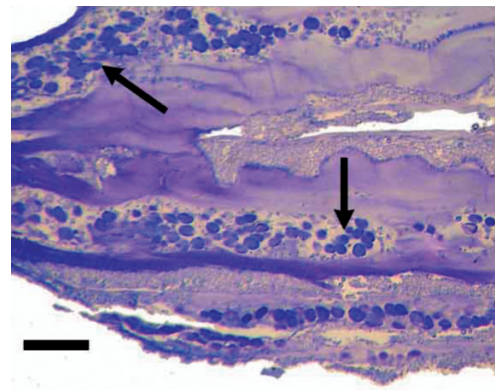

Fig. 7. *Ovabunda benayahui* sclerites (arrow) located within epidermal tissue, scale 0.1 mm.

Sclerites.— There are dense aggregations of sclerites in the epidermal tissue of the tentacles and body wall (fig. 7). They range in diameter from 0.024 to 0.035 mm. The sclerites of the stalk are not quite as numerous but are larger, measuring 0.045 to 0.053 mm in diameter. All of the sclerites are flattened platelets with a very granular surface appearance at 100 power. The microcorpuscular architecture of the sclerites causes them to break easily when isolated from the tissue or manipulated on a microscope slide. This produces many irregular shapes and a lot of debris in the microscopic field. The sclerites from tentacles are the most broken down so that they become highly irregularly shaped. Sclerites from the stalk tend to be more intact and retain an oval like appearance.

Colour.— Preserved colonies in ethanol appear cream to light tan in colour.

Distribution.— This species was originally described from the Gulf of Aqaba, Red Sea. It was later found in other locations throughout the Red Sea (Reinicke, 1997).

Remarks.— This specimen closely resembles the description of the type specimen (Reinicke, 1995) and a more detailed account given later (Reinicke, 1997). There is a larger colony size given in the 1997 description where it is noted, "The colony in well-expanded state reaches 35 mm in total height…" The difference in size may be attributed to the fixation process, age of the specimen, or environmental factors.

After examination of the specimens they apparently were misplaced in the RMNH collection, and not been found again; a fragment has been stored under RMNH Coel. 38677.

Ovabunda hamsina (Reinicke, 1997)

Xenia hamsina Reinicke, 1997: 49.

Material.— Southern coast of La Digue Island (04°23′S; 55°50′E). Depth 8 to 16 meters. 23.xii.1992 (RMNH Coel. 38678, Station 735).

Description.— Multiple, wide stalks with a shared tissue membrane at the base are growing attached to dead stony coral rock. The colonies are between 15 to 22 mm in total height. Smooth stalks have a distinct capitulum containing the polyps. Polyps are up to 4 mm long and 1.5 mm wide. The tentacles are broad, laterally flattened and measure 4 to 5 mm long by 0.5 mm wide at the base. There are four distinct rows of pinnules located along either side of the tentacle. The pinnules are long, slender and evenly distributed in each row with a small space between each pinnule. Pinnules measure up to 0.7 mm long by 0.1 mm wide. There are from 18 to 21 pinnules in the outer, aboral row.

Sclerites.— Polyps contain numerous small, oval shaped sclerites in the tentacles and pinnules. These sclerites are often irregular or tapered at one end, giving them a pear shaped appearance. Sclerites from the stalk have a similar shape, though these are more often completely oval. In both the stalk and polyp the sclerite sizes are similar, ranging from 0.023 to 0.031 mm in diameter. During microscopic examination these sclerites break when manipulated and produce debris in the field of view.

Colour.— This specimen in a preserved state is light tan in colour. The polyps are more whitish coloured than the rest of the colony.

Distribution.— This species has been recorded previously from Sanganeb Atoll, the Red Sea and from the island of Madagascar, Indian Ocean.

Remarks.— The overall shape of the colony, pinnule description, sclerite sizes and shape match well with the original description. However, this colony was smaller than those described by Reinicke (1997). This difference in size could be a result of environmental conditions in which it grew or attributed to age.

Ovabunda impulsatilla (Verseveldt & Cohen, 1971)
(fig. 8)

Xenia impulsatilla Verseveldt & Cohen, 1971: 59; Reinicke, 1995: 32; 1997: 32

Material.— Southwest coast of Praslin Island (04°17′S; 55°41′E), Seychelles. Depth <3 meters. 17.xii.1992 (RMNH Coel. 38679, Station 709). Eastern coast of Bird Island (03°43′S; 55°13′E), Seychelles. <20 meters. 20.xii.1992 (RMNH Coel. 38680, Station 717).

Description.— Colonies are between 10 to 20 mm in diameter at the base and range from 8 to 20 mm high. Stalks are branched and in one specimen the colony is growing attached to stony coral rubble rock with macro-algae attached. The short, broad branches contain polyps at the distal end that are tightly compacted together. Cylindrical polyp stems are 2 mm long by 0.8 mm wide. Polyp tentacles are up to 2 mm in length and slightly flattened orally. The tentacles are widest at the base, measuring 0.3 to 0.4 mm wide. Two rows of pinnules line each side of the tentacles. They are evenly spaced with a blunt, knob-like tip. There are 8 to 10 pinnules in the aboral row, measuring 0.25 mm long by 0.1 mm wide.

Sclerites.— The sclerites are most numerous in the tentacles. The basal portion of the stalks contains fewer sclerites. In a broad sense they are oval shaped platelets, however in most sclerites the perimeter is irregularly formed. Many sclerites have sharp or broken edges, points, or straight sides. All exhibit a fine, darkened granular surface when viewed under a light microscope at 100 power. Polyp sclerites are typically 0.016

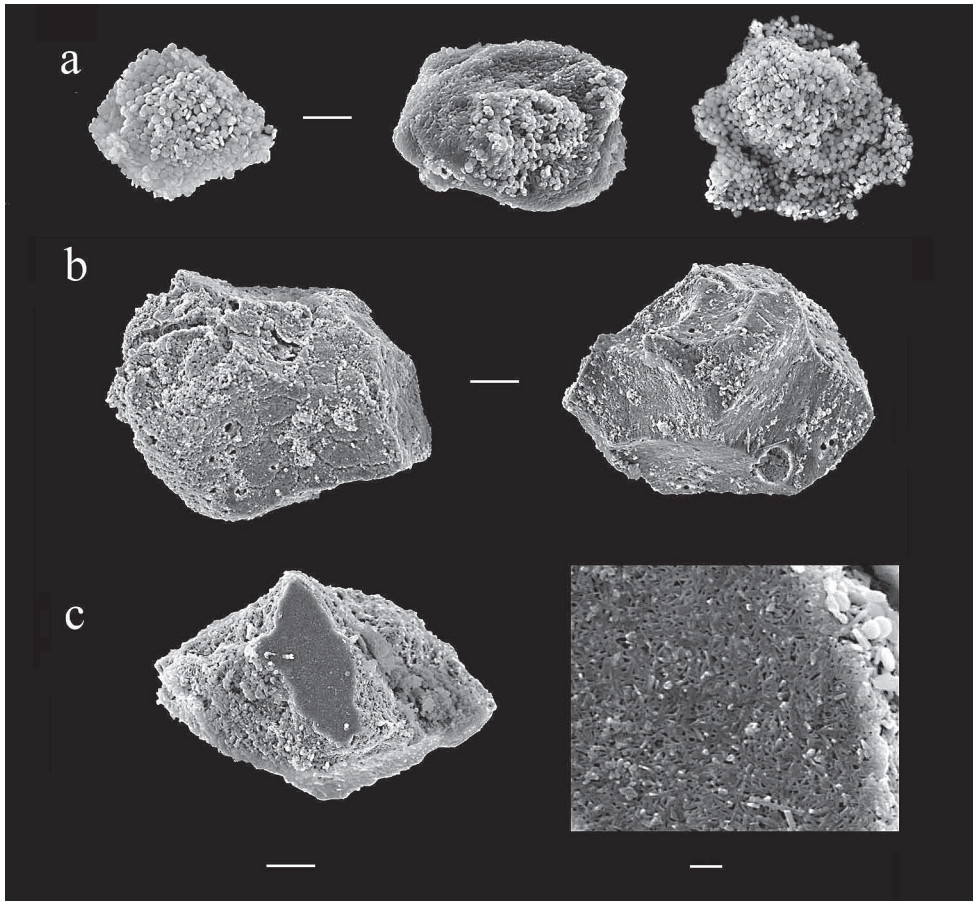

Fig. 8. *Ovabunda impulsatilla*, scanning electron micrographs of sclerites; a) aggregated micro-corpuscle form, scale 0.005 mm., b) solid center sclerite form, scale 0.01 mm., c) tangential section of solid center, scale 0.01 mm. and magnified view at right, scale 0.001 mm.

to 0.025 mm in diameter. The Basal sclerites are usually slightly larger, ranging from 0.026 to 0.031 mm in diameter.

An examination of the sclerites with scanning electron microscopy reveals two distinct forms. The typical *Ovabunda* sclerites (fig. 8a) are made up of tiny, micro-corpuscles aggregated together (Alderslade, 2001). The aggregates are easily broken, falling apart into individual micro-platelets or small groups. The other form is also irregularly shaped and slightly larger. It is coated with micro-platelets over the surface of the sclerite (fig. 8b). This form differs in that the interior is comprised of a solid, calcite material. A magnified cross-section of the sclerite (fig. 8c) reveals that the solid material is a mass of tiny interconnected rods.

Colour.— Preserved colonies are light tan to cream coloured.

Variability.— The samples collected at Praslin Island and Bird Island are very similar in all attributes except size. The colonies from Praslin Island are 20 mm high where-

as the others are only 8 mm high preserved. It is possible that environmental conditions such as light penetration affected the size of the colonies since they were collected at different depths.

Distribution.— This species has been recorded previously from the Gulf of Eilat, Gulf of Suez, and Sanganeb Atoll, Red Sea.

Remarks.— *Xenia impulsatilla* has been transferred to the genus *Ovabunda* in this paper as a result of the re-examination of the type specimen (G. Reinicke, personal communication), which revealed the presence of aggregated micro-corpuscle sclerites. Previous descriptions of this species (Verseveldt & Cohen, 1971; Reinicke, 1995; Reinicke, 1997) match well with the specimens from the Seychelles. However, this is the first account to give a detailed description of the sclerites with the use of scanning electron microscopy. The original assessment of the genus *Ovabunda* (Alderslade, 2001) identified a single sclerite form that was the aggregated cluster of micro-corpuscles (fig. 9a). Until further examination of the sclerites of *Ovabunda* species from other locations is carried out to see if they contain another sclerite form (fig. 8b, 8c) in addition to clustered micro-platelets, this species has been assigned to the genus *Ovabunda*. It would also be advantageous to re-examine the type specimen of *Ovabunda impulsatilla* to see if it also contains two types of sclerites.

Ovabunda aldersladei spec. nov.
(figs 9-10)

Material.— Holotype: Northern coast of Bird Island (03°42'S; 55°12'E), Seychelles. Depth <30 meters. 21.xii.1992 (RMNH Coel. 38681, Station 723).

Description.— The colony is comprised of multiple, unbranched stalks that share common basal tissue. It is growing attached to small pieces of stony coral rubble (fig. 9). This small colony measures 6 mm wide by 7 mm high. Stalks are smooth, cylindrical and up to 3 mm tall. A slightly convex capitulum contains the polyps, which are loosely spaced across the surface. Polyps bodies without tentacles are up to 3 mm long by 1 mm wide. The polyp tentacles are 2.5 mm long and 0.6 mm wide. They are flattened orally and contain primarily two rows of pinnules on either side, but sometimes a partial third row is present. Pinnules are slightly tapered at the distal end with a blunt tip and measure 0.8 mm long by 0.15 mm wide at the base. There are from 10 to 14 pinnules in the outer, aboral row.

Sclerites.— Both the polyps and stalks contain nearly identical shapes and sizes of sclerites. These are generally oval (fig. 10) and measure between 0.018 mm and 0.026 mm in diameter. There is a fine, granular surface detail to the sclerites in reflected light. The shape of the sclerites is notable in that many have a hard or jagged edge, appearing broken or fractured. Often the narrow end of the sclerites is pointed. There is a

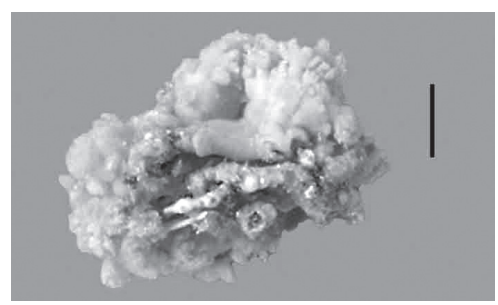

Fig. 9. *Ovabunda aldersladei* spec. nov., holotype, Bird Island, Seychelles. Sta. 723. Scale 5 mm.

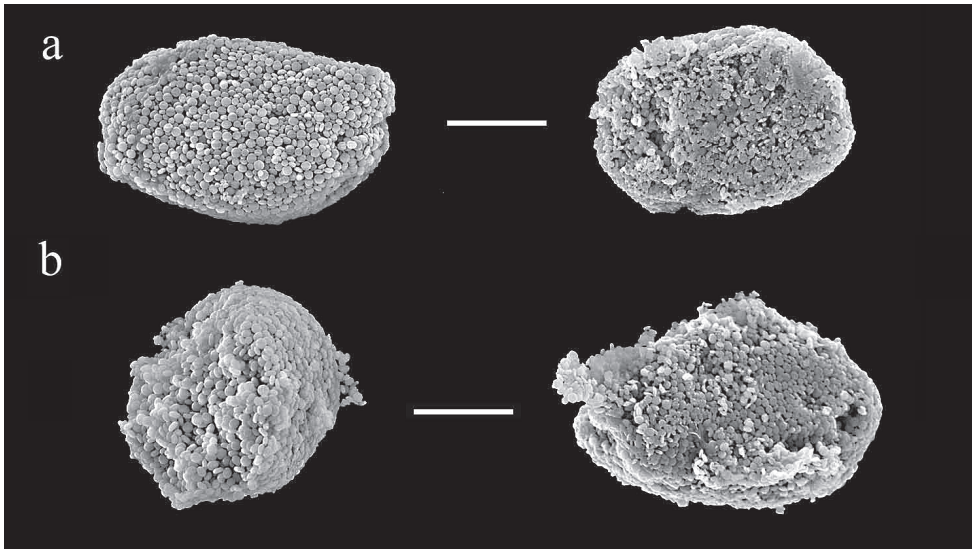

Fig. 10. *Ovabunda aldersladei* spec. nov., holotype, scanning electron micrographs of sclerites; a) stalk, scale 0.01 mm., b) tentacle, scale 0.01 mm.

significant amount of fine, calcite debris that appears in the light microscope field at 40 power when the sclerites are isolated with sodium hypochlorite. The debris is comprised of fine, micro-corpuscles of the *Ovabunda* type.

Colour.— The colony is white preserved in ethanol.

Etymology.— This species is named after friend and mentor Dr. Philip Alderslade. He is well known worldwide for his contributions to octocoral taxonomy.

Remarks.— The sclerites in this specimen are of the *Ovabunda* type but when isolated, they exhibit an irregular perimeter, some with sharp edges. The closest similar species that has been described from this region is *O. biseriata* (Verseveldt & Cohen 1971) from the Red Sea. This species also has two rows of pinnules on either side of the tentacles and 12 to 15 pinnules in the aboral row. The sclerite sizes published for *O. biseriata* contains sclerites that are up to 0.035 mm in diameter. These are larger than the diminutive 0.018 mm to 0.026 mm diameter sclerites observed in *O. aldersladei*.

Fasciclia gen. nov.

Type species.— *Fasciclia ofwegeni*, spec. nov. here designated.

Diagnosis.— Xeniids with tall, large, non-retractile autozooids bound together at the lower basal region into numerous rudimentary stalks. In the stalk-like area of the colony slight longitudinal grooves are present where adjacent polyp bodies are joined. The stalks share a common basal attachment. Colonies are monomorphic and zooxanthellate. Under a compound microscope the sclerites are flattened rods with a very coarse crystalline structured surface. They are often bent in the middle, lobed, or irregularly shaped (see below). Many have the appearance of a primary sclerite that has been fused together with a portion of another. Tentacle sclerites include small, similarly shaped ir-

regular flattened rods (see below). Large, arrowhead-like structures are arranged across the surface and originate from deeper within the sclerite. This complex surface architecture is visible when the sclerites are examined with a scanning electron microscope (see below). The gastric cavity contains two, fully developed, asulcal mesenteries. The remaining six mesenteries are reduced in typical xeniid fashion (fig. 16).

Colour.— Preserved specimens contain large quantities of zooxanthellae and they are usually light brown, cream, or tan in colour.

Etymology.— The generic name is formed from the Latin word "fascicle" which means small bundle. It refers to the lower region of the colony where the autozooids appear to be "bundled" together forming a stalk.

Remarks.— The colony form is similar to *Xenia*, having an upright stalk, branches and large, pinnate polyps. However, the sclerite structure is more similarly aligned with *Anthelia* (See figure 3a, below and Discussion). Many of the sclerites found in *Fasciclia* have a tee, cross, or boomerang shape and an arrowhead-like composite microstructure, which has not been previously described in the family Xeniidae. The new genus was necessary to accommodate the sclerite forms and colony features revealed in the Seychelles xeniid material. Colony morphology, sclerite shape and sclerite microstructures are generic level traits of *Fasciclia*.

Fasciclia ofwegeni spec. nov.
(figs 11-13, 17a, 19b)

Material.—Holotype: Northwest Coast of Vista Do Mar, Mahé, Seychelles. Depth 9 meters. 11.xii.1992 (RMNH Coel. 38682, Station 609). Paratype: Northeast Coast of Vista Do Mar, Mahé, Seychelles. Depth 12 meters. 14.xii.1992 (RMNH Coel. 38683, Station 618).

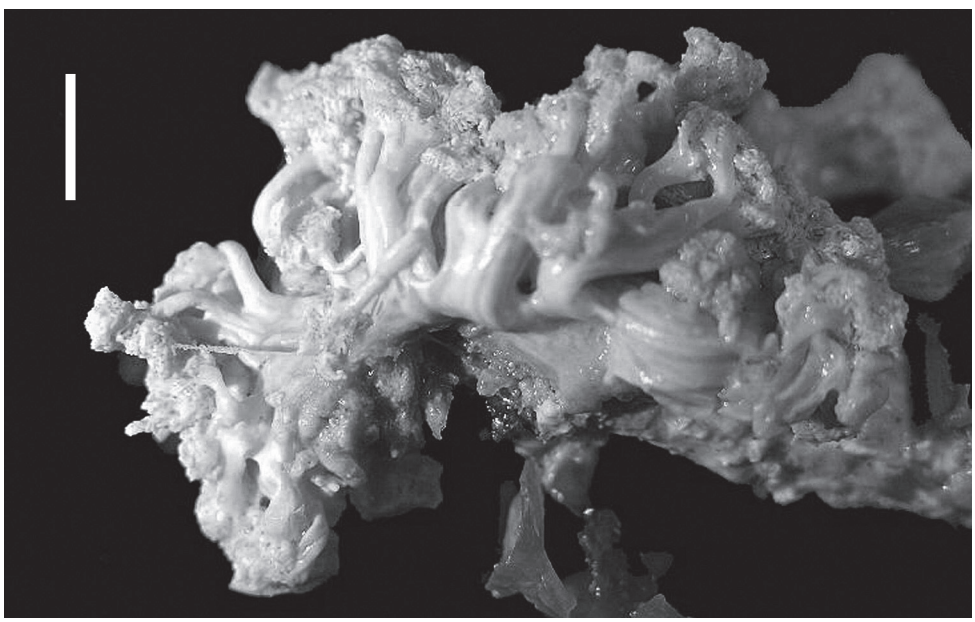

Fig. 11. *Fasciclia ofwegeni* spec. nov., holotype, Mahé Island, Seychelles. Sta. 609. Scale 10 mm.

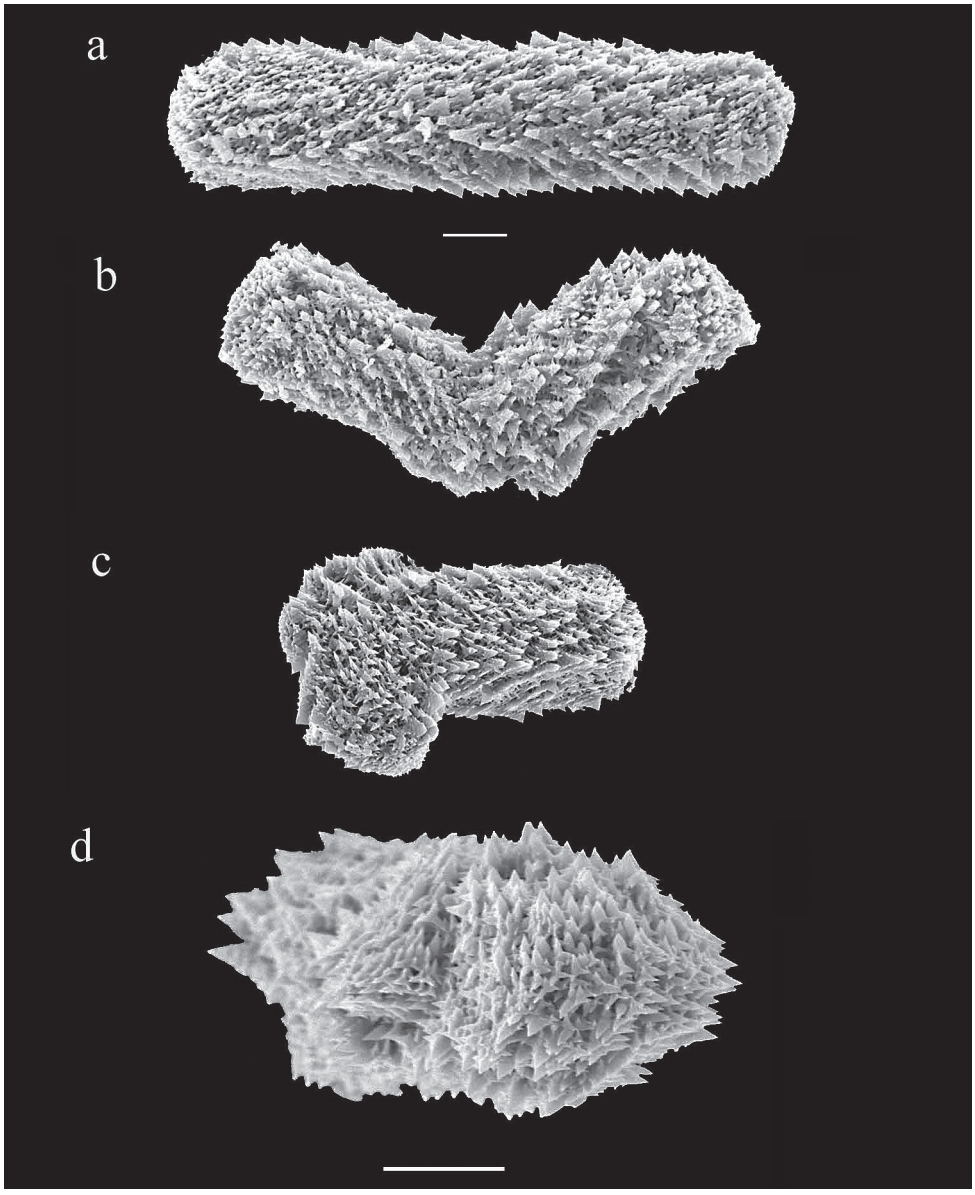

Fig. 12. *Fasciclia ofwegeni* spec. nov., holotype, scanning electron micrographs of stalk sclerites; a) flattened biscuit form similar to Anthelia type, scale 0.005 mm., b) bent form, scale 0.005 mm., c) side view of "T" form, scale 0.005 mm., d) end-view, scale 0.005 mm.

Description.— Colonies are both loose and attached, some growing on large pieces of coral branch rock along with some epizoic *Turbinaria sp*. alga (fig. 11). The holotype covers an area 4.5 cm long and has a total height including the polyps of 2 cm in the preserved state. There are firm stalks that contain longitudinal grooves, which run the length of the stalk. The grooves are aligned with the polyps located at the distal end of

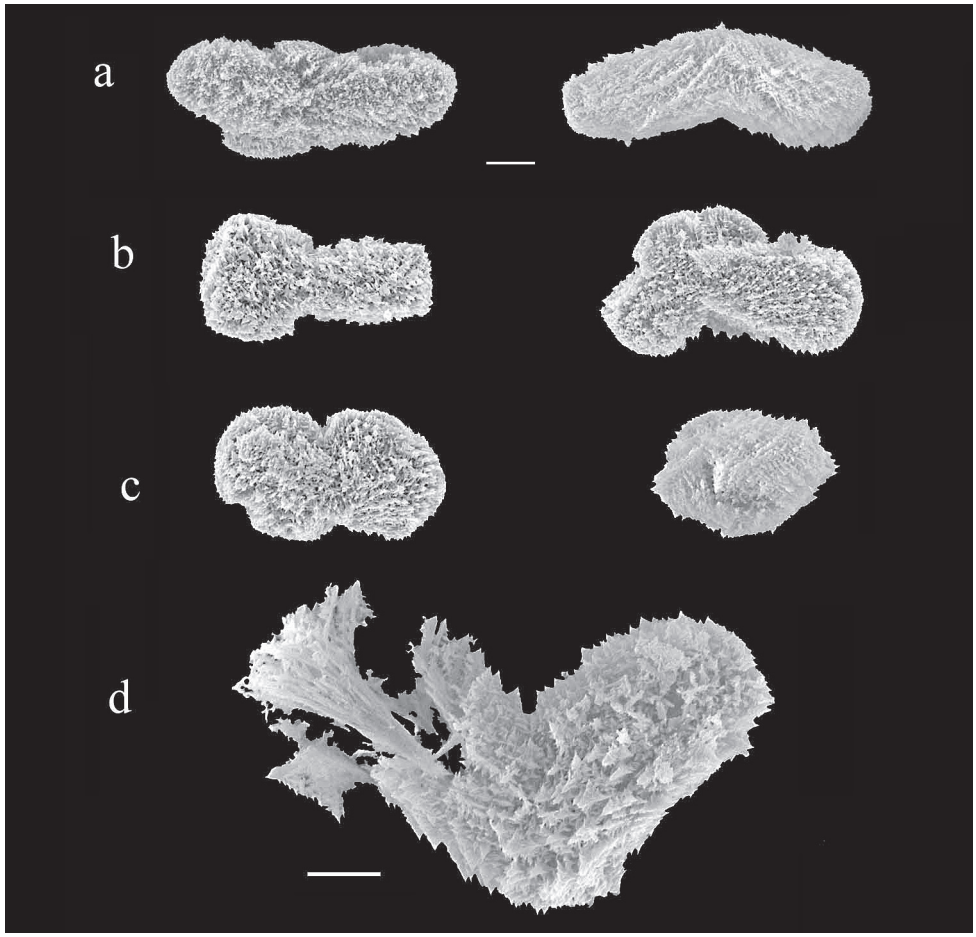

Fig. 13. *Fasciclia ofwegeni* spec. nov., holotype, scanning electron micrographs of tentacle sclerites; a-c) various forms, scale 0.005 mm., d) fractured sclerite, scale 0.005 mm.

the stalk. Stalks share a ribbon of thick tissue at their base that connects them together. The smooth stalks are typically 8 mm long and 4 mm wide. Large polyp bodies develop at different levels near the top of the stalk and each one corresponds to the longitudinal grooves along the stalk. The overall appearance is that the lower regions of groups of polyp bodies have become fused or bundled together forming the stalk portion of the colony. The polyp bodies measured without tentacles are 6 to 8 mm long by 1.0 mm wide. Tentacles are slightly flattened orally and taper to a blunt tip. They measure up to 4.5 mm long by 0.5 mm wide. Cylindrical pinnules with a rounded tip occur in two rows along each side of the tentacle. There is a small free space approximately 0.1 mm wide between each of the rows. There are from 8 to 10 pinnules in the outer row. Pinnules are up to 0.3 mm long and 0.15 mm wide.

Sclerites.— All regions of the colony contain high concentrations of sclerites. They are generally flattened and elongated. The sclerites are most often bent, lobed on one

end or pinched in the middle (figs 12b, 13). There is a rough surface texture that carries over along the edge of the sclerites giving them a fine, jagged appearance (fig. 12a). Sclerites are larger in the polyp bodies and stalks. They are up to 0.033 mm long by 0.007 mm wide. The smallest sclerites were found in the polyps, which were most often 0.028 mm long by 0.005 mm wide.

The use of scanning electron microscopy revealed that the surfaces have laterally radiating spiny rods in herringbone like rows (fig. 12a). Spines are positioned close together with arrow tip-like distal ends. The spines radiate from the interior of the sclerite outwards. In fractured sclerites the crystalline-like long spines can be seen (fig. 13d) with their orientation extending from the interior outward.

Colour.— Colonies are a light tan colour preserved.

Variability.— There are very little differences between the holotype and paratype. The paratype colony was quite large, containing 17 stalks. They were however slightly smaller in size than the holotype and were not attached to any substratum.

Etymology.— This species is named after Dr Leen P. van Ofwegen, National Museum of Natural History Naturalis, Leiden, The Netherlands, collector of the type specimen. It serves as a token of gratitude for his extensive work in octocoral taxonomy.

Fasciclia lobata spec. nov.
(figs 14-16, 19)

Material.— Holotype: Western rim of Poivre Atoll (05°46'S; 53°18'E), Seychelles. Depth 2 meters. 1.i.1993 (RMNH Coel. 38684, Station 780).

Description.— This colony measures 25 mm high by 30 mm wide. It is comprised of multiple, closely spaced stalks that share a common basal attachment (fig. 14). There is no substrate attached to the base. The upper portions in some of the stalks are branched briefly, which then give rise to the polyps. There are longitudinal grooves along the sides of the stalks that are aligned with the lower region of the polyps. Lower portions of the polyps measured without the tentacles are 3 mm long by 1 mm wide. The tentacles are cylindrical with a rounded tip, 2 mm long by 0.2 mm wide. Pinnules are small knob-like barrel shaped measuring 0.25 mm long and 0.2 mm wide. Two rows of pinnules can be found along the edge of each side of the tentacle. There are 5 to 7 pinnules in the aboral row.

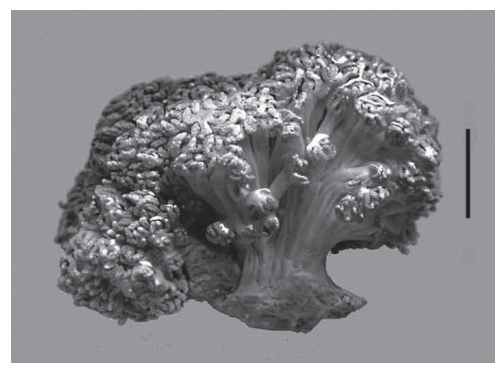

Fig. 14. *Fasciclia lobata* spec. nov., holotype, Poivre Atoll, Seychelles. Sta. 780. Scale 10 mm.

Sclerites.— The polyp and stalk contain similar shapes and sizes of sclerites. They are more numerous in the polyps. Sclerites are flattened, elongated oval shapes that are sometimes bent with a granular surface. They are often irregularly formed with lobes on either side or the ends (fig. 15b). Many are pinched in the middle. The lobed portions of the sclerite are darker in colour when viewed in transmitted light. The

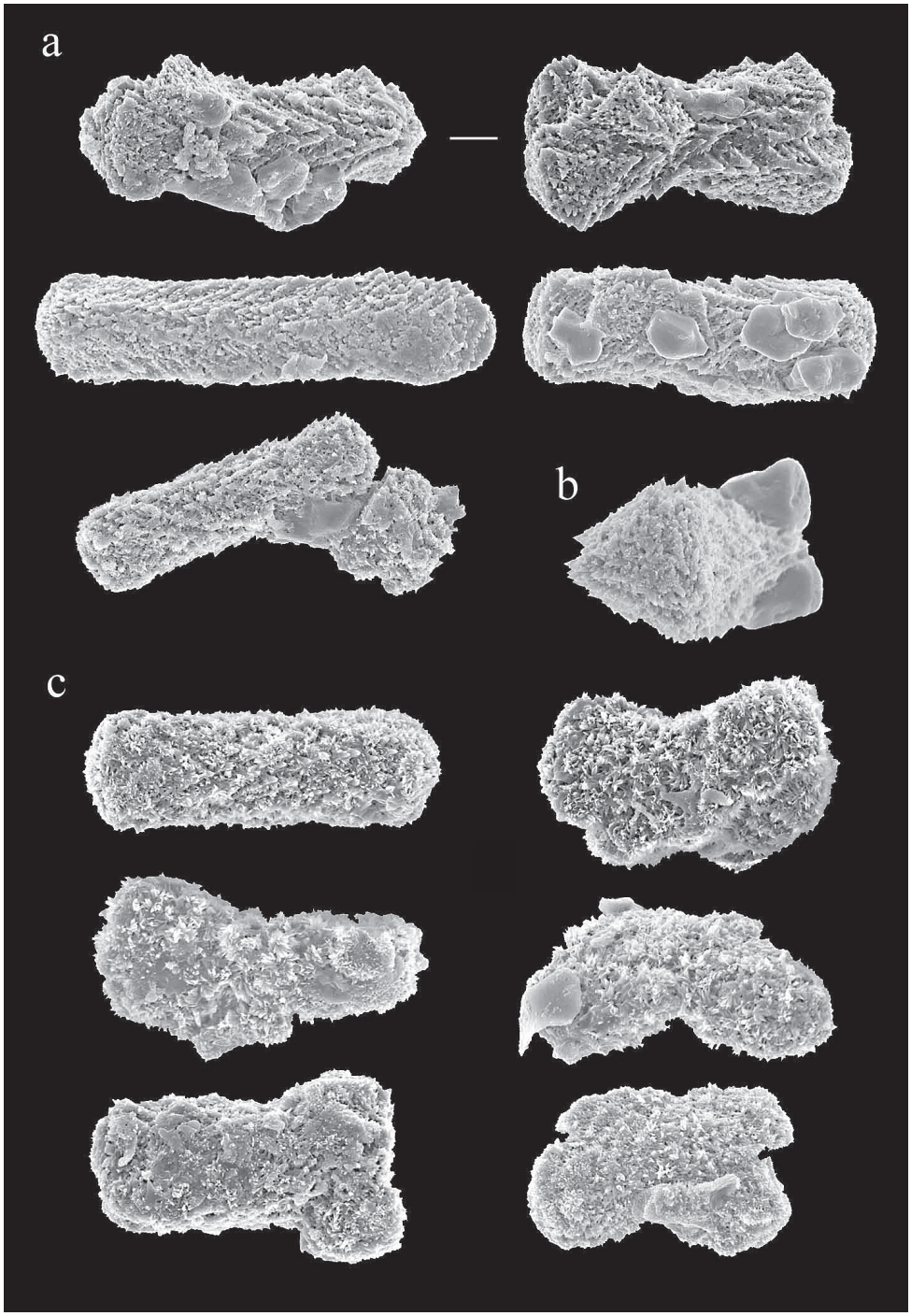

Fig. 15. *Fasciclia lobata* spec. nov., holotype, scanning electron micrographs of sclerites, a) stalk forms, scale 0.005 mm., b) end view, scale 0.005 mm., c) tentacle forms, scale 0.005 mm.

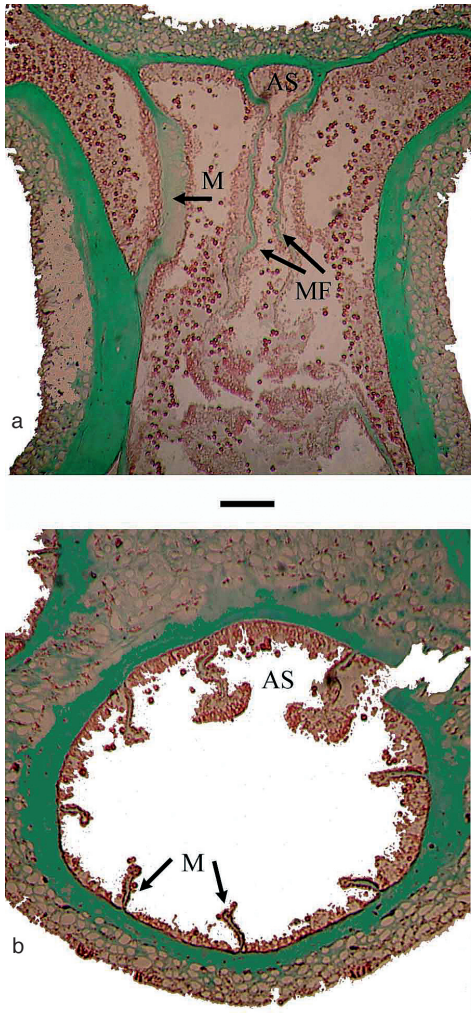

Fig. 16. *Fasciclia lobata* spec. nov., holotype, histological sections; AS = Asulcal Mesenteries M = Mesenteries, MF = Mesenterial Filaments; scale 0.1 mm; a) longitudinal section through polyp body, b) transverse section of lower stalk region.

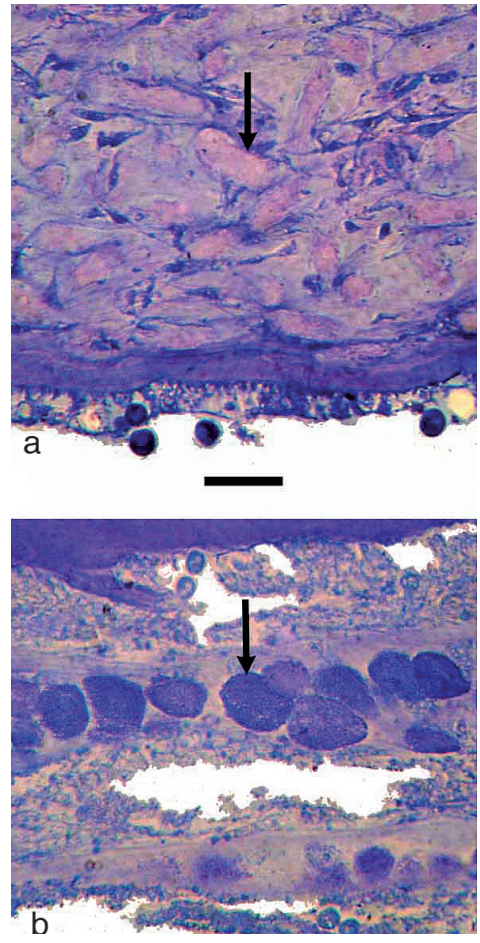

Fig. 17. Histological sections of polyp body interior, scale 0.03 mm.; a) *Fasciclia ofwegeni* spec. nov., holotype, sclerites (arrow), b) *Ovabunda benayahui* sclerites (arrow).

sclerites are up to 0.035 mm long and from 0.008 to 0.016 mm wide at their widest point.

Scanning electron examination revealed that within the stalk there are portions of the sclerites that are made up of spines with arrow tip-like distal ends that are aligned longitudinally in a herringbone arrangement. Then embedded in this formation are larger, pebble-like pieces of solid calcite material (fig. 15a). These solid inclusions appear irregularly shaped but smooth on the surface.

Similar sclerite architecture is found in the polyp sclerites with one significant dif-

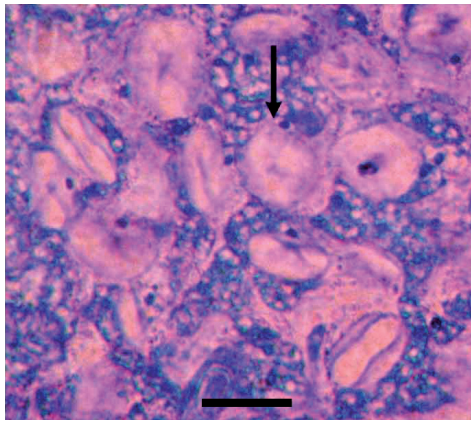

Fig. 18. Sclerites of *Xenia* species (arrow), stain indicates a mineralized structure, scale 0.02 mm.

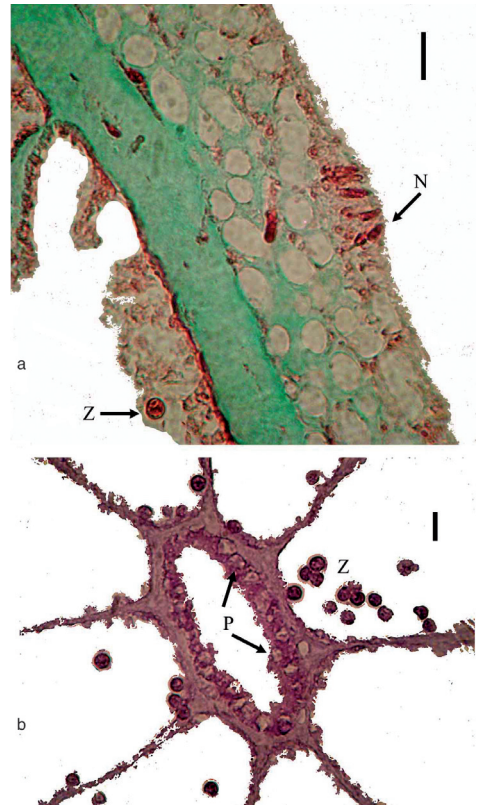

Fig. 19. *Fasciclia* gen. nov., histological sections; N = Nematocysts, Z = Zooxanthellae, P = Pharynx; a) *F. lobata* spec. nov., holotype, epidermis with nematocysts, scale 0.005 mm., b) *F. ofwegeni* spec. nov., holotype, transverse section of a polyp below the siphonoglyph, scale 0.01 mm.

ference. Fine rosette clusters of crystalline-like material form small aggregations on the distal tips in some micro-components (fig. 15c) of the sclerites. At magnifications <100 power the sclerites appear fuzzy except in areas where the solid, pebble-like portions of material are located.

Colour.— Colony stalk and polyp stems are a light golden brown. The polyp heads are darker brown and slightly blackened suggesting some sort of oxidization my have occurred during storage.

Etymology.— The name of this species is derived from the lobe-like protuberances of solid material that are common in many of the sclerites. The lobes are visible when examining the sclerites under 100-power magnification and often appear darker in colour.

Remarks.— Initial observations of *Fasciclia ofwegeni* and *F. lobata* showed similar gross morphology. However, *F. lobata* is generally smaller in size and contains 5 to 7 pinnules in the outer row, fewer than *F. ofwegeni*, which contains 8 to 10 pinnules. Magnification of >2,000 reveal that sclerites of *F. lobata* contain a distinct pebble-like component (fig. 15a) whereas these are absent in *F. ofwegeni*. Also, its polyp sclerites have fine, fuzzy crystalline matrices (fig. 15c) arranged at the surface, unlike *F. ofwegeni*, which has herringbone like rows of rods with arrow tip like ends (fig. 12a). Therefore it is concluded that *F. lobata* is a distinct species.

Tissue sections sampled from the holotype of *F. ofwegeni* and *F. lobata* reveal anatomical features consistent with those found in the Xeniidae. The asulcal pair of mesenteries remains fully developed while the ventral and lateral mesenteries are reduced in lower regions of the polyps and stalks (fig. 16b). Mesogloea in these sections stained green by using Mason's Trichrome. A longitudinal section of the polyp body taken from below the pharynx illustrates the dorsal mesenterial filaments are also well formed (fig. 16a). The oral opening of the polyps exhibits reduced cilia lining the pharynx and siphonoglyph. Although this feature can be common in other octocorals, the limited number of cilia in the siphonoglyph and pharynx is typical among xeniids (fig. 19b).

Discussion

The Tyro expedition to the Seychelles has yielded a rich collection of soft corals of the family Xeniidae, which facilitates our knowledge of octocorals from the Indian Ocean. Unfortunately, no detailed field data or underwater photographs of colonies from this expedition exist. Recent expeditions conducted by the National Museum of Natural History, Naturalis have put more emphasis on documenting colonies in the natural reef habitat prior to collection. The combination of habitat data, photographs of living colonies and scanning electron micrographs of sclerites will help us to create future accurate and complete taxonomic descriptions of octocorals.

Data on the octocoral fauna of the western Indian Ocean has been limited to date. Recent investigations during the later part of the twentieth century including members of the family Xeniidae have focused on the East African coastline (Benayahu, 1993; Williams, 1992) and areas throughout the Red Sea (Reinicke, 1997; Benayahu et al., 2002). Prior to this, there are published reports from Madagascar (Tixier-Durivault, 1966; Verseveldt, 1971). Aside from a few accounts of octocoral observations and descriptions (Verseveldt, 1976; Malyutin, 1992; Ofwegen & Slierings, 1994) little comprehensive information exists on the soft coral communities of the Seychelles. The collections made during the Tyro Expedition to the Seychelles provided an opportunity to perform a thorough examination of the xeniids from this area and employ the use of modern scanning electron microscopy technology for their identification.

Among the eleven different species identified in this collection as belonging to the family Xeniidae, five of them are new. This is not uncommon in geographic areas where little investigation has been done, or where particular families of octocorals have not been thoroughly examined. For example, Roxas (1933) was the first to study the Xeniidae of the Philippine and described six new species of *Anthelia* and twelve of *Xenia*.

The new species described above fit well within their respective generic assignments. Sclerites from *Anthelia mahenensis* are typical, exhibiting a flattened rod shape or elongated oval form (fig. 3a) with herringbone-like surface detail. This species most closely resembles *A. philippinense* (Roxas, 1933) however *A. mahenensis* contains fewer pinnules and these are closely spaced. A. *philippinense* is also recorded as being up to three times larger than *A. mahenensis. Ovabunda aldersladei* is smaller than most other known *Ovabunda* species. Undoubtedly, there is a need for a comprehensive revision of all *Xenia* species in order to assign them correctly (Alderslade, 2000). *O. aldersladei* is the first species among its genus to include both sclerites that are aggregates of micro discs and others that have a solid interior with outer micro discs. Until further

studies will be conducted on the taxonomic significance of this interesting finding it can be suggested that theses two different sclerite forms are variations of the same sclerite developing within the coenenchyme of the *O. aldersladei* colonies. A similar hypothesis was proposed in Tentori & Allemand (2006), who described a physical change in the size and shape of sclerites in *Cladiella* sp. resulting from a diurnal cycle of calcification and decalcification. A detailed study is still required in order to test if this process is applicable to the development of sclerite forms in *Ovabunda* or other xeniid genera.

The classification of the new genus *Fasciclia* in the family Xeniidae is represented in the current study by two species. The new genus was introduced do to its unique colony shape and sclerite forms that have not previously been encountered within this family. It is interesting to note that the introductory notes of Thomson & Mackinnon (1910: 166) who stated in section C: "A study of *Anthelia glauca*, Lamarck, and similar forms in the collection shows that very little importance can be attached to such changeable features as the number of rows of pinnules, or the extent of the middle line left bare. An occasional growth variation - the coherence of adjacent polyps at their bases - is interesting, because it suggests a link between *Anthelia* and *Xenia*, or how the *Xenia* type might arise". The comments suggest that they have observed samples looking like *A. glauca*, but with "coherence of adjacent polyps at their bases". This could be interpreted as the fusing of the lower region, joining polyps above the base. A stalk-like feature, which has been attributed the new genus described above. Unfortunately, no diagnosis of their *A. glauca* specimens was ever given. The British Museum of Natural History very kindly loaned the three specimens from Gardiner's collection that were likely to be the ones mentioned in the text. Upon examination two of the specimens were found to contain typical xeniid sclerites and the third, labeled *Sympodium* did in fact belong to this genus (L.P. van Ofwegen, personal communication). Although none of these specimens corresponded to what was described by Thomson & Mackinnon (1910), it is possible that a specimen exhibiting a fused polyp growth form had been placed in the collection or observed in the wild.

Sclerites.— Sclerite microstructures are a useful part of the octocoral taxonomic process and have received more attention in recent years. Historically, xeniid sclerites have been grouped into two main categories, flattened discs and elongated ovals. Alderslade (2000, 2001) provided an overview of xeniid sclerite architecture where he pointed out a typical xeniid disc sclerite is constructed from radially arranged dendritic rods. The *Heteroxenia elizabethae* sclerites illustrated in Figure 6a and 6b of this paper are an example of this formation. It is also very similar to the microstructure of *H. fuscescens* (Reinicke, 1997: 10a). Kawaguti (1969: 30-32) depicts magnified longitudinal sections taken from the interior of an *H. elizabethae* sclerite that appears to show the dendritic rods. The cigar-shaped mature sclerites of *Anthelia* are constructed of tooth-like rods arranged at an angle to the long axis of the sclerite. A noticeable characteristic of the new genus *Fasciclia* is the similarities in sclerite microstructure to *Anthelia*.

The type species of *Fasciclia, F. ofwegeni* contains the typical *Anthelia* like sclerites (fig. 12a) and diverse shapes where many are gently or sharply bent in the middle (fig. 12b; 13a), pinched in the middle in a lobed configuration (fig. 13c), or often shaped with

one end extended on each side, perpendicular to the main axis (fig. 12c; 13b). The species *F. lobata* differs from *F. ofwegeni* because the tentacle sclerites in *F. lobata* exhibit small, rosette like clusters of delicate crystalline material (fig. 15c). Also, all of the sclerites include a solid, pebble-like component embedded in the calcite matrix (fig. 15). A review of the sclerite shapes compiled by Bayer et al. (1983) showed that none of the variations in *Fasciclia* have been previously attributed to octocorals.

Histology.— Some work has been published on the microanatomy of adult xeniid octocorals. Ashworth (1899, 1900) gave a thorough account of cellular structures in *Xenia* and *Heteroxenia*. Later, Kawaguti (1969) provided a brief summary of xeniid tissue composition, focusing on sclerite development in the scleroblast. This was also the first publication to include scanning electron micrographs of a xeniid. Ashworth (1899) noted the presence of nematocysts in *Xenia*, though they are nearly absent in most species. Figure 19a illustrates the nematocysts in *Fasciclia lobata*. When they are found, nematocyst cells usually occur in small clusters of three to six cells. This clustering effect is usually present in the distal portions of xeniid colonies. They have also been observed in the lobes of *Efflatounaria* species and one species of *Xenia* (M. Janes, unpublished data). Cubical cells are quite common lining the pharyngeal cavity below the siphonoglyph in xeniids. Their presence in other octocorals within the polyp pharynx is unknown. This is being investigated as part of a larger project on the comparative microanatomy of octocorals (work in progress).

A noteworthy observation was made during the course of in situ examinations of the sclerites. When the sclerites were stained with Sanderson's Rapid Bone Stain then counterstained with acid fuchsine the mineralized or calcite components of the sclerites were coloured pink. This can be seen in the sclerites of *Fasciclia ofwegeni* (fig. 17a). The opposite was true when *Ovabunda benayahui* sclerites were stained in the same manor. They appear blue (fig. 17b), owing to a significant non-mineralized or organic component. Alderslade (2001: 52) notes that it is common in species of *Ovabunda* for "many of the sclerites to fall apart soon after exposure to sodium hypochlorite solution." This observation agrees well with the fact that the Seychelles sample of *Ovabunda* sclerites took the stain for organic material and not what would be expected for calcite. As a comparison, a species of *Xenia* was stained with Sanderson's Rapid Bone Stain (fig. 18). It too stained pink due to a dense composition of calcite rods and little, if any organic material. It is possible that this histological staining process could be used on other octocoral sclerites to determine the extent of differences between organic and inorganic sclerite composition.

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