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A new genus and new species of soft coral (Octocorallia: Alcyonacea: Alcyoniidae) from the south western region of Australia

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Abstract

Notodysiferus dhondtae **new genus & new species** (Octocorallia: Alcyoniidae) is described from King George Sound, Albany, Western Australia. The shallow water, dimorphic, zooxanthellate genus has a massive, encrusting growth form similar to some species of warm water alcyoniid genera such as *Sinularia* and *Lobophytum*. The new taxon has both autozooids and siphonozooids in most of the area of the lobes of the polypary, but siphonozooids alone are distributed over the basal regions of the lobes. The sclerites of the new taxon are 8-radiate capstans and their derivatives. Remarks are presented on the alcyonacean fauna of the region, and the new genus is compared to similar taxa.

Key words: Coelenterata, Cnidaria, Octocorallia, Alcyonacea, Alcyoniidae, *Notodysiferus*, new genus, new species, Western Australia

Introduction

King George Sound, Albany, (Fig. 1) is historically important to both terrestrial and marine biologists because it was visited by such important vessels as the *Investigator, L'Astrolabe*, *Le Géographe* and *Le Casuarina*. But although it is the type locality for many marine species, the octocoral fauna of this southwestern corner of Western Australia is virtually unknown.

This part of the Australian coastline lies in the Flindersian province (Bennett & Pope 1953). This province has extremely high levels of biodiversity and endemism, with, for example, 110 species of echinoderms of which 90% are considered endemic (Poore 1995). The province has warm to cool waters in contrast to the cold temperate waters that exist off shore in the southeastern part of the mainland and around Tasmania. In the western and central-western regions of the southern coast, this warmer environment is mostly attributed to the effects of the Leeuwin Current that transports waters from the tropical north-

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west of the country southwards along the west coast and then eastwards along the southern coast into the Great Australian Bight (Cresswell & Golding 1980). The effect on the mainly temperate fauna is the addition of a significant number of species that are more commonly found in the tropical waters of northwestern Australia, Indonesia and Indo-Malaya (Maxwell & Cresswell 1981).

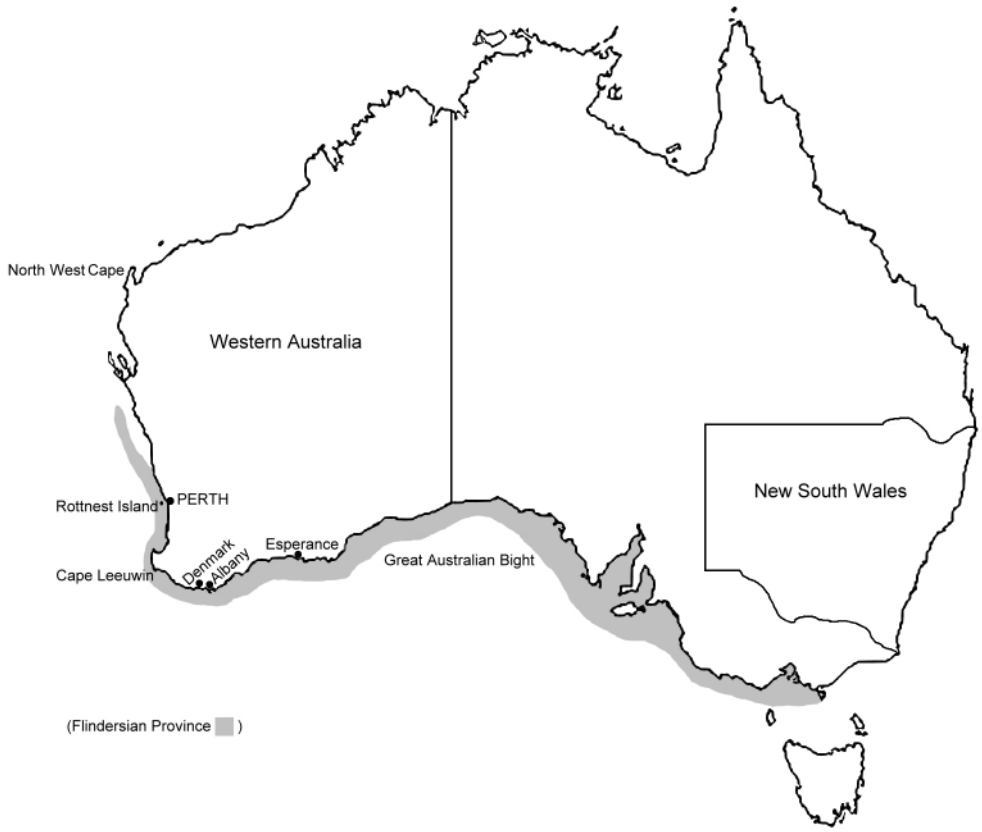


FIGURE 1. Map of Australia showing relevant details.

The marine fauna of Rottnest Island, which lies off the southern part of the west coast of Western Australia, has been the subject of considerable research activity as compared to the southern coastal regions of the state because of its close proximity to Perth, the state's capital city. The Island lies in the southern portion of the west coast overlap zone (North West Cape south to Cape Leeuwin), which is a region where warm-temperate and Indo-West tropical species mix (Wells 1991), and Veron & Marsh (1988) recorded 26 zooxanthellae scleractinian corals here. Published reports of shallow-water soft corals that occur in the Rottnest Island and adjacent mainland region include: *Sinularia platysma* Alderslade & Baxter, 1986; *Sinularia megasclera* Alderslade, 1987; *Skamnarium complanatum* (Verseveldt, 1977) (see Alderslade 2000); and *Zignisis phorinema* Alderslade, 1998.

Unpublished data on material in the Museum and Art Gallery of the Northern Territory (MAGNT) from this area include: *Clavularia ramosa* Hickson, 1894; *Clavularia* sp.; *Carijoa* sp; *Sinularia* spp.; *Cladiella* sp.; *Capnella australiensis* (Thorpe, 1928); *Capnella* spp.; *Erythropodium hicksoni* (Utinomi, 1972); *Alertigorgia* sp.; *Mopsella klunzingeri* Kükenthal, 1908; and *Euplexaura* sp. Such a mix of genera, most of which are commonly considered as tropical, could be expected to occur on suitably substrata as far south as Cape Leeuwin, the southern boundary of the overlap zone (Wells 1991). Beyond this, eastwards to the Great Australian Bight, soft coral records are very scarce. The MAGNT collection holds a shallow-water species of *Clavularia* from Denmark, 50 km to the west of King George Sound, and specimens of *Carijoa multiflora* (Laackmann, 1909) and *Mopsella klunzingeri* from the Port of Esperance 400 km to the east of the Sound. There are no records, however, of shallow-water soft corals from the western and central Great Australia Bight. The only octocoral species from King George Sound reported in the scientific literature is *Alcyonium terminalis* Quoy & Gaimard, 1833; later transferred to the genus *Lemnalia* by Gray (1869), based on the small description and illustrations of the original publication.

The new genus and species described below is quite unusual. From the southwestern, southern and southeastern coasts of Australia (from south of Rottnest Island on the west coast to near the near the northern border of New South Wales on the east coast), it represents the first recorded octocoral species to form large, thickly encrusting colonies of the sort that are common amongst a number of tropical alcyoniid genera. It is also unusual because it appears to be endemic to the cool-temperate waters of the southwest region and not a tropical taxon with an extended southern range. The new species has a growth form reminiscent of a number of species of warm-water alcyoniid genera such as *Sinularia*, but it has dimorphic polyps with a remarkable siphonozooid distribution. As well as being arranged in the usual manner amongst the autozooids, the siphonozooids are the only type of polyp distributed on the base of the lobes and on the polypary surface between the lobes.

Material and methods

The holotype is part of the octocoral collection of the MAGNT, and was donated in 1989 by Dr Peter Murphy when he was leader of the bioprospecting team at the Australian Institute of Marine Science (AIMS), Townsville. Sclerites were photographed on a Jeol 5610LV electron microscope and colony fragments were decalcified in a mixture of 50% formic acid and 15% sodium citrate.

ALCYONIIDAE Lamouroux 1812

Notodysiferus, new genus

Diagnosis. Colonies are large and thickly encrusting, with lobes branched into finger-like processes. Polyps are dimorphic and do not have sclerites. Both siphonozooids and autozooids occur together on most of the area of the lobes, but siphonozooids alone occur on the basal parts of the lobes and on the polypary surface between the lobes. The autozooids are retractile, commonly into calyx-like, coenenchymal protrusions. The siphonozooids on the base of the lobes and between the lobes occur on small coenenchymal papillae. Sclerites are small 8-radiate capstans and their derivatives, up to 0.12 mm in length. The genus is known only from shallow water and is zooxanthellate.

Type species. Notodysiferus dhondtae n.sp., by original designation.

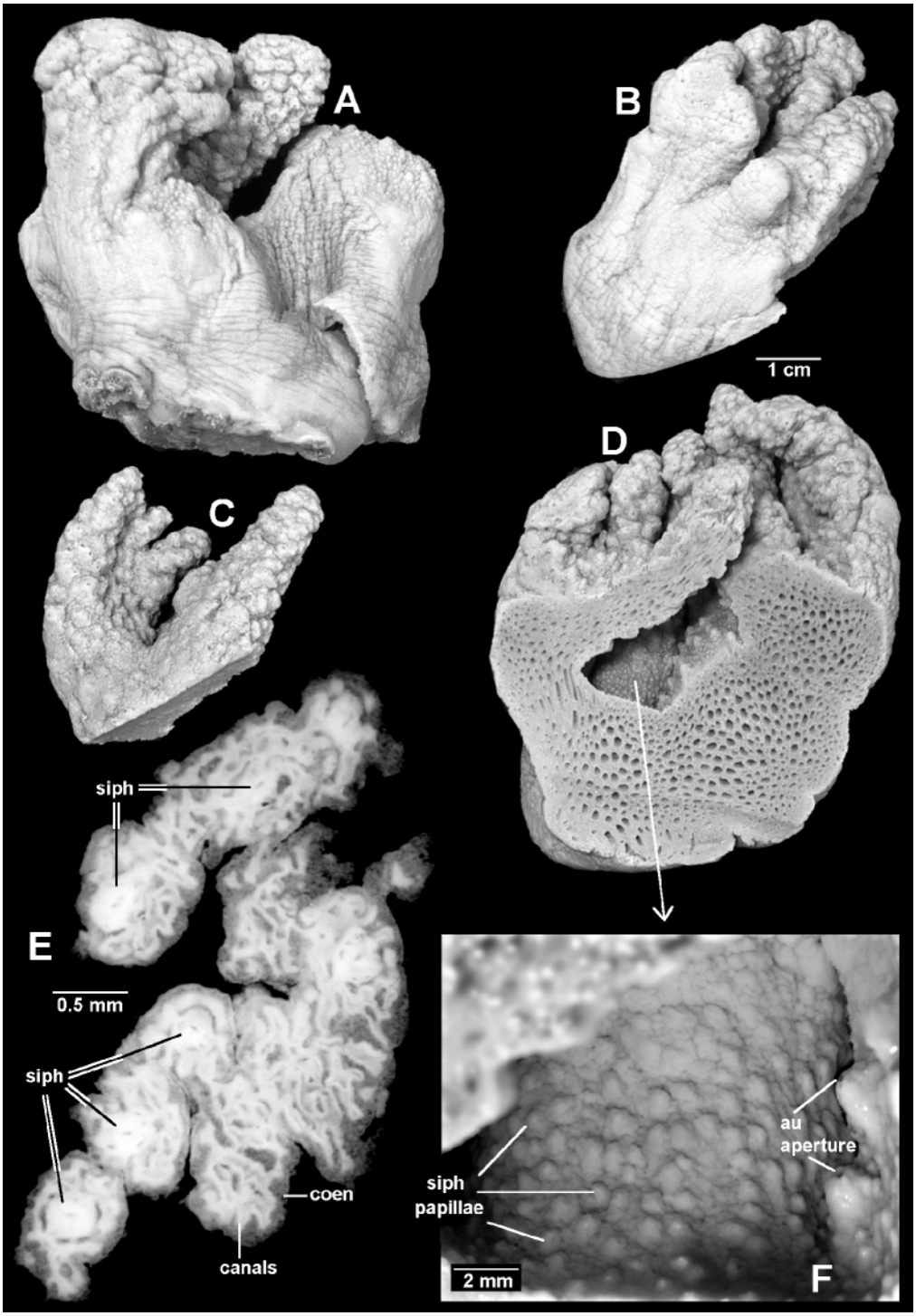
Etymology. The generic name is formed from the transliterated Greek words *noto* (south), *dysis* (west) and *ferus* (wild animal). The latter in the sense of untamed as it is unlikely the coral was ferocious. Gender masculine.

Remarks. In its general colonial morphology, the new genus resembles some species of the massive, lobed, zooxanthellate, alcyoniid genera *Cladiella* Gray, 1869, *Lobophytum* von Marenzeller, 1886, *Sinularia* May, 1898, *Dampia* Alderslade, 1983, and *Klyxum* Alderslade, 2000. Of these five genera, *Dampia* would bare the closest resemblance due the possession of calyces (see illustrations in Fabricius & Alderslade 2001). Only *Lobophytum*, however, has dimorphic polyps, but this genus lacks 8-radiate sclerites. The only dimorphic alcyoniid genera with similar sclerites are *Minabea* Utinomi, 1957, *Paraminabea* Williams & Alderslade, 1999, and *Verseveldtia* Williams, 1990, all of which are not zooxanthellate. Of these, only *Paraminabea* has species that are lobed, and all species of this genus are generally highly coloured, owing to pigments in the sclerites. *Minabea* is a deep-water digitate genus from New Zealand and Japan (see Williams & Alderslade 1999), while *Verseveldtia* is a deep-water capitate taxon. The only published records of *Verseveldtia* are from the east coast of South Africa, but it also occurs off Western Australia (my own unpublished data).

Notodysiferus dhondtae, new species (Figs. 1-4)

Holotype: NTM C14221, south of Mount Martin, King George Sound, Albany, Western Australia, 35°00.8' S, 117°57.0' E, depth 4 m, AIMS bioprospecting team, 27 March 1989.

FIGURE 2. *Notodysiferus dhondtae*, n. gen., n. sp., holotype: A-D, colony fragments; E, subsurface aspect of a decalcified tangential section through a papillate siphonozooid area; F, a papillate siphonozooid area. Abbreviations: au aperture = aperture of retracted autozooid; canals = subsurface canal system; coen = coenenchyme; siph = siphonozooids; siph papillae = papillae housing siphonozooids.



Description. The holotype consists of four fragments from a larger colony (Fig. 2A-D). There is only one portion of colony edge that is complete with lobes and base surface down to the place of attachment (Fig. 2A). This fragment is about 63 mm high, 63 mm across its broadest dimension and 55 mm at its thickest. The smallest fragment (Fig. 2C) only consists of polypary lobes. Most colonial lobes are branched into several more or less finger-like processes, the shortest of which is 10 mm in length and 7 mm thick, and the longest is 60 mm in length and about 15 mm thick.

Polyps are dimorphic. The autozooids are retractile and their tentacles have a single row of 10-12 pinnules along each side of the rachis. Most autozooids have retracted within calyx-like coenenchymal mounds that are about 1.2 mm high and 1.26 – 2.4 mm across at the base. In a few places, however, the autozooid-mounds are extremely low or non-existent. Siphonozooids are scattered between the autozooids, and may even occur on the autozooid-mounds. They are extremely difficult to detect, especially in the parts of the colony where the mounds are well developed. Figure 3A shows a fragment of a polypary lobe where the surface is more or less flat. The fragment has been decalcified to more clearly reveal the location of the zooids. The reticulate subsurface canal system is also made more visible by this method. The contrast of the figure has been enhanced in order to show the features more clearly.

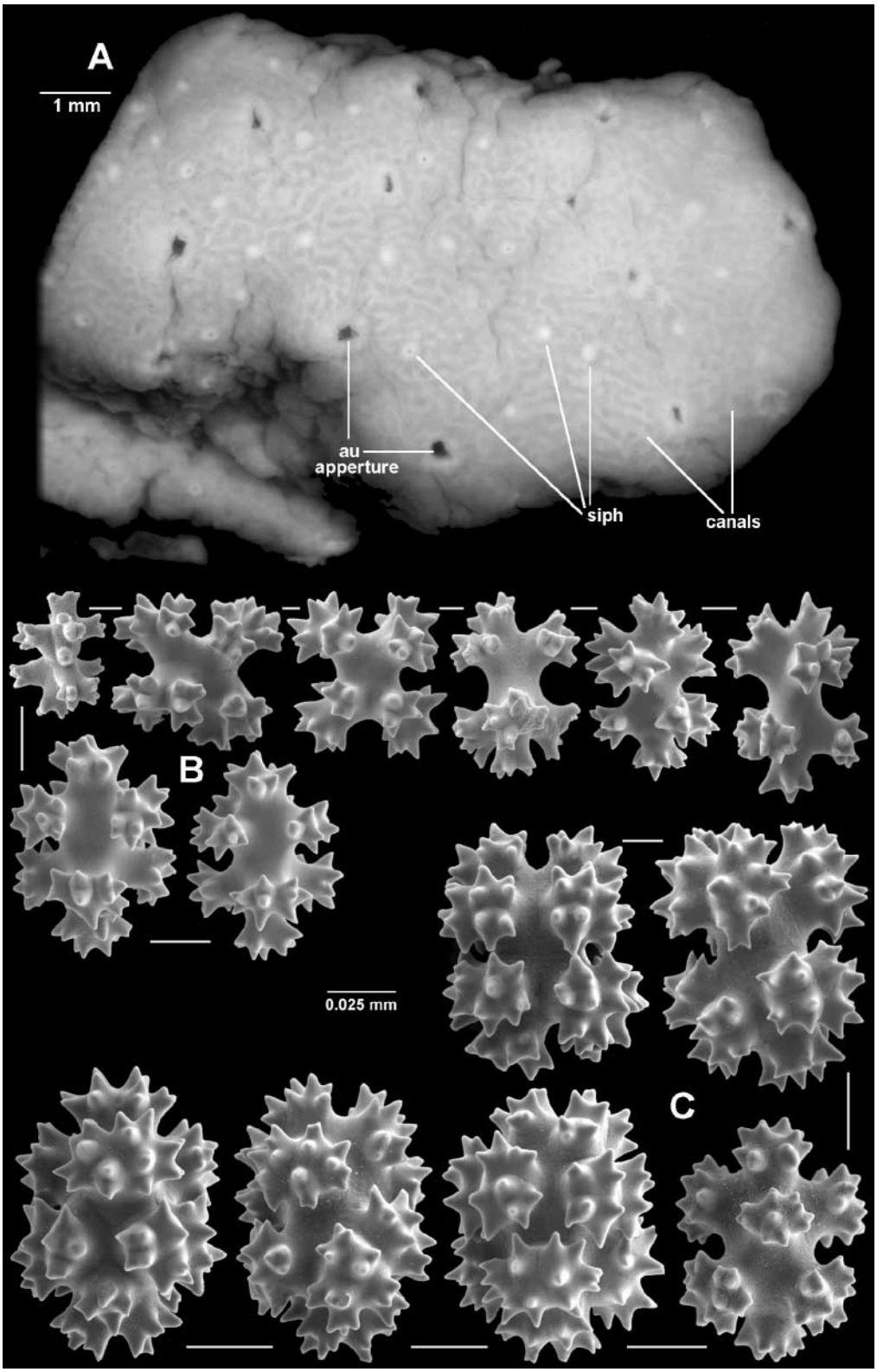
Much of the small amount of polypary surface that is visibly between the autozooid-mounds, and often also the surface of these mounds, is finely cockled. On the basal regions of the lobes, and on the small amount of polypary surface between the lobes, small papillae arise from the cockled surface (Fig. 2D,F). These papillae are the sites of siphonozooids. No autozooids are present in these regions. Figure 2E shows a thin, hand-cut, tangential section of a papillate region. The section has been decalcified and the view is the subsurface aspect. The siphonozooids are clearly visible, as is the zooxanthellae-filled subsurface canal system.

The sclerites of the polypary surface (Fig. 3B) are tuberculate 8-radiate capstans, 0.04-0.08 mm in length, a few of which are twinned as crosses. Deeper into the coenenchyme the tubercles of the sclerites increase in size obscuring their narrow waist and the sclerites become larger. In the centre of the lobe the sclerites are about 0.1 mm long and most are quite oval in outline (Fig. 3C).

The sclerites of the surface of the base are like those of the surface of the polypary. As in the lobes, the size of the basal sclerites increases deeper into the coenenchyme, up to a length of about 0.12 mm (Fig. 4). There are no sclerites in the polyps.

Colour. Field notes state the live colony was brown with orange polyps.

FIGURE 3. *Notodysiferus dhondtae*, n. gen., n. sp., holotype: A, surface of a decalcified portion of the polypary; B, sclerites of the surface of the lobes; C, sclerites of the interior of the lobes. Abbreviations: au aperture = aperture of retracted autozooids; canals = subsurface canal system; siph = siphonozooids.



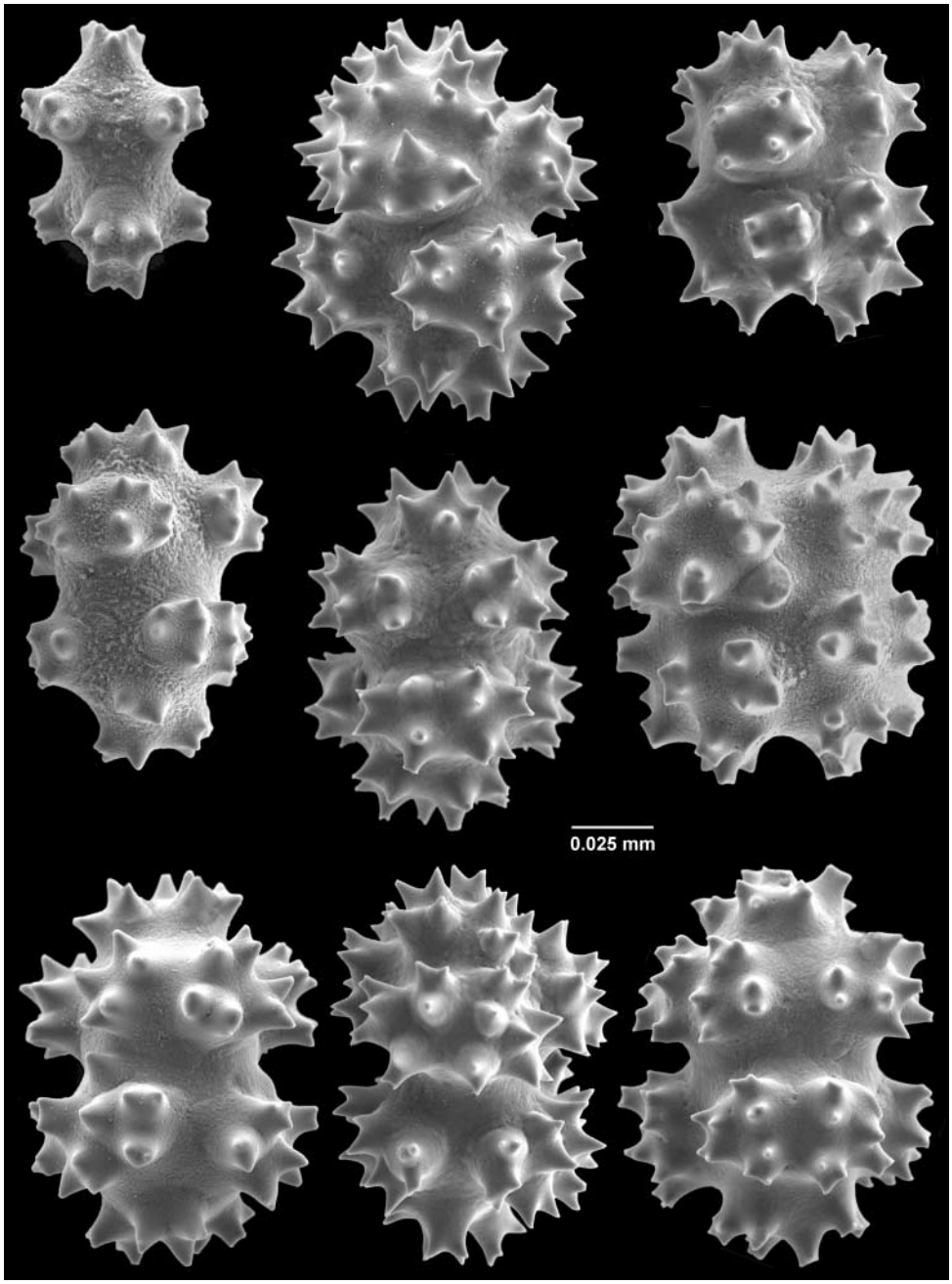


FIGURE 4. *Notodysiferus dhondtae,* n. gen., n. sp., holotype: sclerites of the interior of the base.

Etymology. This species is named for Mme. Marie-José d'Hondt, Muséum National d'Histoire Naturelle, Paris, an infrequent but extremely adept student of octocorals who has been of great help to me on many occasions.

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