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New records of Stylasteridae (Cnidaria: Hydrozoa) from Western Australia, including the description of two new species

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Abstract

Four species of stylasterids are reported from off Western Australia, including two new species and several lots of a poorly known deep-water species, *Crypthelia pudica*. These are the first records of stylasterids from Western Australia. A checklist of the 14 sylasterid species now known from Australia and an historical resumé of their presence off Australia are given.

Introduction

A review of the literature on Australian stylasterids reveals that 11 species, including three exclusively fossil species, have been reported from 28 localities. Of these records, 11 are geographically obscure, such as 'Australia', and of the remaining 17, only six have accompanying bathymetric data. Clearly, much remains to be accomplished concerning the zoogeographical relationships of Australian stylasterids. Based on a collection borrowed from the Western Australian Museum, 22 lots of Western Australian stylasterids were studied, which included two new species, an additional record of *D. violacea,* and nine lots of the poorly known *Crypthelia pudica.* These four species represent the first records of stylasterids from Western Australian and increase to 14 the number of species known from Australia (see Checklist).

Most type specimens of the new species and nontypes of the others are deposited at the Western Australian Museum, Perth (abbreviated WAM), with some specimens also deposited at the United States National Museum of Natural History, Smithsonian (abbreviated USNM). Morphological terminology and general methodology are discussed in Cairns (1983) and amplified in Cairns (1986a, b).

Historical Resume

The earliest definitive record of a stylasterid from Australia was that of the common shallow-water species *Distichopora violacea,* reported by Delongchamps (1824) from 'les côtes de l'Australie'. Hickson (1892) later reported *D. violacea* from Murray Island, Torres Strait, and Boschma (1959) thoroughly discussed this

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species, but added no additional records from Australia. Veron (1986) illustrated this species in colour, stating that it was common on the Great Barrier Reef and often found in caves.

Milne Edwards and Haime (1850a) described three new species, *Stylaster sanguineus, S. granulosus,* and *S. gracilis,* from the imprecise locality of 'Australie'. All three species are still considered valid, with broader distributions in the western Pacific (Boschma 1957). The types of *S. sanguineus,* deposited at the Muséum National Histoire Naturelle, Paris (MNHNP), were re-examined by Boschma, leading to a redescription of that species (Boschma 1964). The types of *S. gracilis* and *S. granulosus,* however, are not deposited at the MNHNP or British Museum (Natural History) (BM) and are presumed to be lost. *S. gracilis* was subsequently reported from Torres Strait by Hickson (1892).

Kent (1871) described a new species, *Distichopora rosea,* from the 'east coast of Australia', but this species was later tentatively synonymised with *D. violacea* by Boschma (1959).

In his monograph of the genus *Distichopora,* Tenison-Woods (1879) listed both *D. violacea* and *D. coccinea* Gray, 1860, from north-east Australia, the latter a new record for the continent. The Australian distribution of *D. coccinea* was confirmed by Boschma (1959), but still without precise distributional data.

Tenison-Woods (1883) also described a new species, *Stylaster incompletus,* from Port Stephens, New South Wales (55 m). This species was subsequently reported by: Waite (1899) as *S. sanguineus* from Bird Island, NSW, 46 m; Hedley (1903) as *S. sanguineus* and by Ritchie (1911) as *S. eximus* from three 'Thetis' stations off NSW, 90-115 m; Boschma (1956) from Port Stephens and Port Denison, Qld; and Wells (1964) from Jumpin Pin, Queensland, 86 m.

Lendenfield (1885), in a checklist of the hydromedusae from Australia, listed four of the six previously reported species, but did not add any new information.

Hall (1893) described *Stylaster mooraboolensis* from the Miocene of Geelong, Victoria and added more records from the Victorian Eocene in 1898 (Hall 1898). Also, in 1898, Hall reported *Sporadopora dichotoma* (Moseley, 1876) from the Miocene of Hamilton, Victoria, and an unidentified *Distichopora* from the Eocene to Miocene of Victoria. Boschma (1957) doubted the identity of *Sporadopora dichotoma,* implying that it was a different species in the same genus.

In Boschma's (1953) listing of the Stylasterina of the Pacific Ocean, he listed 12 species from Australia, but two of them, *S. duchassaingi* and *D. rosea,* are junior synonyms of previously reported species, and another, *Distichopora livida,* was incorrectly attributed to Australia. Therefore, only nine species were validly reported, all of which have been previously discussed.

In Boschma's (1959) Indo-Pacific revision of *Distichopora,* all species of *Distichopora* known from Australia were discussed and a new one reported, *D. nitida* Verrill, 1864, from the Great Barrier Reef. Wells (1954) was cited as the authority for *D. nitida* in Australia, but, actually, Wells (1954) did not report any new records of stylasterids from Australia; Boschma's (1959) identification of

a specimen deposited at the University of Qeensland is therefore the only record of *D. nitida* from Australia.

The last (eleventh) species to be reported from Australia was *Conopora adeta* Cairns, 1987, an unattached coral from relatively deep water (398 m) off Queensland. Cairns listed the other species known from Australia but overlooked the two fossil records of Hall (1898).

Two new species are described in this paper from Western Australia, and *Crypthelia pudica* is also reported for the first time from Australia, which brings to 14 the number of stylasterids known from Australia.

List of Stylasteridae known from Australia

† *Sporadopora dichotoma* sensu Hall, 1898
* *Distichopora violacea* (Pallas, 1766)
Distichopora coccinea Gray, 1860
Distichopora nitida Verrill, 1864
† *Distichopora* sp. sensu Hall, 1898
* *Stylaster marshae* sp. nov.
Stylaster sanguineus Milne Edwards and Haime, 1850
Stylaster granulosus Milne Edwards and Haime, 1850
Stylaster gracilis Milne Edwards and Haime, 1850
Stylaster incompletus (Tenison-Woods, 1883)
† *Stylaster mooraboolensis* (Hall, 1893)
* *Stylaster tenisonwoodsi* sp. nov.
***Conopora adeta* Cairns, 1987**
* *Crypthelia pudica* Milne Edwards and Haime, 1849

† exclusively fossil species
* new record for Western Australia

Family Stylasteridae

Distichopora Lamarck, 1816

Diagnosis

Gastropores usually aligned on lateral branch surfaces and flanked on both sides by a row of dactylopores, together forming a pore row. Coenosteal texture variable including reticulate-granular, tuberculate, tufted, and linear-imbricate. Gastropores never lipped: gastropore and dactylopore tubes long. Gastrostyles usually slender, highly ridged, and very elongate: tabulae common. Dactylopores usually elliptical, oriented perpendicular to gastropore row; no dactylostyles. Ampullae usually superficial. Type species: *Millepora violacea* Pallas, 1766, by monotypy.

Distichopora violacea (Pallas, 1766)

Figure 1D

Distichopora violacea Boschma 1959: 134-144 (synonymy, discussion, and distribution) Cairns 1983: 471-473 (synonymy and illustrations).
Distichopora sp. – Veron 1986: 620-621, figs. 2-4.

Material examined

1 ♀, WAM 936-86, south-east corner of Ashmore Reef off north-western Australia: outer slope, 6-8 m, on under slide of *Porites* ledges.

Discussion

A small typical female colony of *D. violacea* is reported, measuring 18.9 mm tall and 26.3 mm broad and having a dark purple coenosteum. Although this species is one of the most widespread of the stylasterids, known from throughout the tropical Indo-West Pacific, including off eastern Australia (Delongchamps 1824; Hicson 1892; Boschma 1959; Veron 1986), it has not been reported previously from off Western Australia.

Stylaster Gray, 1831

Diagnosis

Gastro- and dactylopores arranged in cyclostystems, which are variable in location, ranging from a uniform coverage of all branch surfaces (Group A) to a strictly sympodial arrangement (Group C), with many intermediate arrangements (Group B). Coenosteal colour and texture variable: most common textures reticulate-granular and linear-imbricate. Gastro- and dactylostyles present. Gastrostyles usually ridged; dactylostyles can be quite robust (Group A) or rudimentary (Groups B and C). Ring palisade often present; gastropore inner shelf also often present in Group C. Ampullae superficial, usually with distinct efferent pores. Type species: *Madrepora rosea* Pallas, 1766, by subsequent designation (Milne-Edwards and Haime 1850b).

Stylaster marshae sp. nov.

Figures 1A, E, 2A-G

Holotype

1 ♀, WAM 535-87, north-west of Surf Point, Dirk Hartog Island, Shark Bay, WA, 26°07′40″S, 113°10′20″E, 9 m, under ledges, 5 April 1979.

Paratypes

3 ♀, WAM 424-86, 1 ♀, USNM 79518, same locality as above; 2 ♀, WAM 425-86, east side of reef, south of Surf Point, Dirk Hartog Island, Shark Bay, WA, 1-2 m, under ledges, 5 April 1979; 5 ♀, WAM 80-78, 1 ♀, USNM 79519, Goss Passage, south-east end of Long Island, Wallabi Group. Houtman Abrolhos, WA, 7.5-13 m, sheltered position, 4 September 1977; 2 ♀, 3 ♂, WAM 431-86, inside outer reef north-west of Gun Island, Pelsaert Group, Houtman Abrolhos,

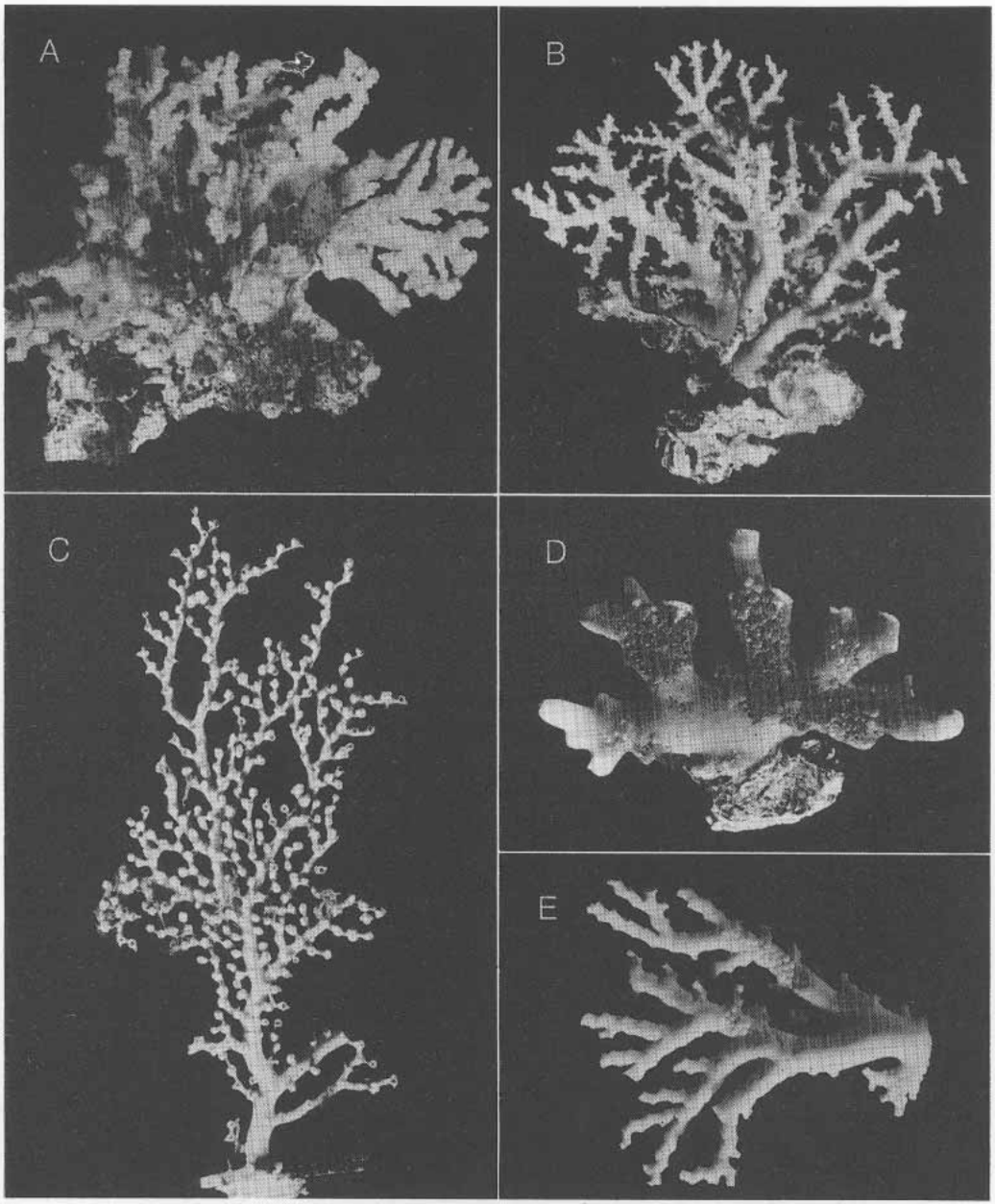

Figure 1 A. *Stylaster marshae* sp. nov., holotype, WAM 535-87, x 0.73. B. *Stylaster tenisonwoodsi* sp. nov. holotype, WAM 536-87, x 1.2. C. *Crypthelia pudica*, WAM 19-85, male, x 1.1 D. *Distichopora violacea*, WAM 936-86, female, x 2.1. E. *Stylaster marshae* sp. nov., paratype, female, USNM 79519, x 14.

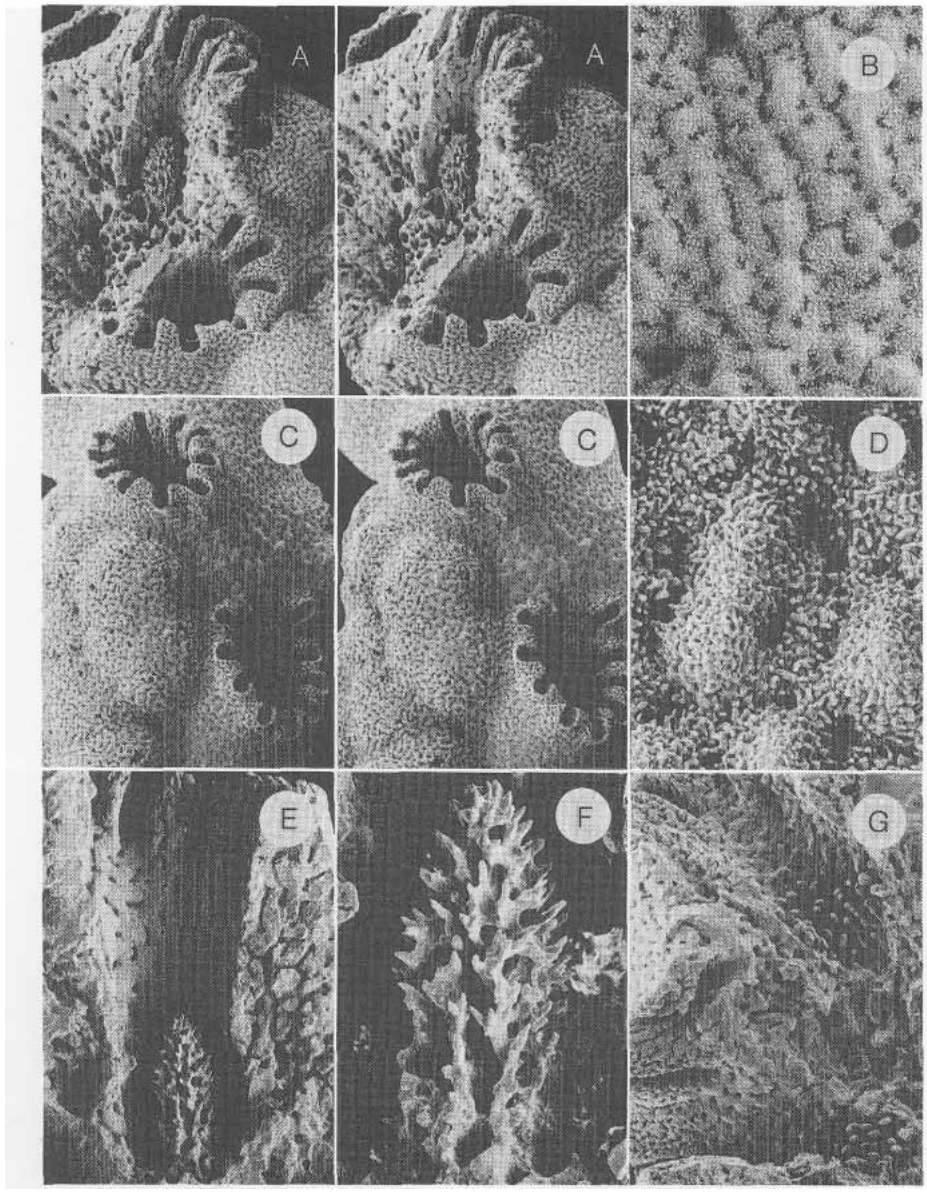

Figure 2 *Stylaster marshae* sp. nov. (A, WAM 129-58, female; B-F, WAM 424-86, female; C, G, WAM 431-86, male): A. Fractured cyclosystems revealing gastrostyles, ring palisade, and efferent pores of two female cyclosystems, x 21.3, stereo pair. B. Rough coenosteal strips with three isolated dactylopores, x 62. C. Two cyclosystems with adjacent mass of male ampullae with apical efferent pores, x 20.7, stereo pair. D. Coenosteal texture, x 164. E-F. Gastrostyle, x 44.6, x 120, respectively. G. Gastropore tubes missing gastrostyles revealing diffuse ring palisades, x 34.1.

WA, 0-1 m on coral reef among dead *Acropora*, 1 April 1976; 1 ♀, WAM 430-86, same habitat as previous record but south-west of Gun Island, collected on 8 April 1976; 1 ♀, WAM 429-86, south-east side of Pelsaert Island, Pelsaert Group, Houtman Abrolhos, WA, intertidal reef platform, 13 December 1982; 1 ♀, 2 ♂, WAM 427-86, Carnac Island, off Fremantle, WA, 9 January 1978; 2 ♀, 2 ♂, WAM 129-58, Cape Vlaming and Salmon Point at Rottnest Island, WA, in caves and on broken reef surface, December 1950; 3 ♀, WAM 130-73, Green Island Reef, Rottnest Island, WA, on wall of reef hole exposed to surge, 22 January 1973; 4 ♀, 3 ♂, WAM 426-86, Rottnest Island, WA; 3 ♀, 2 ♂, WAM 440-86, 1 ♂, USNM 79520, Little Island off Whitford Beach, WA, 1-2 m, on roof of cave, 13 April 1974.

Description

Colony shape variable, apparently dependent on degree of water movement. In high-energy environments, such as under exposed ledges, colonies uniplanar to bushy, with robust, blunt-tipped branches. In calmer, sheltered environments, such as within caves, colonies exclusively uniplanar, with more delicate, slender branches. Branches anastomose occasionally in robust colonies. Largest colony examined (the holotype) 5.9 cm tall, 9.3 cm broad, and 4.0 cm deep. Coenosteum white; however, dried and, probably, living tissue (coenosarc) light orange. Some colonies appear to be light pink, caused by an algal encrustation. Coenosteum reticulate-granular, the slightly convex strips 65-85 μm wide and covered with irregularly shaped granules up to 16 μm tall and 5 μm in diameter. The tall granules produce a rough coenosteal texture. Coenosteum covered with round isolated dactylopores 60-70 μm in diameter, particularly common on large-diameter basal branches.

Cyclosystems variably arranged: occurring on all branch surfaces of robust colonies, sympodially arranged on delicate colonies, and with intermediate arrangements in yet others. Cyclosystems round (0.9-1.1 mm in diameter) to slightly elliptical, often slightly exsert proximally but flush at the diastemate distal edge. Occasionally, cyclosystems fuse together ('chaining') in a meandering line of two to five, all sharing a common sulcus as in *Distichopora*. Based on 50 cyclosystems, there is a range of 7-14 dactylopores per cyclosystem, average = 10.46 (σ = 1.66), and mode of 10 and 11.

Gastropore tube long and cylindrical, the gastrostyle occupying the basal 40 per cent. A well-developed diffuse ring palisade is present adjacent to the upper half of the gastrostyle, the elements up to 0.10 mm tall and often fused into vertical ridges up to 0.2 mm long. Illustrated gastrostyle elongate-conical, 0.51 mm and 0.19 mm in diameter (H:W = 2.68). Gastrostyles highly ridged, the ridges bearing elongate sharp spines up to 35 μm long. Both pseudosepta and dactylotomes about 0.10 mm wide; diastemas, when present, two to three times width of pseudoseptum. Dactylostyles moderate in development, composed of a linear series of blunt elements about 42 μm tall and 10-11 μm in diameter.

Female ampullae large hemispheres, up to 0.90 mm in diameter, often clustered, but not losing the individuality of their shape. Lateral efferent pore about 0.20 mm in diameter. Female ampullae often appear to be slightly undercut around basal

perimeter, perhaps caused by a series of small afferent pores. Individual male ampullae 0.50-0.65 mm in diameter, but often two or three closely united into one roughly hemispherical structure about 0.80 mm in diameter, with two or three apical efferent pores, presumably one for each gonophore. These irregularly shaped compound ampullae are, in turn, often clustered into larger elevated masses, the individual ampullae becoming indistinct. Male efferent pores 34-40 μm in diameter.

Discussion

The arrangement of cyclosystems in *S. marshae* is quite variable but, in general, follows that of *Stylaster* (Group B) as defined by Cairns (1983). *S. marshae* is distinguished from the other species in this group by its numerous isolated dactylopores, occasional chaining of cyclosystems, rough coenosteal texture, and undercut female ampullae.

Etymology

This species is named in honour of Mrs Loisette Marsh of the Western Australian Museum, who collected some of the specimens and made them all available to me.

Habitat and distribution

Insular Western Australia from Dirk Hartog Island, Shark Bay to Rottnest Island, 0-13 m, in caves, reef flats, and under ledges.

Stylaster tenisonwoodsi sp. nov.

Figures 1B, 3A-F

Holotype

1 ♀, WAM 536-87, south-east corner of Ashmore Reef, outer slope on under sides of *Porites* ledges, 6-8 m, 15 September 1986.

Paratypes

2 ♀, WAM 934-86, 1 ♀, USNM 79521, same locality as holotype; 3 ♀, USNM 77050, Alpha Helix sta. 79-M-35, 10°43′20″S, 150°17′E (Louisiade Archipelago, Papua New Guinea), 1-11 m, 14 June 1979; 1 ♀, USNM 77165, Sting Ray sta. 78-T-7, 11°38′N, 123°52′38″E (Visayan Sea, Philippine Islands), 90 m, 5 June 1978.

Description

Colonies uniplanar to slightly bushy, delicate, with no branch anastomosis. Largest colony (holotype) composed of three uniplanar flabella diverging in slightly different planes from a common basal encrustation. Largest flabellum 33 mm tall and 52.3 mm broad. Four of the eight colonies studied have bicoloured coenosteum. The basal 20-80 per cent of the bicoloured colonies is light rose-violet, the complementary distal portions being pale orange. Superimposed on this background coenosteal colour, all cyclostystems are pigmented a much deeper

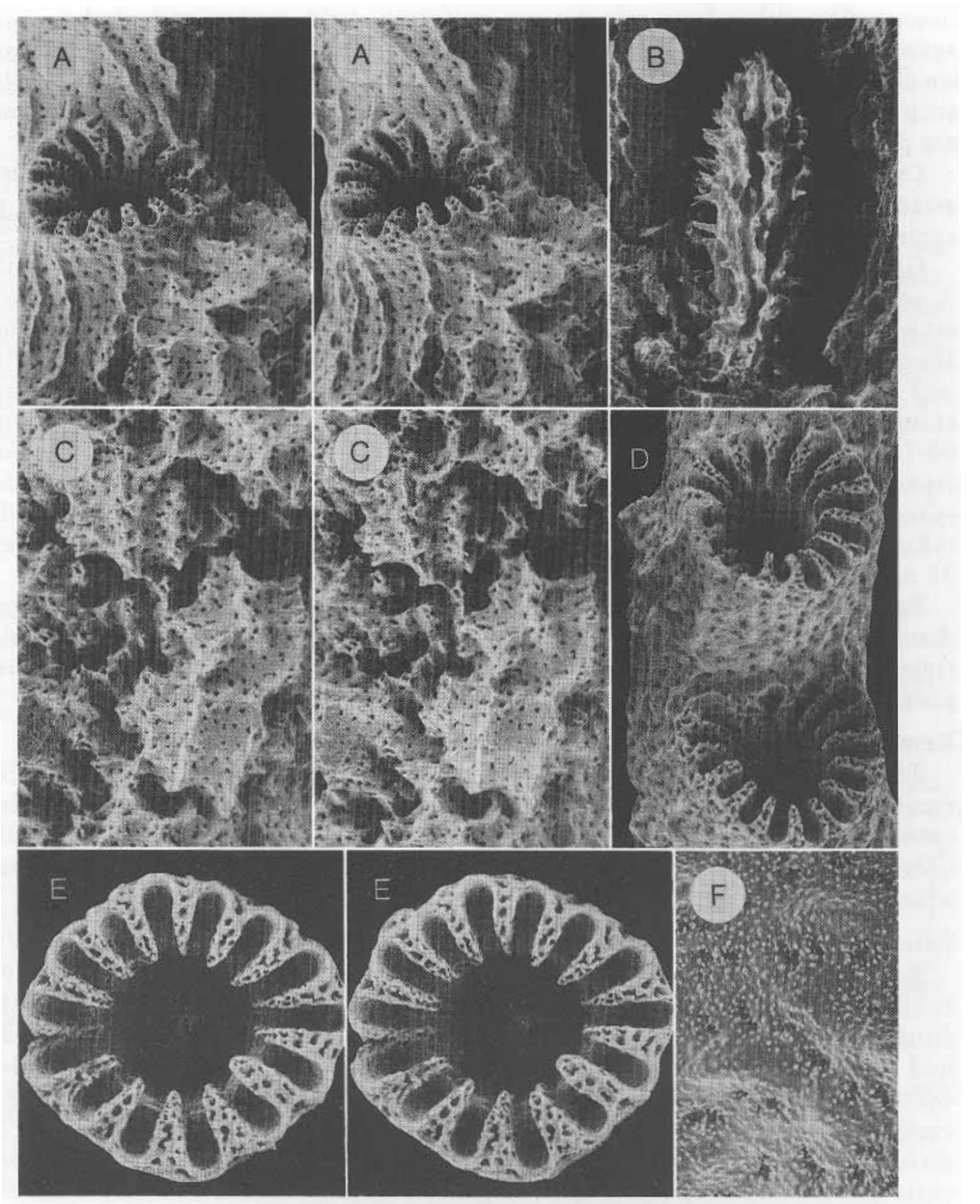

Figure 3 *Stylaster tenisonwoodsi* sp. nov. Paratypes from WAM 934-86: A. Cyclosystem, carinate coenosteum and female ampullae, x 31.1, stereo pair. B. Gastrostyle and ring palisade, x 123. C. Cluster of female ampullae, x 32, stereo pair. D. Two cyclosystems, x 34.5. E. Cyclosystem including view of several lateral dactylostyles in upper dactylotomes, x 57, stereo pair. F. Coenosteal texture, x 111.

orange. The other four colonies are uniformly light orange with darker cyclosystems. Coenosteum reticulate-granular, the strips 90-100 μm wide, covered with small rounded granules about 10 μm in diameter. Every third or fourth coenosteal strip is slightly carinate for a distance of up to 1 mm. Some isolated dactylopores are present.

Cyclosystems round, 0.70-0.85 mm in diameter, and exclusively sympodially arranged. Based on 50 cyclosystems, there is a range of 9-16 dactylopores per cyclosystem, average = 13.0 (σ = 1.56), and mode of 12 and 13.

Gastropore tube long and cylindrical, the gastrostyle occupying the lower half. A well-developed, diffuse ring palisade present adjacent to upper half of gastrostyle, composed of vertically elongate elements up to 26 μm tall and 100 μm long. Illustrated gastrostyle similar to that of *S. marshae:* elongate-conical, 0.40 mm tall, and 0.13 mm in diameter (H:W = 3.0). Style highly ridged, the ridges bearing elongate sharp spines up to 38 μm long. Both pseudosepta and dactylotomes 65-75 μm wide; diastemas, when present, two to three times width of pseudoseptum. Dactylostyle rudimentary, composed of a uniserial arrangement of widely spaced elements about 30 μm tall and 10 μm in diameter. In addition, lateral dactylostyles are present in upper dactylotome region, consisting of small elements 15 x 15 μm in size.

Female ampullae prominent but irregularly shaped structures 0.65-0.70 mm in diameter. Irregularity in shape caused by a network of tall (0.10 mm) reticulate ridges that cover the ampullae. Female ampullae often clustered; lateral efferent pores 0.11-0.12 mm in diameter. Male ampullae unknown.

Remarks

The rose-violet colour of the colony bases is the same as that of closely adjacent encrusting *Lithothamnion* algae. There is a possibility that the rose-violet proximal colouration may be caused by an encrusting or boring alga of similar colour that only gradually infiltrates from the colony base and avoids the cyclosystem areas, which would explain the observed colour pattern.

Discussion

Based on its strictly sympodial arrangement of cyclosystems, *S. tenisonwoodsi* belongs to *Stylaster* (Group C) as defined by Cairns (1983). It is distinguished from other species in this group by its carinate coenosteum and female ampullae, and its pale orange coenosteal ground colour with darker pigmentation around the cyclosystems. *S. carinatus* Broch, 1936, from off Japan (64-212 m) has a similar carinate coenosteum and a similar range of dactylopores per cyclosystem but differs in having: cyclosystems on all sides of branches (Group A), larger cyclosystems, and very deep seated gastrostyles.

Etymology

This species is named in honour of Rev. Julian Edmund Tenison-Woods, who wrote over 20 papers on the Tertiary and Recent stony corals of Australia and Tasmania from 1876-1883.

Distribution

Ashmore Reef, WA; Louisiade Archipelago, Papua New Guinea; Philippine Islands; 1-90 m.

Crypthelia Milne Edwards and Haime, 1849

Diagnosis

Gastro- and dactylopores arranged in cyclosystems, which usually occur on anterior branch faces. Cyclosystems covered partially or entirely by one or more fixed lids. Coenosteum linear-imbricate; nematopores common. Gastropore tube double chambered; no gastro- or dactylopores. Ampullae usually superficial and large, occurring in a variety of positions and with a variety of efferent pore locations. Type species: *Crypthelia pudica* Milne Edwards and Haime, 1849, by monotypy.

Crypthelia pudica Milne Edwards and Haime, 1849

Figures 1C, 4A-H

Crypthelia pudica Milne Edwards and Haime, 1849: 69 – Broch 1936: 95-99, pl. 13, fig. 39 – Boschma 1957: 36-38 (synonymy) – Cairns 1983: 493-496, figs 22A-H.
Cryptelia pudica – Milne Edwards and Haime 1850a: 93, pl. 3, fig. 1.
Cryptohelia pudica – ?Moseley 1881: 71-76, 82-83 (only Challenger sta. 171: 28°33'S, 177° 50'W, 1097 m).

Material examined

2 ♀, WAM 20-85, Soela sta. 1-84-52, 15°46.4'S, 120°39.9'E, 446-450 m, 10 February 1984; 4 ♂, WAM 19-85, 1 ♂, USNM 79524, Soela sta. 1-84-53, 15°48.0'S, 120°41.0'E, 396-400 m, 10 February 1984; 1 ♂, WAM 548-84, Soela sta. 1-84-54, 15°51.2'S, 120°44.3'E, 348-350 m, 10 February 1984; 3 ♀, 1 ♂, WAM 18-85 and 25-85, 1 ♀, USNM 79523, Soela sta. 1-84-58, 15° 12.8'S, 121°05.9'E, 404-410 m, 11 February 1984; 1 ♀, WAM 24-85, Soela sta. 1-84-59, 15° 09.4'S, 121°05.5'E, 448-450 m, 11 February 1984; 1 ♂, WAM 26-85, Soela sta. 1-84-80, 12° 48.1'S, 122°56.7'E, 496-504 m, 15 February 1984; 2 ♂, WAM 27-85, Soela sta. 1-84-81, 12° 54.4'S, 123°00.7'E, 452-462 m, 15 February 1984; 1 ♀, WAM 28-85, Soela sta. 1-84-89, 16° 55.1'S, 119°54.6'E, 432-434 m, 18 February 1984; 1 ♀, WAM 22-85, 1 ♀, USNM 79522, Soela sta. **1-84-102, 16°55.2'S, 119°52.8'E, 430-432 m, 20 February 1984.**

Types

The holotype is not present at the MNHNP or the BM, where most of the Milne Edwards and Haime types are deposited, and therefore it is assumed to be lost.

Type locality

Philippine Islands (restricted by Boschma 1957: 37).

Description

Largest Australian colony (Soela sta. 1-84-53, Figure 1C) 8.3 cm tall and 3.8 cm wide, with a basal branch diameter of 3.2 mm attached to the silicious spicules of a hexactinellid sponge. Colonies uniplanar and delicate, but reinforced

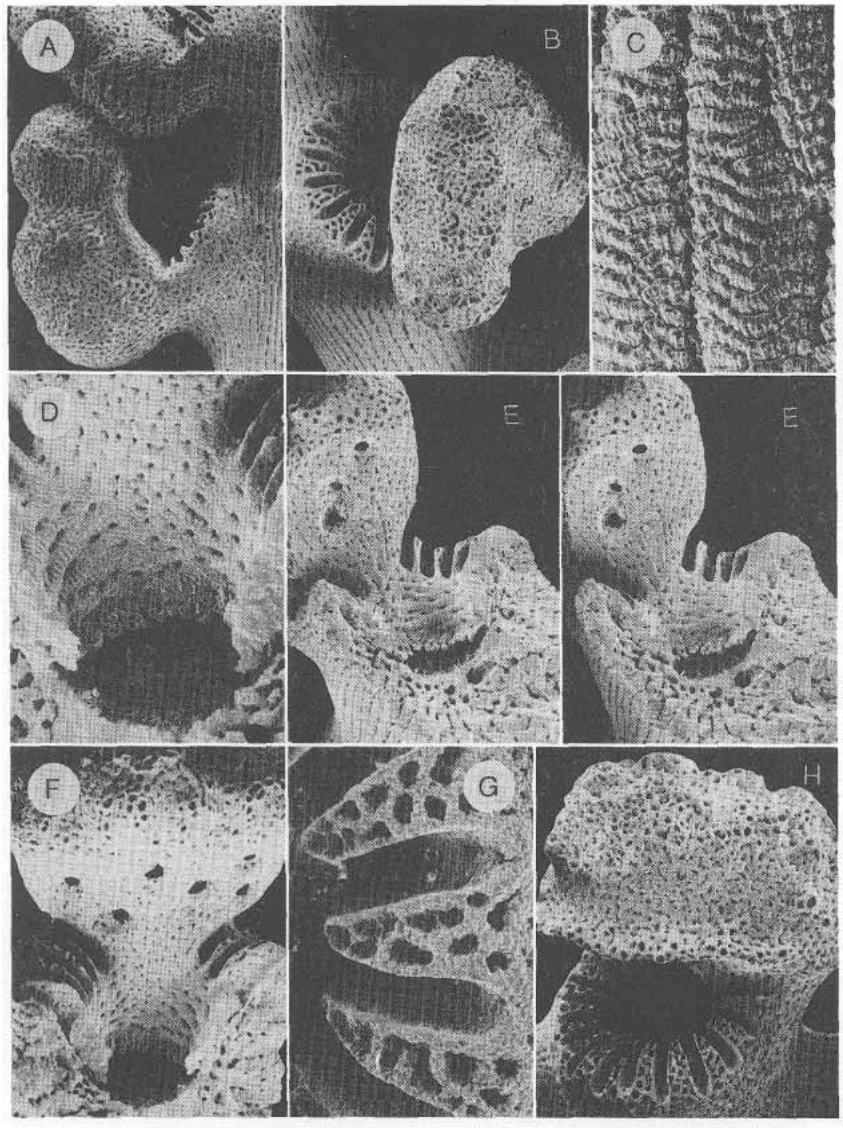

Figure 4 *Crypthelia pudica* (A, WAM 18-85, female; B, D-G, WAM 19-85, male; C, WAM 28-85, female; H, WAM 22-85, female): A. Female cyclosystem with three smooth ampullae, distalmost ampullae fused with adjacent cyclosystem, x 18.7. B. Male cyclosystem, x 25. C. Coenosteal texture, x 250. D. Longitudinal fracture of cyclosystem revealing upper and lower gastropore chambers, x 65. D, E. Longitudinal fracture of male cyclosystem revealing gastropore chambers and several male efferent pores beneath lid, x 29.3, x 27.1, respectively, E. a stereo pair. G. Three pseudosepta, x 109. H. Side view of female cyclosystem with spiny ampulla, x 31.

with frequent branch anastomoses. Coenosteum white and linear-imbricate in texture. Coenosteal strips flat to slightly convex, 60-80 μm wide, with about 65 broad platelet edges per mm (Figure 4C). Irregularly shaped unelevated nematopores (papillae) 30-35 μm in diameter scattered over coenosteum. Elevated papillae, up to 70 μm tall, common on ampullae and lid edges.

Cyclosystems round to slightly elliptical, 1.1-1.5 x 1.2-1.6 mm in diameter. Cyclosystems only slightly flared. Based on 51 cyclosystems, there is a range of 13-20 dactylopores per cyclosystem, average = 17.20 (σ = 2.43), and mode of 17.

Large upper gastropore chamber about 0.45 mm in diameter; aperture (gastopore ring constriction) to lower flattened chamber about 0.40 mm in diameter; lower chamber about 0.53 mm in diameter. Circular coenosteal strips present in upper gastropore chamber. Inner edges of gastropore ring constriction highly serrate. Concave base of lower chamber spinose. Lid 100-150 per cent size of cyclosystem; horizontal in females, inclined upward in males. Pseudosepta about 0.13 mm wide, not concave but very porous; dactylotomes 85-91 μm wide.

Female ampullae massive, 1.0-1.1 mm in diameter, usually confined to the cyclosystem lid but occasionally with one or two ampullae in cyclosystem wall adjacent to lid. Often more than one and up to four ampullae present per cyclosystem, arranged in a linear or triangular fashion. If linearly arranged, the distalmost ampulla often merges with the ampulla of the adjacent cyclosystem lid (Figure 4A). Female ampullae variable in ornamentation: those of some colonies are smooth with few papillae (Figure 4A), whereas others are very irregular in shape, with tall papillae (Figure 4H). Efferent pores round, 0.17-0.19 mm in diameter, opening beneath lid. Male ampullae smaller (0.55-0.60 mm in diameter) and usually clustered two to seven per cyclosystem lid. Occasionally, especially near incipient cyclosystem anastomosis, ampullae also present in cyclosystem wall adjacent to fusion. Male ampullae usually studded with prominent papillae. Efferent pores irregular in shape, 65-80 μm in diameter, opening beneath cyclosystem lid. Efferent pores of those ampullae located in cyclosystem wall open apically near the outer edge of the pseudosepta but outside the cyclosystem proper. Ampullar formula predominantly A-A2 (Cairns 1986b).

Discussion

Crypthelia pudica is the type species of the genus, but is poorly known and the type specimen is lost. The 18 colonies collected off Western Australia afforded an excellent opportunity to describe and figure more of the variation within the species. The Western Australian specimens are very similar to those colonies described by Fisher (1938) and Cairns (1983) from the Philippine Islands (type locality), except that the Australian female colonies have multiple ampullae per lid, which is assumed to be within the range of variation of this species.

The 28 species of *Crypthelia* can be grouped by their ampullar formula, a set of characters derived by Cairns (1986b). For instance, only two of the 28 species of *Crypthelia* have the A-A2 formula: *C. pudica* and *C. trophostega* Fisher, 1938.

C. pudica is easily distinguished from *C. trophostega,* known only from off the Aleutian Islands from about 500 m, by its smaller cyclosystems, smaller nematopores, and strictly unifacial cyclosystem arrangement.

Distribution

Philippine Islands (549-1633 m); ?Kermadec Islands (Moseley 1881); on the continental slope off north-western Western Australia from south of Ashmore Reef to west of Lacepede Islands (348-504 m), all collected by an Engel trawl on a soft bottom.

Acknowledgements

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