

New or notable records of brittle stars (Echinodermata: Ophiuroidea) from South Africa

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(With 1 figure and 9 plates)

Ophiuroid research in South Africa has not kept pace with global taxonomic research with the last major taxonomic review of the group being published in 1976. This paper documents all new records of Ophiuroidea from South Africa since (and including) 1977. These records originate from specimens housed in five zoological collections, from photographic records and from reports published in the non-taxonomic literature. A short review of the history of ophiuroid taxonomy in South Africa is also given and for each new record, key references, distribution, ecology, additional notes and, where possible, photographs, are presented. This has resulted in an additional 24 species being recorded within the mainland Exclusive Economic Zone of South Africa, elevating the total known number of ophiuroid species reported in the region to 137.

Keywords: taxonomy, nomenclature, new record.

CONTENTS

Abstract	83	Family Gorgonocephalidae	85	Family Ophiidermatidae	105
Introduction	83	Family Ophiomyxidae	89	Family Ophiolepididae	111
Materials and methods	84	Family Ophiuridae	89	Discussion	112
Results	84	Family Amphiuroidae	92	Acknowledgements	112
Species accumulation over time	84	Family Ophiactidae	95	Abbreviations	112
Taxonomic account	85	Family Ophiocomidae	95	References	113
Class Ophiuroidea	85	Family Ophiotrichidae	98		
Family Asterocheimidae	85	Family Ophiacanthidae	104		

INTRODUCTION

The coastline of mainland South Africa is c. 3650 km in length, with an Exclusive Economic Zone (EEZ) of 1 068 659 km² (Griffiths *et al.* 2010). The greatest depth recorded within the mainland EEZ is c. 5700 m. The continental shelf is narrow along the east coast, wider on the west coast and reaches a maximum width of c. 260 km off the Agulhas Bank in the south. Marine systematic research in South Africa began during the mid-1750s to late 1800s (H.L. Clark 1923) and initially took the form of a number of large expeditions, such as the *Challenger* and the *Gazelle* expeditions that collected within South African waters. The majority of these specimens were taken to European museums, where they were described and often well illustrated (Linder & Griffiths 1999; Griffiths *et al.* 2010). In the 20th century, further efforts to document the southern African echinoderm fauna were undertaken by other large expeditions, such as the *Valdivia* and some Antarctic expeditions (H.L. Clark 1923). Today, South Africa is well-known for its extraordinary biodiversity and is considered to be the third most biologically diverse country in the world (World Conservation Monitoring Centre 1992). Griffiths *et al.* (2010) reported that

12 914 marine species were known from South Africa, with 33% of these endemic to the region. Complementing this, over 291 000 records, including marine invertebrates, molluscs, fish and algae are curated at various coastal museums within South Africa alone (Griffiths *et al.* 2010).

The current state of knowledge for ophiuroids in South Africa is a result of contributions from a number of authors since the late 1700s (Fig. 1). The first record of an ophiuroid from South Africa was that by Retzius (1783) who reported *Asterias euryale* (= *Astrocladus euryale*) from the Cape of Good Hope, followed by Müller & Troschel (1842) and Ljungman (1867) who added two and five additional species to the South African fauna, respectively. As a result of the *Challenger* expedition, which sampled seven stations within South African waters (excluding the Prince Edward and Marion Islands), Lyman (1878; 1882), reported four and 17 new ophiuroids, respectively. Later, Bell (1888) described one additional new ophiuroid from the same collection. Bell (1905) further added five new ophiuroids in one of his papers on the Echinoderma of South Africa. Döderlein (1910) wrote the first consolidated account of South African echinoderms, reporting 84 species of echinoderm, including 29 ophiuroids.

More than a decade later, H.L. Clark (1923) reported a total of 57 ophiuroid species as being known for South Africa, including six new species which were largely derived from the *Pieter Faure* expedition. Mortensen (1925) added two more species to the fauna from a collection sent to him from the Durban Museum (*Astroschema capense* (= *Astromorpha capensis*) and *Ophiactis savignyi* (Müller & Troschel, 1842)), the former being new to science. Hertz (1927a,b) added four new species to the South African fauna, but two of these were soon synonymized by Mortensen (1933a) in his significant contribution to the Ophiuroidea and Asteroidea of South Africa. Mortensen (1933a) recorded 36 new ophiuroid species from material collected mostly off the *Pickle* and the *John. C. Meikle*, bringing the total number of ophiuroids known for South Africa to 82 species. Mortensen (1936) reported on collections from the *Discovery* expedition and added two new species from South Africa. A.M. Clark (1952) described an additional three species collected during the University of Cape Town (UCT) Ecological Surveys and from the *Africana*. Later, A.M. Clark (1974) summarized records from 22 years of collections undertaken during the UCT Ecological Surveys and the *Anton Bruun* expedition that had accumulated since A.M. Clark's (1952) report by describing three new species and adding four new records to South Africa. Clark & Courtman-Stock (1976), now the standard current monograph on the southern African echinoderm fauna (excluding Holothuroidea), reported on 115 species of Ophiuroidea. However, only 101 of these species were found within the political borders of South Africa. Shortly afterwards, A.M. Clark (1977) reported on a number of deep-water species collected by the *Meiring Naude*, which added ten new ophiuroid species to the South African fauna. Madsen (1977) reported *Ophiernus quadrispinus* Koehler 1907 from off Cape point, a new record for South Africa. Following this, no taxonomic work was undertaken for 35 years until recently when Olbers & Samyn (2012) reported *Ophiocoma brevipes* Peters, 1851, *O. dentata* Müller & Troschel, 1842, *O. doederleini* de Loriol, 1899 and *O. pusilla* (Brock, 1888) as new records for South Africa. Later that year, Milne (2012) reported *Ophiactis picteti* (de Loriol, 1893), *Macrophiothrix demessa* (Lyman, 1862) and *M. propinqua* (Lyman, 1862) occurring at Sodwana Bay. These two reports raised the total number of ophiuroids reported in the published literature for South Africa to 119.

In addition to these published reports, additional data and unidentified material have continued to accumulate. Bolton *et al.* (2001) reported that between 1999 and 2001, 51 species of echinoderm were added to the KwaZulu-Natal (KZN) checklist. The voucher specimens supporting these records have been deposited in the collections of the Royal Museum for Central Africa in Tervuren, Belgium (RMCA) and although Samyn & Thandar (2003) used these records to conduct a preliminary biogeographical analysis, no species list was ever formally published. In addition, ophiuroid samples have continued to accumulate in the Iziko South African Museum (SAM) but have remained unidentified and mostly uncatalogued for a period of ~35 years.

The aim of the present contribution is to gather all data regarding additions to the ophiuroid fauna of South Africa subsequent to the previous monograph by Clark &

Courtman-Stock (1976), and to list and document these in a single publication. These new records include both those published in papers subsequent to 1976 (as listed above), the identified but unpublished records of RMCA, photographic records and those newly identified by the authors from collections in the SAM.

MATERIALS AND METHODS

The ophiuroid species reported on in this account originate from a number of sources. The majority of the records are from unidentified specimens deposited in the SAM collection, while others originate from the Ezemvelo KZN Wildlife (EKZNW) Echinoderm collection, housed in Durban. Also reported on are the South African specimens housed in the RMCA in Tervuren, Belgium, the Smithsonian National Museum of Natural History, Washington DC (USNM), and the Australian Museum (AM) in Sydney. Additional records were obtained from photographic evidence sourced from the South African National Biodiversity Institute (SANBI) iSpot programme, the Animal Demography Unit EchinoMAP programme and published literature, as cited in the taxonomic account below.

Specimens are preserved either in 70% ethanol or dry. The RMCA collections are preserved dry, while those held by SAM and EKZNW are mostly preserved in ethanol. The specimens were collected using a variety of methods, including trawling, dredging, grab sampling, SCUBA diving and by hand on the shore. The depths at which the specimens were collected ranged from 0–2948 m.

Specimens were primarily identified using the keys and descriptions of Lyman (1878), Clark, A.M. (1952), Clark & Rowe (1971), Clark, A.M. (1974), Clark & Courtman-Stock (1976), Cherbonnier & Guille (1978), Mortensen (1925) and Mortensen (1933a). Additional useful literature is also cited for each species.

Taxa are arranged according to their currently known classification as given by Stöhr *et al.* (2014) in the World Ophiuroid Database linked to the World Register of Marine Species (WoRMS). Species are presented under the binomen as considered valid by Stöhr *et al.* (2014). A comprehensive diagnosis is given and where possible, type material, distribution, ecology and additional notes are also reported. In addition, where specimens were available, these were photographed.

RESULTS

Species accumulation over time

The increasing number of ophiuroid species reported for the region since 1783 is presented in Fig. 1. For more than 60 years, only a single species was known for the region. The number of species slowly increased until 1923, when there were a number of reports by largely three European researchers whose work focused on South African echinoderm collections over approximately the following half century, culminating in the monograph of Clark & Courtman-Stock (1976). From that time until the start of the present study, no ophiuroid taxonomy has been undertaken in South Africa.

This report documents additions to the ophiuroid fauna since Clark & Courtman-Stock (1976), including A.M. Clark

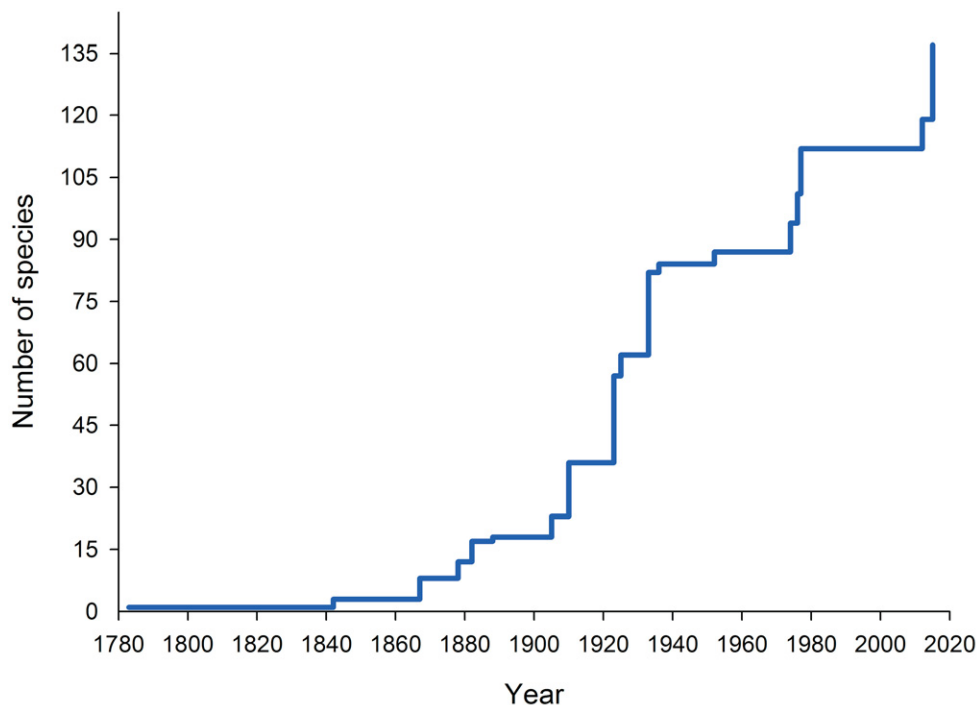


Fig. 1. Increase in the number of Ophiuroidea species reported for South Africa from 1783 to present (137).

(1977) and Madsen (1977), raising the total by 24 species across 11 families and 19 genera. Therefore, the current total number of known species from South Africa is 137.

Of the 28 species reported here, 24 are new to South Africa while four are for noting (*Amphilimna cribriformis* A.M. Clark, 1974; *Ophionephthys lowelli* A.M. Clark, 1974; *Ophiernus quadrispinus* Koehler, 1908; *Amphioplus* (*Lymanella*) *depressus* (Ljungman, 1867)). Six species are represented by only a single record, while 11 have been reported five or more times. Twelve species were recorded in only shallow water (<30 m), four in deep water (31–500 m), five in very deep water (>501 m) while seven species traversed both shallow and deep depths. Most of the additions are Indo-Pacific species whose ranges have extended southwards into subtropical eastern regions of South Africa and were derived from the collection deposited in the RMCA and unidentified material in the SAM. Table 1 lists all species with their global and local distribution and depth ranges within South Africa.

TAXONOMIC ACCOUNT

Class **OPHIUROIDEA** Gray, 1840

Family **ASTEROSCHEMATIDAE** Verrill, 1899

Asteroschema salix Lyman, 1879

Plate 1A, B

Asteroschema salix Lyman, 1879: 66–67, pl. 17, figs 466–469; Baker, 1980: 23–24; McKnight, 2000: 21, 22. pl. 6, fig. 7.

Material/Records

SAM A28143, –31.0000°, 30.4500°, off Glenmore, depth 900 m, 12 May 1977, *Meiring Naude*, station number SM134, beam trawl, identified by M. Okanishi and J.M. Olbers.

Diagnosis

(See Baker 1980)

D.D. up to 10 mm. Disc round, indented interradially, lateral interradiial surface almost vertical, body surface covered with epidermal plates with rounded granules. Radial shields elongated, narrow, raised, covered in plates, converging and almost meeting at centre of disc. Oral shields absent, adoral shields indistinct. Jaws covered by minute granules. Teeth seven, broad, triangular, lowermost appearing to be paired. Genital slits short, wide. Arms five, slender, coiling, narrow, higher than wide. No arm spines from first pair of tentacle pores to segment 15, then two arm spines, one slightly smaller. Arm spines short, innermost longest and cigar-shaped, finely serrated. Colour in life: pink (McKnight 2000).

Global distribution

New Zealand (McKnight 2000), South Africa.

Ecology

Depth range: 341–1800 m (Lyman 1879; Baker 1980; McKnight 2000).

Habitat: No details recorded.

Remarks

Single specimen recorded off KZN south coast, previously only known from waters off New Zealand and is a noteworthy extension into the Indian Ocean. According to Baker (1980), type locality is west of Raoul Island, Kermadecs, depth 1152 m. Holotype housed in the Natural History Museum, London (BMNH 82.12.23.271B).

Family **GORGONOCEPHALIDAE** Ljungman, 1867

Astroboa nuda (Lyman, 1874)

Astrophyton nudum Lyman, 1874: 251–252, pl. 6, fig. 4–5.

Table 1. Summary of distribution and depth information of new or notable records of ophiuroid species for South Africa in this paper. Notable species are marked with an asterisk. WC: Western Cape, EC: Eastern Cape and KZN: KwaZulu-Natal.

	Distribution within South Africa	Depth (within South Africa)	Distribution outside South Africa
Asteroschematidae			
<i>Asteroschema salix</i>	Off Glenmore (KZN)	900 m	New Zealand.
Gorgonocephalidae			
<i>Astroboa nuda</i>	Sodwana Bay (KZN)	68–120 m	Indo-Pacific, Australia, Western Indian Ocean, Red Sea, Persian Gulf, East Indies, China and south Japan, Philippines, Madagascar, Mozambique.
<i>Astroglymma cf. sculptum</i>	Off Umhlangi (KZN)	68–70 m	Indo-west Pacific, Australia, India, Mauritius, Malaysian Archipelago, China.
Ophiomyxidae			
<i>Ophiomyxa australis</i>	Mbashe River (EC) to Dog Point (KZN)	11–75 m	East Africa and Islands, Madagascar, Kenya, Mascarene Basin, Red Sea, Seychelles, Somalia, Tanzania, Western Indian Ocean, New Zealand.
Ophiuridae			
<i>Ophiurus quadrispinus*</i>	Off Cape Town (WC)	2730–2948 m	South Georgia and Crozet Island, Southern Ocean, southern Atlantic, near the South Orkneys.
<i>Amphiophiura sculptilis</i>	Off Durban (KZN)	2608 m	Antarctic Ocean, northern Atlantic, southern Atlantic, Zanzibar, Oman, Réunion, Indonesia, Japan, south America, Brazil, Bay of Bengal.
Amphiuridae			
<i>Amphilimna cribriformis*</i>	Umhlangi (KZN) to Prince's Grant (KZN)	38–200 m	Mozambique.
<i>Amphioplus (Lymanella) depressus*</i>	Durban (KZN) to Sodwana Bay (KZN)	0 m	Arabian Sea, Persian Gulf, Bay of Bengal, Red Sea, Madagascar, Australia, Mozambique.
<i>Ophionephthys lowelli*</i>	East London (EC) to Sodwana Bay (KZN)	0–55 m	None (endemic)
Ophiactidae			
<i>Ophiactis picteti</i>	Trafalgar (KZN) to Sodwana Bay (KZN)	7.5–25 m	East Indies, Indo-Malayan Region, Western Indian Ocean, Australia, Madagascar, Kenya and Tanzania.
Ophiocomidae			
<i>Ophiocomella sexradia</i>	Reunion Rocks (KZN)	0 m	Indo-Pacific, Mozambique, China, India, south Japan, Australia, Tasman sea, Réunion, Rodrigues, Hawaiian Islands.
<i>Ophiomastix koehleri</i>	Aliwal Shoal (KZN) to Sodwana Bay (KZN)	14–15 m	Madagascar, Zanzibar, Kenya, Aldabra, Comoros.
<i>Ophiomastix venosa</i>	Coffee Bay (EC) to Sodwana Bay (KZN)	15–21 m	Aldabra, Kenya, Mascarene Basin, Mozambique, Rodriguez, Seychelles, Somalia, Tanzania, Philippines, Madagascar, Comoros, Bay of Bengal, tropical Indo-Pacific.
Ophiotrichidae			
<i>Macrophiothrix demessa</i>	Aliwal Shoal (KZN) to Bhanga Nek (KZN)	13–64 m	Tropical Indo-west Pacific, Australia, Hawaiian Islands, Mozambique, Mauritius, Zanzibar, Red Sea, India, Seychelles, Maldives Islands, Philippines, China Sea.
<i>Macrophiothrix propinqua</i>	Aliwal Shoal (KZN) to Kosi Bay (KZN)	7.5–50 m	Tropical Indo-west Pacific, Red Sea, India, Aldabra, Comoros, Madagascar, Kenya, Mascarene Basin, Mauritius, Mozambique, Red Sea, Seychelles, Somalia, Tanzania, Western Indian Ocean.
<i>Ophiotrix (Acanthophiothrix) purpurea</i>	Sodwana Bay (KZN) to Kosi Bay (KZN)	12–29 m	Aldabra, Madagascar, Mascarene Basin, Red Sea, Seychelles, Tanzania, Western Indian Ocean, Australia.
<i>Ophiotrix (Ophiotrix) echinotecta</i>	Isipingo (KZN) to Bhanga Nek (KZN).	0–64 m	Madagascar, Kenya, Mozambique, Somalia, Tanzania.
<i>Ophiotrix (Ophiotrix) foveolata</i>	Amanzimtoti (KZN) to Sodwana Bay (KZN)	9–305 m	Madagascar, Mozambique, Thailand.
Ophiacanthidae			
<i>Ophiotoma cf. alberti</i>	Cape Town (WC)	2730 m	Rockall Trough, Bay of Biscay, Azores, northeastern Atlantic.
<i>Ophiotoma cf. gracilis</i>	Cape Town (WC)	2875–2948 m	Lesser Antilles and Columbia.
Ophiidermatidae			
<i>Ophiochaeta hirsuta</i>	Sodwana Bay (KZN) to Kosi Bay (KZN)	8–29 m	Indo-Malayan Region, Western Indian Ocean, Aldabra, Australia, South Pacific Islands, Red Sea.
<i>Ophioconis cupida</i>	Kosi Bay (KZN)	49 m	Australia, Bay of Bengal, Comoros, Red Sea, Madagascar, Philippines, China, Japan, Pacific Islands.
<i>Ophiodyscrita acosmeta</i>	Sodwana Bay (KZN)	16–23 m	Japan, China and Australia.
<i>Ophiopeza spinosa</i>	Leadsman Shoal (KZN) to Kosi Bay (KZN)	8–24 m	Somalia, Aldabra, Mascarene Basin, Western Indian Ocean, Kenya, Madagascar, Mozambique, Red Sea, Mauritius, Seychelles, Tanzania, Hawaii, southeastern Polynesia.
<i>Ophiarachna affinis</i>	Sodwana Bay (KZN)	14–31 m	Indonesia, Aldabra, Australia, Fiji, Samoa, Mozambique, Seychelles, Red Sea in East Indies, Philippines and South Pacific Islands.
<i>Ophiarachnella gorgonia</i>	Aliwal Shoal (KZN) to Bhanga Nek (KZN)	8–20 m	China, Japan, Australia, East Indies, Philippines, South Pacific Islands, Ceylon, Bay of Bengal, Thailand, Somalia, Tanzania, Kenya, Madagascar, Mozambique, Mascarene Islands, Islands of the Western Indian Ocean, Red Sea, Mauritius.
<i>Ophiarachnella septemspinosa</i>	Protea Banks (KZN) to Bhanga Nek (KZN)	8–44 m	Aldabra, Mascarene Basin, Western Indian Ocean, Kenya, Madagascar, Mozambique, Red Sea, Mauritius, Seychelles, Tanzania, China and South Japan, Australia, East Indies, Philippine Islands, Maldives.
Ophioplepididae			
<i>Ophioplocus imbricatus</i>	Sodwana Bay (KZN)	10 m	Somalia, Aldabra, Mascarene Basin, Kenya, Madagascar, Mozambique, New Zealand, Red Sea, Mauritius, Seychelles, Tanzania, Australia, Réunion, Andaman Sea.

Astroboa nuda Döderlein, 1911: 86–88; Mortensen, 1940: 67; Tournamal & Marder, 1966: 9–17, fig. 1–4; Clark & Courtman-Stock, 1976: 100, 108, 130–131; Cherbonnier & Guille, 1978: 17–18, pl. 1, figs 3–4; Baker, 1980: 60, fig. 22; Guille & Vadon, 1985: 62.

Astrophyton elegans Koehler, 1905: 123–125, pl. 13, fig. 2, pl. 18, fig. 1.

Astroboa nigra Döderlein, 1911: 83–86, pl. 9, figs 9, 9a.

Astroboa nuda var. *elegans*: Döderlein, 1927: 45.

Astroboa nuda var. *nigra*: Döderlein, 1927: 44; Balinsky, 1957: 2–3.

Material/Records

Data Record Sink *et al.*, 2006-6, –27.4817°, 32.7117°,

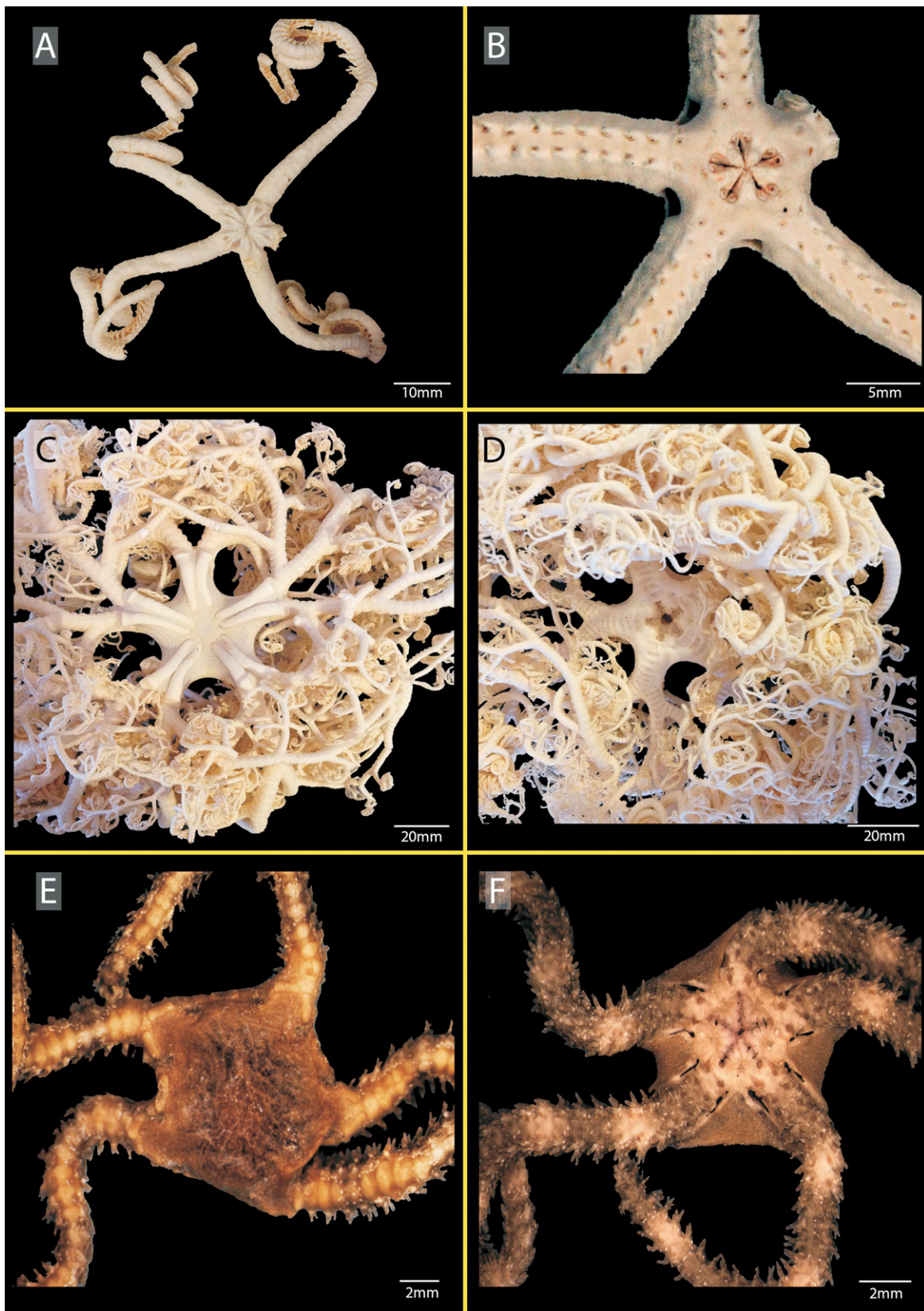


Plate 1. Dorsal (A) and ventral (B) views of *Asteroschema salix*, SAM A28143, -31.0000° , 30.4500° , off Glenmore, depth 900 m, 12 May 1977, Meiring Naude, station number SM134, beam trawl. Photograph provided by D. Van den Spiegel. Dorsal (C) and ventral (D) views of *Astroglymma cf. sculptum*, SAM A74047, -27.7668° , 32.6500° , NE Gypsea Hill, depth 84-90 m, 9 June 1990, Meiring Naude, station number ZK22, Natal Museum Dredging Programme. Dorsal (E) and ventral (F) views of *Ophiomyxa australis*, RMCA MT2274, -27.5227° , 32.6919° , Sodwana Bay, 2-mile Reef, depth 13 m, 9 August 1999. Photograph provided by D. Van den Spiegel.

Sodwana Bay, Wright Canyon, depth 70–120 m, ROV, November 2000, Determined by Gordon Paterson. Data Record Sink *et al.*, 2006–55, –27.5263°, 32.7198°, Sodwana Bay, Jesser Canyon, depth 100–110 m, ROV, November 2000, determined by Gordon Paterson. Data Record SANBI, iSpot, –27.5355°, 32.6799°, Sodwana Bay Canyons, depth 69 m, 1 March 2014, determined by K. Sink.

Diagnosis

(See Clark & Courtman-Stock 1976; Baker 1980)

D.D. up to 92 mm. Disc depressed interradially and centrally, interradiial and radial areas naked towards centre of the disc but with an increasing presence of tiny tubercles towards disc margin. Radial shields, narrow, paved densely with low granules giving smooth appearance, raised at disc margin, slightly broader on distal side terminating in oval slightly concave plate, converging to centre of disc. Oral papillae short, narrow, no continuous fringe in distal notches. Teeth three to five, thicker than oral papillae but elongated. Genital slits small, wide. Genital papillae present on inner edge. Ventral interradiial areas densely covered with tiny tubercles. Madreporite, one. Arms higher than wide basally, branching, first fork close to disc base, four to eight segments between forks with up to 28 forks along arm. Arms covered in small, smooth, polygonal plates, girdle bands present on arms from after 2nd fork but continuous before 3rd branch, girdle hooklets with secondary tooth. Arm spines absent before 15th fork, spines 3–4 with distal spines becoming hooklets with two hooks. Colour in life: black, white or yellow.

Global distribution

Indo-Pacific, Australia, Western Indian Ocean, Red Sea, Persian Gulf, East Indies, China and south Japan, Philippines, Madagascar, Mozambique (Kalk 1958; Richmond 2002; Rowe & Gates 1995; Clark & Rowe 1971; Tsumamal & Marder 1966; Balinsky 1957; Clark & Courtman-Stock 1976; Macnae & Kalk 1958; Cherbonnier & Guille 1978), South Africa (Sink *et al.* 2006).

Ecology

Depth range: 0.5–120 m (Tsumamal & Marder 1966; Sink *et al.* 2006).

Habitat: Found on coral reefs, both within deep crevices and on open reef.

Remarks

Previously known in Mozambique and hence not surprisingly recorded in South Africa. According to Rowe & Gates (1995), type locality is the Philippines, with the holotype being held at the Museum of Comparative Zoology (MCZ 2911).

Astroglymma cf. sculptum (Döderlein, 1896)

Plate 1C, D

Astrophyton sculptum Döderlein, 1896: 299, pl. 18, figs 29a, b; Baker, 1980: 66, 74, figs 19, 28, 31.

Astroglymma sculptum: (misspelling) Rowe & Gates, 1995: 365.

Gorgonocephalus robillardi de Loriol, 1899: 31–34, pl. 3, fig. 3.

Astrodictylus robillardi: Döderlein, 1911: 96–98.

Astroglymma sculptum Döderlein, 1927: 47–50, pl. 1, figs 3, 4;

pl. 5, fig. 13; Koehler, 1930: 15, pl. 2, figs 10–12; Guille & Vadon, 1985: 62.

Astroglymma robillardi: Mortensen, 1933b: 34, pl. 3, figs 1, 2; pl. 4, fig. 1.

Material/Records

SAM A74047, –27.7668°, 32.6500°, NE Gypsea Hill, depth 84–90 m, 9 June 1990, *Meiring Naude*, station number ZK22, Natal Museum Dredging Programme. USNM 1072476, –29.4500°, 31.5100°, east of Durban, *Anton Bruun*, station number 394B, depth 68–70 m, 25 September 1964, determined by A.N Baker.

Diagnosis

(See Baker 1980)

D.D. up to 50 mm. Disc deeply excavated interradially. Radial shields long, slender, widely separated distally almost touching proximally, almost reaching centre of disc. Disc and radial shields covered in minute conical tubercles, ventral interradiial area may bear long spinelets. Five madreporites present in angle of ventral interradiial area. Oral shields smooth, adoral shields not distinct, deep pits bordering jaws. Oral papillae unequal, small, mostly spiniform. Teeth small, spatulate. Genital slits short, D-shaped. Genital papillae blunt-tipped on outer edge. Arms branching, first fork just beyond disc, forking at least 20 times along arm. Dorsal arms covered in low polygonal plates. Girdle bands narrow, present from arm bases, girdle hooklets with secondary tooth. Arm spines present from sixth fork as two stumps, becoming three with one or two terminal points, distally becoming hooklets with terminal point and smaller secondary tooth. Ventral arms covered with smaller flat polygonal plates, the ventral arms have ladder-like pits on first 2–3 forks.

Global distribution

Indo-west Pacific, Australia, India, Mauritius, Malaysian Archipelago, China Sea (Baker 1980; Imaoka *et al.* 1991; Rowe & Gates 1995), South Africa.

Ecology

Depth range: 7–300 m.

Habitat: On continental shelf and slope (Rowe & Gates 1995).

Remarks

Baker (1980) synonymized *Astroglymma robillardi* with *A. sculptum*, agreeing with Mortensen (1933b) that there were no reliable differences between *sculptum* and *robillardi* and that a specimen being found in the Indian Ocean gave no reason to have separate species. He did note that Mortensen's *A. var. spinosum* may have merit but without comparative material it should remain a variety.

In this study, the specimen of *Astroglymma* described from off Durban had some noticeable differences; however, not those that Mortensen used to differentiate *A. robillardi* from *A. var. spinosum*. Mortensen (1933b) used the following to differentiate *sculptum* from *spinosum*: i) *spinosum* disc has thick stumps ending in some hyaline thorns with similar stumps on radial shields except they are close set in comparison to *sculptum*. Ventrally, few stumps present.

The specimen at hand (SAM A74047) had fine tubercles and were close together giving a smooth appearance, while ventrally, the disc covering was similar to the dorsal disc; ii) in *A. var. spinosum* there were no distinct grooves on the oral frame and no ladder pits on proximal part of arm. In SAM A74047 these pits were present; iii) the arm spines in *A. var. spinosum* begin before the 1st fork and the primary hooks are larger and different in shape (*A. var. spinosum* hooks are hunched over) to *sculptum*. In SAM A74047, there are very few hooks on the arm spines and they begin from the 4th fork.

In addition to not being similar to *A. var. spinosum*, SAM A74047 also has a number of differences from *A. sculptum*: i) arm spines start from the 4th fork and not the 6th as in *sculptum*; ii) distal arm spines have hooks but very few with secondary hooks; iii) girdle hooklets only have a terminal hook, therefore no secondary hooks are present on girdle belts as described by de Loriol (1899), Baker (1980) and Mortensen (1933b); and iv) there are 8–10 forks on SAM A74047 which is much fewer than those for *sculptum* (up to 20 forks). Therefore, it is noted that SAM A74047, does not strictly conform to *sculptum*, *robillardii* or *var. spinosum*.

The second record for South Africa is held at the Smithsonian Institution, National Museum of Natural History in Washington, D.C. (USNM), (USNM 1072476). The type locality of this species is Amboina, Indonesia.

Family OPHIOMYXIDAE Ljungman, 1867

Ophiomyxa australis Lütken, 1869

Plate 1E, F

Ophiomyxa australis Lütken, 1869: 45, 98, 99; Lyman, 1882: 246; Koehler, 1907: 341, Benham, 1909: 101; H.L. Clark, 1915: 168, pl. 1, figs 1–2; H.L. Clark, 1916: 77; Matsumoto, 1917: 19–21, fig. 3, pl. 1, figs 4–7; H.L. Clark, 1938: 201, pl. 13, figs 1–21; H.L. Clark, 1939: 36–37; H.L. Clark, 1946: 170–171; Madsen, 1967: 141; Clark & Rowe, 1971: 78, 92–93, pl. 13, figs 3, 4; Devaney, 1974: 115–116; Cherbonnier & Guille, 1978: 18–19, pl. 3, figs 1, 2; Sloan *et al.*, 1979: 99, figs 5, 6; Irimura, 1982: 2–4, fig. 1; Guille & Vadon, 1985: 62; Sastry, 1991: 375–376; Rowe & Gates, 1995: 406; Mbongwa, 2013: 15.

Ophiomyxa brevispina von Martens, 1870: 249–50; de Loriol, 1893b: 425–426; Döderlein, 1896: 298, pl. 17, fig. 27; Koehler, 1905: 119; H.L. Clark, 1915: 170, pl. 1, figs 1, 2; Koehler, 1930: 48.

Ophiomyxa robillardii de Loriol, 1893a: 53–54, pl. 25, fig. 5.

Ophiomyxa brevispina var. *irregularis* Koehler, 1898: 111–112.

Ophiomyxa irregularis Koehler, 1905: 119–120, pl. 12, fig. 1; Koehler, 1922a: 17–20, pl. 2, fig. 18, pl. 5, figs 1, 2, pl. 6, fig. 4, pl. 92, fig. 2; Koehler, 1930: 48.

Material/Records

RMCA MT2305, –27.5227°, 32.6919°, Sodwana Bay, 2-mile Reef, no depth, 10 February 2001, collected by Y. Samyn, determined by Y. Samyn and M. Garcia. RMCA MT2274, –27.5227°, 32.6919°, Sodwana Bay, 2-mile Reef, depth 13 m, 9 August 1999, collected by Y. Samyn, determined by Y. Samyn and M. Garcia. RMCA MT2361, –27.5227°, 32.6919°, Sodwana Bay, depth 30 m, 14 August 1999, collected

by Y. Samyn, determined by Y. Samyn and M. Garcia. SAM A28127, –27.5166°, 32.6833°, Sodwana Bay, depth 15 m, 24 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. SAM A28133, –27.5166°, 32.6833°, Sodwana Bay, depth 15 m, 25 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. SAM A28140 and SAM A28142, –27.5166°, 32.6833°, Sodwana Bay, depth 14 m, 1 August 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. EKZNW SB_4_JMO_2010, –27.8667°, 32.6000°, Leadsman Shoal, depth 11 m, SCUBA, 13 October 2010, determined by J.M. Olbers. SAM A74042, –27.1000°, 32.8841°, off Dog Point, depth 74 m, 7 June 1990, Dredge, *Meiring Naude*, station number ZC10, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A74043, –27.1844°, 32.8350°, off Rocktail Bay, depth 75 m, 4 June 1987, Dredge, *Meiring Naude*, station number ZD2, Natal Museum Dredging Programme, determined by J.M. Olbers.

Diagnosis

(See Cherbonnier & Guille 1978)

D.D. up to 23 mm. Disc pentagonal, covered with thick opaque smooth skin. Radial shields short, narrow, separated by width of arm base; disc margin scales overlap. Genital slits bordered by plates similar to ones on disc margin, long, narrow. Oral shields oval, triangular, covered by thick skin, longer than wide, abutting genital slit. Oral papillae three, broad, serrated, flattened and transparent on edges. Teeth similar. Arms five, covered in thick naked skin. Arm spines up to seven, one on segment one, then two and four on first free arm segments. Arm spines slender, serrated and rugose at tip, some becoming curved or slightly hooked. Dorsal arm plates irregular, fragmented, becoming less fragmented distally. Ventral arm plates distinctly broader than long, deep notch on distal side, not contiguous distally. Tentacle scales absent. Colour in life: blood-red dorsally and ventrally, arms lightly banded with yellow.

Global distribution

East Africa and Islands, Madagascar, Kenya, Mascarene Basin, Red Sea, Seychelles, Somalia, Tanzania, Western Indian Ocean, New Zealand (Stöhr *et al.* 2014), Indo-west Pacific (Rowe & Gates 1995), South Africa (Mbongwa 2013).

Ecology

Depth range: 11–75 m.

Habitat: In sand, grey ooze, coral, crannies in coral, stones and gravel, mud, sandstone rubble, gorgonians (Lyman 1882; H.L. Clark 1938).

Remarks

According to Rowe & Gates (1995), the type locality is Bass Strait (as ‘...inter Australian et Tasmaniam’) with the syntypes being held at the Natural History Museum of Denmark (ZMUC 474) (Tom Schiøtte, pers. comm.).

Family OPHIURIDAE Lyman, 1865

Subfamily Ophiolucinae Matsumoto, 1915

Ophiernus quadrispinus Koehler, 1908

Plate 2A, B

Ophiernus quadrispinus Koehler, 1908a: 533, 601–602; pl. 10,

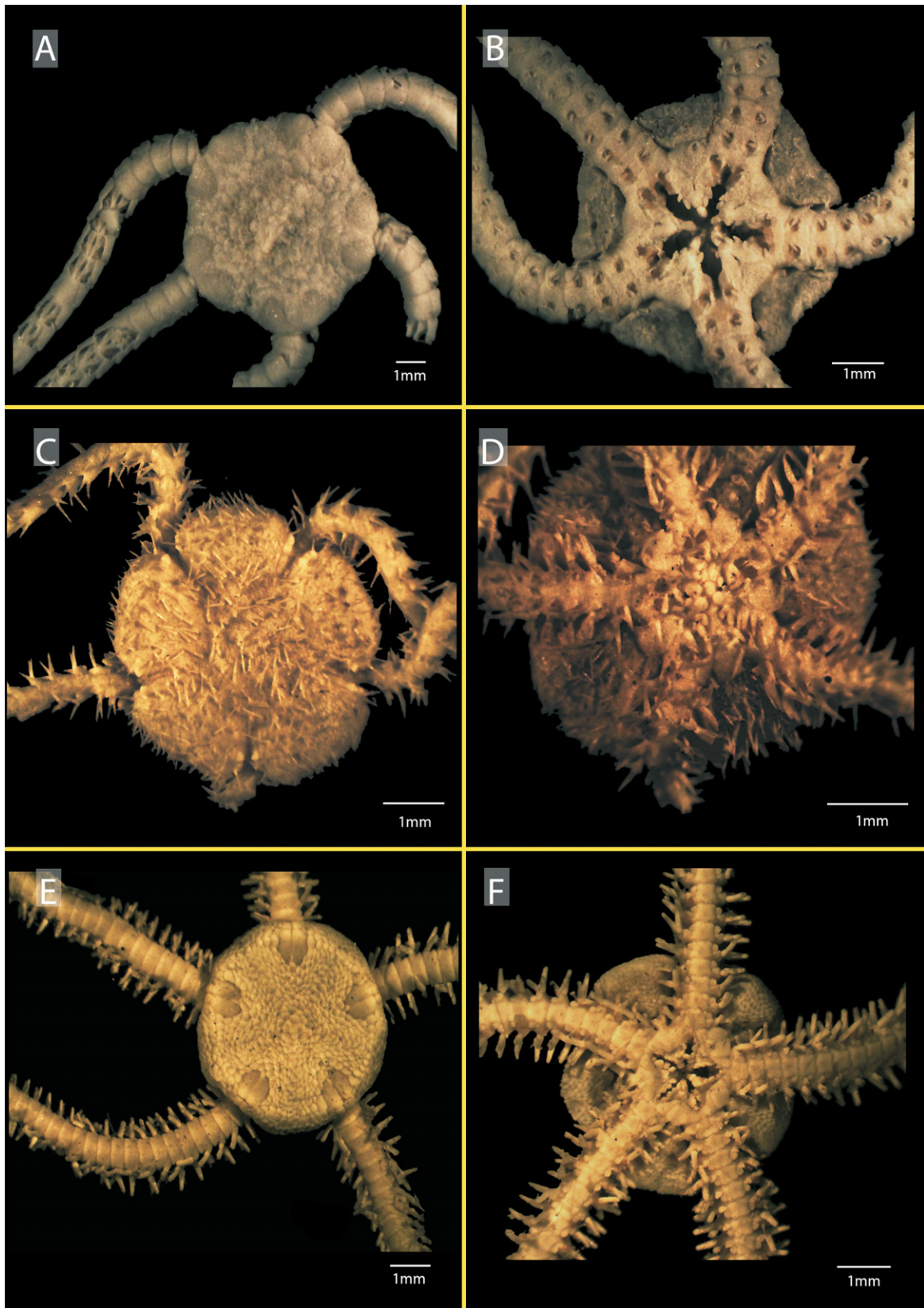


Plate 2. Dorsal (A) and ventral (B) views of *Ophiernus quadrispinus*, SAM A22018, off Saldanha Bay, -33.8116° , 16.5000° , depth 2730 m, 27 August 1959, trawl, *Africana II*, station number A193. Dorsal (C) and ventral (D) views of *Amphilimna cribriformis*, SAM A22787 (paratype), NE of Durban, depth 86 m, -29.4833° , 31.7500° , dredge, mud, 9 September 1964, station number NAD52E. Dorsal (E) view and ventral (F) views of *Amphioplus (Lymanella) depressus*, SAM A74078, -34.0817° , 23.0126° , Knysna, depth 0 m, 7 July 1960, collected by hand, UCT Ecological Survey Collection.

figs 102, 103; Koehler, 1908b: 142,146; Madsen, 1977: 120–121, fig. 7; Billett *et al.*, 2013: 20–25.

Material/Records

SAM A22018, off Saldanha Bay, -33.8116° , 16.5000° , depth 2730 m, 27 August 1959, trawl, *Africana II*, station number A193, determined by A.M. Clark. SAM A22015, -34.6166° , 17.0500° , off Cape Town, depth 2875–2948 m, 8 December 1959, trawl, *Africana II*, station number A315, determined by A.M. Clark. Data Record Madsen, 1977, -34.4044° , 17.7437° , off Cape Point, depth 1700–1900 m, *Fisheries Survey*.

Diagnosis

(See Madsen 1977)

D.D. up to 7 mm. Disc pentagonal, covered in scales, dorsally and ventrally, scales slightly bigger abutting radial shields and genital slits. Sparse granules on disc margin extending onto margins of radial shields. Radial Shields, large, oval, longer than wide, separated by disc scales. Oral shields arrow-shaped, naked. Adoral shields not distinct, extending up to first ventral arm plate, may or may not be contiguous proximally. Jaws long. Oral papillae five to six, including two smaller papillae in series with scales around second oral pore. Teeth three to four, tapering to blunt point. Genital slits as long as interradiar area, genital papillae absent. Ventral arm plates bell-shaped, first plate sunken, contiguous proximally becoming reduced and separated distally. Dorsal arm plates wider than long, distal edge straight proximally, becoming convex distally. Lateral plates increasing in size distally, hosting arm spines. Arm spines four, delicate, cylindrical, pointed, shorter than segment length, decreasing distally. Arm spines placed on mid-plate proximally, moving dorsally distally, upper bristle-like arm spine absent. Arms moderately long (all specimens broken), dorsal arm with slight keel. Tentacle scales two, sometimes one, varying in shape from pointed to round, unequal in size.

Global distribution

South Georgia and Crozet Island, Southern Ocean, Southern Atlantic, near the South Orkneys (Madsen 1977; Billett *et al.* 2013), South Africa (Madsen 1977).

Ecology

Depth range: 1700–3250 m (Madsen 1977).

Habitat: No information available.

Remarks

Although these specimens were trawled in 1959 and identified by A.M. Clark (date of determination unknown), they were not included in the Clark & Courtman-Stock (1976) monograph for unknown reasons. Later, Madsen (1977) described it as a new record for South Africa.

Granules on disc margin are similar to *O. vallincola* Lyman, 1878 but fewer in number. Similarly, granules extend onto margins of radial shields, but again fewer in number. Dorsal arm plates wider than long but slightly wider than in *O. vallincola*. Type locality is Southern Ocean (Koehler 1908a). In addition, the two similar species, *O. seminudus* and *O. quadrispinus* both lack the bristle-like supplementary spines on the lateral plate whereas these are present on *O. vallincola*.

Subfamily Ophiurinae Lyman, 1865

Amphiophiura sculptilis (Lyman, 1878)

Ophioglypha sculptilis Lyman, 1878: 84–85, pl. 4, figs 115, 116; Lyman, 1882: 37.

Ophioglypha variabilis Lyman, 1878: 85–86, pl. 4, figs 113, 114; Lyman, 1882: 37.

Ophiura sculptilis: Ludwig, 1901: 925; H.L. Clark, 1911: 77.

Ophioglypha remota Koehler, 1904a: 54, pl. 9, figs 1–3.

Amphiophiura sculptilis Koehler, 1914: 24; Koehler, 1922a: 364; H.L. Clark, 1915: 313; Matsumoto, 1915: 77; Hertz, 1927b: 74; H.L. Clark, 1939: 108; Madsen, 1951: 114; Litvinova, 1971: 299, pl. 3, figs 2, 4, 5; Vadon & Guille, 1984: 588, 592–593, pl. 5, 1–4; Guille & Vadon, 1986: 169; Manso, 2010: 196.

Material/Records

Data Record Guille & Vadon, 1986, -29.8133° , 34.5450° off Durban, depth 2608 m, 21 August 1979, dredge, *Safari I (Marion-Dufresne)*, station number DS1, determined by A. Guille and A. Vadon.

Diagnosis

(See Lyman 1878; Vadon & Guille 1984)

D.D. up to 15 mm. Dorsal disc thick, scales thin and flat, large round central plate, five distinct plates separated by small irregular scales. Radial shields distinct, D-shaped, contiguous distally, tapering proximally with wedge of scales between them, large scale present on dorsal interradiar area. Ventral interradiar areas scaled, but dominated by large oral shield. Oral shield pentagonal, distal edge rounded, slightly longer than wide, covering most of the ventral disc surface. Adoral shields relatively broad, contiguous. Oral papillae five, broad, closely set, apical papillae blunt. Genital slits moderately long, genital papillae present, squarish becoming spiniform, forming arm combs dorsally. Dorsal arm plates fan-shaped, rounded distal edge, contiguous. Lateral arm plates broad, meeting ventrally. Ventral arm plates squat, bell-shaped, constricted by large tentacle pore, distal edge longer than proximal edge, wider than long, distal edge straight becoming rounded, not contiguous. Arm spines up to six, blunt. Tentacle pores large, tentacle scales up to five within disc, two on remaining arm.

Global distribution

Antarctic Ocean, Northern Atlantic, Southern Atlantic, Zanzibar, Oman, Réunion, Indonesia, Japan, South America, Brazil, Bay of Bengal (Koehler 1914; Koehler 1922a; H.L. Clark 1939; Vadon & Guille 1984), South Africa (Guille & Vadon 1986).

Ecology

Depth range: 300–4320 m (Vadon & Guille 1984).

Habitat: Grey sand, globigerina ooze, grey mud (Koehler 1914; Koehler 1922a).

Remarks

Single record from South Africa, collected during French expedition Safari I on *Marion-Dufresne*, reported by Guille & Vadon (1986). Type locality is off Japan.

Family **AMPHIURIDAE** Ljungman, 1867

Amphilimna cribriformis A.M. Clark, 1974

Plate 2C, D

Amphilimna cribriformis A.M. Clark, 1974: 442–444, figs 1a–d; Thomas, 1975: 131, 132, 137; Clark & Courtman-Stock, 1976: 122, 165, 166, figs 182, 183; Liao, 1989: 342.

Material/Records

SAM A22784 (disintegrated holotype), NE of Durban, depth 118 m, -29.5670° , 31.6500° , dredge, sandy green-brown mud, 9 September 1964, station number NAD40V; SAM A22787 (paratype), NE of Durban, depth 86 m, -29.4833° , 31.7500° , dredge, mud, 9 September 1964, station number NAD52E; SAM A22785 (paratype), one specimen in poor condition, off Zimbali, depth 115 m, -29.5670° , 31.6500° , dredge, mud, no station data or collection date; SAM A22788 (paratype), NE of Tongaat, depth 150 m, -29.5833° , 31.6333° , dredge, sandy green brown mud, 9 September 1964, station number NAD35W; SAM A22789 (paratype), off Zimbali, depth 118 m, -29.5677° , 31.6519° , dredge, sandy green brown mud, 9 September 1964, station number NAD43G; SAM A22790 (paratype), off La Mercy, depth 200 m, -29.6333° , 31.6019° , dredge, mud, 8 September 1964, station number NAD33B; SAM A22791 (paratype), off Sheffield Beach, depth 86 m, -29.4833° , 31.7500° , dredge, mud, 9 September 1964, station number NAD55C.

Diagnosis

(See A.M. Clark 1974; Clark & Courtman-Stock 1976)

D.D. up to 6.5 mm. Disc pentagonal, indented radially, uniformly white, both dorsally and ventrally due to preservation. Dorsal and ventral disc covered in medium-sized fine disc scales with scattered, tapering, sharp spinelets, no change in spinelet, scale density or size on disc margin. Radial shields long, narrow, spines may be absent. Genital plates large, lie at angle in which they appear to be overlapping, each plate hosting two stout spines at their dorsal end. Oral shields triangular with rounded angles, as long as wide, widest distally. Adoral shields restricted to lateral edge of oral shield, triangular with inner margin curved, not contiguous. Jaws slightly elongated, two to four asymmetrical apical oral papillae, three spinose distal papillae, two distal-most being on edge of adoral shield. Teeth single, broad with small elongated oral tentacle scale either side. Arms long and thin, first two to four dorsal arm plates short, compressed or rudimentary, narrow. First free arm plate fan-shaped with convex distal edge, as long as wide, narrowly contiguous, plates translucent, porous and brittle with underlying structure visible. First ventral arm plate appearing triangular, adjacent to adoral plates, second arm shield with straight distal edge, broader between tentacle pores. Ventral arm plates thereafter with slight convex edge, becoming concave distally, narrowing adjacent to tentacle pores, longer than broad. Arm spines six, with first seven to nine arm plates hosting flattened, webbed arm spines, forming a wing-like flange which excludes lowermost spine. Beyond disc, arm spines free, flattened, becoming round and tapering distally. Tentacle scales two on segments one to ten, outer scale small, inner scale spinose resembling an arm spine, becoming reduced and eventually completely lost, single tentacle scales after segment ten.

Global distribution

Mozambique, South Africa (A.M. Clark 1974; Clark & Courtman-Stock 1976).

Ecology

Depth range: 86–200 m.

Habitat: Sandy mud, continental shelf (A.M. Clark 1974; Thomas 1975; Clark & Courtman-Stock 1976).

Remarks

Upon examination, it was found the holotype has disintegrated, it is suggested that if a neotype were to be erected, the paratype SAM A22787, collected 13 km from original type locality, would be the most appropriate specimen because this individual, one of nine paratypes, is most probably in the best condition.

In 1899, Verrill placed *Amphilimna* into the family Amphiuroidae, which was supported by H.L. Clark (1915) and Koehler (1922a). Later in 1967, Thomas placed *Amphilimna* into the Ophiacanthidae, which was supported by A.M. Clark (1974), Clark & Courtman-Stock (1976) and Liao (1989). Paterson (1985) then placed it into a subfamily Ophiotominae (family Ophiacanthidae). In 2010, Martynov proposed to place *Amphilimna* back into the Amphiuroidae as suggested by Verrill (1899), despite having an atypical dental plate. This genus has been dubbed an aberrant genus between Amphiuroidae and Ophiacanthidae.

Amphioplus (Lymanella) depressus (Ljungman, 1867)

Plate 2E, F

Amphipholis depressa Ljungman, 1867: 312.

Ophiophragmus affinis Duncan, 1887: 89–90, pl. 8, figs 4–6.

Amphiura relictus Koehler, 1898: 69, pl. 4, figs 37, 38; Koehler, 1900: 4, pl. 16 figs. 15, 16.

Amphioplus relictus: H.L. Clark, 1915: 256; H.L. Clark, 1938: 251.

Amphioplus depressus: H.L. Clark, 1915: 254; H.L. Clark, 1946: 205; James, 1970: 142–144, fig. 1g–k.

Amphipholis hastata Ljungman, 1867: 313.

Amphioplus hastatus: H.L. Clark, 1915: 257; H.L. Clark, 1923: 331; Koehler, 1927: 6; H.L. Clark, 1939: 75–76; Day & Morgans, 1956: 308; A.M. Clark, 1967: 47; Vine, 1986: 195.

Amphioplus (Lymanella) hastatus: A.M. Clark, 1970: 51, 54–55, fig. 9p, q; Clark & Rowe, 1971: 80, 102, fig. 24a; Hughes & Gamble, 1977: 355; Cherbonnier & Guille, 1978: 81, 83–86, figs 36, 37; Sloan *et al.*, 1979: 101; Richmond, 2002: 326.

Amphioplus (Lymanella) depressus: A.M. Clark, 1970: 54; Clark & Rowe, 1971: 102; Gibbs *et al.*, 1976: 117–118; Baker 1979: 46.

Material/Records

DBN52H, -29.8660° , 31.0270° , Durban Bay, depth 0 m, 18 July 1950, collected by hand, UCT Ecological Survey Collection, determined by unknown. SAM A74078, -34.0817° , 23.0126° , Knysna, depth 0 m, 7 July 1960, collected by hand, UCT Ecological Survey Collection, determined by T. O'Hara. Data Record Mbongwa, 2013, -27.7320° , 32.6264° , Sodwana Bay, depth unknown, 27 February 2013, determined by J.M. Olbers and N.A. Mbongwa.

Diagnosis

(See A.M. Clark 1970; Clark & Rowe 1971)

D.D. up to 10 mm. Primary rosette may or may not be distinct. Disc scales moderate in size, overlapping, central scales may be larger than peripheral scales. Disc margin sharp, sometimes with small projections or spines. Radial shields contiguous for half their lengths, may be half disc radius or less. Oral shields narrow, diamond-shaped, longer than wide, adoral shields triangular, contiguous. Oral papillae four, arranged in a continuous row forming a straight line, third papilla slightly enlarged. Arm length approximately 6–7 times disc diameter. Dorsal arm plates oval, wider than long, distal margin convex, contiguous. Ventral arm plates pentagonal, flat distally, narrowly contiguous. Arm spines, up to three, pointed, about as long as segment. Tentacle scales, two, large covering pore.

Global distribution

Arabian Sea, Persian Gulf, Bay of Bengal, Red Sea, Madagascar, Australia, Mozambique, Indonesia, Philippines, Australia, Fiji and Japan (Cherbonnier & Guille 1978; Baker 1979; Clark & Rowe 1971; Rowe & Gates 1995), South Africa.

Ecology

Depth range: 0–82 m.

Habitat: Associated with seagrass (*Syringodium isoetifolium* and *Cymodocea serrulata*), mud and sand (Cherbonnier & Guille 1978), mud (James 1970), brown mud and detritus.

Remarks

Mortensen (1940) stated that the marginal spines are not diagnostic for *hastatus*, given that specimens from the Persian Gulf are inconsistent. Later H.L. Clark (1946) stated that it was doubtful that *hastatus* could be distinguished from *A. (Lymanella) depressus* because they have relatively broad radial shields, no distinct median distal angle on their dorsal arm plates and often the marginal scales are more or less specialized. In addition, he also mentioned that the prominent primary rosette is not a reliable character because of the likelihood of loss and regeneration; this was further supported by A.M. Clark (1970). Clark & Rowe (1971) distinguished *hastatus* from *depressus* using the distinctness of the primary rosette, the size of the radial shields and whether there were spines on the disc margin, all of which were considered unlikely to be distinguishing characters by Mortensen (1940), H.L. Clark (1946), A.M. Clark (1970) and Baker (1979). Therefore, based on the material at hand and these characters it is believed that *hastatus* is a synonym of *depressus*.

A.M. Clark found that the South African records of *Amphioplus (Lymanella) hastatus* reported by Day & Morgans (1956) and by Day (1974) are in fact misidentifications of *Amphioplus (Lymanella) integer* (Clark & Courtman-Stock 1976). According to Rowe & Gates (1995) the type locality is Mozambique (Ljungman 1867).

Ophionephtys lowelli A.M. Clark, 1974

Plate 3A, B

Ophionephtys lowelli Clark, 1974: 462–464, figs 10a–e; Clark

& Courtman-Stock, 1976: 103, 116–117, 159–160; Mbongwa, 2013: 15.

Material/Records

SAM A22782 (disintegrated holotype), off East London, depth 55 m, –33.0500°, 27.9000°, dredge, brown sand and shell, 17 July 1959, station number SCD82P; SAM A22781 (paratype), NE of East London, depth 55 m, –32.5505°, 28.6352°, dredge, sand and mud, 16 July 1959, station number SCD74S; SAM A74075, Sodwana Bay, depth 0 m, –27.5396°, 32.6804°, by hand, collected by Rebecca Milne, among algae, 15 October 2010, identified by J.M. Olbers; Unaccessioned (UKZN), Sodwana Bay, no depth, –27.7320°, 32.6264°, SCUBA, 27 February 2013, identified by J.M. Olbers.

Diagnosis

(See Clark 1974; Clark & Courtman-Stock 1976)

D.D. up to 8 mm. Disc round, in all specimens at hand the dorsal disc ‘lid’ is missing. Oral shields variable, as long as wide or wider, triangular with broadly rounded angles, widest proximally or rhombic with proximal lobe being flattened. Adoral shields triangular, widely separated interradially, with broad distal lobe contiguous with lateral arm shield. Jaws slightly sunken, with two large, broad infradental oral papillae appearing in preserved specimens to be apical papillae. Two spiniform, rugose-tipped oral papillae, one shorter than the other and both attached to oral plate and in series with infradental papillae. Oral tentacle scale distinct, short and sharp situated close to teeth. No genital papillae, genital slits small and indistinct. Arms long, approximately ten times disc length, first seven to nine dorsal arm plates rudimentary, showing underlying structure, plates becoming whole, square or slightly longer than broad, with rounded edges slightly convex on distal side and concave on proximal side, broadly contiguous. Ventral arm plates similar in shape, convex distally, overlapping each other, longer than broad. Arm spines four or five, lowest one thick, blunt, approximately segment length, remaining spines slightly shorter and tapering but blunt, covering not smooth, slightly rough. Tentacle scale single, oval, longer than broad, moderate in length, approximately half segment length.

Global distribution

South Africa (endemic).

Ecology

Depth range: 0–55 m.

Habitat: Found in brown sand, shell and mud and coral sand (A.M. Clark 1974; Clark & Courtman-Stock 1976).

Remarks

During this study, the holotype was borrowed for examination but found to have disintegrated in the jar. If a neotype were required to be erected, it is suggested that one of the seven paratype specimens (SAM A22781) be selected because these were collected 90 km from the original type locality and appear to be in reasonable condition.

A.M. Clark (1974) mentioned that her figure of the dorsal disc was reconstructed because the upper side was probably

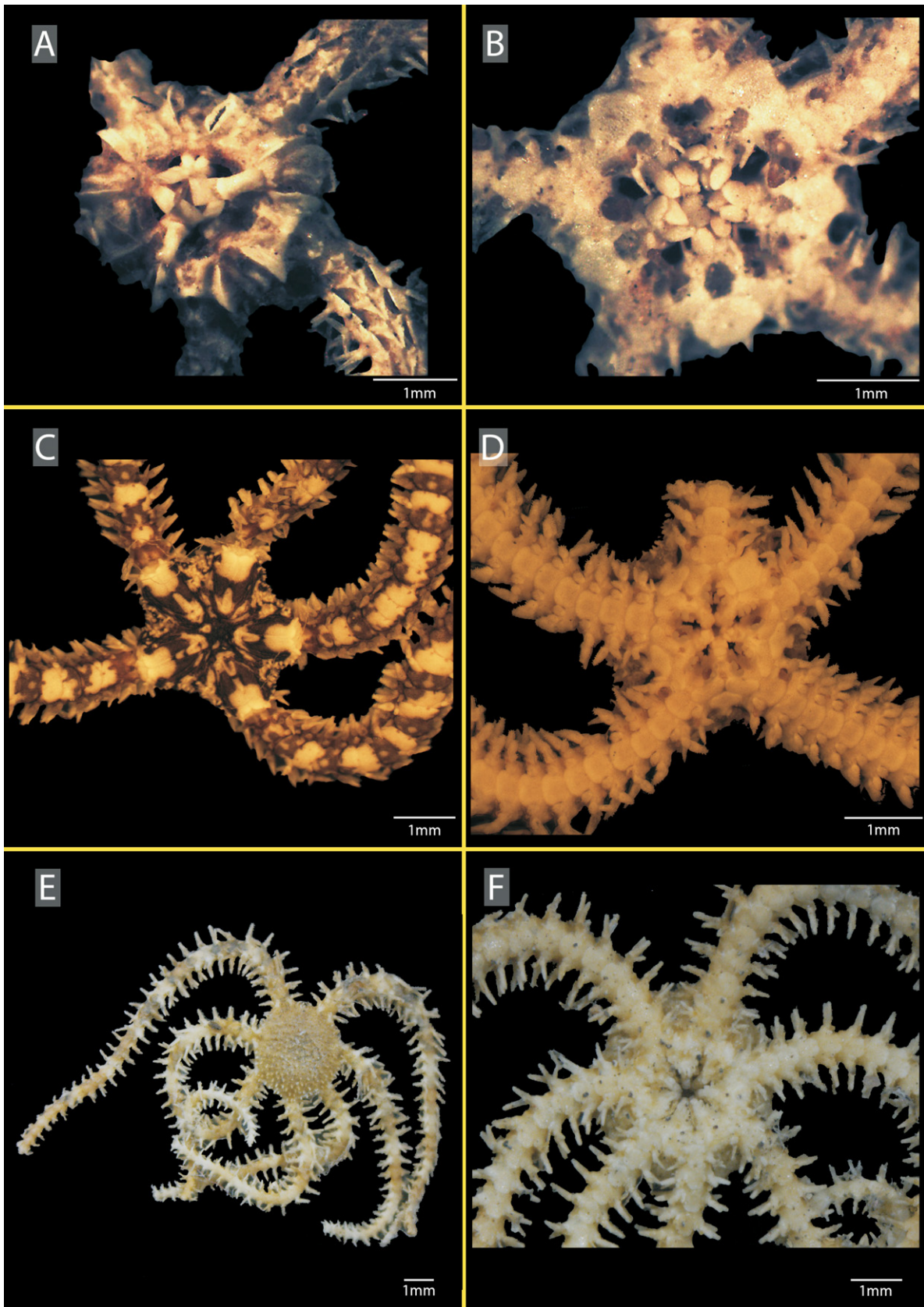


Plate 3. Dorsal (A) and ventral (B) views of *Ophionephthys lowelli*, SAM A22781, NE of East London, depth 55 m, -32.5505° ; 28.6352° , dredge, sand and mud, 16 July 1959, station number SCD74S. Dorsal (C) and ventral (D) views of *Ophiactis cf. picteti* SAM A74065, -27.5230° ; 32.6920° , Sodwana Bay, depth 12.5 m, 15 October 2010, SCUBA. Dorsal (E) and ventral (F) views of *Ophiocomella sexradia*, EKZNR RR_4_JMO_2010, -29.9861° ; 30.9645° , Reunion Rocks, intertidal, 24 September 2010.

covered with a continuous extremely fine scaling, towards the periphery where it turns brown when partially dried. No specimens available for examination here (paratypes and one new specimen) had any dorsal disc resemblance to the reconstructed dorsal disc in A.M. Clark (1974), i.e. they were all missing their dorsal disc 'lids'. The single fresh specimen available for examination was uniformly white, both dorsally and ventrally, with no distinct markings or colouration.

Family OPHIACRIDAE Matsumoto, 1915

Ophiactis cf. picteti (de Loriol, 1893)

Plate 3C, D

Ophiocnida picteti de Loriol, 1893b: 405–407, pl. 13, fig. 2.

Ophiactis picteti: H.L. Clark, 1915: 267; Clark & Rowe, 1971: 82, 104; Cherbonnier & Guille, 1978: 123–125, fig. 56; Sloan *et al.*, 1979: 101–102; Humphreys, 1981: 10, 21; Milne, 2012: 155.

Material/Records

RMCA MT2275, –30.9620°, 30.3050°, Trafalgar, KZN, depth 25 m, 21 August 1999, SCUBA, collected by Y. Samyn, determined by M. Garcia. SAM A28136, –27.5166°, 32.6833°, Sodwana Bay, depth 15 m, 28 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. SAM A74053, SAM A74056, SAM A74060, SAM A74070, SAM A74071, SAM A74072 and SAM A74073, –27.5230°, 32.6920°, Sodwana Bay, depth 7.5 m, 15 October 2010, SCUBA, ACEP II, determined by J.M. Olbers. SAM A74063 and SAM A74065, –27.5230°, 32.6920°, Sodwana Bay, depth 12.5 m, 15 October 2010, SCUBA, ACEP II, determined by J.M. Olbers. SAM A74057, –27.5230°, 32.6920°, Sodwana Bay, depth 22 m, 15 October 2010, SCUBA, ACEP II, determined by J.M. Olbers. SAM A74069, –27.5230°, 32.6920°, Sodwana Bay, depth unknown, 15 October 2010, SCUBA, ACEP II, determined by J.M. Olbers.

Diagnosis

(See Cherbonnier & Guille 1978)

D.D. up to 6 mm. Disc round, dorsally covered with overlapping scales, many conical small spinelets mainly in interradial areas and on margin. Ventral interradial areas with finer scales, scattered conical spines. Arms five, simple. Radial shields elongated, narrow triangular, length at least two-thirds disc radius, each pair separated by four enlarged scales, distally approximating or contiguous, light patch on distal part of each radial shield. Genital slits ending at edge of disc, no distinct scales, genital papillae absent. Oral shields spearhead-shaped or oval, slightly wider than long, may be truncated on distal side; adoral shields contiguous interradially, single apical papillae, two to three distal oral papillae. Up to seven arm spines (usually six), short, longest less than twice segment length, tapering to blunt tips, three uppermost ones stout and conical and rugose, remaining spines elongated and decreasing in size toward ventral side. Dorsal arm plates oval, becoming elliptical, wider than long, distal edge convex, broadly contiguous. Ventral arm plates hexagonal, edges rounded in proximal part of arm, becoming flat-truncated on both sides, slightly wider than long. Single tentacle scale, large, round. Colour in life: disc and arms brown with white, marbled, arms banded sometimes with dark spots, ventrally arms white, spinelets white.

Global distribution

East Indies, Indo-Malayan Region, Western Indian Ocean, Australia, Madagascar, Kenya and Tanzania (Clark & Rowe 1971; Rowe & Gates 1995; Cherbonnier & Guille 1978; Humphreys 1981), South Africa (Milne 2012).

Ecology

Depth range: 0–50 m.

Habitat: Coral patches, coral reef flats (Humphreys 1981).

Remarks

In South Africa, as Sloan *et al.* (1979) suggested, *O. picteti* has also been misidentified as *O. hemiteles* in some works. Milne (2012) reported *O. hemiteles* collected in Sodwana Bay (initially identified by J.M. Olbers), but these were re-examined again by J.M. Olbers and were found to be *O. picteti* based on the presence of the narrow median distal lobe (Sloan *et al.* 1979) and the blunt arm spines.

Clark & Rowe (1971) used skin-covered oral shields as a character but in the specimens at hand, which were dry on examination, these do not show the oral shield obscured. In addition, Cherbonnier & Guille (1978) mentioned that the adoral shields are small but in the specimens at hand, the adorals could be adequately seen. Although the arms are broken on all specimens at hand, it is noted that de Loriol (1893) also suggested that the disc diameter and arm length ratio was approximate in the descriptions, which is D.D.:A.L. = 1:6. In addition, Sloan *et al.* (1979) stated that the Indian Ocean specimens have a narrow median distal lobe on the oral shields which is true of the specimens at hand.

According to Rowe & Gates (1995) the type locality is Amboina, Indonesia, and was thought to be held at the Natural History Museum in Genève but upon investigation, this was not the case (Jean Mariaux, pers. comm).

Family OPHIOCOMIDAE Ljungman, 1867

Ophiocomella sexradia (Duncan, 1887)

Plate 3E, F

Ophiocnida sexradia Duncan, 1887: 92–93, pl. 8, fig. 10, 11; Koehler, 1905: 33.

Ophiocoma parva H.L. Clark, 1915: 292, pl. 14, figs 8, 9; H.L. Clark, 1921: 132, pl. 13, fig. 4; H.L. Clark, 1938: 331–332; A.H. Clark, 1939: 5–7, pl. 1, figs 1, 2; H.L. Clark, 1946: 247; Balinsky, 1957: 27; Kalk, 1958: 207, 216, 237; Macnae & Kalk, 1969: 104, 106, 130; Clark & Rowe, 1971: fig. 38d.

Amphilimna sexradia: H.L. Clark, 1915: 259.

Amphilimna sexradiata: Koehler, 1927: 3.

Ophiocomella clippertoni: A.H. Clark, 1939: 5–7 (as *O. parva*); A.H. Clark, 1952: 296.

Ophiocomella schultzi A.H. Clark, 1941: 481–483; Clark & Rowe, 1971, figs 38c, e.

Ophiomastix sexradiata A.H. Clark, 1952: 297–298; Clark & Rowe, 1971: 86, 118, figs 38a, b.

Ophiocomella sexradia: Clark & Rowe, 1971: 86–87, 118, figs 38c–f; Devaney, 1974: 162–164; Clark & Courtman-Stock, 1976: 105, 122, 175; Hughes & Gamble, 1977: 355; Cherbonnier & Guille, 1978: 178–179, pl. 12, figs 5, 6; Sloan *et al.*, 1979: 109; Vine, 1986: 195; Sastry, 1991: 374, 382,

pl. 4, fig. 20; Rowe & Gates, 1995: 389; Richmond, 2002: 326; Putchakarn & Sonchaeng, 2004: 423; Stöhr *et al.*, 2008: 547, 555–556; Mbongwa, 2013: 16.

Material/Records

EKZNW RR_9_JMO_2010, –29.9861°, 30.9645°, Reunion Rocks, intertidal, 27 February 2010, collected and determined by J.M. Olbers. EKZNW RR_7_JMO_2010, –29.9861°, 30.9645°, Reunion Rocks, intertidal, 30 January 2010, collected and determined by J.M. Olbers. EKZNW RR_4_JMO_2010, –29.9861°, 30.9645°, Reunion Rocks, intertidal, 24 September 2010, collected and determined by J.M. Olbers.

Diagnosis

(See Clark & Courtman-Stock 1976; Cherbonnier & Guille 1978)

D.D. up to 6 mm. Disc covered with short blunt spines, densities may differ. Radial shields not distinct. Oral shields variable, round, rhombic, spearhead-shaped or hexagonal. Adoral shields not contiguous. Dental papillae four to six, usually in series. Oral papillae three. Teeth blunt and wide. Genital slits narrow and elongated. Arms six, rarely three or seven. Dorsal arm plates fan-shaped, as wide as long. Ventral arm plates squarish, distal edge rounded, proximal edge truncated. Arm spines, up to four, sometimes five, tapering to blunt tip or may be square tipped, one segment length. Tentacle scale, one, oval, first pair of pores may have two. Fissiparous. Colour in life: disc dark brownish or green, arms banded with brown, green or red.

Global distribution

Indo-Pacific, Mozambique, China, India, south Japan, Australia, Tasman Sea, Réunion, Rodrigues, Hawaiian Islands (Richmond 2002; Clark & Rowe 1971; Rowe & Gates 1995; Rowe & Richmond 2004; Sastry 1991), South Africa (Mbongwa 2013).

Ecology

Depth range: 0–33 m (Koehler 1905; Rowe & Gates 1995).

Habitat: Associated with sponges, coral bases and sea grass beds, algae.

Remarks

In KZN, this species appears to be associated with the six-armed species *Ophiactis savignyi* found in and among rocky shore algae scrapings.

According to Rowe & Gates (1995), the type locality is Mergui Archipelago, Burma (Myanmar).

Ophiomastix koehleri Devaney, 1977

Plate 4A, B

Ophiomastix koehleri Devaney, 1977: 274–283, fig. 1–4; Cherbonnier & Guille, 1978: 186–188, pl. 11, figs 1, 2; Sloan *et al.*, 1979: 92, 109, fig. 16; Humphreys, 1981: 10, 25.

Material/Records

RMCA MT2146, –30.2637°, 30.8264°, Aliwal Shoal, depth 15 m, August 1999, collected by Y. Samyn and E. Vanden Berghe, determined by Y. Samyn. RMCA MT2161, –27.4472°, 32.7167°, Sodwana Bay, 7-mile Reef, depth

18 m, February 2001, collected by Y. Samyn, determined by Y. Samyn and M. Garcia. SAM A28130, –27.5166°, 32.6833°, Sodwana Bay, depth 15 m, 25 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. SAM A28120, –27.5166°, 32.6833°, Sodwana Bay, depth 14 m, 23 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers.

Diagnosis

(See Devaney 1977; Cherbonnier & Guille 1978)

D.D. up to 23 mm. Disc round and puffy, dorsally disc covered uniformly by short, rounded granules, ventrally disc with similar granules but not extending up to oral shields, leaving a broken wide V-shaped interradiar area with scales, dark brown, variegated with whitish grey. Oral shields round with dark patch on each surrounded by white on margin, adorals small, not contiguous. Genital slits large, almost reaching disc margin, genital papillae present, extending to oral shields. Dorsal arm plates fan-shaped, much wider than long, convex distally, most often a thin white line bordering the plates, narrowly contiguous. Ventral arm plates fan-shaped with convex distal edges, brown with small grey patch surrounded by white margin. Arm spines three to four on each side of same or mostly adjacent segments, often alternating, uppermost spine markedly longer, cigar-shaped, clavate distally and more or less bifurcate at tip, broadly banded with bands becoming more obvious distally, up to five times segment length, remaining spines cigar-shaped with blunt tip, greyish bands not always around full circumference of spine, two to three times segment length, shortest being 1.5 times segment length. Tentacle scales two, becoming one after approximately one third of arm length, oval, similar in size. Colour in life: uniformly dark purple, brown, black with white edges, dorsal arm plates off-white with large irregular purple patches, giving arm banded appearance. Upper arm spines pale or purple mottled, clavate, remaining arm spines purple and white annulations, tentacle scales banded, oral shields with large dark purple blotches.

Global distribution

Madagascar, Zanzibar, Kenya, Aldabra, Comoros (Cherbonnier & Guille 1978), South Africa.

Ecology

Depth range: 0–18 m.

Habitat: Under *Porites* coral colonies, over sandy gravel in lagoonal seagrass bed (Sloan *et al.* 1979).

Remarks

According to Devaney (1977) the type locality is Zanzibar and the holotype is held at the Natural History Museum in London (BMNH 1965-6-1-451). The granules on the ventral interradiar area do not extend to oral shields but the spines originating from the genital slits do extend up to oral shields.

Ophiomastix venosa Peters, 1851

Plate 4C, D

Ophiomastix venosa Peters, 1851: 464–465; Lütken, 1869: 44; Lyman, 1882: 175; Koehler, 1904b: 73–74, figs 28, 29;

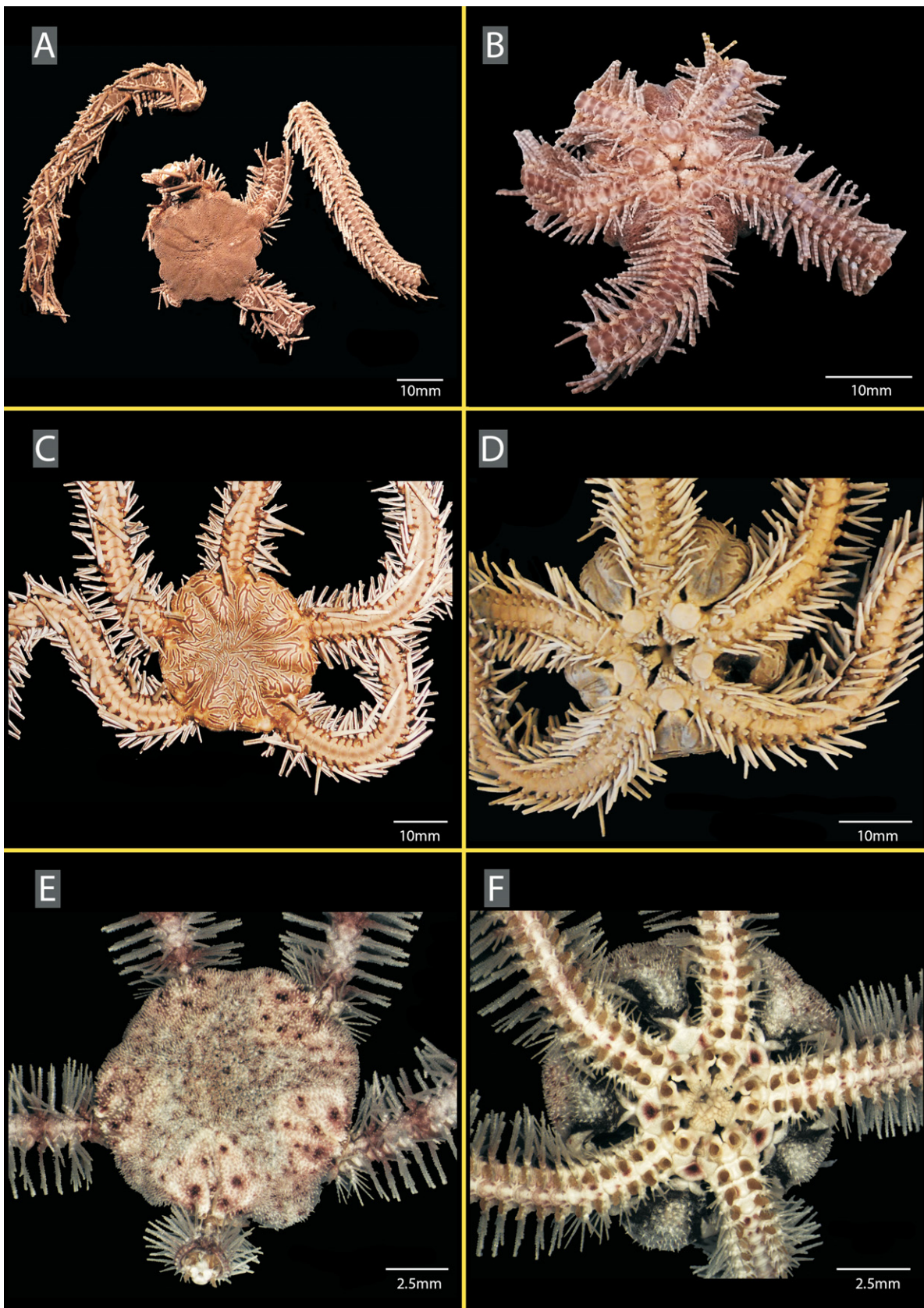


Plate 4. Dorsal (A) and ventral (B) views of *Ophiomastix koehleri*, SAM A28130, -27.5166° , 32.6833° , Sodwana Bay, depth 15 m, 25 July 1976, SCUBA, J.L.B. Smith Institute. Dorsal (C) and ventral (D) views of *Ophiomastix venosa*, RMCA MT2353, -27.5227° , 32.7129° , Sodwana Bay, depth 21 m, 7 November 2003. Dorsal (E) and ventral (F) views of *Macrophiothrix demessa*, RMCA MT2156, -27.5227° , 32.6919° , Sodwana Bay, 2-mile Reef, depth 13 m, 4 September 1999.

H.L. Clark, 1915: 296; H.L. Clark, 1921: 134, 138; H.L. Clark, 1923: 349; Balinsky, 1957: 27–28; Kalk, 1958: 237; Macnae & Kalk, 1969: 130; Clark & Rowe, 1971: 88, 120; Clark & Courtman-Stock, 1976: 105, 122, 176–177, fig. 191; Devaney, 1978: 279, 350–353, figs 41, 42; Cherbonnier & Guille, 1978: 190–192, pl. 14, figs 1–2, fig. 63; Sloan *et al.*, 1979: 109–111; Tortonese, 1980: 117, 128, fig. 12; Humphreys, 1981: 10, 25.

Material/Records

RMCA MT2353, -27.5227° , 32.7129° , Sodwana Bay, depth 21 m, 7 November 2003, collected and determined by Y. Samyn. SAM A28128, -27.5166° , 32.6833° , Sodwana Bay, depth 15 m, 25 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. AM J.10517, -31.9839° , 29.1525° , Coffee Bay, depth unknown, collection date 1974.

Diagnosis

(See Clark & Courtman-Stock, 1976; Devaney, 1978; Cherbonnier & Guille 1978)

D.D. up to 31 mm. Disc round and puffy, dorsal disc scales fine, light brown, pair of radiating dark brown lines outlined in white starting from base of each arm and meandering in random pattern. Ventral disc scales lighter brown and coarser in proximal interradiation areas, some ovate imbricated scales delimiting periphery of disc. Granules sparsely scattered on both dorsal and ventral sides of disc, with scattered cylindrical spines towards margin of dorsal disc. Radial shields visible, but not distinct. Genital slits large, reach margin of disc, genital papillae absent. Oral shields slightly wider than long, adoral shields triangular, largely separated. Arm spines two to four, alternating in number, cigar-shaped, but tapering with darker longitudinal line; on every two to three segments, upper arm spine is enlarged and has clavate, cloven or digitate tip, c. 3.5–4 times segment length, longitudinal line absent on largest spines, other arm spines approximately two times segment length. Dorsal arm plates broadly fan-shaped, wider than long, broadly contiguous, becoming slightly longer than wide, narrowly contiguous. Ventral arm plates pentagonal but truncated, distal side straight or convex, lateral sides may be concave. Tentacle scales two basally, distally one, ovate. Colour in life: disc light brown with radiating lines on disc, radial shields with black petaloid pattern (Humphreys 1981), arm spines with longitudinal dark stripe, dorsal arm plates brownish with a darker faded line down length of arm, ventrally uniformly light brown.

Global distribution

Aldabra, Kenya, Mascarene Basin, Mozambique, Rodriguez, Seychelles, Somalia, Tanzania, Philippines, Madagascar, Comoros, Bay of Bengal, tropical Indo-Pacific (Clark & Rowe 1971; Cherbonnier & Guille 1978; Devaney 1978; Tortonese 1980), South Africa.

Ecology

Depth range: 0–21 m.

Habitat: Found in shallow lagoons, often on sand and rubble, algal carpet, under boulders, coral heads, and *Porites* in lagoonal seagrass beds (Sloan *et al.* 1979), may be in same

habitat with *Ophiocoma scolopendrina* (de Lamarck, 1816) (Balinsky 1957).

Remarks

Clark & Courtman-Stock (1976) recorded this species in Mozambique. Type locality is Mozambique.

Family **OPHIOTRICHIDAE** Ljungman, 1867

Macrophiothrix demessa (Lyman, 1862)

Plate 4E, F

Ophiiothrix demessa Lyman, 1862: 82; 1865: 172–173; Marktanner-Turneretscher, 1887: 310; Brock, 1888: 513; Koehler, 1905: 91–92, pl. 9, figs 5, 6; H.L. Clark, 1915: 270; 1921: 109; 1939: 83.

Ophiiothrix mauritiensis de Lorient, 1893a: 38, pl. 24, fig. 5.

Ophiiothrix coronata Koehler, 1905: 91, pl. 9, figs 8, 9; Koehler, 1922a: 217–218, pl. 40, fig. 5, pl. 41, figs 1–4, pl. 98, fig. 1; Koehler, 1930: 137; Vine, 1986: 195.

Amphiothrix demessa: H.L. Clark, 1946: 217; Eudean, 1957: 243; Fell, 1960: 24.

Macrophiothrix mossambica Balinsky, 1957: 18, fig. 7, pl. 3, figs 11–12.

Macrophiothrix demessa: A.M. Clark, 1968: 289–291, figs 3e, f, 4h, 5h, 7e; Clark & Rowe, 1971: 82, 114, pl. 37f; Devaney, 1974: 139–140; Clark & Courtman-Stock, 1976: 111, 138, fig. 114; Sloan *et al.*, 1979: 102–103; Cherbonnier & Guille, 1978: 151–152, pl. 4, figs 1, 2; fig. 61: 7–9; Sastry, 1991: 374, 377, pl. 3, fig 16; Milne, 2012: 155.

Material/Records

RMCA MT2156, -27.5227° , 32.6919° , Sodwana Bay, 2-mile Reef, depth 13 m, 4 September 1999, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2154, -30.2637° , 30.8264° , Aliwal Shoal, depth 16 m, 15 August 1999, collected by Y. Samyn and E. Vanden Berghe, determined by Y. Samyn and M. Garcia. RMCA MT2166, -26.9335° , 32.8871° , Bhanga Nek, depth 20 m, 14 August 1999, collected by Y. Samyn, determined by M. Garcia and Y. Samyn. SAM A74052, -27.5396° , 32.6804° , Sodwana Bay, depth unknown, 15 October 2010, collected by R. Milne, ACEP II, determined by J.M. Olbers. SAM A28145, -29.5500° , 31.4167° , Ballito, depth 60–64 m, 7 June 1988, *Meiring Naude*, station number XX131, Natal Museum Dredge, determined by J.M. Olbers. EKZLNW LR_3_ME_2008, -27.7167° , 32.6501° , NE of Liefeldt's Rocks, depth 50 m, 8 June 1988, *Meiring Naude*, Natal Museum Dredge, determined by J.M. Olbers.

Diagnosis

(See Clark & Courtman-Stock 1976; Cherbonnier & Guille 1978).

D.D. up to 12 mm. Disc puffy, covered dorsally with long thorny stumps, two to six terminal points, ventrally covered with similar stumps, but more scattered and typically single terminal points. Radial shields triangular, two-thirds length of disc radius, covered with shorter and less numerous stumps than those on disc. Jaws elongated, oral shields broadly triangular, much wider than long. Adoral shields not contiguous. Genital slits halfway to disc, genital plate large, adjacent to slit, with disc spinelets not continuing to edge of

genital slit. Dorsal arm plates broadly fan-shaped, about twice as wide as long or wider, broadly in contact, armed with small rugose granules or sparse stumps. Ventral arm plates wide, fan-shaped, but with rounded proximal edges, as long as wide, sometimes slightly longer than wide, contiguous. Arm spines up to 14, thorny over entire length, glassy, longest spine at least three times segment length, shortest ventrally. Tentacle scale one, triangular. Colour in life: dorsal side of disc greyish with more or less conspicuous dark pink spots, ventrally lighter and fewer spots. Arms banded purple, pink or red with white dorsally and lighter ventrally, with two to three arm segments between bands.

Global distribution

Tropical Indo-west Pacific, Australia, Hawaiian Islands, Mozambique, Mauritius, Zanzibar, Red Sea, India, Seychelles, Maldives Islands, Philippines, China Sea (Rowe & Gates 1995; Sastry 1991; Clark & Rowe 1971; Hoggett 1991), South Africa (Milne 2012).

Ecology

Depth range: 0–128 m.

Habitat: Concealed in coral, deep rocky crevices, under stones with coarse sand and with *Lithothamnion* (Hoggett 1991).

Remarks

Recorded from Mozambique in Clark & Courtman-Stock (1976). According to Rowe & Gates (1995) the type locality is in the Hawaiian Islands (recorded as Sandwich Islands). Specimens are held at the Museum of Comparative Zoology (holotype: MCZ 2278; paratypes: MCZ 2279, MCZ 2280, MCZ 2281 and MCZ 4095).

Macrophiothrix propinqua (Lyman, 1862)

Plate 5A, B

Ophiothrix propinqua Lyman, 1862: 83–84; 1874: 234; Ljungman, 1867: 333; Marktanner-Turneretscher, 1887: 308; Brock, 1888: 510; Koehler, 1898: 98–100, pl. 3, figs 20–22; Koehler, 1905: 81; H.L. Clark, 1915: 277; H.L. Clark, 1921: 113; Koehler, 1922a: 256–257, pl. 38, figs 1–2, pl. 101, fig. 4; Murakami, 1943a: 207–208.

Ophiothrix triloba von Martens, 1870: 260–261.

Ophiothrix bedoti de Loriol, 1893b: 420–422, pl. 15, fig. 1.

Ophiothrix schmidtii Djakonov, 1930: 237–239, pl. 12: 1, 2.

Ophiotrichoides propinqua: H.L. Clark, 1946: 232; Balinsky, 1957: 21; Endean, 1957: 244.

Macrophiothrix schmidtii: A.M. Clark, 1966: 649.

Ophiothrix (Keystonea) propinqua: A.M. Clark, 1966: 648; A.M. Clark, 1968: 283, fig. 2e; Clark & Rowe, 1971: 86–87, 107; Clark & Courtman-Stock, 1976: 102, 111, 145; Gibbs *et al.*, 1976: 127; Cherbonnier & Guille, 1978: 149, pl. 5, figs 1, 2, fig. 61: 11, 12; Sloan *et al.*, 1979: 103; Guille & Wolff, 1984: 6.

Ophiothrix (Placophiothrix) westwardi Devaney, 1974: 143–148, figs 8–14.

Macrophiothrix propinqua: A.M. Clark, 1980: 537; Guille & Vadon, 1985: 62; Hoggett, 1991: 1130–1133, fig. 28, 29; Sastry, 1991: 378, pl. 3, fig 18; Milne, 2012: 155.

Material/Records

RMCA MT2216, –27.5227°, 32.6919°, Sodwana Bay, depth

unknown, 10 April 1999, collected by Y. Samyn and E. Vanden Berghe, determined by Y. Samyn and M. Garcia. RMCA MT2261, –30.2637°, 30.8264°, Aliwal Shoal, depth 20 m, 14 August 1999, collected by Y. Samyn and E. Vanden Berghe, determined by Y. Samyn and M. Garcia. SAM A28123, SAM A28124, and SAM A28126, –27.5166°, 32.6833°, Sodwana Bay, depth 15 m, 24 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. SAM A28134, –27.5166°, 32.6833°, Sodwana Bay, depth 15 m, 25 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. EKZNSW SB_1_ME_2008, –27.5227°, 32.6919°, Sodwana Bay, depth 10–15 m, 12 September 1987, *Meiring Naude*, Natal Museum Dredging Programme, collected by D. Herbert, R. Broker and M. Mander, determined by J.M. Olbers. SAM A74051, –27.5396°, 32.6804°, Sodwana Bay, depth unknown, 15 October 2010, ACEP II, collected by R. Milne, determined by J.M. Olbers. SAM A74055, –27.5230°, 32.6920°, Sodwana Bay, depth 7.5 m, 15 October 2010, ACEP II, collected by R. Milne, determined by J.M. Olbers. SAM A74039, –26.9002°, 32.9180° SE of Kosi Bay, depth 50 m, 3 June 1990, *Meiring Naude*, station number ZA37, Natal Museum Dredging Programme, determined by J.M. Olbers. EKZNSW SX_10_2014, –26.9266°, 32.8866°, Saxon Reef, depth 9 m, 4 December 2014, collected by J.M. Olbers, determined by J.M. Olbers.

Diagnosis

(See Clark & Courtman-Stock 1976; Cherbonnier & Guille 1978)

D.D. up to 12 mm. Disc round, puffy, scales clearly visible, with or without armament. Radial shields large, more than half disc radius, naked, disc scales in single or multiple rows between radial shields, some with tubercles or spines. Ventral interradial areas with tubercles, but somewhat sharper than dorsal ones. Oral shields diamond-shaped, wider than long, adoral shields sometimes touching. Genital slits narrow, reaching margin of disc, genital papillae absent, genital plate conspicuous. Dorsal arm plates fan-shaped to elliptical, much wider than long, especially distally, with proximal edge short, distal edge slightly trilobed, broadly contiguous for more than one third of their breadth, some proximal-most plates contain point on distal end. Ventral arm plates square and slightly wider than long, most often with slight distal notch. Arm spines up to eight, finely serrated over total length or serrations at apex of spine, orientated proximally, glassy, longest two times longer than segment length, shortest on ventral side. Tentacle scale, one, large, oval. Colour in life: pink, purple with patterns on disc, arms banded every three to four segments. Radial shields reddish, sometimes with blue patches, distal edge outlined with white.

Global distribution

Tropical Indo-west Pacific, India, Aldabra, Comoros, Madagascar, Kenya, Mascarene Basin, Mauritius, Mozambique, Red Sea, Seychelles, Somalia, Tanzania, Western Indian Ocean (Rowe & Gates 1995; Richmond 2002), South Africa (Milne 2012).

Ecology

Depth range: 0–80 m.

Habitat: Associated with coral, coral slabs, in crevices.

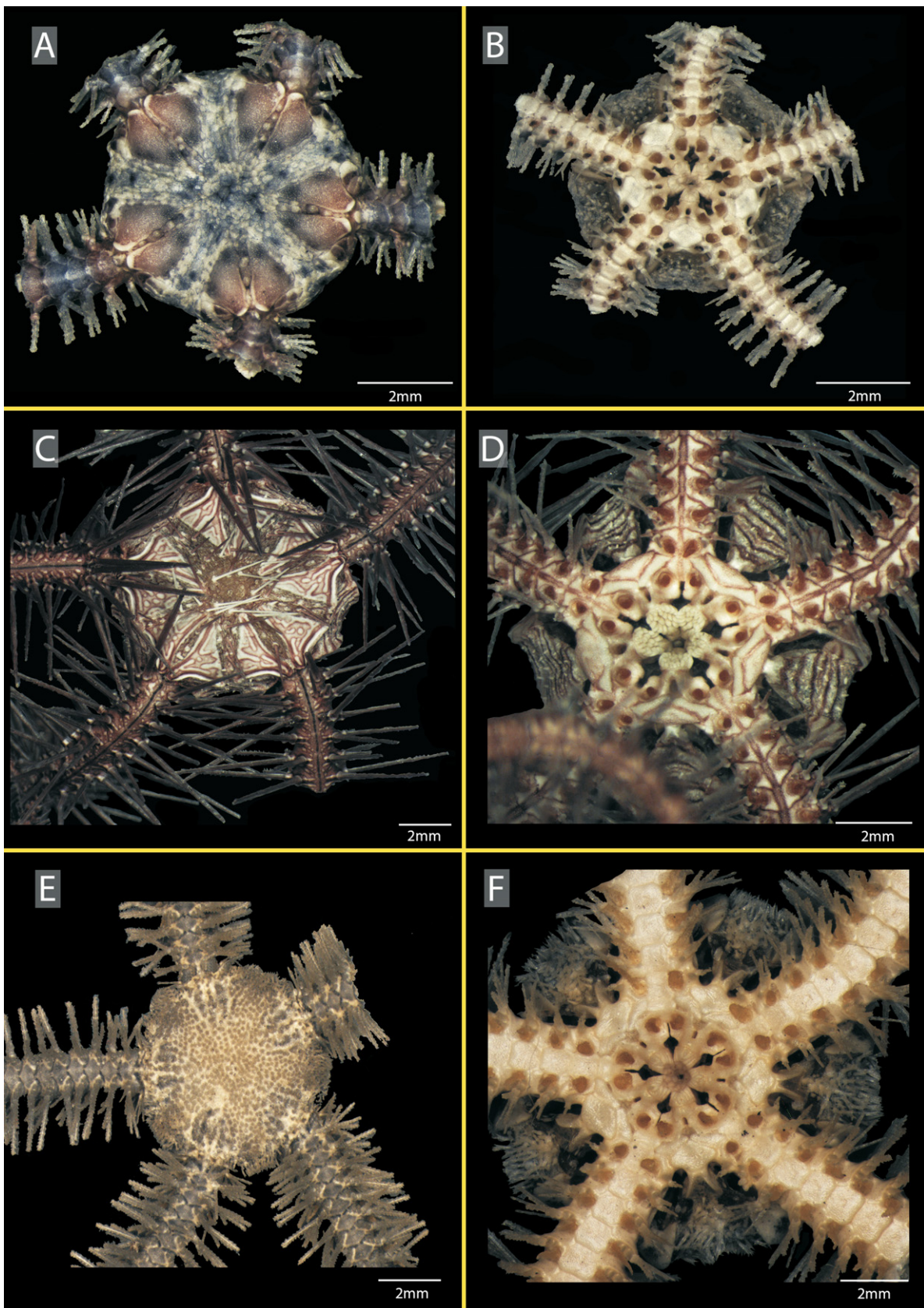


Plate 5. Dorsal (A) and ventral (B) views of *Macrophiothrix propinqua*, RMCA MT2216, -27.5227° , 32.6919° , Sodwana Bay, depth unknown, 10 April 1999. Dorsal (C) and ventral (D) views of *Ophiothrix (Acanthophiothrix) purpurea*, RMCA MT2185, -27.5227° , 32.6919° , Sodwana Bay, depth 12 m, 8 April 1999, SCUBA. Dorsal (E) and ventral (F) view of *Ophiothrix (Ophiothrix) echinotecta*, RMCA MT2257, -27.9335° , 32.8871° , Bhangana Nek, depth 20 m, 14 August 1999, SCUBA.

Remarks

In 1966, A.M. Clark designated *propinqua* to *Ophiothrix* (*Keystonea*), but in 1980, she transferred it to *Macrophiothrix* because of their similarities in arm and internal jaw structures. *M. propinqua* is easily recognized from other *Macrophiothrix* species due to its smaller size, radial shields always naked except for a few stumps near edges and arm spines that are shorter than in other *Macrophiothrix* species.

According to Rowe & Gates (1995), the type locality is Kiribati (as Kingsmill IIs) with the holotype held at the Museum of Comparative Zoology (MCZ 2399).

Ophiothrix (Acanthophiothrix) purpurea von Martens, 1867

Plate 5C, D

Ophiothrix purpurea von Martens, 1867: 346; Döderlein, 1896: 296, pl. 14, fig. 12, pl. 17, figs 23–23a; Koehler, 1905: 102; H.L. Clark, 1915: 277; Koehler, 1922a: 261, pl. 58, figs 3–4, pl. 101, fig. 6; Vine, 1986: 195.

Ophiothrix fallax de Loriol, 1893a: 47–48, pl. 25, fig. 2.

Ophiothrix lorioli Döderlein, 1896: 297, pl. 14, figs 13a, b, pl. 17, figs 24a, b.

Placophiothrix purpurea: H.L. Clark, 1939: 86–87; Clark & Spencer-Davis, 1966: 599.

Ophiothrix (Acanthophiothrix) purpurea: Clark & Rowe, 1971: 86–87, 112, figs 35d, 36, pl. 15, figs 4, 11; Devaney, 1974: 141–142; Cherbonnier & Guille, 1978: 148–149, pl. 5, figs 5–6, fig. 61: 5–6; Sloan *et al.*, 1979: 103; Rowe & Gates, 1995: 424–425; Humphreys, 1981: 23; Price & Rowe, 1996: 75; Puchakarn & Sonchaeng, 2004: 422; Guille & Vadon, 1985: 63.

Material/Records

RMCA MT2185, -27.5227° , 32.6919° , Sodwana Bay, depth 12 m, 8 April 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2211, -27.5227° , 32.6919° , Sodwana Bay, depth 16 m, 15 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2288, -27.5227° , 32.6919° , Bhanga Nek, depth 15 m, 10 September 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2289, -26.9335° , 32.8871° , Bhanga Nek, depth 29 m, 16 August 1999, SCUBA, collected by Y. Samyn, P. Timm and E. Vanden Berghe, determined by Y. Samyn and M. Garcia. RMCA MT2357, -27.5227° , 32.6919° , Sodwana Bay, depth unknown, 19 February 2003, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. SAM A28122, RW76-14_1, -27.5166° , 32.6833° , Sodwana Bay, depth 15 m, 24 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. EKZNW SB_2_ME_2008, -27.5333° , 32.6910° , Sodwana Bay, depth 13 m, 6 July 1987, SCUBA, collector G. Williams, determined by J.M. Olbers. Data Record Echinomap 445, -27.5265° , 32.6822° , Sodwana Bay, Bikini Reef, depth unknown, 10 May 2013, photographed and determined by C. Griffiths and G. Jones.

Diagnosis

(See Clark & Rowe 1971; Cherbonnier & Guille 1978)

D.D. up to 17 mm. Disc pentagonal, dorsally scaled with armament of scattered tubercles and spinelets (long

and short) interradially and between radial shields, smaller spinelets on disc margin. Disc ventrally with small spinelets. Radial shields triangular, naked, large, about two-thirds disc radius, more or less conspicuous dark purple stripe along proximal edge, central area more or less variegated whitish and purple, proximal edge concave. Oral shields elliptical, with sharp point on proximal side, much wider than long. Adoral shields contiguous. Genital slits almost to margin, with genital plate from about halfway. Dorsal arm plates hexagonal, distal side convex, as long as wide or longer, consecutive plates in contact for less than one-third of their widths. Ventral arm plates somewhat fan-shaped, distal side concave, proximal edge convex becoming straight, as long as or longer than wide. Arm spines up to seven, mostly five, glassy, upper spines smooth becoming serrated, up to five times segment length, lower spines shorter and more serrated, lowest arm spine often very short with hooks. Tentacle pores large. Tentacle scale one, small, pointed. Colour in life: dorsally reds, pinks and whites, some with striking lines, arms have thin dark longitudinal line along length of arm both dorsally and ventrally, dorsal arm plates with some lateral whitish patches.

Global distribution

Aldabra, Madagascar, Mascarene Basin, Red Sea, Seychelles, Tanzania, Western Indian Ocean, Australia (Rowe & Gates 1995; Stöhr *et al.* 2014), South Africa.

Ecology

Depth range: 5–508 m (Rowe & Gates 1995).

Habitat: Epizoic on *Millepora* spp., soft corals, gorgonians and crinoids (Sloan *et al.* 1979; Price & Rowe 1996).

Remarks

Specimens were consistent with descriptions given by Cherbonnier & Guille (1978) and Clark & Rowe (1971). Most distinctive feature of this species is the dark longitudinal lines on both dorsal and ventral arms. Type locality is Amboina, Indonesia (Rowe & Gates 1995).

Ophiothrix (Ophiothrix) echinotecta Balinsky, 1957

Plate 5E, F

Ophiothrix (Ophiothrix) echinotecta Balinsky, 1957: 16–17, fig. 6, pl. 3, figs 9–10; Kalk, 1958: 198; Macnae & Kalk, 1969: 99, 106, 129; Clark & Rowe, 1971: 84–85, 109; Clark & Courtman-Stock, 1976: 112, figs 112, 116, 101, 143; Tortonese 1980: 122; Humphreys, 1981: 23.

Ophiothrix echinoteta (Misspelling): Mbongwa, 2013: 16.

Material/Records

RMCA MT2257, -27.9335° , 32.8871° , Bhanga Nek, depth 20 m, 14 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by Y. Samyn and M. Garcia. SAM A28118, SAM A28125, SAM A28129, SAM A28131, SAM A28135, -27.5166° , 32.6833° , Sodwana Bay, depth 14–15 m, 23 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. SAM A28137, SAM A28138, SAM A28139, -27.2225° , 32.7966° , Island Rock, depth unknown, 28 July 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers. SAM A28141, -27.5166° , 32.6833° , Sodwana Bay, depth 14 m, 1 August 1976, SCUBA, J.L.B. Smith Institute, determined by J.M. Olbers.

SAM A28146, -29.5500° , 31.4167° , Ballito, depth 60–64 m, 7 June 1988, Dredge, *Meiring Naude*, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A28147, -27.5338° , 31.3188° , SE of Sheffield Beach, depth 50 m, 1 June 1990, Dredge, *Meiring Naude*, station number XX153, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A74049, -28.5167° , 32.4333° , off Cape St Lucia, depth 55 m, 12 June 1988, *Meiring Naude*, station number ZO6, dredge, Natal Museum Dredging Programme, determined by J.M. Olbers. Data Record Mbongwa, 2013, -29.9997° , 30.9450° , Isipingo, intertidal, 13 March 2013, collected by N.A. Mbongwa, determined by J.M. Olbers.

Diagnosis

(See Clark & Courtman-Stock 1976)

D.D. up to 8 mm. Disc round, covered with stumps with density on radial shields being slightly less, stumps bicuspid, tricuspid and multifid, stumps reaching ventral interradial areas. Radial shields length about half disc radius, some scattered short stumps, fewer than rest of disc. Oral shields diamond-shaped, twice as wide as long. Adoral shields narrow and contiguous. Genital slits reaching halfway up to margin with distinct genital plate adjacent to slit. Dorsal arm plates fan-shaped, single rugose, short stump on distal point on many plates, narrowly contiguous. Ventral arm plates slightly broader than long with straight or slightly concave distal edge. Arm spines up to ten, serrated for total length, glassy, the middle spine longest, approximately three times segment length, upper spines shorter with uppermost spine being short stumps, lowermost being transformed into a hook. Tentacle scale one, small, may bear one or two sharp points at tip. Colour in life: dorsal disc light and dark greens, greys and blues. Radial shields variegated white and green, slightly darker than remaining disc, dorsal arm plates sometimes with dark transverse line or chevron on distal side. Ventral side slightly lighter.

Global distribution

Madagascar, Kenya, Mozambique, Somalia, Tanzania (Balinsky 1957; Clark & Rowe 1971; Tortonese 1980; Humphreys 1981), South Africa (Mbongwa 2013).

Ecology

Depth range: 0–64 m.

Habitat: Found in rock hollows and under echinoids *Echinometra mathaei* and *Stomopneustes variolaris* (Balinsky 1957). May also be found on coarse sand, gravel, shell debris, stones and sponges.

Remarks

Probably the easiest South African *Ophiothrix* species to identify, due to a rugose stump present on many of the dorsal arm plates. Type locality is at Lighthouse Rocks, Inhaca Island, Mozambique. Type specimens are held at the Iziko South African Museum (holotype SAM A22355 and paratypes SAM A22356).

Ophiothrix (Ophiothrix) foveolata Marktanner-Turneretscher, 1887

Plate 6A, B

Ophiothrix foveolata Marktanner-Turneretscher, 1887: 313, pl. 13, figs 32, 33; Koehler, 1905: 76–77; H.L. Clark, 1915:

280; Koehler, 1922a: 238–239, pl. 47, figs 4–7, pl. 98, fig. 6; Koehler, 1930: 140; Clark & Spencer Davies, 1966: 599; A.M. Clark, 1966: 647; Clark & Rowe, 1971: 84, 85, 110, pl. 15, fig. 3; Day, 1974: 94; Putschakarn & Sonchaeng, 2004: 423; Mbongwa, 2013: 16.

Ophiothrix insidiosa Koehler, 1898: 92–93, pl. 4, figs 34–36. *Ophiothrix poecilodisca* H.L. Clark, 1915: 276, pl. 13, fig. 5; H.L. Clark, 1923: 341.

Placophiothrix foveolata: Balinsky, 1957: 20, pl. 4, fig. 15; Kalk, 1958: 207, 214; Macnae & Kalk, 1962: 111; Macnae & Kalk, 1969: 102, 106, 130.

Ophiothrix (Ophiothrix) foveolata: Day, 1969: 184; Clark & Courtman-Stock, 1976: 101, 112, 143–144, fig. 118.

Material/Records

RMCA MT2174, -27.4132° , 32.7268° , Sodwana Bay, 9-mile Reef, depth 18 m, 12 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by Y. Samyn and M. Garcia. EKZNW SB_1_JMO_2009, -27.5361° , 32.6851° , Sodwana Bay, depth 9 m, 8 December 2009, SCUBA, collected and determined by J.M. Olbers. SAM A28148, -30.0686° , 31.0508° Amanzimtoti, depth 300–305 m, 9 July 1985, dredge, *Meiring Naude*, station number XX66, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A74040, -26.8667° , 32.9168° NE of Kosi Bay, depth 51–53 m, 3 June 1990, dredge, *Meiring Naude*, station number ZA40, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A74044, -27.5188° , 32.7022° , off Sodwana Bay, depth 77 m, 2 June 1990, dredge, *Meiring Naude*, station number ZH18, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A74045, -27.5168° , 32.7166° , off Sodwana Bay, depth 70 m, 2 June 1990, dredge, *Meiring Naude*, station number ZH22, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A74046, -27.5502° , 32.7069° , SE of Sodwana Bay, depth 70 m, 2 June 1990, dredge, *Meiring Naude*, station number ZH23, Natal Museum Dredging Programme, determined by J.M. Olbers. SAM A74048, -27.7500° , 32.6502° , off Gypsea Hill, depth 110 m, 8 June 1988, dredge, *Meiring Naude*, station number ZK4, Natal Museum Dredging Programme.

Diagnosis

(See Clark & Courtman-Stock 1976)

D.D. up to 13 mm. Disc round, disc mostly naked covered in scales and some scattered small granules, though peripherally some scattered large trifold stumps, disc scales moderately large. Radial shields triangular, naked, more than two thirds disc radius, single row of scales between radial shields. Oral shields broad diamond-shaped, much wider than long. Adoral shields moderate in size, may or may not be contiguous. Genital slits halfway to disc margin, genital papillae absent, distinct genital plate. Dorsal arm plates fan-shaped, distal edge convex, consecutive plates in contact for less than half their width. Ventral arm plates square or rectangular, wider than long, distal edge concave, proximal edge slightly convex or straight. Arm spines up to eight, glassy, serrated, longest four to five times segment length, some spines with dark longitudinal bands and some with clavate tips. Tentacle scale one, small, tapering. Colour in life: ranging from orange, light brown

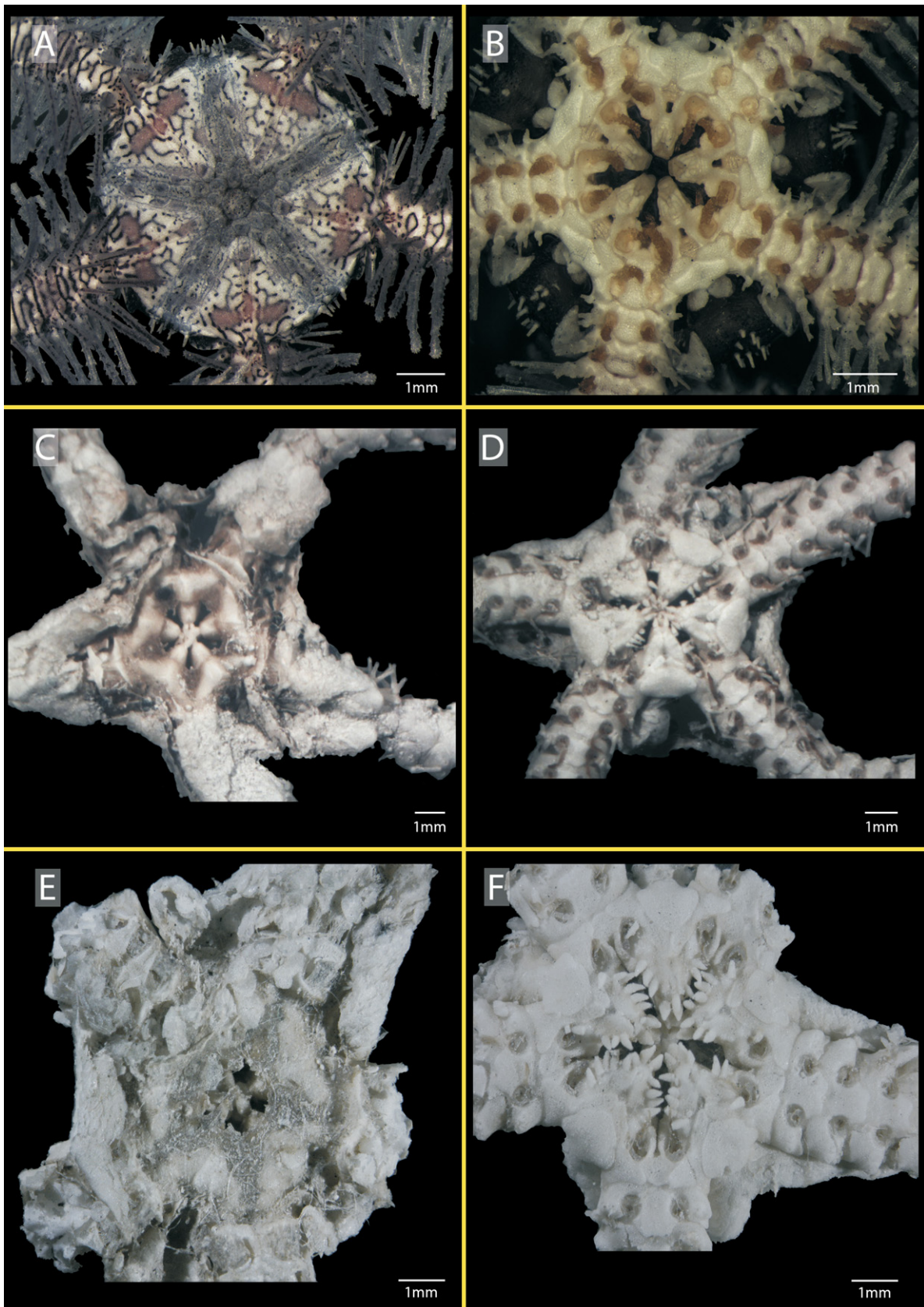


Plate 6. Dorsal (A) and ventral (B) views of *Ophiothrix* (*Ophiothrix*) *foveolata*, RMCA MT2174, -27.4132° ; 32.7268° , Sodwana Bay, 9-mile Reef, depth 18 m, 12 August 1999, SCUBA. Dorsal (C) and ventral (D) views of *Ophiotoma* cf. *alberti* SAM A22112, -33.8116° ; 16.5000° , off Saldanha Bay, depth 2730 m, 27 August 1959, trawl, *Africana II*, station number A193. Dorsal (E) and ventral (F) views of *Ophiotoma* cf. *gracilis*, SAM A22103, -34.6166° ; 17.0500° , off Cape Town, depth 2875–2948 m, 8 December 1959, trawl, *Africana II*, station number A315.

to violet, young specimens may be bright red, radial shields whitish, patterned with dark purple lines and pinkish patches, adradial edges of radial shields may have dark lines. Arms transversed with same striking dark lines as on disc.

Global distribution

Madagascar, Mozambique, Thailand (Cherbonnier & Guille 1978; Clark & Rowe 1971; A.M. Clark 1980; Putschakarn & Sonchaeng 2004; Stöhr *et al.* 2014), South Africa.

Ecology

Depth range: 9–305 m.

Habitat: Coral reefs, under dead coral blocks, rock crevices and in *Cymodocea* beds (Clark & Courtman-Stock 1976; Day 1969).

Remarks

Quite similar to *M. propinqua*, but radial shield size is a useful character to distinguish between species. According to Rowe & Gates (1995), the type locality is Aru Islands, Indonesia.

Family **OPHIACANTHIDAE** Ljungman, 1867

Ophiotoma cf. alberti (Koehler, 1896)

Plate 6C, D

Ophiotrema alberti Koehler, 1896: 251; Koehler, 1906: 6; Koehler, 1907: 324; Koehler, 1908a: 612; Koehler, 1909: 196–198; Matsumoto, 1915: 62; Koehler, 1922a: 90; Mortensen, 1927: 183; Gage *et al.*, 1983: 288; Paterson, 1985: 57–58, fig. 3; Smirnov *et al.*, 2014: 197.

Ophiotoma alberti: Madsen, 1951: 113; O'Hara & Stöhr, 2006: 75; Martynov, 2010: 18, 92, 97–103, 126, 131, figs 66A–E, fig. 67A, fig. 68, figs 6C, H, figs 13C, E, F, fig. 18L, fig. 28B.

Material/Records

SAM A22112, –33.8116°, 16.5000°, off Saldanha Bay, depth 2730 m, 27 August 1959, trawl, *Africana II*, station number A193, determined by A.M. Clark.

Diagnosis

(See Paterson 1985; Martynov 2010)

D.D. up to 17 mm. Disc with small scales, scattered spinelets also extending onto ventral interradial areas. Radial shields naked, sometimes visible, rounded pear-shaped. Oral papillae four or five, in continuous series with two scales in oral tentacle pores. Oral shield large, wider than long, nearly D-shape with rounded proximal edge and slight distal lobe. Adoral shields wing-like, proximal edge indented opposite second oral tentacle pore. Dorsal arm plates triangular to bell-shaped, twice as wide as long, nearly contiguous. Ventral arm plates rectangular with obtuse proximal angle and slight indent on distal edge, nearly contiguous on proximal arm. Arm spines four, glassy, smooth, slightly flattened, rounded tip, uppermost longest, up to two segments in length. Tentacle pores large. Tentacle scales needle-like or round, variable, small if not absent, number from zero to five.

Global distribution

Rockall Trough, Bay of Biscay, Azores, northeastern

Atlantic (Paterson 1985), South Africa (A.M. Clark, unpubl.).

Ecology

Depth range: 1862–4354 m (Smirnov *et al.* 2014).

Habitat: No information available.

Remarks

A single specimen is catalogued in the SAM collection, identified by A.M. Clark but for reasons unknown not included in the monograph by Clark & Courtman-Stock (1976). According to Paterson (1985), the type locality is North Atlantic Ocean and the type is held at the Natural History Museum in Paris (MNHN).

Ophiotoma cf. gracilis (Koehler, 1914)

Plate 6E, F

Ophiotrema gracilis Koehler, 1914: 112–114, pl. 12, figs 1,2; Paterson, 1985: 54, 58, fig. 23; Borrero-Pérez *et al.*, 2008: 181, fig. 71.

Ophiotoma gracilis: Martynov, 2010: 98, 103, 141.

Material/Records

SAM A22103, –34.6166°, 17.0500°, off Cape Town, depth 2875–2948 m, 8 December 1959, trawl, *Africana II*, station number A315, determined by A.M. Clark.

Diagnosis

(See Paterson 1985; Martynov 2010)

D.D. up to 11 mm. Disc with small scales, scattered spinelets also extending onto ventral interradial areas, but not up to oral shields. Radial shields naked, elongated triangular, rounded distal margin, separated but diverging. Oral papillae five, conical, in a continuous series with two scales in oral tentacle pores, which are more elongated, almost spiniform. Oral shield large, much wider than long, spear-head-shaped, with distinct distal lobe. Adoral shields elongated, contiguous. Genital slits narrow. Dorsal arm plates triangular, distal edge convex, almost as long as wide, not contiguous. Ventral arm plates pentagonal, proximal edge concave and obtuse, lateral edges excavated by tentacle pores, much longer than wide, not contiguous. Arms relatively slender. Arm spines four, fine, smooth, pointed, uppermost longest, up to 1.5 segments in length. Tentacle pores large. Tentacle scales subequal, five or six, spinose.

Global distribution

Lesser Antilles and Colombia (Borrero-Pérez *et al.* 2008), South Africa (A.M. Clark, unpubl.).

Ecology

Depth range: 490–2948 m (Borrero-Pérez *et al.* 2008; A.M. Clark, unpubl.).

Habitat: No information available.

Remarks

A single specimen is catalogued in the SAM collection and was identified by A.M. Clark (date unknown), but for unknown reasons not reported in the monograph by Clark & Courtman-Stock (1976). Prior to the study by Borrero-Pérez *et al.* (2008), the holotype was the only known specimen.

A number of differences occur between *Ophiotoma alberti* and *O. gracilis*. In *O. gracilis* the arms are more slender, arm spines finer, dorsal arm plates narrower, smaller and more widely separated, ventral arm plates longer, the oral tentacle pore scales are different in size and shape to the oral papillae and the oral shield is spearhead-shaped. The tentacle scales in *alberti* are smaller and while in *gracilis* they are spinose they are more obvious. On the specimen at hand (SAM A22103), the arm spines are missing.

According to Borrero-Pérez *et al.* (2008) the type locality is Lesser Antilles and is held at the Smithsonian Institution (USNM 32301) (Koehler 1914).

Family **OPHIODERMATIDAE** Ljungman, 1867

Ophiochaeta hirsuta Lütken, 1869

Plate 7A, B

Ophiochaeta hirsuta Lütken, 1869: 38, 71; H.L. Clark, 1915: 222; Clark & Rowe, 1971: 127, figs 44a, b; Gibbs *et al.*, 1976: 129; Sloan *et al.*, 1979: 115; Marsh *et al.*, 1993: 62; Rowe & Gates, 1995: 398; Price & Rowe, 1996: 78.

Ophiochaeta boschmai A.H. Clark, 1964: 388–340, fig. 2.

Material/Records

RMCA MT2307, -27.5227° , 32.6919° , Sodwana Bay, depth unknown, 10 August 1999, SCUBA, collected by Y. Samyn, determined by Y. Samyn and M. Garcia. RMCA MT2293, -26.9335° , 32.8871° , Bhangana Nek, depth 29 m, 14 August 1999, SCUBA, collected by Y. Samyn, P. Timm and E. Vanden Berghe, determined by Y. Samyn and M. Garcia. RMCA MT2290, RMCA MT2291, -27.5227° , 32.6919° , Sodwana Bay, depth 8–24 m, 8–10 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by Y. Samyn and M. Garcia.

Diagnosis

(See Clark & Rowe 1971; Sloan *et al.* 1979)

D.D. up to 7 mm. Disc pentagonal, completely covered in indented granules and long, thin spinelets both dorsally and ventrally, spinelets densest on ventral interradials close to oral shields. Oral shields and adoral shields may have granules, but few if present. Radial shields concealed by granulation and spinelets. Marginal plates covered by rounded and enlarged granules, disc spines dense on disc margin. Genital slits single, up to halfway to margin, genital papillae absent. Oral shields triangular, slightly longer than wide; no supplementary oral shields. Adoral shields large, triangular, not contiguous. Oral papillae five to six, pointed. Teeth three, lowermost bluntly pointed, second square and uppermost pointed. Dorsal arm plates triangular, distal edge straight, proximally narrowly contiguous, distally not contiguous. Ventral arm plates pentagonal, distal edge straight or somewhat convex. Arm spines up to 12, tapering, subequal, all shorter than one segment length. Tentacle scales oval, two proximally, but one along most of arm. Colour in life: grey to brown, mottled, arms banded with dark brown, light brown and white.

Global distribution

Indo-Malayan Region, Western Indian Ocean, Aldabra, Australia, South Pacific Islands, Red Sea (Richmond 2002; Rowe & Gates 1995; Clark & Rowe 1971), South Africa.

Ecology

Depth range: 0–26 m (Rowe & Gates 1995).

Habitat: Associated with *Porites* coral colonies or on sandy gravel in lagoonal sea grass beds (Sloan *et al.* 1979).

Remarks

All specimens from South Africa are housed in the RMCA and are consistent with descriptions given by Clark & Rowe (1971). Type locality is Fiji Islands (H.L. Clark 1915). Rowe & Gates (1995) suggested the material may be in the Natural History Museum of Denmark, but upon investigation, this was found not to be the case (Tom Schiøtte, pers. comm.).

Ophioconis cupida Koehler, 1905

Plate 7C, D

Ophioconis cupida Koehler, 1905: 15–16, pl. 1, figs 19, 20; Clark & Rowe, 1971: 88–89, 127; Cherbonnier & Guille, 1978: 222–223, pl. 16, figs 3, 4; Vine, 1986: 195; Rowe & Gates, 1995: 399.

Ophiurodon cupida: Matsumoto, 1915: 84; Matsumoto, 1917: 315.

Ophiurodon cupidum: Koehler, 1930: 278; H.L. Clark, 1939: 95–96; Murakami, 1943a: 213; H.L. Clark, 1946: 255.

Material/Records

SAM A74041, -26.8669° , 32.9167° , NE of Kosi Bay, depth 49 m, 3 June 1990, dredge, *Meiring Naude*, station number ZA41, Natal Museum Dredging Programme, determined by J.M. Olbers.

Diagnosis

(See Cherbonnier & Guille 1978)

D.D. up to 4 mm. Disc pentagonal, disc almost completely covered in granules both dorsally and ventrally. Radial shields concealed by granulation. Oral shields triangular, wider than long; supplementary oral shields present, but concealed by granulation. Adoral shields relatively large, triangular, not contiguous. Oral shields and adoral shields may have granules, but easily rubbed off. Oral papillae, five to six, pointed. Teeth three, lowermost wide, large, square, edges translucent. Genital slits single, almost up to disc margin, genital papillae absent. Dorsal arm plates fan-shaped with distal point, narrowly contiguous. Ventral arm plates pentagonal, distal edge pointed, narrowly contiguous. Arm spines up to eight, tapering, subequal, longest one slightly longer than segment length. Tentacle pores moderately large. Tentacle scales one, elongated oval, translucent. Colour grey or white with large brown patches on radial areas, arms banded with brown.

Global distribution

Australia, Bay of Bengal, Comoros, Red Sea, Madagascar, Philippines, China, Japan, Pacific Islands (Cherbonnier & Guille 1978; Rowe & Gates 1995), South Africa.

Ecology

Depth range: 10–600 m (Rowe & Gates 1995).

Habitat: Found amongst sand, kelp and stones.

Remarks

Easily recognizable within the family by the translucent

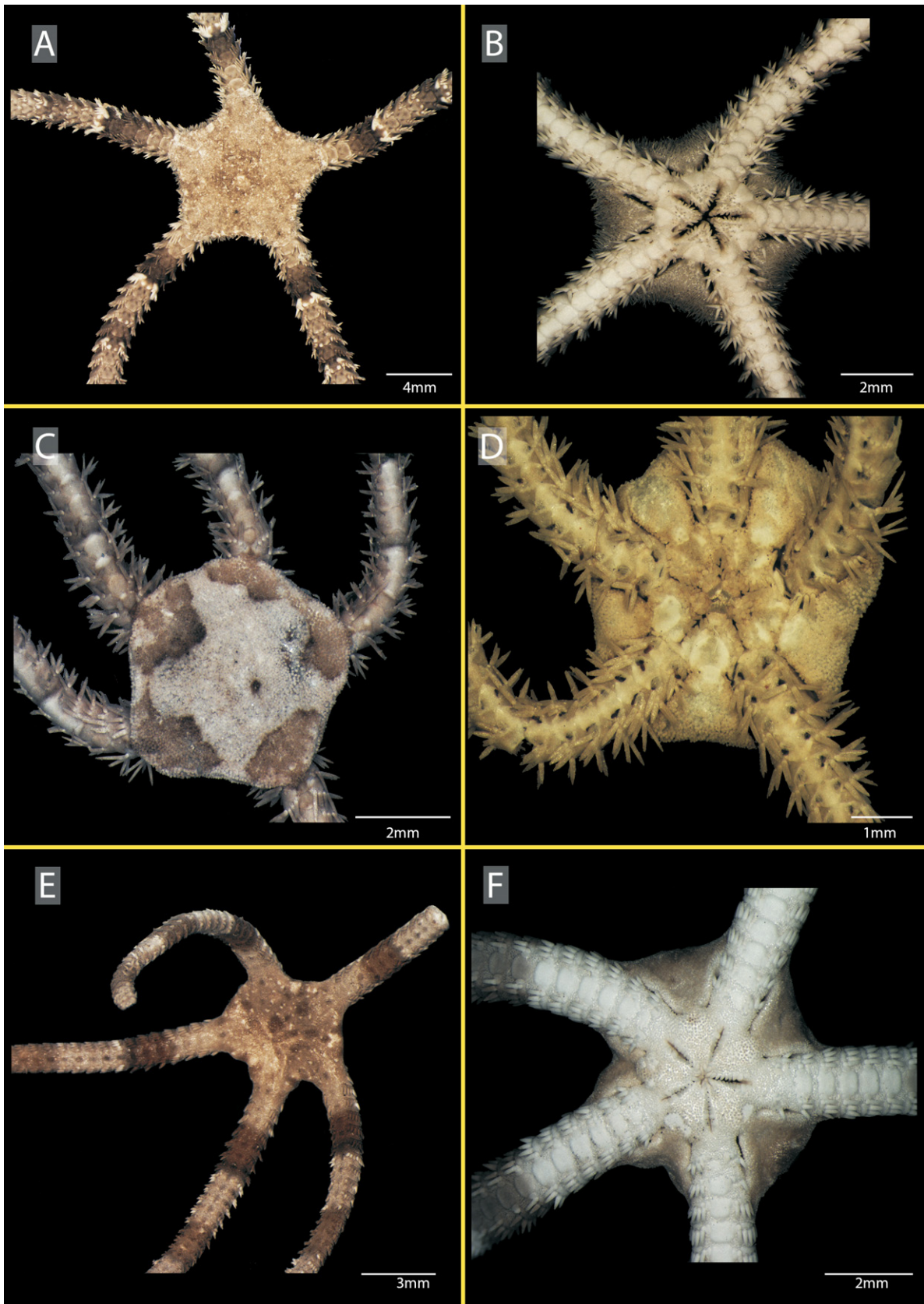


Plate 7. Dorsal (A) and ventral (B) view of *Ophiochaeta hirsuta*, RMCA MT2290, RMCA MT2291, -27.5227° , 32.6919° , Sodwana Bay, depth 8–24 m, 8–10 August 1999, SCUBA. Dorsal (C) and ventral (D) views of *Ophioconis cupida*, SAM A74041, -26.8669° , 32.9167° , NE of Kosi Bay, depth 49 m, 3 June 1990, dredge, *Meiring Naude*, station number ZA41, Natal Museum Dredging Programme. Dorsal (E) and ventral (F) views of *Ophiodyscrita acosmeta*, RMCA MT2183, -27.4472° , 32.7167° , Sodwana Bay, 7-mile Reef, depth 23 m, July 2000, SCUBA.

teeth and tentacle scales. According to Rowe & Gates (1995), the type locality is Moluccas and Sulu Archipelago (Indonesia) with the syntypes held at the Naturalis (ZMA.ECH.O 2004, ZMA.ECH.O 2005 and ZMA.ECH.O 2035 (Joke Bleeker, pers. comm.).

***Ophiodyscrita acosmeta* H.L. Clark, 1938**

Plate 7E, F

Ophiodyscrita acosmeta H.L. Clark, 1938: 356–357; H.L. Clark, 1946: 265; Clark & Rowe, 1971: 88–89, 128; Rowe & Gates, 1995: 399; Price & Rowe, 1996: 79; Lane *et al.*, 2000: 483; Marsh & Morrison, 2004: 295, 298, 302, 306, 312, 337. *Ophiocryptus pacificus* Murakami, 1943b: 188–189, fig. 10. *Ophiostegastus compsus* A.M. Clark, 1968: 317–321, fig. 10.

Material/Records

RMCA MT2183, -27.4472° , 32.7167° , Sodwana Bay, 7-mile Reef, depth 23 m, July 2000, SCUBA, collected by Y. Samyn and I. Tallon, determined by F.W.E. Rowe and J.M. Olbers. RMCA MT2184, -27.5227° , 32.6919° , Sodwana Bay, 2-mile Reef, depth 16 m, August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by F.W.E. Rowe and J.M. Olbers.

Diagnosis

(See H.L. Clark 1938)

D.D. up to 8 mm. Disc round to pentagonal, covered with small, slightly-indented granules completely covering dorsal and ventral side. Granules on oral shields, adorals, supplementary oral shields and dorsal, ventral and lateral arm plates. Radial shields also concealed, some granules slightly enlarged over marginal area. Oral shields ovate to spearhead-shaped, wider than long. Oral papillae, six to seven, flattened. Genital slit up to two-thirds to margin of disc. Arms slightly flattened. Dorsal arm plates D-shaped, twice as wide as long, with rounded distal edge, with two more-or-less conspicuous whitish patches on distal edge of each plate, covered with granules similar to those on disc. Ventral arm plates more or less rhombic, becoming bell-shaped with distal edges round, not contiguous distally. Lateral plates slightly projecting. Arm spines up to eight, appressed, short, less than half segment length. Tentacle scales, ovate, up to three basally, inner one largest, two becoming one toward distal segments of arm. Colour in life: dorsally brown and grey, ventrally lighter, dorsal disc patchy light and dark. Arms banded with darker bands of three to five segments.

Global distribution

Japan, China and Australia (Clark & Rowe 1971), South Africa.

Ecology

Depth range: 0–23 m.

Habitat: No detail recorded.

Remarks

Type locality is Broome, Western Australia with the holotype at the Museum of Comparative Zoology (MCZ 5294) (H.L. Clark 1938).

***Ophiopeza spinosa* (Ljungman, 1867)**

Plate 8A, B

Ophiarachna spinosum Ljungman, 1867: 305.

Ophiopeza dubiosa: A.M. Clark, 1968: 313.

Ophiopeza fallax: Lütken, 1869 (non Peters, 1851): 35.

Ophiopeza spinosa: Clark & Rowe, 1971: 90–91, 127, fig. 44e; Gibbs *et al.*, 1976: 130; Cherbonnier & Guille, 1978: 227–228, pl. 17, figs 3, 4; Tortonese, 1980: 129; Humphreys, 1981: 10; Vine, 1986: 195; Vail & Rowe, 1989: 273–275, fig. 3; Marsh *et al.*, 1993: 62; Rowe & Gates, 1995: 400–401; Mbongwa, 2013: 16.

Pectinura spinosa: Lyman, 1874: 221.

Ophiopezella dubiosa de Loriol, 1893a: 7, pl. 23, fig. 2; H.L. Clark, 1909: 120; H.L. Clark, 1915: 304.

Ophiopezella luetken de Loriol, 1893b: 392–394, pl. 13, fig. 1.

Ophiopezella spinosa: H.L. Clark, 1909: 120; H.L. Clark, 1915: 304; H.L. Clark, 1921: 141; Koehler, 1922a: 338–339; H.L. Clark, 1946: 258.

Distichophis clarki Ely, 1942: 46–48, fig. 12.

Material/Records

(See Cherbonnier & Guille 1978)

RMCA MT2181, RMCA MT2254, -27.5227° , 32.6919° , Sodwana Bay, 2-mile Reef, depth 8–24 m, 9–10 August 1999, SCUBA, collected by Y. Samyn and I. Tallon, determined by Y. Samyn. RMCA MT2284, RMCA MT2296, -26.9335° , 32.8871° , Bhanga Nek, depth 20 m, 14 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. SAM A28119, -27.5166° , 32.6833° , Sodwana Bay, depth 14 m, 23 July 1976, dredge, J.L.B. Smith Institute, determined by J.M. Olbers. EKZNW LS_1_ME_2008, -27.8736° , 32.6036° , Leadsman Shoal, depth 9–14 m, 14 August 1988, collected by D. Herbert, determined by J.M. Olbers. EKZNW SX_ME_2_2008, -26.9311° , 32.8905° , Saxon Reef, depth 13 m, 4 December 2008, collected and determined by J.M. Olbers.

Diagnosis

D.D. up to 11 mm. Disc pentagonal, covered with dense coat of small indented granules, closely packed up to oral shields, extending onto oral plates or jaws. Disc margin with series of plates in interradial areas. Radial shields concealed by granulation. Oral shields spearhead-shaped, supplementary oral shield not covered by granulation, adoral shields present, relatively large, not contiguous, not distinct, covered in granules. Oral papillae, six to seven, elliptical leaf-shaped, pointed but blunt. Teeth four. Genital slits reach halfway to disc margin, genital papillae absent. Dorsal arm plates broadly fan-shaped basally, wider than long, but rounded on distal edge, becoming more typical fan-shaped distally, not contiguous distally. Ventral arm plates bell- or fan-shaped, narrowly contiguous. Arm spines, up to 12, conical, short, half segment length, slightly longer basally, appressed. Tentacles scales two for most of arm length, inner one large, ovate, almost twice as long as outer one. Colour in life: disc grey to brown yellow, sometimes with patchy patterns, arms banded and marbled.

Global distribution

Somalia, Aldabra, Mascarene Basin, Western Indian Ocean, Kenya, Madagascar, Mozambique, Red Sea, Mauri-

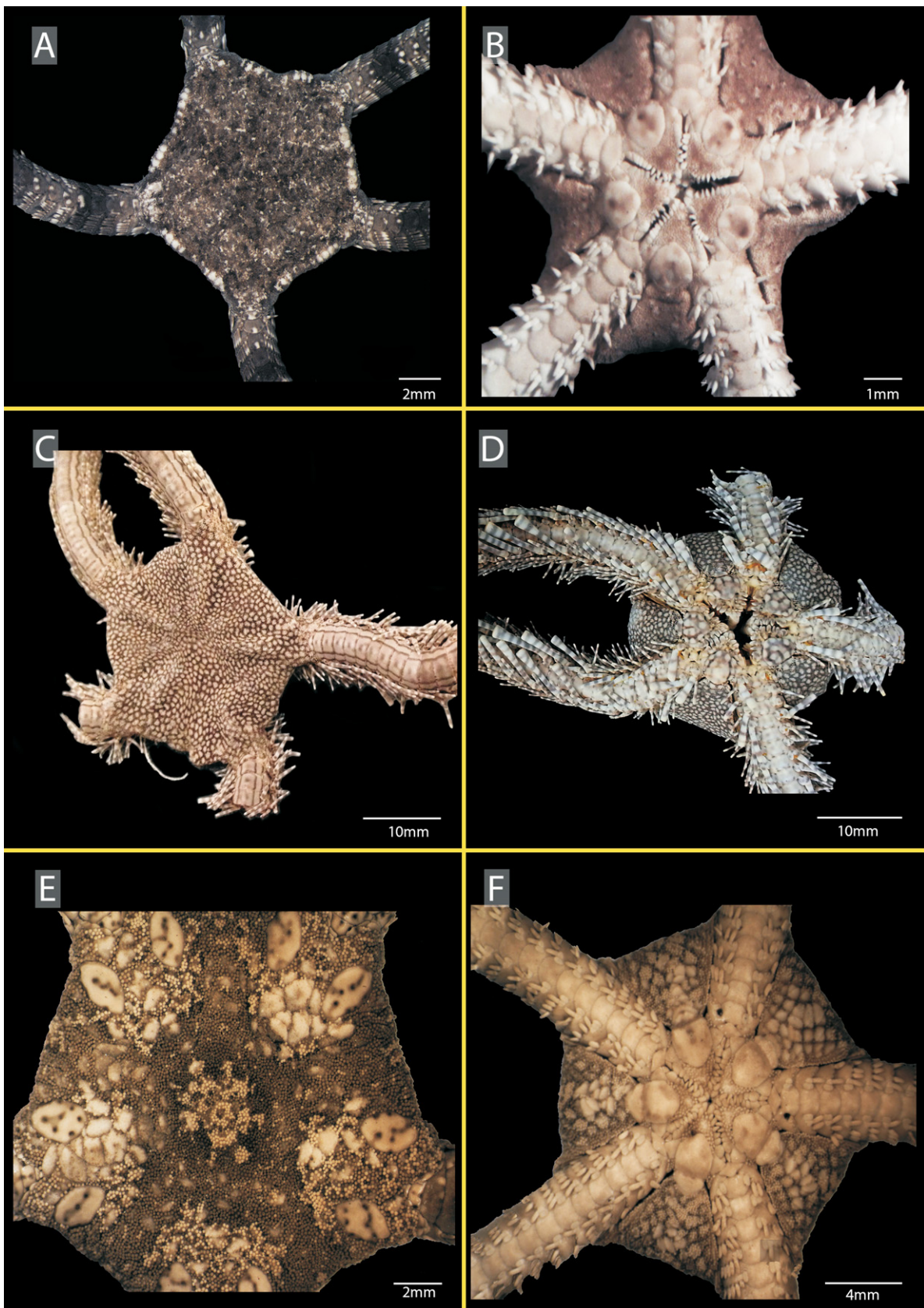


Plate 8. Dorsal (A) and ventral (B) views of *Ophiopeza spinosa*, RMCA MT2284, RMCA MT2296, -26.9335° ; 32.8871° , Bhanga Nek, depth 20 m, 14 August 1999, SCUBA. Dorsal (C) and ventral (D) views of *Ophiarachna affinis*, SAM A28132, -27.5166° ; 32.6833° , Sodwana Bay, depth 15 m, 23 July 1976, dredge, J.L.B. Smith Institute. Dorsal (E) and ventral (F) views of *Ophiarachnella gorgonia*, RMCA MT2144, -26.9335° ; 32.8871° , Bhanga Nek, depth 20 m, 14 August 1999, SCUBA. Photograph provided by D. Van den Spiegel.

tius, Seychelles, Tanzania, Hawaii, southeast Polynesia (Rowe & Gates 1995; Tortonese 1980), South Africa.

Ecology

Depth range: 0–74 m (Rowe & Gates 1995).

Habitat: Found under rocks and coral rubble (Stöhr *et al.* 2014), amongst mixed algae and on coral reefs.

Remarks

All specimens were consistent with descriptions given by Clark & Rowe (1971) and Cherbonnier & Guille (1978). According to Rowe & Gates (1995) the type locality is Foa Island, Tonga.

Ophiarachna affinis Lütken, 1869

Plate 8C, D

Ophiarachna affinis Lütken, 1869: 34, 98; de Loriol, 1893b: 411–413; H.L. Clark, 1909: 128; Koehler, 1904b: 76–77; H.L. Clark, 1915: 299, pl. 18, figs 1, 2; Koehler, 1922a: 333–335, pl. 4, fig. 1; Koehler, 1930: 271–272, pl. 14, fig. 1; Clark & Rowe, 1971: 88–89, 123, fig. 42a; Devaney, 1974: 175–176; Sloan *et al.*, 1979: 111, figs 17, 18; Rowe & Gates, 1995: 395.

Ophiarachna clavigera Brock, 1888: 495–497.

Material/Records

RMCA MT2344, –27.5367°, 32.6900°, Sodwana Bay, depth 31 m, 6 June 2003, SCUBA, collected by Y. Samyn, determined by Y. Samyn and M. Garcia. RMCA MT2140, –27.5227°, 32.6919°, Sodwana Bay, depth 15 m, 10 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. SAM A28121, SAM A28132, –27.5166°, 32.6833°, Sodwana Bay, depth 15 m, 23 July 1976, dredge, J.L.B. Smith Institute, determined by J.M. Olbers.

Diagnosis

(See H.L. Clark 1915; Devaney 1974)

D.D. up to 28 mm. Disc round, somewhat puffy, densely covered in round granules both dorsally and ventrally, granules extending onto oral plates. Radial shields not distinct. Oral shields naked, spearhead-shaped with marbled patterns, single supplementary plate, naked, half width of oral shield. Adoral shields small, not contiguous. Oral papillae five to six, shape varies, broad, elliptical leaf-shaped, middle papillae more slender than proximal and distal ones. Oral tentacle scales three, deep in mouth. Teeth five, lowest tooth square becoming pointed. Genital slits long and reach edge of disc margin, genital papillae absent, but disc granules up to edge of slit. Arm spines up to five, lowermost spine flattened and blunt, others flattened, but conical or tapering, twice segment length, basally lowermost arm spines may reach three to four times segment length. Dorsal arm plates rectangular, with slight distal concave notch on distal side, twice as wide as long proximally, becoming equal distally. Ventral arm plates, square to fan-shaped proximally, becoming longer than wide distally, distal edges slightly convex, plates have thin lighter margin along whole arm length. Tentacle scales, two, oval, outer one somewhat rectangular. Colour in life: disc brown and grey with widely-spaced spots both dorsally and ventrally, arms banded with broad dark and light brown bands of

four to nine segments, with four longitudinal dark lines down the length of arm. Arm spines annulated with grey and brown.

Global distribution

Indonesia, Aldabra, Australia, Fiji, Samoa, Mozambique, Seychelles, Red Sea in East Indies, Philippines and South Pacific Islands (Clark & Rowe 1971; Richmond 2002; H.L. Clark 1909; Rowe & Gates 1995), South Africa.

Ecology

Depth range: 0–31 m.

Habitat: Found under *Porites* colonies over sandy gravel, under boulders over sand and rubble and among coral rubble (Devaney 1974; Sloan *et al.* 1979).

Remarks

Apart from the different oral configuration, this species is similar in colouration to *Ophiocoma (Breviturma) doederleini* but distinguished by the presence of four longitudinal dark lines along arms.

According to Rowe & Gates (1995) the type locality is Fiji Islands, with the holotype held at the Natural History Museum of Denmark (ZMUC 470) (Tom Schiøtte, pers. comm.)

Ophiarachnella gorgonia (Müller & Troschel, 1842)

Plate 8E, F

Ophiarachna gorgonia Müller & Troschel, 1842:105.

Pectinura gorgonia: Lütken, 1869: 15; Lyman, 1882: 15; Koehler, 1898: 58, pl. 2, figs 1, 2.

Pectinura marmorata Lyman, 1874: 222, pl. 5, figs 1–7.

Pectinura venusta de Loriol, 1893a: 16–19, pl. 23, fig. 3.

Ophiarachnella marmorata: H.L. Clark, 1915: 305.

Ophiarachnella gorgonia: H.L. Clark, 1909: 123–124;

Matsumoto, 1917: 323–324, pl. 6, fig. 7; H.L. Clark, 1921: 141–142, pl. 12, fig. 5, pl. 35, figs 4, 5; Koehler, 1922a: 339–340; H.L. Clark, 1946: 260–261; A.M. Clark, 1965: 66;

Clark & Rowe, 1971: 88, 125, fig. 42b, pl. 20, fig. 2; Cherbonnier & Guille, 1978: 217–218, pl. 15, figs 5, 6; Sloan *et al.*, 1979: 111; Tortonese, 1980: 129; Humphreys, 1981: 10; Irimura, 1982: 66, 67, fig. 39, pl. 13, fig. 6; Guille &

Vadon, 1985: 64; Marsh *et al.*, 1993: 62; Rowe & Gates, 1995: 396; Putchakarn & Sonchaeng, 2004: 423.

Material/Records

RMCA MT2139, –27.5227°, 32.6919°, Sodwana Bay, depth 8–24 m, 10 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2256, RMCA MT2266, –30.2637°, 30.8264°, Aliwal Shoal, depth 14–18 m, 3 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2329, Sodwana Bay, depth unknown, 21 July 2000, SCUBA, collected by Y. Samyn and I. Tallon, determined by M. Garcia. RMCA MT2322, RMCA MT2327, –27.5227°, 32.6919°, Sodwana Bay, 2-mile Reef, depth unknown, 12–24 July 2000, SCUBA, collected by Y. Samyn and I. Tallon, determined by M. Garcia. RMCA MT2144, –26.9335°, 32.8871°, Bhanga Nek, depth 20 m, 14 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2328, –27.4472°, 32.7167°, Sodwana Bay, 7-mile Reef, depth unknown,

22 July 2000, SCUBA, collected by Y. Samyn and I. Tallon, determined by M. Garcia.

Diagnosis

(See Cherbonnier & Guille 1978)

D.D. up to 19 mm. Disc rounded with slight indentations on both sides at base of arms, covered in rounded granules dorsal and ventrally, peripheral granules slightly elongated. Radial shields naked, ovate, longer than wide, relatively small. Granules on ventral interradial areas closely packed up to oral shields and onto oral plates or jaws. Oral shields naked, pentagonal, large, supplementary oral shields distal to each oral shield, D-shaped, often equal to length of oral shield. Adoral shields small, not contiguous, triangular. Oral papillae oval and flattened, distalmost broadest. Teeth four to five, lowermost square, others pointed. Genital slits reach disc margin, genital papillae absent, but disc granulation to slit edge. Arms triangular in cross-section for more than half arm length. Arm spines up to 11, appressed to arm, tapering, approximately half segment length. Dorsal arm plates elliptical proximally, twice as wide as long, broadly in contact, becoming fan-shaped and narrowly in contact in distal parts. Distal edge on proximal most segments sometimes scalloped. Ventral arm plates hexagonal, distal edge convex, becoming flattened distally, wider than long proximally, but longer than wide distally. Tentacle scales two for most of the arm length, inner one oval and long, outer one rectangular and slightly pointed. Colour in life: disc green, brown and white with patches both dorsally and ventrally, radial shields may be mottled white, arms banded dark green and white, ventrally uniformly white, with white patches on interradial areas. Arm spines similar in coloration to arm segments.

Global distribution

China, Japan, Australia, East Indies, Philippines, South Pacific Islands, Ceylon, Bay of Bengal, Thailand, Somalia, Tanzania, Kenya, Madagascar, Mozambique, Mascarene Islands, islands of the Western Indian Ocean, Red Sea, Mauritius (Clark & Rowe 1971; Rowe & Gates 1995), South Africa.

Ecology

Depth range: 0–39 m.

Habitat: Under *Porites* colonies over gravel, beneath encrusting coral colonies, rubble and among algae (Humphreys 1981; Sloan *et al.* 1979).

Remarks

Some disc scales exposed, but may be a result of granules being rubbed off. All South African records held at the Royal Museum for Central Africa.

Hoareau *et al.* (2013) found three clades within *gorgonia*, two from the Western Indian Ocean. Based on the colour morphology, it is believed that this species is from Hoareau's lineage number two. However, sequencing the South African *O. gorgonia* specimens would be required to confirm this.

Ophiarachnella septemspinosa (Müller & Troschel, 1842)

Plate 9A, B

Ophiarachna septemspinosa Müller & Troschel, 1842: 105–106.

Pectinura septemspinosa Lütken, 1869: 15; Lyman, 1882: 17; de Loriol, 1893b: 395, pl. 13, fig. 2; Koehler, 1905: 9.

Pectinura rigida Lyman, 1874: 224.

Ophiarachna armata Troschel, 1879: 137–138.

Ophiarachnella septemspinosa: H.L. Clark, 1909: 126; Koehler, 1930: 273; H.L. Clark, 1938: 349–350; 1946: 263–264; Cherbonnier & Guille, 1978: 218–219, pl. 16, figs 1, 2; Humphreys, 1981: 10; Guille & Vadon, 1985: 64; Marsh *et al.*, 1993: 62; Gates & Rowe, 1995: 397; Mbongwa, 2013: 16.

Material/Records

RMCA MT2137, RMCA MT2143, RMCA MT2138, RMCA MT2334, –27.5367°, 32.6900°, Sodwana Bay, depth 8–30 m, 10–15 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia and Y. Samyn. RMCA MT2295, RMCA MT2245, RMCA MT2244, –30.2637°, 30.8264°, Aliwal Shoal, depth 15–44 m, 5–13 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia and Y. Samyn. RMCA MT2141, –26.9335°, 32.8871°, Bhanga Nek, depth 16 m, 15 August 1999, SCUBA, collected by Y. Samyn and E. Vanden Berghe, determined by M. Garcia. RMCA MT2350, –27.5367°, 32.6900°, Sodwana Bay, depth 31 m, 7 November 2003, SCUBA, collected by Y. Samyn, determined by Y. Samyn and J.M. Olbers. RMCA MT2348, –30.8332°, 30.4343°, Protea Banks, depth 38 m, 13 November 2003, SCUBA, collected by Y. Samyn, determined by Y. Samyn and J.M. Olbers. EKZNW LSS_4_EKZNW, –27.8667°, 32.6000°, Leadsman Shoal, depth 11 m, 13 October 2010, SCUBA, collected by J. Wood and J. Dives, determined by J.M. Olbers. EKZNW AS_1_JMO_2008, –30.2669°, 30.8001°, Aliwal Shoal, depth 17 m, 14 June 2008, SCUBA, collected by J. Wood and J. Dives, determined by J.M. Olbers.

Diagnosis

(See Cherbonnier & Guille 1978)

D.D. up to 38 mm. Disc round, flat, densely covered in granules both dorsally and ventrally, extending onto jaws. Radial shields naked, contrasting in colour with disc, small, circular. Oral papillae three to four, elliptical, slightly pointed. Teeth broad, but not square. Oral shields naked, oval but truncated distally by large supplementary oral shield, as wide as oral shield, some specimens have marbled oral shields. Adoral shields small, not contiguous. Genital slits long and reaching edge of disc margin, genital plate distinct and slightly higher than interradial area. Dorsal arm plates elliptical rectangular, more than twice as long as wide, rounded lateral angles, proximal edges straight, distal margins may be scalloped. Ventral arm plates hexagonal, convex distally, somewhat concave proximally, wider than long, becoming longer toward distal end of arm, tentacle pore indenting lateral edges. Arm spines up to nine, conical or tapering, same length as segment with exception of lowermost arm spine which is twice as long as segment, cigar-shaped, flattened and tip square. Tentacle scales two, oval, outer one somewhat broader than inner, becoming one distally. Colour in life: uniformly grey, red, yellow or greenish, ventrally lighter, arms banded.

Global distribution

Aldabra, Mascarene Basin, Western Indian Ocean, Kenya,

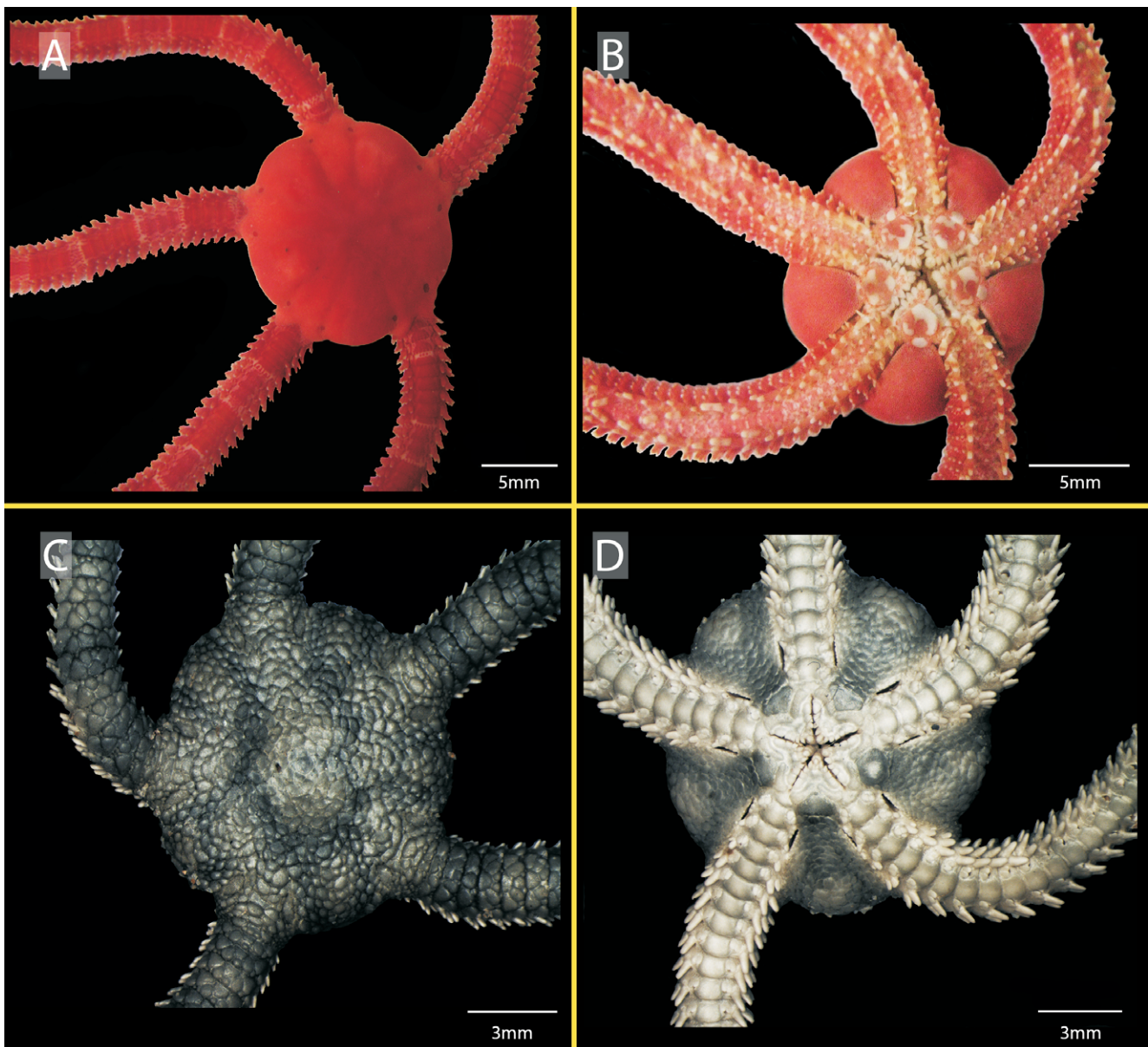


Plate 9. Dorsal (A) and ventral (B) views of *Ophiarachnella septemspinosa*, EKZNW LSS_4_EKZNW, -27.8667° , 32.6000° , Leadsman Shoal, depth 11 m, 13 October 2010, SCUBA. Dorsal (C) and ventral (D) views of *Ophioplocus imbricatus*, RMCA MT2306, -27.6180° , 32.6880° , Sodwana Bay, depth 10 m, July 2000, SCUBA, photograph provided by D. Van den Spiegel.

Madagascar, Mozambique, Red Sea, Mauritius, Seychelles, Tanzania, China and South Japan, Australia, East Indies, Philippine Islands, Maldives (Rowe & Gates 1995; Clark & Rowe 1971; Cherbonnier & Guille 1978; Richmond 2002), South Africa (Mbongwa 2013).

Ecology

Depth range: 0–55 m.

Habitat: Found under boulders over sand, under coral (*Millepora* spp.) colonies, in sand channels and rubble areas of reef flats (Humphreys 1981; Sloan *et al.* 1979).

Remarks

Easily recognizable by the small radial shields and striking colours. The South African specimens are 'very red' in comparison to the Australian red specimens and may

represent a cryptic species complex (Tim O'Hara, pers. comm.).

According to Rowe & Gates (1995) the type locality is the Moluccas, Indonesia. Type material is housed in the Naturalis (ZMA.ECH.O 7084 and RMNH.ECH. 3566, Joke Bleeker, pers. comm.).

Family **OPHIOLEPIDIDAE** Ljungman, 1867

Ophioplocus imbricatus (Müller & Troschel, 1842)

Plate 9C, D

Ophioplocus imbricatus Müller & Troschel, 1842: 93–94.

Ophioplocus tessellatus Lyman, 1862: 76–77.

Ophioplocus imbricatus: Lyman, 1865: 69–70; Lyman, 1882: 20, pl. 35, figs 10–12; Studer, 1882: 7; de Loriol, 1893a: 12–13; Bell, 1898: 849; Bell, 1909: 11; Koehler, 1922a:

435–436; Koehler, 1922b: 48, pl. 84, fig. 12; Clark, H.L. 1915: 344; Clark, 1921: 143, pl. 12, fig. 8, pl. 35, figs 1–3; Clark, 1938: 365–366; Clark, 1946: 275–276; Clark & Rowe, 1971: 90–91, 128; Cherbonnier & Guille, 1978: 239–242, fig. 77a–f; Humphreys, 1981: 11; Guille & Vadon, 1985: 64; Rowe, 1989: 287; Putchakarn & Sonchaeng, 2004: 423; Stöhret *et al.*, 2008: 547, 553.

Ophioplocus imbricata: Rowe & Gates, 1995: 435.

Material/Records

RMCA MT2306, –27.6180°, 32.6880°, Sodwana Bay, depth 10 m, July 2000, SCUBA, collected by Y. Samyn and I. Tallon.

Diagnosis

(See Clark & Rowe 1971; Cherbonnier & Guille 1978)

D.D. up to 11 mm. Disc round, disc scales slightly imbricated and distinct, with central plate present, scales naked. Radial shields small, elongated oval, widely separated, naked. Genital slits small, short, quarter length of interradiar area, genital papillae present. Oral shields triangular, moderately large, much wider than long, rounded angles, widest distally. Adoral shields relatively wide, may be contiguous or slightly separated. Jaws slightly sunken, four to five oral papillae, distalmost being broadest, remaining papillae elliptical leaf-shaped, apical papillae bluntly pointed. Teeth four, rounded. Oral tentacle scale inside oral slit. No arm combs. Dorsal arm plates fragmented along entire length of arm, with lateral arm plates becoming more prominent distally. Ventral arm plates slightly wider than long, rectangular and contiguous, becoming triangular and non-contiguous distally, distal edge rounded throughout. Arm spines three, stout, thick, conical, mostly appressed to arms, no longer than one segment length, becoming shorter distally, occasionally lowermost longest. Tentacle scales, two, ovate or similar to spines in shape, rarely three. Colour in life: dark green or grey with irregular patterns and patches on dorsal disc conforming to interradiar areas, arms banded, ventrally brown but pale.

Global distribution

Somalia, Aldabra, Mascarene Basin, Kenya, Madagascar, Mozambique, New Zealand, Red Sea, Mauritius, Seychelles, Tanzania, Australia, Réunion, Andaman Sea (Putchakarn & Sonchaeng, 2004; Stöhr *et al.*, 2008; Rowe & Gates, 1995; Stöhr *et al.*, 2014), South Africa.

Ecology

Depth range: 0–197 m (Koehler 1922a).

Habitat: Found with grey sand and mud (Koehler 1922a), angiosperm beds, bases of coral or patch reefs (Humphreys 1981).

Remarks

Both Müller & Troschel (1842) and Rowe & Gates (1995) reported the type localities as Mauritius and Timor (Indonesia) which is surprising, as these locations are extremely far apart. A broken non-type specimen was located at the Naturalis which was recorded from Indonesia (Joke Bleeker, pers. comm.).

H.L. Clark (1938) reported examining a number of specimens with colours ranging from grey to those with the dorsal

disc tinted with orange and orange or red-orange ventrally, particularly near the oral shields, while others were light brown dorsally and orange-red ventrally.

DISCUSSION

Although no species new to science were found during this study, 24 species new to South Africa are documented. This represents more than a 15% addition to the ophiuroid fauna of the region, representing a significant addition to the fauna.

The large number of records from the east coast suggests under-sampling, compared to the south and west coasts, which have historically been more thoroughly sampled (Griffiths *et al.* 2010). Deep-water sampling is also required, especially on the east coast, and abyssal sampling is virtually non-existent in the whole region (Griffiths *et al.* 2010). Of the 145 new data records, 137 were from KwaZulu-Natal, four from the Western Cape, four from the Eastern Cape and no records from the Northern Cape.

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ABBREVIATIONS

A.L.	Arm length.
AM	Australian Museum, Sydney, Australia.
BMNH	Natural History Museum, London, United Kingdom.
D.D.	Disc diameter.
EKZNV	Ezemvelo KZN Wildlife, South Africa.
GMNH	Muséum d'Histoire Naturelle (Natural History Museum), Genève, Switzerland.
KZN	KwaZulu-Natal.
MCZ	Museum of Comparative Zoology, Harvard University, Massachusetts, U.S.A.

MNHN	Muséum national d'Histoire Naturelle (Natural History Museum, Paris, France).
Naturalis	Naturalis Biodiversity Centre, Leiden, Netherlands (incorporating ZMA Zoologisch Museum Amsterdam (ZMA) and Rijksmuseum van Natuurlijke Historie (RMNH)).
NMV	Museum Victoria, Australia.
RMCA	Royal Museum for Central Africa, Tervuren, Belgium.
SAM	Iziko South African Museum, Cape Town, South Africa.
UCT	University of Cape Town, South Africa.
UKZN	University of KwaZulu-Natal, South Africa.
USNM	Smithsonian Institution, National Museum of Natural History, Washington, D.C., U.S.A.
ZMB	Museum für Naturkunde an der Universität Humboldt zu Berlin, Berlin, Germany.
ZMUC	Natural History Museum of Denmark, Copenhagen, Denmark.

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