Ophiomyxa tenuispina Mortensen, 1933

Ophiomyxa tenuispina Mortensen, 1933a: 304-306, fig. 30, pl. 19, fig. 27; Clark & Courtman-Stock 1976: 134, 111, figs 99, 100, 101.

Diagnosis – Adapted from Mortensen (1933a) and Clark & Courtman-Stock (1976). D.D. up to 11mm. Disc pentagonal, covered with thick, smooth, naked skin; disc margin with row of marginal plates. Radial shields just shorter than arm base width, narrow, cigar-shaped. Oral shields oval to diamond-shaped. Adoral shields contiguous. Oral papillae 3-4, broad, serrated, flattened and transparent on edges. Teeth similar. Arms simple, five, covered in thick skin. Arm spines 4-5 (not alternating) on free segments, slender, serrated and rugose at tip. One arm spine on first segment, then two on segments two and three, increasing to five on free segments. Dorsal arm plates wider than long, fragmented with two adjacent plates. Ventral arm plates wider than long, with deep distal notch. Genital slits two-thirds interradial length. Tentacle scales absent. Colour greenish, arms banded.

Fig. 144. Distribution of *Ophiomyxa tenuispina* in South Africa.

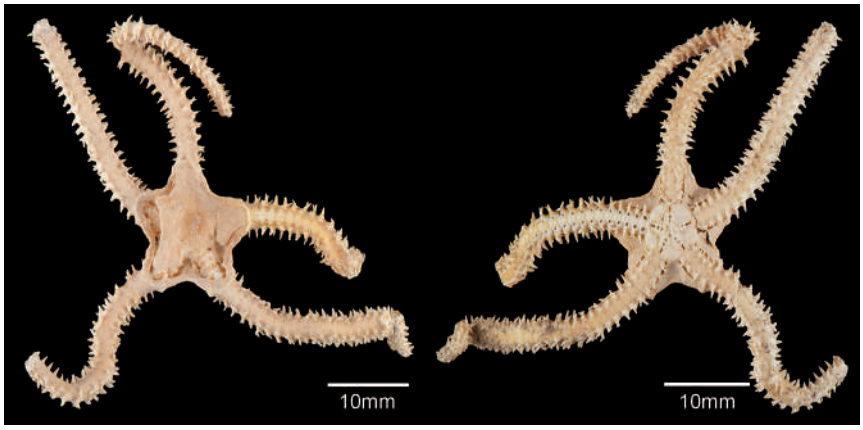

Fig. 145. Dorsal (left) and ventral (right) views of *Ophiomyxa tenuispina* (ZMUC OPH-288).

Distribution and habitat – South Africa: off Haga Haga (EC) to Dog Point (KZN); depth range: 74-260 m. Habitat: rock, sandstone rubble, gorgonians, stones, sponges.

Remarks – Endemic to South Africa. *O. tenuispina* and *O. australis* are the only South African species that have fragmented dorsal arm plates. The holotype is in the Natural History Museum of Denmark (ZMUC OPH-288), type locality is north east of East London, depth 174 m.

Ophiomyxa vivipara capensis Mortensen, 1936

Ophiomyxa vivipara Studer, 1876: 462; Lyman 1882: 246; Clark 1915a: 170, pl. 2, figs 1, 2; Clark 1923: 313; Mortensen 1933a: 301-404, figs 27-29.
Ophiomyxa vivipara capensis Mortensen, 1936: 242; Clark A.M. 1952: 199; Clark & Courtman-Stock 1976: 134, 101, 111, figs 101, 102; Alva & Vadon 1989: 828-829, 832.

Diagnosis – Adapted from Mortensen (1936) and Clark & Courtman-Stock (1976). D.D. up to 23 mm, disc pentagonal. Disc covered with thick, opaque, smooth skin. Radial shields short, narrow, just shorter than arm base width. Oral shields oval with broad distal lobe, longer than wide, abutting the genital slit. Adoral shields not contiguous, narrow. Oral papillae 3-4, broad, serrated, flattened with transparent edges. Teeth similar, 4-5. Arms simple, five, covered in thick naked skin. Tentacle oral scales two, sharp, deep in mouth. Arm spines slender, serrated and rugose at tip, up to four on free segments. One spine on segments 1-5. Dorsal arm plates delicate, whole, with small pits visible, wider than long proximally, then equally wide as long, with distal notch. Ventral arm plates equally wide as long or slightly longer, distally notched and proximal edge straight. Genital slits bordered by long, narrow plates, approximately two-thirds of interradial areas length. Tentacle pores large, tentacle scales absent.

Distribution and habitat – South Africa: off Orange River (NC) to East London (EC); depth range: 101-450 m. Habitat: sand, mud, rock, coral, clay and rough bottom.

Remarks – Endemic to South Africa. According to Mortensen (1936), the only difference between *O. vivipara* (the Magellanic form) and *O. vivipara* var*. capensis* is that the variety has one spine up to the fifth or sixth segment, while the Megellanic form has two spines from the third or fourth segment. Clark & Courtman-Stock (1976) disputed that this could be used as a difference, but did agree that there was a zoogeographical subspecific difference and retained it as the subspecies *O. vivipara capensis*. A number of specimens within Iziko South African Museum were labelled as *O. vivipara*, these were examined and changed to *O. vivipara capensis* based on the arm spine arrangement described above. Genetically, they are difficult to distinguish (O'Hara *et al.* 2014).

The dorsal arm plates on the ophiomyxids should be carefully examined, as they can break easily, making the plates appear to be fragmented. Mortensen (1924) stated that the dorsal arm plate configuration in *O. vivipara* is a single plate which

is thin, delicate and fenestrated, whereas in *O. australis* and *O. tenuispina*, the dorsal arm plates are fragmented.

Type material of *O. vivipara* is in the Museum of Natural History of Berlin (syntype ZMB Ech 2193) and the type locality is Argentina, depth unknown.

Fig. 146. Distribution of *Ophiomyxa vivipara capensis* in South Africa.

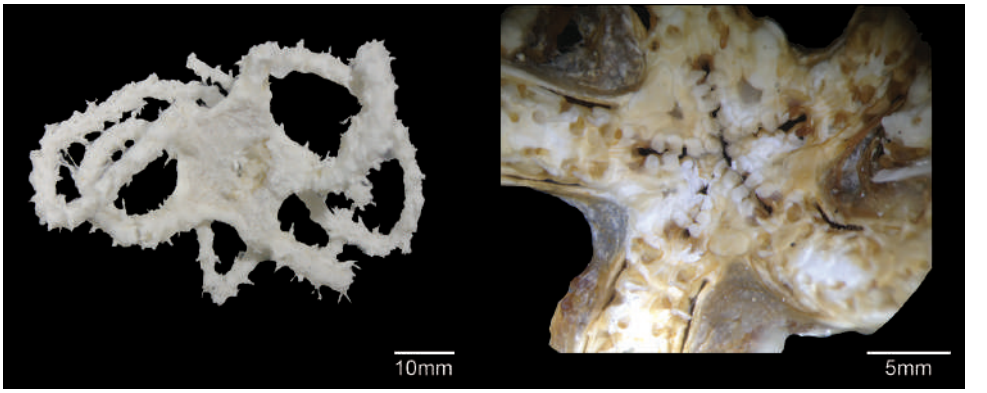

Fig. 147. Dorsal (left) and ventral (right) views of *Ophiomyxa vivipara capensis* (SAMC A082574).

Genus ***Ophioconis*** Lütken, 1869

Diagnosis – Adapted from Lütken (1869), Lyman (1882) and Cherbonnier & Guille (1978). Disc covered in closely-packed granules. Oral papillae numerous, up to 14. Supplementary oral shields present. Teeth few, large, blunt with translucent edges. Genital slits two per interradius. Arm spines up to nine.

Ophioconis cupida Koehler, 1905

Ophioconis cupida Koehler, 1905a: 15-16, pl. 1, figs 19, 20; Clark & Rowe 1971: 88-89, 127; Cherbonnier & Guille 1978: 222-223, pl. 16, figs 3, 4; Marsh 1986: 72; Vine 1986: 195; Rowe & Gates 1995: 399; Olbers *et al.* 2015: 105, 107, pl. 7C, D.

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

Ophiurodon cupidum: Koehler 1930: 278; Clark H.L. 1939: 95-96; Murakami 1943b: 213; Clark 1946: 255.

Diagnosis – Adapted from 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 5-6, 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.

Distribution and habitat – Madagascar, Comoros, Red Sea, Bay of Bengal, China, Japan, Philippines, Australia and Pacific Islands (Cherbonnier & Guille 1978; Rowe & Gates 1995), South Africa: Kosi Bay (KZN); depth range: 10-600 m. Habitat: found among algae, sand and stones.

Remarks – Olbers *et al.* (2015) noted this species as a new record for South Africa. Easily recognisable within the family by the translucent teeth and tentacle scales. See Olbers *et al.* (2015) for additional remarks. Type material is in Naturalis (ZMA. ECH.O 2004, ZMA.ECH.O 2005 and ZMA.ECH.O 2035) (Joke Bleeker, pers. comm.).

Fig. 148. Distribution of *Ophioconis cupida* in South Africa.

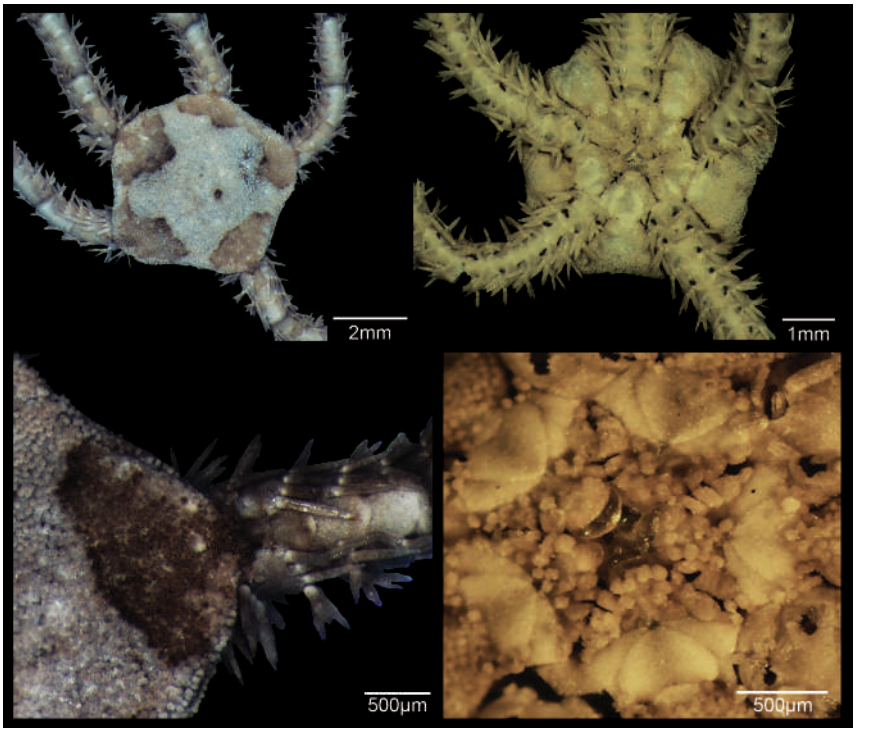

Fig. 149. Dorsal (top left), ventral (top right), dorsal disc and basal arms (bottom left), jaws (bottom right) views of *Ophioconis cupida* (SAMC A74041).

Genus ***Ophiarachna*** Müller & Troschel, 1842

Diagnosis – Adapted from Müller & Troschel (1842) and Lyman (1882). Disc granulated, including radial shields. Supplementary oral shields present. Oral papillae numerous and close-set. Teeth in vertical series. Genital slits two per interradius. Arm spines usually long, erect, typically 4-6, smooth. Tentacle scales 1-2.

Ophiarachna affinis Lütken, 1869

Ophiarachna affinis Lütken, 1869: 34, 98; de Loriol 1893b: 411-413; Koehler 1904b: 76-77; Clark 1909: 128; Clark 1915b: 299, pl. 18, figs 1, 2; Koehler 1922b: 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; Marsh 1986: 71; Rowe & Gates 1995: 395; Olbers *et al.* 2015: 109, pl. 8C, D.
Ophiarachna clavigera Brock, 1888: 495-497.

Diagnosis – Adapted from 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 oral shield, naked, half width of oral shield. Adoral shields small, not contiguous. Oral papillae 5-6, shape varies, broad, thin, 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, reaching 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 3-4 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-coloured 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 4-9 segments, with four longitudinal dark lines down length of arm. Arm spines annulated with grey and brown.

Distribution and habitat – Mozambique, Aldabra, Seychelles, Red Sea in East Indies, Philippines, Indonesia, Australia, Fiji, Samoa, South Pacific Islands (Clark 1909; Clark & Rowe 1971; Rowe & Gates 1995; Richmond 2002), South Africa: Sodwana Bay (KZN); depth range: 0-31 m. Habitat: under *Porites* colonies over sandy gravel, under boulders over sand and rubble and among coral rubble.

Remarks – Apart from the different oral configuration, this species is similar in colouration to *Breviturma doederleini***,** but distinguished by the presence of four longitudinal dark lines along arms as well as the elongated ventral arm spines.

Olbers *et al.* (2015) noted this species as a new record for South Africa.

Type material is in the Museum of Natural History of Hamburg (ZMH E4073) and the type locality is Fiji, depth unknown.

Fig. 150. Distribution of *Ophiarachna affinis* in South Africa.

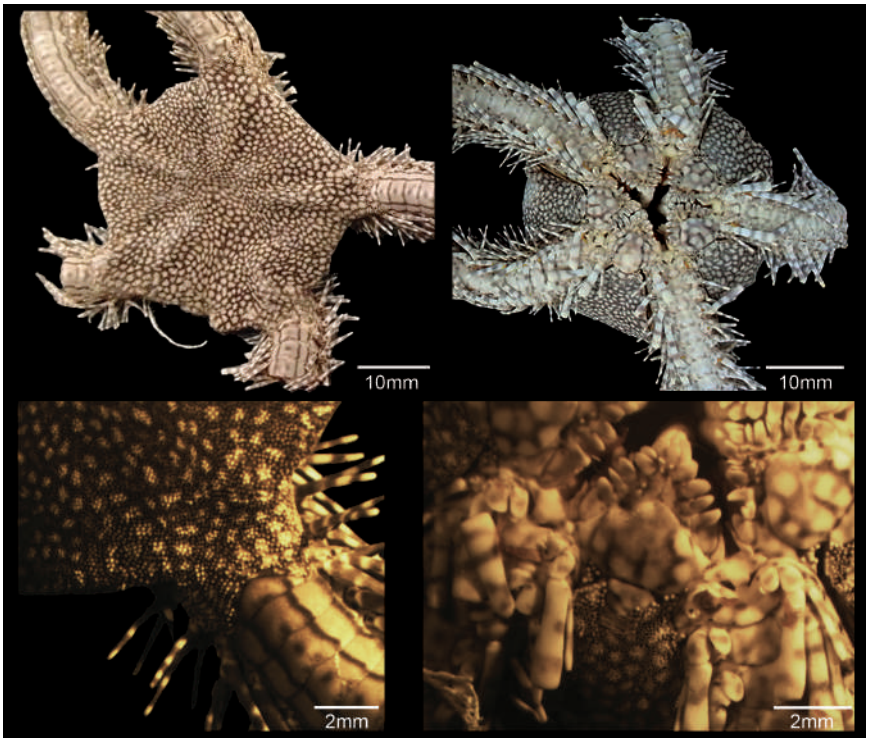

Fig. 151. Dorsal disc (top left), ventral disc (top right), dorsal disc and arms (bottom left), jaw and ventral interradial area (bottom right) views of *Ophiarachna affinis* (SAMC A28132).

Ophiarachna septemspinosa Müller & Troschel, 1842

Ophiarachna septemspinosa Müller & Troschel, 1842: 105-106.
Pectinura septemspinosa Lütken 1869: 33; Lyman 1882: 17; de Loriol 1893b: 395, pl. 13, fig. 2; Koehler 1905a: 9.
Pectinura rigida Lyman, 1874: 224.
Ophiarachna armata Troschel, 1879: 137-138.
Ophiarachnella septemspinosa: Clark 1909: 126; Koehler 1930: 273; Clark 1938: 349-350; 1946: 263-264; Cherbonnier & Guille 1978: 218-219, pl. 16, figs 1, 2; Humpreys 1981: 10; Guille & Vadon 1985: 64; Marsh 1986: 71; Marsh *et al.* 1993: 62; Rowe & Gates 1995: 397; Mbongwa 2013: 16; Olbers *et al.* 2015: 110-112, pl. 9A, B.

Diagnosis – Adapted from 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, very small, circular. Oral papillae 3-4, 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 appear scalloped due to colouration. 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 square-tipped. 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 lightly banded.

Distribution and habitat – Western Indian Ocean and associated islands, Red Sea, Maldives, East Indies, China, South Japan, Philippines, Australia (Clark & Rowe 1971; Cherbonnier & Guille 1978; Rowe & Gates 1995; Richmond 2002), South Africa: Protea Banks (KZN) to Kosi Bay (KZN); depth range: 0-55 m. Habitat: found under boulders and coral (*Millepora* spp) colonies.

Remarks – Easily recognisable 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. obs.). The DNA phylogeny of O‘Hara *et al.* (2017) indicates that *Ophiarachnella* is polyphyletic, with *O. septemspinosa* being contained within the genus *Ophiarachna*.

Olbers *et al.* (2015) noted this species as a new record for South Africa.

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

Fig. 152. Distribution of *Ophiarachna septemspinosa* in South Africa.

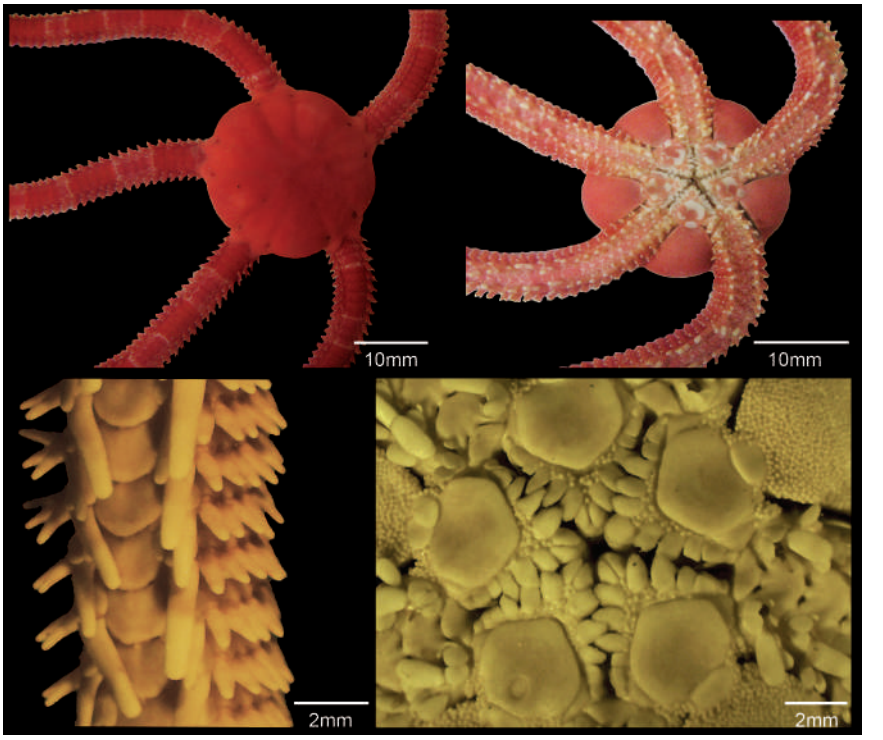

Fig. 153. Dorsal disc (top left), ventral disc (top right), ventral arms (bottom left), jaws (bottom right) views of *Ophiarachna septemspinosa* (EKZNW LSS_4_EKZNW).

4.4.6. Family OPHIOCOMIDAE Ljungman, 1867

O'Hara *et al.* 2019 have reclassified the Ophiocomidae according to a genetic phylogeny into four genera: *Breviturma* (including *O. pica*), *Ophiocomella* (including *O. valenciae)*, *Ophiocoma*, and *Ophiomastix* (with *Ophiarthrum* a synonym).

Genus ***Breviturma*** Stöhr *et al*., 2013

Breviturma brevipes Peters, 1851

Ophiocoma brevipes Peters, 1851: 466; Marktanner-Turneretscher 1887: 303; de Loriol 1893a: 25, 26, pl. 23, fig. 4; Clark 1908: 296; Clark 1911: 256; Koehler 1922b: 319-322, pl. 72, figs 6-9; Clark 1932: 205; Devaney 1968: 45; Devaney 1970: 13; Clark & Rowe 1971: 86, 119; Devaney 1974: 151-152; Hughes & Gamble 1977: 355; Cherbonnier & Guille 1978: 168-169, pl. 10, figs 3, 4; Sloan *et al.* 1979: 104; Clark 1980: 534; Tortonese 1980: 125, fig. 11; Humpreys 1981: 10, 23; James 1982: 39-40, pl. 2B; Marsh 1986: 71; Sastry 1991: 380, pl. 4, fig. 21; Liao & Clark 1995: 258-260, fig. 138, pl. 19, fig. 6; Rowe & Gates 1995:

385; Rowe & Richmond 2004: 3292; Olbers & Samyn 2012: 140-143, pls 1a-g, 2a-c; Mbongwa 2013: 15.

Ophiocoma brevispinosa Smith, 1876: 40.

Ophiopeza danbyi Farquhar, 1897: 189-190, pl. 14, figs 7, 8; Clark 1915a: 291.

(Non *Ophiocoma brevipes*: Stöhr *et al.* 2008: 553, 555, fig 5e.)

Ophiocoma (*Breviturma*) *brevipes* Stöhr *et al.* 2013: 10-13, figs 2d, 4, 5a, d, g, j, m, p.

Breviturma brevipes O'Hara *et al.* 2019: 74.

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D. up to 25 mm. Disc with small, fine, spherical granules closely packed on both dorsal and ventral side. Oral shields round to oval with dark markings. Adoral shields not contiguous. Oral papillae 4-5. Teeth wide and rounded. Genital slits clearly visible, elongated and bordered with slightly more prominent granules. Arms banded on the dorsal side. Dorsal arm plates oval, wider than long, broadly contiguous. Ventral arm plates nearly as wide as long, bluntly pointed on the proximal side, not contiguous distally. Arm spines up to six, uppermost thickest on the proximal part of the arm, longest spine shorter than, or equal to, segment length. Tentacle scales two, oval. Colour in life, disc colour patterns variable, with a combination of light greens, whites, yellows and browns in blotchy star, or simply no particular pattern.

Distribution and habitat – Mozambique, north-western parts of the Indian Ocean, tropical Indo-West Pacific (Rowe & Richmond 2004), South Africa: Aliwal Shoal (KZN) to Kosi Bay (KZN); depth range: 0-54 m. Habitat: associated with coral heads or boulders, on fine to coarse sand and at the bases of algae in the sandy littoral zone.

Remarks – Additional notes on *B. brevipes* are given by Olbers & Samyn (2012), who describe this as a new record for South Africa and include notes on the juveniles, which differ from the adults. O'Hara *et al.* 2018 raised *Breviturma* to the rank of genus.

The type material is in the Museum of Natural History of Berlin (syntypes ZMB Ech 4660, ZMB Ech 961-3) and the type locality is Quirimbas Island, Mozambique, depth unknown.

Fig. 154. Distribution of *Breviturma brevipes* in South Africa.

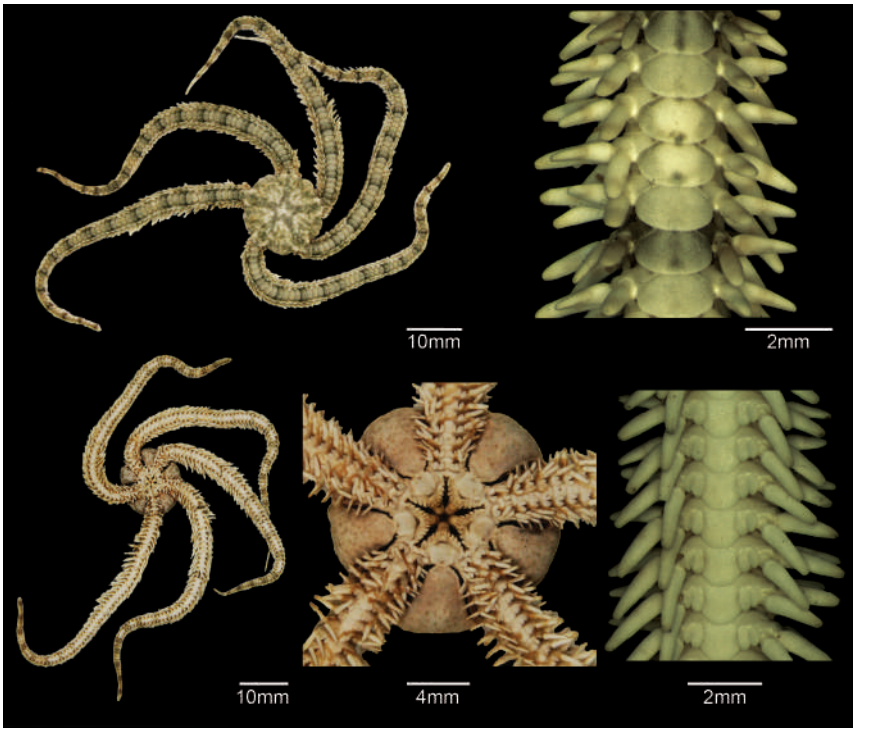

Fig. 155. Dorsal whole (top left; RMCA MT2194), dorsal arm plates (top right; RMCA MT2193), ventral whole (bottom left; RMCA MT2194), jaws (bottom centre; RMCA MT2194), ventral arm plates (bottom centre; RMCA MT2193) views of *Breviturma brevipes* (RMCA MT2194).

Breviturma dentata Müller & Troschel, 1842

Ophiocoma dentata Müller & Troschel, 1842: 99, pl. 7, figs 3, 3a; Devaney 1968: 45; Devaney 1970: 13; Clark & Rowe 1971: 86, 119, pl. 18, figs 2, 3; Hughes & Gamble 1977: 355; Cherbonnier & Guille 1978: 168, pl. C, figs 3, 4; Tortonese 1980: 125, figs 11A, B; James 1982: 40, pl. 2C, D; Guille & Vadon 1985: 63; Marsh 1986: 71; Sastry 1991: 380, pl. 4, fig. 22; Liao & Clark 1995: 260-261, fig. 139; Rowe & Gates 1995: 386; Price & Rowe 1996: 76; Rowe & Richmond 2004: 3292; Olbers & Samyn 2012: 143-144, pl. 2d, e; Mbongwa 2013: 15.

Ophiocoma insularia Lyman, 1862: 80-81; Macnae & Kalk 1958: 130.

Ophiocoma ternispina von Martens, 1870: 252-253.

Ophiocoma variegata Smith, 1876: 39.

Ophiocoma (*Breviturma*) *dentata* Stöhr *et al.* 2013: 13-17, figs 2e, f, 5b, e, h, k, n, q.

Breviturma dentata O'Hara *et al.* 2019: 74

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D up to 14 mm. Disc covered in granules. Radial shields not distinct. Oral shields round, as long as wide, with marbled pattern. Adoral shields small, not contiguous. Dental papillae broad, not extending far into mouth. Dorsal arm plates broad, elliptical and contiguous. Ventral arm plates square with rounded corners, rounded distal edge, as wide as long, contiguous. Arm spines four, broadly and irregularly banded once

Fig. 156. Distribution of *Breviturma dentata* in South Africa.

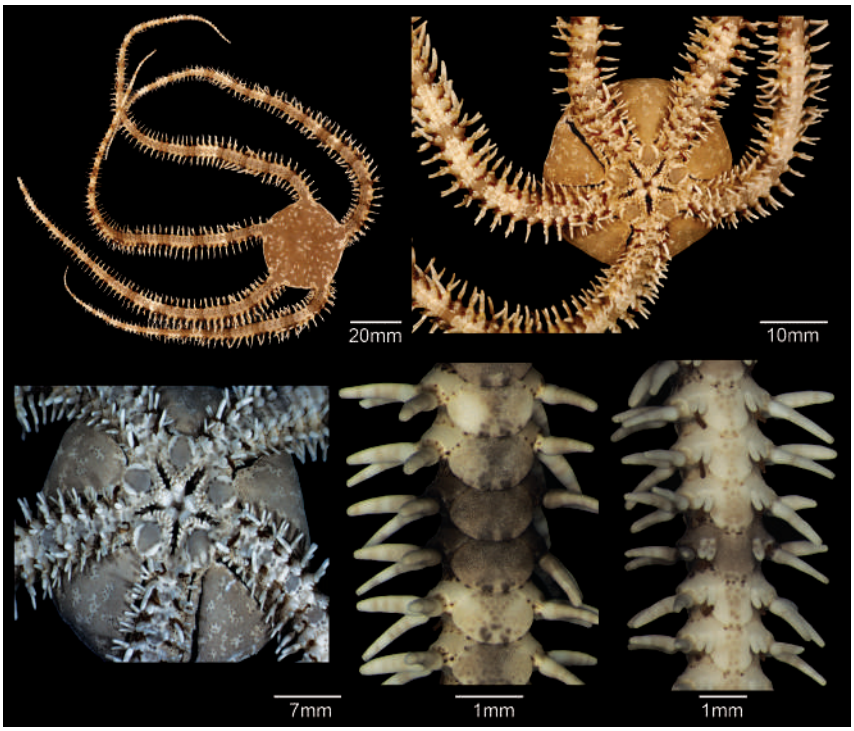

Fig. 157. Dorsal whole (top left), ventral whole (top right), ventral disc (bottom left), dorsal arm plates (bottom centre), ventral arm plates (bottom centre) views of *Breviturma dentata* (RMCA MT2380).

or twice with light brown, upper arm spines thick, blunt, somewhat flattened and slightly shorter than lower ones. Tentacle scales two, oval. Colour in life variegated with brown, white and beige, both dorsally and ventrally with the presence of small dark brown spots.

Distribution and habitat – Tropical Indo-West Pacific, Western Indian Ocean (Macnae & Kalk 1958; Rowe & Gates 1995; Rowe & Richmond 2004), South Africa: Aliwal Shoal (KZN) to Kosi Bay (KZN); depth range: 0-35 m. Habitat: sub-littoral zone, under boulders and associated with coral and coral debris on sand or rubble.

Remarks – The holotype is in the Museum of Natural History of Berlin (ZMB Ech 931), type locality Celebes (Islands of Sulawesi, Indonesia), depth unknown.

Additional notes on *B. dentata* are given in Olbers & Samyn (2012), where it is described as a new record for South Africa.

Breviturma doederleini de Loriol, 1899

Ophiocoma doederleini de Loriol, 1899: 30, pl. 3, fig. 2; Devaney 1968: 69; Devaney 1970: 12-18, figs 18, 14, 22; Devaney 1974: 154; Sloan *et al.* 1979: 104, figs 8-10; Clark 1980: 534; Humpreys 1981: 10, 24; Marsh 1986: 71; Rowe & Gates 1995: 396; Olbers & Samyn 2012: 144-145, pls 2f, g, 3a, b.
Ophiocoma dentata Lütken, 1859: 165 (non Müller & Troschel 1842); Clark 1921: 121.
Ophiocoma (*Breviturma*) *doederleini* Stöhr *et al.* 2013: 7-10, figs 2a-c, 3.
Breviturma doederleini O'Hara *et al.* 2019: 74.

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D. up to 30 mm. Disc covered in granules both dorsally and ventrally. Radial shields not distinct. Oral shields large, round to oval, longer than wide. Oral papillae up to six, distalmost broadest. Teeth broad, square. Adoral shields not contiguous. Genital slits long, genital papillae present. Dorsal arm plates fan-shaped, wider than long, distal edge rounded, broadly contiguous. Ventral arm plates fan-shaped with distal edge rounded. Arm spines annulated, flat and tapering proximally, but remaining spines tapering, shortest arm spine longer than segment length. Tentacle scales 2-3, large, oval. Colour in life greyish brown dorsally and ventrally either with fine black reticulating lines, white-ringed black spots, or speckled with light spots.

Distribution and habitat – Indian Ocean and west central Pacific Ocean (Rowe & Gates 1995), South Africa: Sodwana Bay (KZN) to Kosi Bay (KZN); depth range: 12-20 m. Habitat: under large boulders on gravel.

Remarks – Additional notes of *Breviturma doederleini* are given in Olbers & Samyn (2012) who describe it as a new record for South Africa.

According to Devaney (1970) the annulation of the arm spines is used in the field as an easy character to separate *Breviturma dentata* from *B. doederleini*, being absent in *dentata* but present in *doederleini*.

The holotype is in the Muséum d'Histoire naturelle, Genève (MHNG INVE 71892) and the type locality is Mauritius, depth unknown.

Fig. 158. Distribution of *Breviturma doederleini* in South Africa.

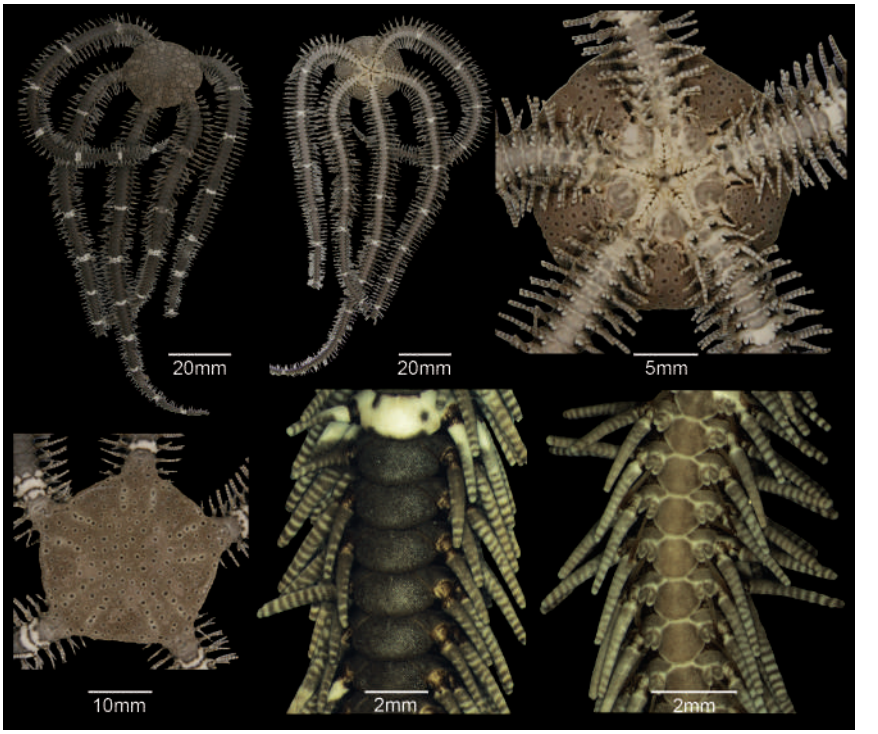

Fig. 159. Dorsal whole (top left; RMCA MT2249), ventral whole (top centre; RMCA MT2249), ventral disc (top right; RMCA MT2250), dorsal disc (bottom left; RMCA MT2250), dorsal arm plates (bottom centre; RMCA MT2507), ventral arm plates (bottom centre; RMCA MT2507), views of *Breviturma doederleini*.

Breviturma pica Müller & Troschel, 1842

Ophiocoma pica Müller & Troschel, 1842: 101; Clark 1921: 127, pl. 13, fig. 8; Clark 1938: 333; Balinsky 1957: 25-26; Macnae & Kalk 1958: 130; Devaney 1968: 131; Devaney 1970: 19-20, figs 23-25, 27; Clark & Rowe 1971: 86-87, 118; Clark & Courtman-Stock 1976: 173; Cherbonnier & Guille 1978: 172, pl. 11, figs 5, 6; Sloan *et al.* 1979: 106, Clark 1980: 535, 548; Tortonese 1980: 124; Price 1982: 8; James 1982: 36-38, pl. 1C; Marsh 1986: 71; Vine 1986: 195; Sastry 1991: 381, pl. 5, fig. 25; Liao & Clark 1995: 262-263, fig. 141; Rowe & Gates 1995: 387; Price & Rowe 1996: 77; Olbers & Samyn 2012: 146-147, pl. 3e, f.
Breviturma pica O'Hara *et al.* 2019: 74.

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D up to 17 mm. Disc with spherical granules extending onto distal parts of ventral interradial areas. Radial shields not distinct. Oral shields usually oval. Adoral shields triangular, not contiguous. Oral papillae 3-4, dental papillae 6-10. Teeth one or two, slightly elongated and blunt. Genital slits long, genital papillae present, cone-shaped. Dorsal arm plates fan-shaped, convex on distal side with distal side being longer than proximal side, concave proximally. Ventral arm plates straight to slightly convex distally, plates becoming slightly longer distally. Arm spines five proximally, 4-5 distally, slender, first and second spines longest, *c.* twice segment length, lower arm spines same length as segment or slightly longer. Tentacle scales two, oval, large, inner one slightly smaller basally. Colour in life dark brown or black with radiating golden lines on disc and often, transverse bands annulating the arms.

Distribution and habitat – Indo-Pacific (Clark 1921; Clark & Rowe 1971), South Africa: Qolora (EC) to Kosi Bay (KZN); depth range: 0-24 m. Habitat: under rocks or dead coral rubble.

Remarks – Additional notes on *B. pica* are given in Olbers & Samyn (2012). Distribution is here extended from Richards Bay (KZN) south to Qolora (EC).

Location of type material is unknown. According to Müller & Troschel (1842) it is in the Muséum national d'Histoire naturelle in Paris (MNHN), but could not be found

Fig. 160. Distribution of *Breviturma pica* in South Africa.

by Nadia Améziane (pers. comm.). The type locality is also unknown, according to Müller & Troschel (1842).

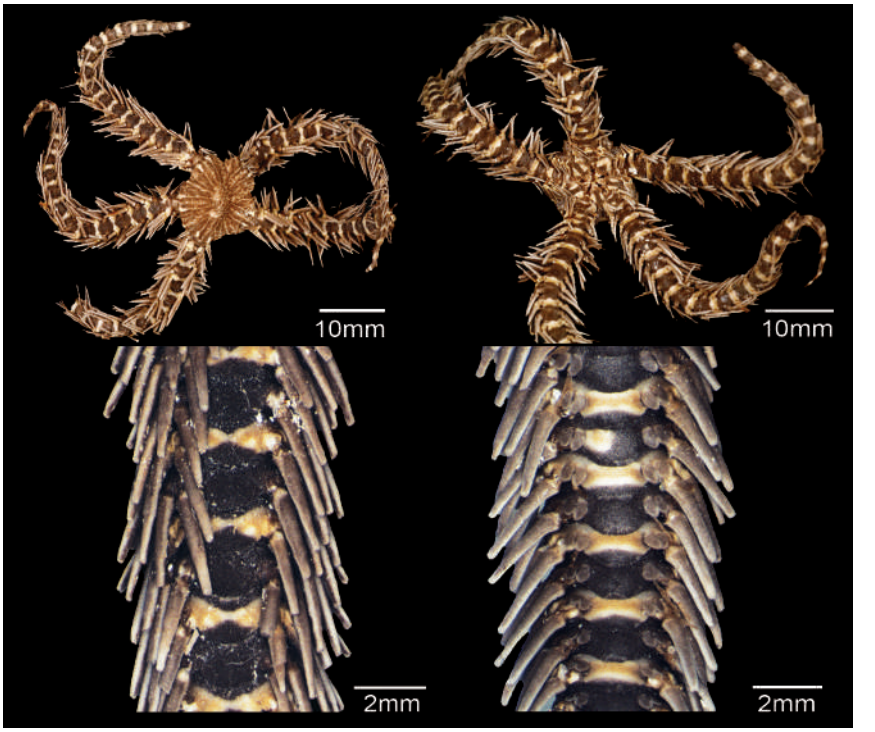

Fig. 161. Dorsal whole (top left), ventral whole (top right), dorsal arms (bottom left), ventral arms (bottom right) views of *Breviturma pica* (RMCA MT1496).

Breviturma pusilla (Brock, 1888)

Ophiomastix pusilla Brock, 1888: 499; Devaney 1970: 25.

Ophiocoma latilanxa Murakami, 1943a: 194-196, fig. 13; Murakami 1943b: 218; Devaney 1970: 25-27.

Ophiocoma pusilla: Clark 1921: 131; Devaney 1970: 25, figs 26, 29; Clark & Rowe 1971: 86-87, 118; Clark & Courtman-Stock 1976: 122, 174, fig. 190; Cherbonnier & Guille 1978: 173-174, pl. 11, figs 3, 4; Sloan *et al.* 1979: 106; Clark 1980: 535, 544; Tortonese 1980: 127; Humpreys 1981: 10, 24; Price 1982: 8; Guille & Vadon 1985: 63; Marsh 1986: 71; Vine 1986: 195; Liao & Clark 1995: 263-264, fig. 142; Rowe & Gates 1995: 388; Price & Rowe 1996: 77; Olbers & Samyn 2012: 147-148, pl. 4a, b; Mbongwa 2013: 15.

Breviturma pusilla O'Hara *et al.* 2019: 74

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D up to 8 mm. Disc with uniformly distributed granules both dorsally and ventrally, concealing radial shields, granules forming a V-shape in interradial area. Oral shields oval, nearly twice as long as wide. Adoral shields triangular, not contiguous. Oral papillae 4-5. Dental papillae in 2-3 rows. Dorsal arm plates fan-shaped proximally, wider than long, with convex distal side contiguous, distally plates longer than wide and less contiguous. Ventral arm plates fan-shaped, wider than long, distally becoming longer than wide. Arm spines 4-5, hollow, glassy and *c.* two-and-a-half times segment length. Second uppermost arm spines at a third of arm length with pustular distal expansions, while other arm spines tapering. Tentacle scales two. Colour in life, disc slightly speckled, may have banded arms from half way down the arms to the tips.

Distribution and habitat – Tropical Indo-West central Pacific Ocean (Rowe & Gates 1995), including Red Sea and Mozambique (Clark 1967; Clark & Courtman-Stock 1976). South Africa: Aliwal Shoal (KZN) to Kosi Bay (KZN); depth range: 0-32 m. Habitat: in sand channels, under rubble and associated with coral.

Remarks – Additional notes on *O. pusilla* are given by Olbers & Samyn (2012) who report this species as a new record for South Africa.

The type material is in the Museum of Natural History of Berlin (ZMB Ech 5429 and ZMB Ech 4777), type locality is Ambon, Indonesia, depth unknown.

Fig. 162. Distribution of *Breviturma pusilla* in South Africa.

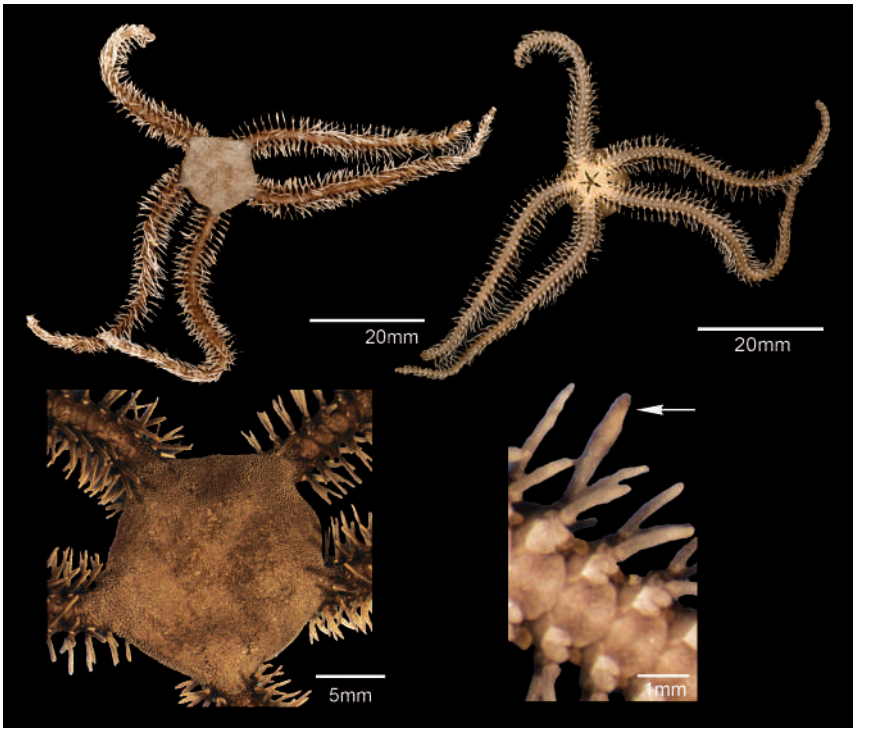

Fig. 163. Dorsal whole (top left), ventral whole (top right), dorsal disc (bottom left), arm spines, arrow indicating swollen spine (bottom right) views of *Breviturma pusilla* (RMCA MT2153).

Genus ***Ophiocoma*** Agassiz, 1836

Ophiocoma erinaceus Müller & Troschel, 1842

Ophiocoma erinaceus Müller & Troschel, 1842: 98; Kalk 1958: 207, 216, 237; Clark 1967: 47; Devaney 1968: 173; Devaney 1970: 33, figs 45-47; Clark & Rowe 1971: 86, 119, pl. 17, figs 5, 6; Clark & Courtman-Stock 1976: 122, 173; Cherbonnier & Guille 1978: 169, pl. 10, figs 5, 6; Sloan *et al.* 1979: 106, figs 11, 12; Clark 1980: 535, 548; Tortonese 1980: 124; Humpreys 1981: 10, 24; James 1982: 38, pl. 1D; Price 1982: 8; Guille & Vadon 1985: 63; Marsh 1986: 71; Vine 1986: 195; Sastry 1991: 380, pl. 4, fig. 23; Liao & Clark 1995: 261-262, fig. 140; Rowe & Gates 1995: 387; Price & Rowe 1996: 77; Rowe & Richmond 2004: 3292; O'Hara *et al.* 2004: 537-541; Benavides-Serrato & O'Hara 2008: 51; Reza Fatemi *et al.* 2010: 44, fig. 2; Olbers & Samyn 2012: 145-146, pl. 3c, d; Mbongwa 2013: 15.

Ophiocoma similanensis Bussarawit & Rowe, 1985: 1, figs 1, 2; Price & Rowe 1996: 77.

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D. up to 21.5 mm, dorsal disc covered with coarse granules, ventral interradial area mostly naked with granules forming a V-shape. Radial shields not distinct. Oral shields variable, pear-shaped, circular or hexagonal, broadest distally. Adoral shields small, not contiguous. Dorsal arm plates uniform black, fan-shaped, distally convex, imbricating, more than twice as wide as long. Ventral arm plates uniform brown, from regular hexagons proximally to pentagons distally. Arm spines 3-4, uppermost largest, some specimens have longitudinal stripes on arm spines, spines flattened closest to disc. Tube feet in live specimens red, in preserved specimens white. Tentacle scales two, equal in size. Colour characteristically black, dark brown or dark red dorsally, lighter ventrally.

Distribution and habitat – Tropical to subtropical Indo-Pacific (Olbers & Samyn 2012), South Africa: Treasure Beach (KZN) to Kosi Bay (KZN); depth range: 0-27 m. Habitat: associated with coral, found on gravel under boulders. Juveniles found on sponges (*Haliclona* species) or under dead coral boulders.

Remarks – Additional notes are given in Olbers & Samyn (2012) and even though *O. erinaceus* is one of the most abundant brittle stars in littoral tropical seas, its taxonomy has only recently been resolved. O'Hara *et al.* (2004) used molecular, morphological and day / night colour change data to show that *O. erinaceus* is a species complex of three species: *O. erinaceus*, *O. schoenleinii* Müller & Troschel 1842 and *O. cynthiae* Benavides-Serrato & O'Hara, 2008.

In this study, distribution is extended from Treasure Beach (KZN) to Kosi Bay (KZN).

The type material is in the Museum of Natural History of Berlin (syntypes: ZMB Ech 921, ZMB Ech 922, ZMB Ech 923 and ZMB Ech 924) and the type locality is the Red Sea, depth unknown.

Fig. 164. Distribution of *Ophiocoma erinaceus* in South Africa.

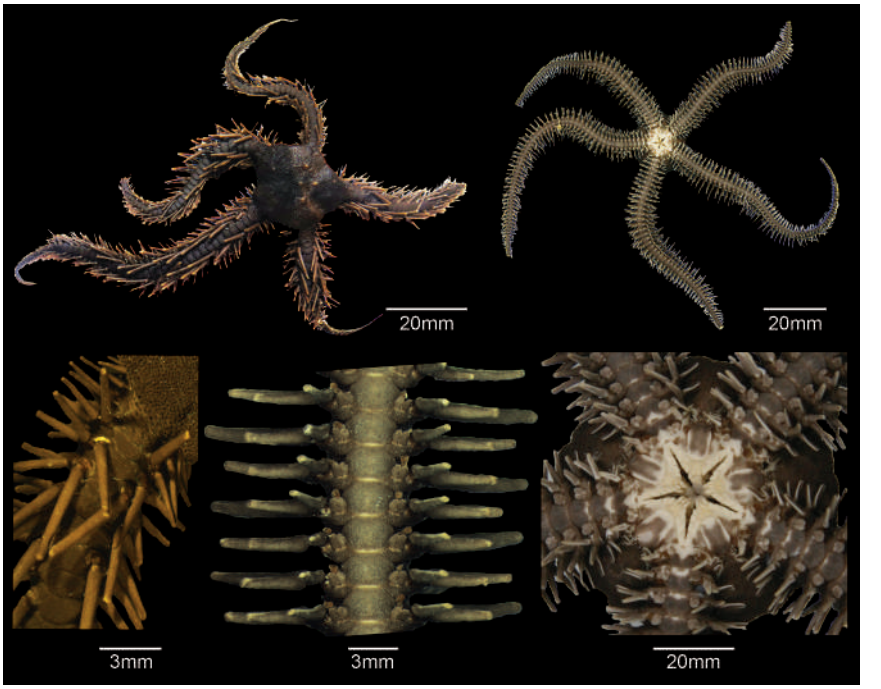

Fig. 165. Dorsal whole (top left; RBINS, RSAKZN/2016.008 (unaccessioned)), ventral whole (top right; RBINS, RSAKZN/2016.008 (unaccessioned)), dorsal basal arms (bottom left; LSS_5_EKZNW), ventral arms (bottom centre; RMCA MT2136), ventral disc (bottom right; LSS_5_EKZNW) views of *Ophiocoma erinaceus*.

Ophiocoma scolopendrina (Lamarck, 1816)

Ophiura scolopendrina Lamarck, 1816: 544.

Ophiocoma scolopendrina: Clark 1932: 207; Kalk 1958: 205; Macnae & Kalk 1958: 130; Devaney 1968: 203; Devaney 1970: 33-35; Clark & Rowe 1971: 86, 119, pl. 17, figs 3, 4; Clark & Courtman-Stock 1976: 122, 174; Hughes & Gamble 1977: 355; Sloan *et al.* 1979: 106, fig. 13; Clark 1980: 535; Tortonese 1980: 124; Price 1982: 8; James 1982: 36-39, pl. 2A; Guille & Vadon 1985: 63; Vine 1986: 195; Marsh 1986: 71; Sastry 1991: 381, pl. 4, fig. 24; Liao & Clark 1995: 264-265, fig. 143; Rowe & Gates 1995: 388; Reza Fatemi *et al.* 2010: 45, fig. 3; Olbers & Samyn 2012: 148-150, pl. 4c, d; Mbongwa 2013: 15-16.

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D. up to 25 mm. Disc round or pentagonal. Dorsal disc densely covered with spherical granules, covering the whole surface including the indistinct radial shields. Ventral disc with same, densely distributed granules, but less dense closer to genital slits. Oral shields oval, shorter than wide. Adoral shields restricted to the lateral

edge of the oral shield, triangular, not contiguous. Oral papillae five, inner ones more pointed. Oral tentacle scale low and wide. Dental papillae 4-9, placed in a cluster below wide, truncated teeth. Genital slit bordered by elongated genital papillae. Dorsal arm plates fan-shaped, wider than long, distal margin straight in first segments, becoming convex in distal segments. First two ventral arm plates distinctly smaller, distal margin indented, lateral margins convex and proximal margin straight, *c.* as long as wide. Remaining ventral arm plates significantly larger, wider then long, distal margin convex, proximal margin concave. Arm spines 3-5, three on segment three, 4-5 on segment eight, uppermost ones thick, short, longer than segments; lower arm spines slender, longer than segment, except for first two segments. Tentacle scales two, oval, inner one a fraction longer. Colour in life, disc uniformly brown both dorsally and ventrally. Dorsal arm plates blotched with brown on beige, giving arms a variegated to banded pattern.

Distribution and habitat – Tropical Indo-Pacific (Rowe & Gates 1995), including Red Sea (Clark & Rowe 1971), South Africa: Umgazana (EC) to Kosi Bay (KZN); depth range: 0-179 m. Habitat: common in the upper eulittoral zone and rocky shores.

Remarks – A detailed description of *O. scolopendrina* is given in Olbers & Samyn (2012), who also designated a neotype (MNHN EcOh 11043) for *O. scolopendrina*, locality Mauritius. In this study, distribution is extended from KwaZulu-Natal south to Umgazana (EC).

Fig. 166. Distribution of *Ophiocoma scolopendrina* in South Africa.

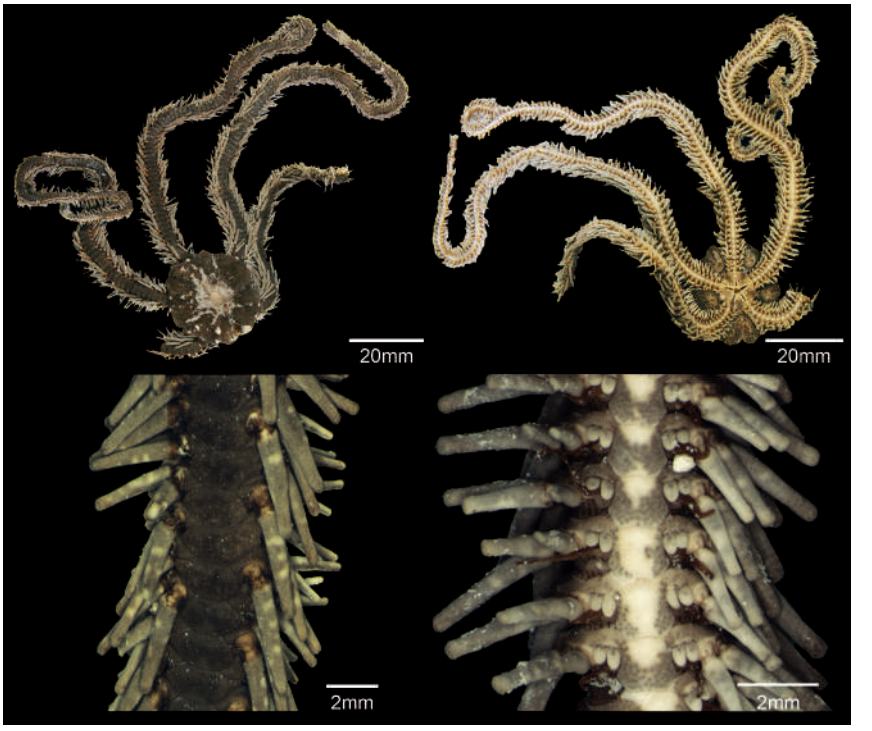

Fig. 167. Dorsal whole (top left; RMCA MT1708), ventral whole (top right; RMCA MT1708), dorsal arms (bottom left; RMCA MT1708), ventral arms (bottom right; RMCA MT1708) views of *Ophiocoma scolopendrina*.

Genus ***Ophiocomella*** A.H. Clark, 1939

Ophiocomella sexradia (Duncan, 1887)

Ophiocnida sexradia Duncan, 1887: 92-93, pl. 8, figs 10, 11; Koehler 1905a: 33.
Ophiocoma parva Clark, 1915a: 292, pl. 14, figs 8, 9; Clark 1921: 132, pl. 13, fig. 4; Clark 1938: 331-332; Clark A.H. 1939: 5-7, pl. 1, figs 1, 2; Clark 1946: 247; Balinsky 1957: 27; Kalk 1958: 207, 216, 237; Macnae & Kalk 1969: 104, 106, 130; Clark & Rowe 1971: 86, 87, 118, fig. 38d, pl. 18, fig. 6.
Amphilimna sexradia: Clark 1915a: 259.
Amphilimna sexradiata: Koehler 1927: 3.
Ophiocomella schultzi Clark, 1941: 481-483; Clark & Rowe 1971, fig. 38c, e.
Ophiocomella clippertoni Clark A.H., 1939: Clark A.H. 1952: 296.
Ophiomastix sexradiata Clark A.H. 1952: 297-298; Clark & Rowe 1971: 86, 118, fig. 38a, b.
Ophiocomella sexradia: Clark & Rowe 1971: 86-87, 118, fig. 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; Marsh 1986: 71; Vine 1986: 195; Sastry 1991: 374, 382, pl. 4, fig. 20; Liao & Clark 1995: 265, fig. 144; Rowe & Gates 1995: 389; Richmond 2002: 326; Putchakarn & Sonchaeng 2004: 423; Stöhr *et al.* 2008: 547, 555-556; Mbongwa 2013: 16; Olbers *et al.* 2015: 95-96, pl. 3E, F.

Diagnosis – Adapted from Clark & Courtman-Stock (1976) and 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 4-6, 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 tips 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.

Distribution and habitat – Mozambique, Reunion, Rodrigues, India, China, south Japan, Australia, Tasman Sea, Hawaiian Islands (Clark & Rowe 1971; Sastry 1991; Rowe & Gates 1995; Richmond 2002; Rowe & Richmond 2004), South Africa: Isipingo (KZN); depth range: 0-33 m. Habitat: associated with sponges, coral bases and sea grass beds or algae.

Remarks – In KwaZulu-Natal, this species appears to be associated with the six-armed species *Ophiactis savignyi* found in and among rocky shore algae scrapings. The type material is housed in the Museum of Comparative Zoology (holotype: MCZ OPH-3758, paratype: MCZ OPH-3759 and MCZ OPH-3855), type locality Torres Strait, Murray Island, Australia, depth unknown.

Fig. 168. Distribution of *Ophiocomella sexradia* in South Africa.

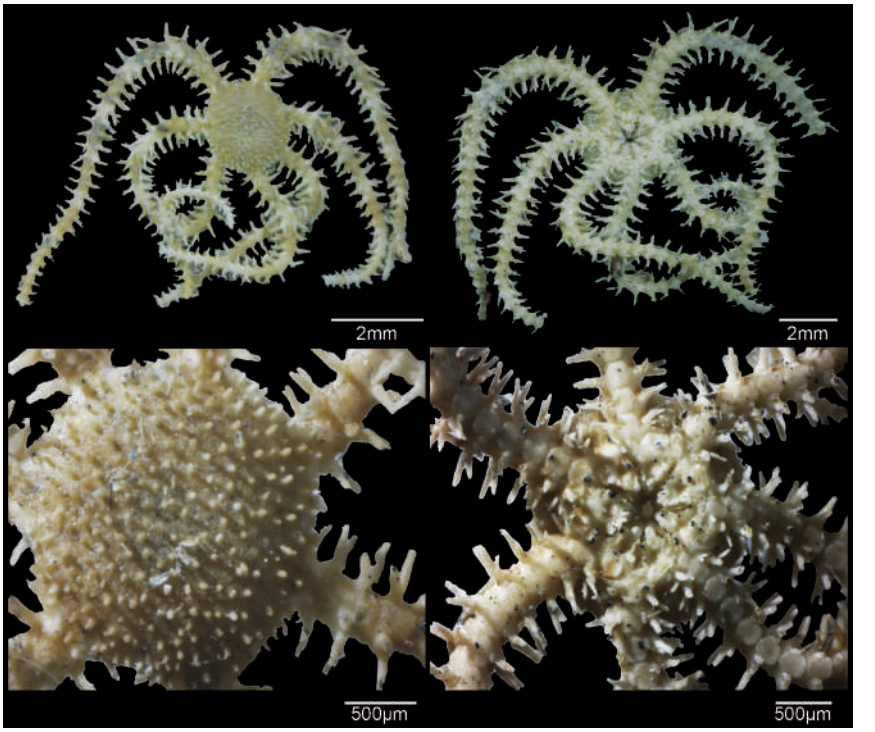

Fig. 169. Dorsal whole (top left), ventral whole (top right), dorsal disc (bottom left), ventral disc (bottom right) views views of *Ophiocomella sexradia* (EKZNW RR_4_JMO_2010).

Ophiocomella valenciae Müller & Troschel, 1842

Ophiocoma valenciae Müller & Troschel, 1842: 102; Eyre & Stephenson 1938: 38, 43; Kalk 1958: 200, 207, 237; Macnae & Kalk 1958: 130; Clark 1967: 44-45; Devaney 1968: 126; Macnae & Kalk 1969: 101, 106, 130; Clark & Rowe 1971: 86, 119, pl. 18, fig. 1; Hughes & Gamble 1977: 355; Sloan *et al.* 1979: 109, fig. 14; Clark 1980: 535, 548; Tortonese 1980: 125; Humpreys 1981: 10, 24-25; Price 1982: 8; Vine 1986: 195; Olbers & Samyn 2012: 150, pl. 4e, f; Sastry 1991: 382; Milne 2012: 155; Mbongwa 2013: 16.
Ophiocomella valenciae: O'Hara *et al.* 2019: 74.

Diagnosis – Adapted from Devaney (1970) and Olbers & Samyn (2012). D.D. up to 20 mm. Disc covered dorsally and ventrally with moderately fine granules, which become elongated towards margin of disc. Radial shields defined by lighter colour on some specimens, but this could be an artefact of preservation. Oral shields round to oval. Adoral shields not contiguous. Oral papillae 3-4, dental papillae numerous. Teeth square 3-4. Genital slits long, genital papillae present. Dorsal arm plates broad, oval, broadly contiguous. Ventral arm plates square to pentagonal,

distal edge straight, proximal edge may be slightly convex. Arm spines up to six, uppermost spines shorter than middle spines, one segment length. Tentacle scale one, oval, sometimes two on first segments. Colour in life, disc brown, arms tawny with darker bands.

Distribution and habitat – Tropical Indian Ocean, including Red Sea and possibly Persian Gulf (Clark & Rowe 1971; Tortonese 1980), South Africa: Umgazana

Fig. 170. Distribution of *Ophiocomella valenciae* in South Africa.

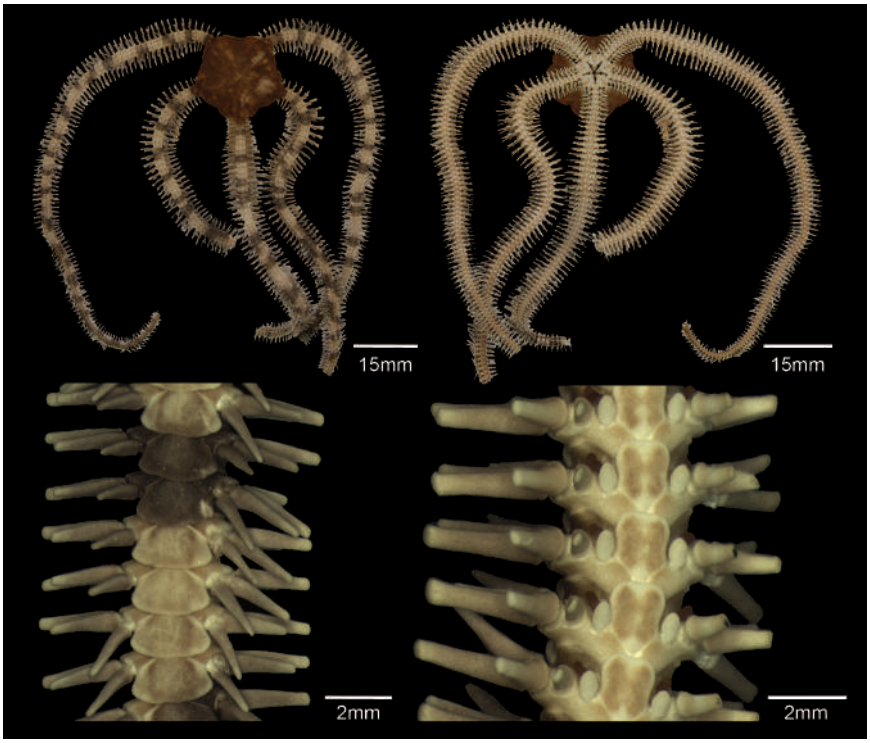

Fig. 171. Dorsal whole (top left), ventral whole (top right), dorsal arms (bottom left), ventral arms (bottom right) views of *Ophiocomella valenciae* (RMCA MT1750).

(EC) to Kosi Bay (KZN); depth range: 0-18 m. Habitat: associated with coral and sponges, found within rocky crevices, cobbles, rubble and various algal beds.

Remarks – Additional notes of *O. valenciae* are given in Olbers & Samyn (2012). The type material is in the Museum of Natural History of Berlin (syntypes ZMB Ech 4625 and ZMB Ech 955) and the type locality is the Gulf of Aden, depth unknown.

Genus ***Ophiomastix*** Müller & Troschel, 1842

Diagnosis – Adapted from Lyman (1882) and Clark & Courtman-Stock (1976). Disc mostly smooth, or with scattered spinelets or granules, densities differ. Radial shields indistinct, but proportionally larger than in *Ophiocoma*. Oral and dental papillae as in *Ophiocoma*. Adoral shields small and widely separated. Arm spines smooth, solid, up to four, uppermost usually club-shaped or tips clavate. Genital slits usually long, starting close to oral shield. Tentacle scales one or two.

Ophiomastix koehleri Devaney, 1977

Ophiomastix koehleri Devaney, 1977: 274-283, figs 1-4; Cherbonnier & Guille 1978: 186-188, pl.11, figs 1, 2; Sloan *et al.* 1979: 92, 109, fig.16; Humpreys 1981: 10, 25; Olbers *et al.* 2015: 96, pl. 4A, B.

Diagnosis – Adapted from Devaney (1977) and Cherbonnier & Guille (1978). D.D. up to 25 mm. Disc round and puffy, dorsally disc covered uniformly by short, rounded granules, disc ventrally with similar granules, but not extending up to oral shields, leaving a broken wide V-shaped interradial area with scales dark brown, variegated with whitish grey. Oral shields round with dark patch on each surrounded by white on margin, adoral shields 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 3-4 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 tips, greyish bands not always around full circumference of spine, 2-3 times segment length, shortest being one-and-a-half times segment length. Tentacle scales two, becoming one after *c.* 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 arms 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.

Distribution and habitat – Madagascar, Zanzibar, Kenya, Comoros, Aldabra (Cherbonnier & Guille 1978), South Africa: Aliwal Shoal (KZN) to Sodwana Bay (KZN); depth range: 0-18 m. Habitat: under *Porites* coral colonies and in lagoonal seagrass beds.

Remarks – According to Devaney (1977) the type locality is Zanzibar and the holotype is in the Natural History Museum in London (NHMUK 1965.6.1.451). Olbers *et al.* (2015) reported this species as a new record for South Africa and provided additional remarks.

Fig. 172. Distribution of *Ophiomastix koehleri* in South Africa.

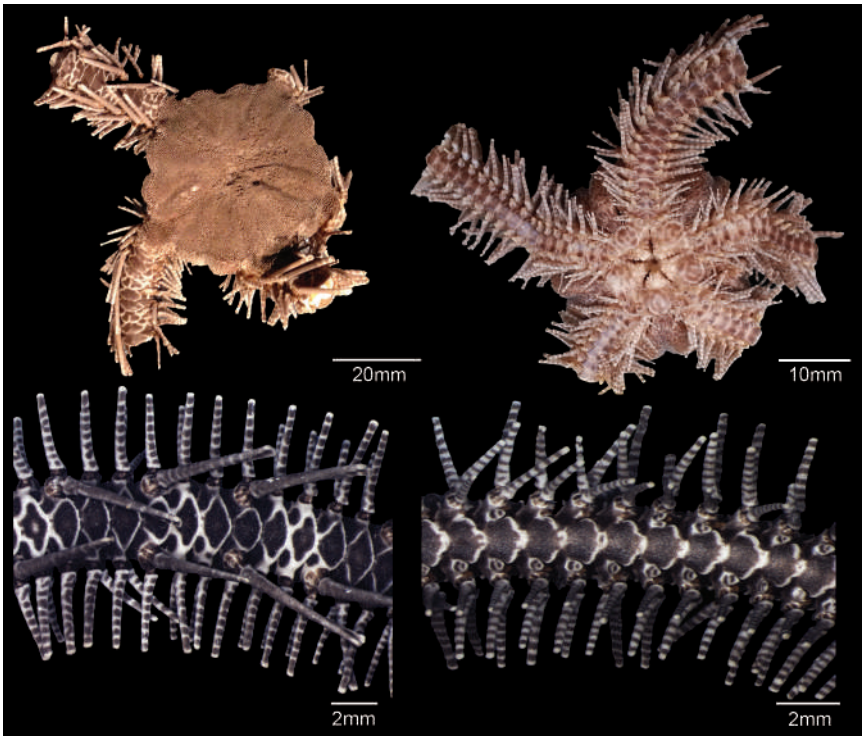

Fig. 173. Dorsal disc (top left), ventral disc (top right), dorsal arms (bottom left), ventral arms (bottom right) views of *Ophiomastix koehleri* (SAMC A28130).

Ophiomastix venosa Peters, 1851

Ophiomastix venosa Peters, 1851: 464-465; Lütken 1869: 44; Lyman 1882: 175; Koehler 1904a: 73-74, figs 28, 29; Clark 1915a: 296; Clark 1921: 134, 138; 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, fig. 63, pl. 14, figs 1, 2; Sloan *et al.* 1979: 109-111; Tortonese 1980: 117, 128, fig. 12; Humpreys 1981: 10, 25; Olbers *et al.* 2015: 96, 98, pl. 4C, D.

Diagnosis – Adapted from Clark & Courtman-Stock (1976), Devaney (1978) and Cherbonnier & Guille (1978). D.D. up to 36 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 interradial 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, reaching disc margin, genital papillae absent. Oral shields slightly wider than long, adoral shields triangular, not contiguous. Arm spines 2-4, alternating in number, cigar-shaped, but tapering with darker longitudinal line, on every 2-3 segments, upper arm spine enlarged with clavate, cloven or digitate tip, *c.* 3.5 - 4 times segment length, longitudinal line absent on largest spines, other arm spines *c.* twice segment length. Dorsal arm plates broad 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, arm spines with longitudinal dark stripe, dorsal arm plates brownish with a darker faded line down length of arm, ventrally uniformly light brown.

Distribution and habitat – Mozambique, Tanzania, Kenya, Somalia, Mascarene Basin, Madagascar, Rodriguez, Comoros, Aldabra, Seychelles, Bay of Bengal, Philippines (Clark & Rowe 1971; Cherbonnier & Guille 1978; Devaney 1978; Tortonese 1980), South Africa: Coffee Bay (EC) to Sodwana Bay (KZN); depth range: 0-21 m. Habitat: shallow lagoons, often on sand and rubble, algal carpet, under boulders, coral heads, and *Porites* in lagoonal seagrass beds, may be in same habitat with *Ophiocoma scolopendrina.*

Remarks – Type locality is Mozambique, syntypes are in the Museum of Natural History of Berlin (ZMB Ech 965, ZMB Ech 977, ZMB Ech 978 and ZMB Ech 979), depth unknown.

Fig. 174. Distribution of *Ophiomastix venosa* in South Africa.

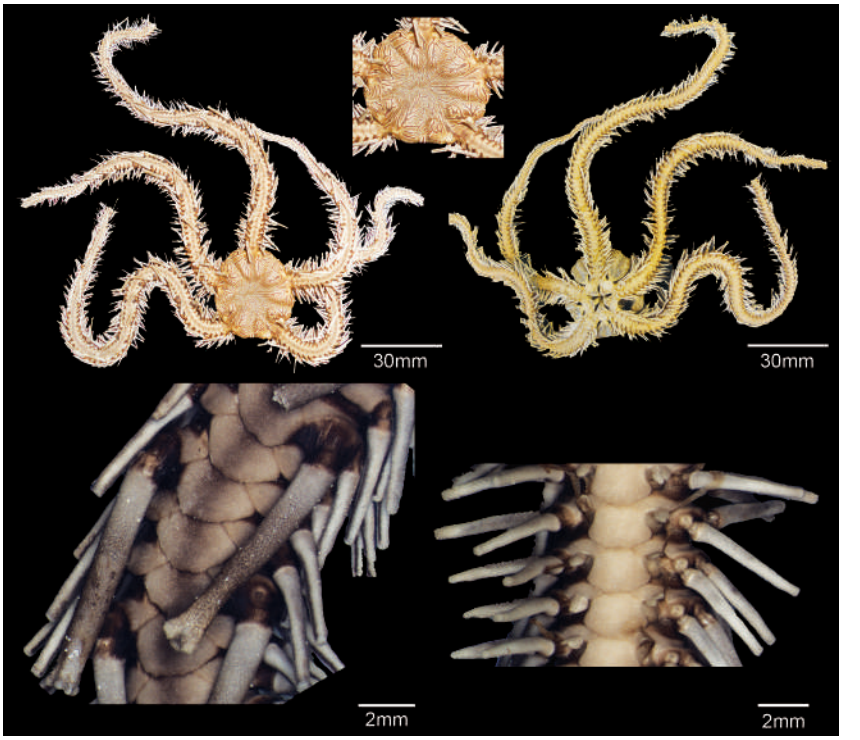

Fig. 175. Dorsal whole (top left), ventral whole (top right), dorsal arm plates (bottom left) and ventral arm plates (bottom right), dorsal disc (inset) of *Ophiomastix venosa* (RMCA MT2353).

4.5. Order OPHIOLEUCIDA O'Hara *et al.*, 2017
4.5.1. Family OPHIERNIDAE O'Hara *et al.*, 2018

Genus ***Ophiernus*** Lyman, 1878

Diagnosis – Adapted from Lyman (1878) and Madsen (1977). Disc bearing granules on thick skin. Radial shields usually naked and conspicuous. Arms long and more-or-less flattened. Dorsal arm plates well-developed, contiguous, in some species 3-6 proximal-most plates form triangular-shaped areas covered in skin. Ventral arm plates whole, contiguous. Arm spines small, smooth. In the South African species, only *O. vallincola* has the bristle-like supplementary arm spines, distally directed, appressed and placed in a furrow along the thickened edge of the lateral edge on the lateral arm plate characteristic of the genus. Adoral shields broadly separate oral shields from lateral arm plates and usually contiguous with lateral arm plates. Tentacle pores large, first pair within disc with three scales. Tentacle scales two, in series with three from first tentacle pores, may or may not completely cover tentacle pores. Genital slits long.

Ophiernus quadrispinus Koehler, 1908

Ophiernus quadrispinus Koehler, 1908a: 533, 601-602; pl. 10, figs 102, 103; Koehler 1908b: 142, 146; Madsen 1977: 120-121, fig. 7; Billett *et al.* 2013: 20-25; Olbers *et al.* 2015: 89, 91, pl. 2A, B.

Diagnosis – Adapted from Madsen (1977). D.D. up to 7 mm. Disc pentagonal, covered in plates both dorsally and ventrally, plates abutting radial shields and genital slits slightly larger. Sparse granules on disc margin extending onto margins of radial shields. Radial shields large, oval, longer than wide, separated by disc scales. Oral shields spearhead-shaped, naked. Adoral shields not distinct, extending up to first ventral arm plate, may or may not be contiguous proximally. Jaws long. Oral papillae 5-6, including two smaller papillae in series with scales around second oral pore. Teeth 3-4, tapering to blunt point. Genital slits as long as interradial 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 arm plates increasing in size distally, with 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 spines 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.

Distribution and habitat – Southern Ocean, Southern Atlantic, near the South Orkneys (Madsen 1977; Billett *et al.* 2013), South Africa: off Saldanha Bay (WC) to off Cape Town (WC); depth range: 1700-3250 m (Madsen 1977). Habitat: no details recorded.

Remarks – Similar to *O. vallincola* Lyman, 1878 except in disc granules, dorsal arm plates and the absence of bristles. The granules are less dense adjacent to radial shields and the dorsal arm plates much wider than long in *quadrispinus*. The most obvious difference is the absence of bristles on the lateral arm plates on *vallincola*. Type material is in the National Museums of Scotland (Z.1921.143.1242) from Scotia Station 313; 62°10' S, 041°20' W, 3195 m (Koehler 1908a).

Fig. 176. Distribution of *Ophiernus quadrispinus* in South Africa.

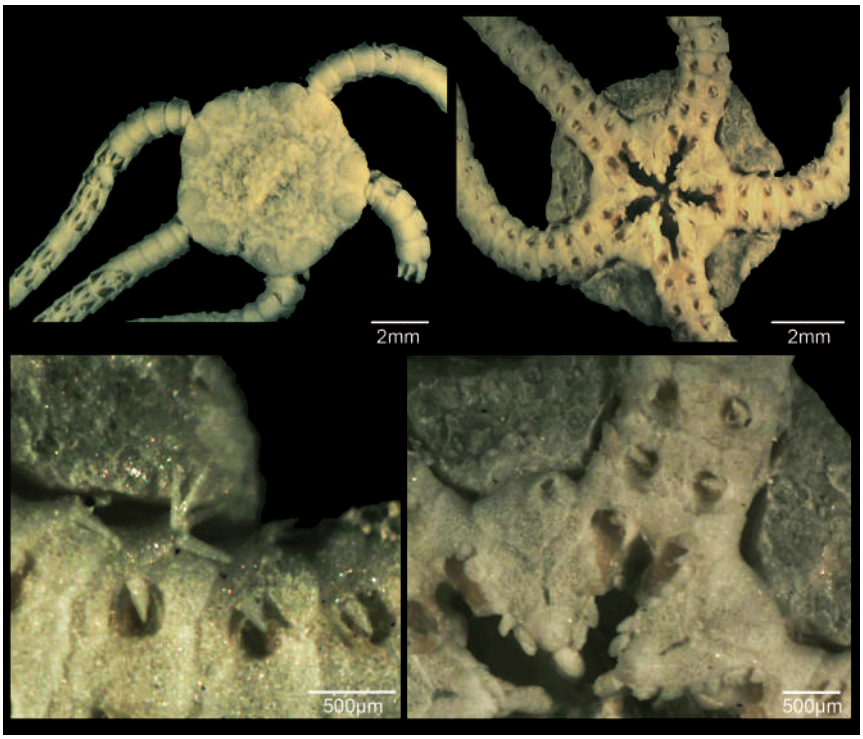

Fig. 177. Dorsal whole (top left), ventral disc (top right), basal tentacle scales (bottom left), jaws (bottom right) views of *Ophiernus quadrispinus* (SAMC A22018).

Ophiernus vallincola Lyman, 1878

Ophiernus vallincola Lyman, 1878: 122, pl. 6, figs 170-172; Lyman 1882: 32. pl. 24, figs 16-18, pl. 38, figs 6-9; Koehler 1896a: 244; Clark 1923: 365; Hertz 1927a: 114; Madsen 1977: 112-114, fig. 2; Clark & Courtman-Stock 1976: 185, 106, 124, fig. 201; Baker 1979: 33; Paterson 1985: 98-99, fig. 40a, b; Rowe & Gates 1995: 403; Mah *et al.* 2009: 397; Martynov 2010: 130, figs 5g, r, 11h.
Ophiernus abyssalis Koehler, 1896a: 242-244; Koehler 1909b: 138, 143-145, pl. 28, figs 3-4.

Diagnosis – Adapted from Clark & Courtman-Stock (1976). D.D. up to 20 mm. Disc round, skin naked, plates on periphery of disc around radial shields developed with granules extending onto margins of radial shields. Radial shields distinct, separated, oval or round with proximal edge tapering slightly. Ventral interradial areas have few scattered minute granules (not all specimens). Oral shields spearhead-shaped, naked. Adoral shields not distinct, extending up to first ventral arm plate, may or may not be contiguous proximally. Jaws moderately long. Oral papillae 5-6, including two smaller papillae in series with scales around second oral pore. Teeth 3-4, lowest sometimes tapering to blunt point. Ventral arm plates bell-shaped, first plate sunken, contiguous proximally becoming reduced and separated. Dorsal arm plates wider than long, distal edge straight proximally becoming convex. Lateral arm plates increasing in size distally, hosting arm spines. Arm spines three, cylindrical, pointed, longest spine as long as ventral arm plate, but generally shorter than a segment. Arm spines placed on mid-plate proximally, moving dorsally distally. Bristles present on dorsal side above arm spines. Arms moderately long, dorsal arm with slight keel. Genital slits almost as long as interradial area, with distinct genital plate distally, no genital papillae. Tentacle scales two, seldom three, rounded, equal in size, some distal scales pointed.

Distribution and habitat – Mozambique, Atlantic Ocean, Pacific Ocean, south west Ireland, Bay of Biscay and Azores (Mortensen 1933d, Paterson 1985), South Africa: off Saldanha Bay (WC) to off Cape Town (WC); depth range: 460-4065 m. Habitat: green mud.

Fig. 178. Distribution of *Ophiernus vallincola* in South Africa.

Remarks – The granules on the disc and radial shields were not distinct on the specimens examined, however, Clark & Courtman (1976) did state that the granules are easily rubbed off. The type locality is west of Azores at 1830 m depth. Syntypes are known to be housed in the Museum of Comparative Zoology, MCZ OPH-397 (2 specimens) and MCZ OPH-844 (2 specimens) (Rowe & Gates 1995).

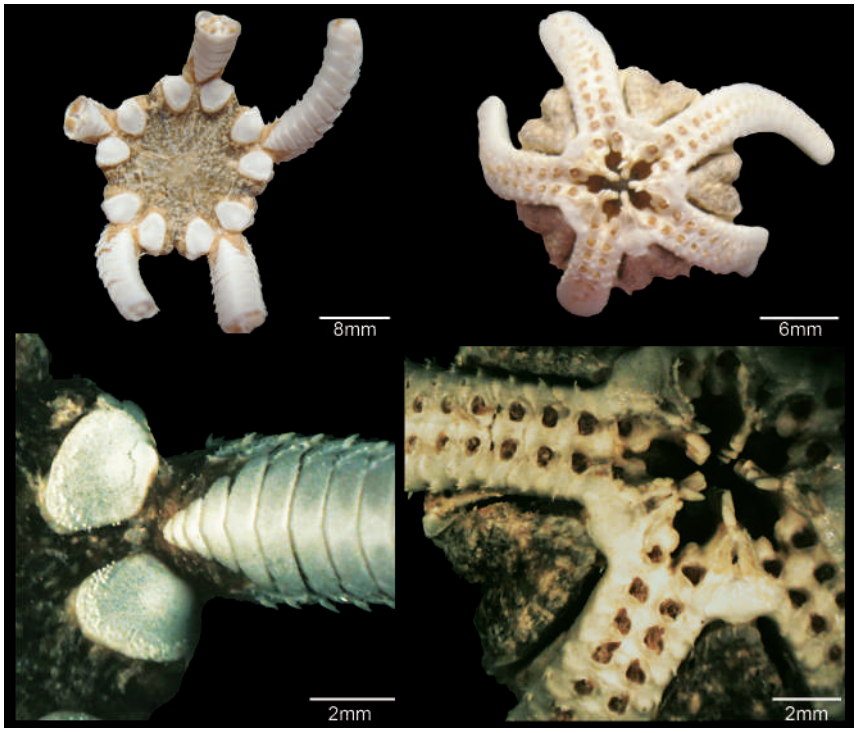

Fig. 179. Dorsal whole (top left), ventral disc (top right), radial shields (bottom left), ventral interradial area and jaws (bottom right) views of *Ophiernus vallincola* (SAMC A7539).

4.5.2. Family OPHIOLEUCIDAE Matsumoto, 1915

Genus ***Ophiopallas*** Koehler, 1904

Diagnosis – Adapted from Koehler (1904) and Madsen (1983). Dorsal disc covered in granules. Dorsal arm plates well-developed, widely in contact. Ventral arm plates contiguous. Arm spines 2-8, minute, comb-like accessory arm spines. Tentacle pores with 1-2 flat tentacle scales. Genital slit extending up onto dorsal side with papillae.

Ophiopallas paradoxa Koehler, 1904

Ophiopallas paradoxa Koehler, 1904a: 12-13, pl. 3, figs 1-3; Clark 1915a: 348; Koehler 1922b: 436-437, pl. 79, figs 1, 2; Koehler 1930: 280; Clark 1974: 477-478, fig. 15; Clark & Courtman-Stock 1976: 106, 124, 186, figs 199, 203; Baker 1979: 32, 34, fig. 4c; Madsen 1983: 54-57, figs 1e, f, 10a, b, 11; Liao & Clark 1995: 288, fig 161; Rowe & Gates 1995: 404; O'Hara 2008b: 30; Mah *et al.* 2009: 397; Martynov 2010: 38, fig. 26i, j; Stöhr 2011a: 28, fig. 11d.
Ophiopallas paradoxa altera Hertz, 1927a: 110, pl. 9, fig. 5.

Diagnosis – Adapted from Clark & Courtman-Stock (1976). D.D. up to 6 mm. Disc round, covered in granules dorsally and ventrally, extending onto radial shields. Radial shields moderate in size, triangular with round corners, radial shield margins contiguous, but concealed by disc scaling. Oral shields very large, naked, longer than wide, indented laterally just over midway, with broad distal lobe. Adoral shields not distinct, not contiguous, narrow. Few scattered granules on jaws. Oral papillae 4-6, distalmost large and opercular in series with second oral tentacle scale, apical papillae sometimes paired. Teeth two, equal in size and shape as apical papillae. Genital slits long, elongated and reach up onto dorsal disc, genital papillae present, slightly elongated, continuous with the granules on the disc. Arms flattened ventrally and have keel dorsally, tapering. Dorsal arm plates wider than long, becoming longer than wide distally, distal edge straight or slightly rounded, contiguous, granules extend onto first dorsal arm plate. Ventral arm plates rectangular but restricted on sides by tentacle pores, distal edge convex. Arm spines up to eight, slender, uppermost up to one-and-a-half times segment length, lowermost shortest, *c.* half as long as segment. Tiny accessory arm spines from segments 15 present, comb-like, glassy, curved, bifurcate and can only be seen at high magnification. Tentacle scales large, oval, one except on first segment, where there are two.

Distribution and habitat – New Zealand, Australia, East Indies, Indonesia, Philippines, Mozambique (Koehler 1904a; Clark 1915a; Hertz 1927a; Koehler 1930; Clark 1974; Clark & Courtman-Stock 1976; Baker 1979; Madsen 1983; Liao

Fig. 180. Distribution of *Ophiopallas paradoxa* in South Africa.

& Clark 1995; Rowe & Gates 1995; Mah *et al.* 2009), South Africa: Sodwana Bay (KZN); depth range: 200-500 m. Habitat: coarse shelly sand.

Remarks – Single South African specimen found at Sodwana Bay. The specimen examined was in poor condition with the highest arm spine count being five.

The type locality is Macassar (between Celebes and Borneo), Gilolo Passage (New Guinea) and Banda Sea (Indonesia) (Rowe & Gates 1995) with the lectotype being designated by Madsen (1983) as Siboga Station 159, Banda Sea, depth 411 m. Type material is in the Zoological Museum Amsterdam (now Naturalis) (ZMA.ECH.O.2435; ZMA.ECH.O.2436; ZMA.ECH.O.2437; ZMA.ECH.O.2438; ZMA.ECH.O.2439 and ZMA.ECH.O.2440; Joke Bleeker, pers. comm.).

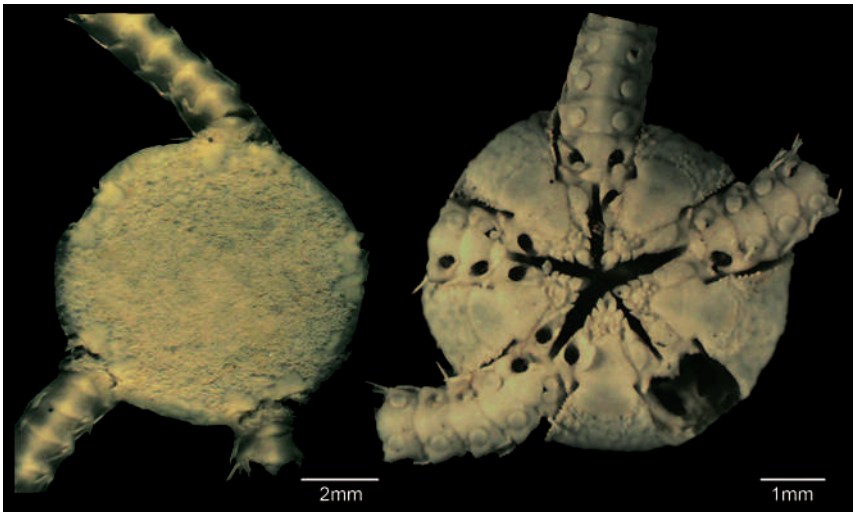

Fig. 181. Dorsal (left) and ventral (right) views of *Ophiopallas paradoxa* (SAMC A22801).

4.6. Order AMPHILEPIDIDA O'Hara *et al.*, 2018
4.6.1. Family OPHIOLEPIDIDAE Ljungman, 1867

Genus ***Ophiolepis*** Müller & Troschel, 1840

Diagnosis – Adapted from Müller & Troschel (1840) and Lyman (1882). Disc covered in thick plates surrounded by smaller plates, disc notched at each arm base. Teeth present, no dental papillae. Oral papillae numerous. Adoral shields wide, may or may not be contiguous. Genital slits two per interradius, thin, genital plates distinct. Supplementary dorsal arm plates present. Arm spines short, small.

Ophiolepis cincta cincta Müller & Troschel, 1842

Ophiolepis cincta Müller & Troschel, 1842: 90; Lyman 1865: 60; Lyman 1882: 19, pl. 37, figs 7-9; Studer 1882: 7; Koehler 1905a: 16-17; Clark 1915a: 342; Clark 1921: 143; Mortensen 1933a: 382-383; Balinsky 1957: 28; Kalk 1958: 207, 216, 238; Macnae & Kalk 1969: 106, 130; Clark & Rowe 1971: 90-91, 129, fig. 46c; Clark & Courtman-Stock 1976: 107, 125, 189-190, fig. 196; Hughes & Gamble 1977: 355; Cherbonnier & Guille 1978: 232-234, fig. 74a-g; Guille & Vadon 1985: 64; Marsh 1986: 72; Vine 1986: 195; Rowe & Gates 1995: 434; Liao & Clark 1995: 292-293, fig. 163, pl. 19, figs 4, 5; Mbongwa 2013: 16.
Ophiolepis garretti Lyman 1862: 77-78; Lyman 1865: 61, pl. 2, fig. 4.
Ophioelegans cincta James 1981: 15-17, pl. 1A.

Diagnosis – Adapted from Clark & Courtman-Stock (1976) and Cherbonnier & Guille (1978). D.D. up to 18 mm. Disc pentagonal, covered dorsally and ventrally with smooth, imbricating plates, plates surrounded by smaller plates both dorsally and ventrally. Radial shields smooth, elongated, no larger than largest disc plates. Oral shields spearhead-shaped with distal lobe and rounded distal end, as long as wide. Adoral shields broad, contiguous. Oral papillae 3-4, broad, in series with oral tentacle scale. Teeth present, broad, rounded. Genital slits long, narrow, reaching edge of disc margin, genital plates distinct. Dorsal arm plates wider than long, supplementary smaller plates bordering lateral and distal edges of each dorsal arm plate. Ventral arm plates almost square basally, becoming strongly fan-shaped distally and narrowly contiguous. Arm spines 3-4 (usually three), short, conical, about half segment length. Tentacle scales two, oval, large. Colour in life, disc pink to brown, irregularly marbled with grey, white or silver patches, arms banded.

Distribution and habitat – Western Indian Ocean, Red Sea, Seychelles, China, south Japan, Philippines, Australia, Fiji (Clark & Rowe 1971; Rowe & Gates 1995), South Africa: Aliwal Shoal (KZN) to Bhanga Nek (KZN); depth range: 0-20 m. Habitat: under boulders over sand and under coral debris.

Fig. 182. Distribution of *Ophiolepis cincta cincta* in South Africa.

Remarks – Easily recognisable by its pink, white and silver colouration. Type material is in the Museum of Natural History of Berlin (syntype: ZMB Ech 863), type locality is the Red Sea, depth unknown.

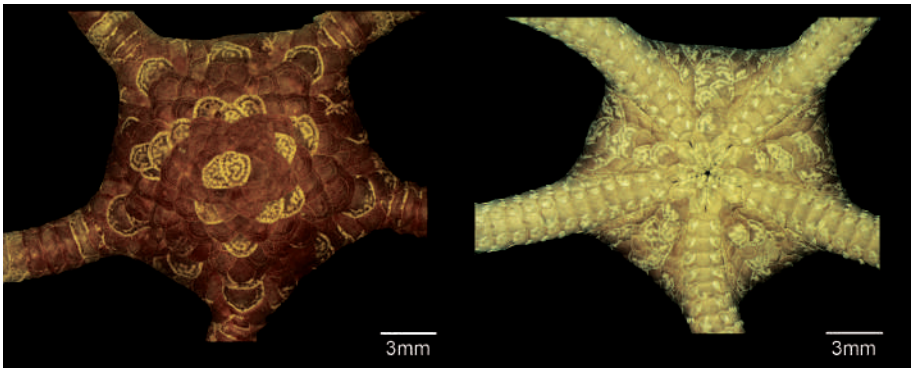

Fig. 183. Dorsal (left) and ventral (right) views of *Ophiolepis cincta cincta* (RMCA MT2316).

4.6.2. Family HEMIEURYALIDAE von Martens, 1867

Genus ***Ophioplocus*** Lyman, 1862

Diagnosis – Adapted from Lyman (1862) and Lyman (1882). Disc covered with close plates dorsally and ventrally. Teeth present. No dental papillae. Oral papillae present, closely set. Adoral shields wide, may or may not be contiguous. Genital slits two per interradius, short, extending only half-way to disc margin, genital plates indistinct. Dorsal arm plates fragmented. Arm spines three, stout.

Ophioplocus imbricatus (Müller & Troschel, 1842)

Ophiolepis imbricata Müller & Troschel, 1842: 93-94.
Ophioplocus tessellatus Lyman, 1862: 76-77; Lyman 1882: 20.
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; Clark 1915a: 344; Clark 1921: 143, pl. 12, fig. 8, pl. 35, figs 1-3; Koehler 1922a: 48, pl. 84, fig. 12; Koehler 1922b: 435-436; Clark 1938: 365-366; Clark 1946: 275-276; Clark & Rowe 1971: 90-91, 128; Cherbonnier & Guille 1978: 239-242, fig. 77a-f; Humpreys 1981: 11; Guille & Vadon 1985: 64; Rowe 1989: 287; Liao & Clark 1995: 298-299, fig. 169; Putchakarn & Sonchaeng 2004: 423; Stöhr *et al.* 2008: 547, 553; Olbers *et al.* 2015: 111-112, pl. 9C, D.
Ophioplocus imbricata: Rowe & Gates 1995: 435.

Diagnosis – Adapted from Clark & Rowe (1971) and Cherbonnier & Guille (1978). D.D. up to 26 mm. Disc round, disc plates slightly imbricated and distinct, with central plate present, plates naked. Radial shields small, elongated-oval, widely separated, naked. Genital slits small, short, quarter length of interradial 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, 4-5 oral papillae, distalmost being broadest, remaining papillae elliptical leaf-shaped, apical papillae bluntly pointed. Teeth four, rounded. Oral tentacle scale inside oral slit. 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 interradial areas, arms banded, ventrally brown but pale.

Distribution and habitat – Mozambique, Madagascar, Mascarene Basin**,** Reunion, Mauritius, Tanzania, Kenya, Aldabra, Somalia, Red Sea, Seychelles**,** Andaman Sea, Australia and New Zealand (Rowe & Gates 1995; Putchakarn & Sonchaeng 2004; Stöhr *et al.* 2008; Stöhr *et al.* 2018), South Africa: Sodwana Bay (KZN); depth range: 0-197 m. Habitat: grey sand and mud, angiosperm beds, bases of coral or patch reefs.

Remarks – Olbers *et al.* (2015) recorded this species as a new record for South Africa. Syntypes (RMNH.ECH.857) deposited in Naturalis with the type locality as Indian Ocean (Joke Bleeker, pers. comm.), depth unknown.

Fig. 184. Distribution of *Ophioplocus imbricatus* in South Africa.

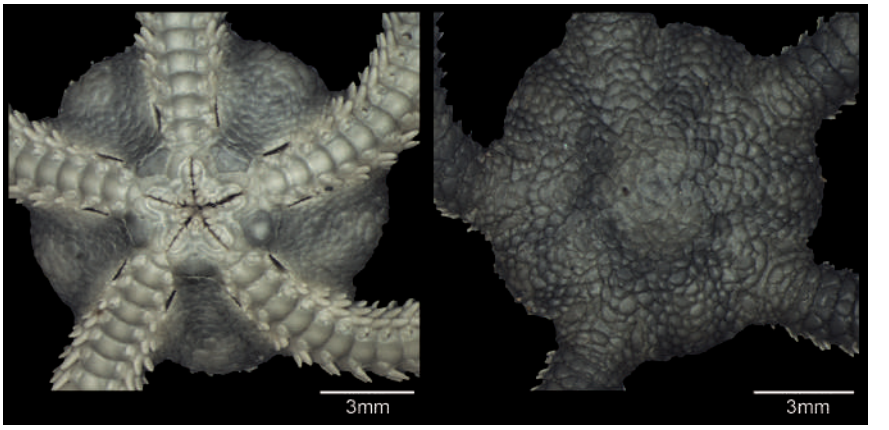

Fig. 185. Dorsal (left) and ventral (right) views of *Ophioplocus imbricatus* (RMCA MT2306).

4.6.3. Family AMPHILIMNIDAE O'Hara *et al.*, 2018

Genus ***Amphilimna*** Verrill, 1899

Diagnosis – Adapted from Verrill (1899b), Devaney (1974) and Thomas (1975). Disc with notch at base of each arm, disc plates may have spines or granules. Radial shields variable in size and shape, largely in contact. Oral papillae 2-6. Ventral arm plates abruptly widen distally. Arm spines 6-10, ones under disc flattened and fused to form a flange. Tentacle pores very large and open. Tentacle scales spiniform, round or flat, two (rarely one).

Amphilimna cribriformis Clark, 1974

Amphilimna cribriformis Clark, 1974: 442-444, fig. 1a-d; Thomas 1975: 131, 132, 137; Clark & Courtman-Stock 1976: 122, 165, 166, figs 182, 183; Liao 1989: 342; Olbers *et al.* 2015: 92, pl. 2C, D.

Diagnosis – Adapted from Clark (1974) and Clark & Courtman-Stock (1976). D.D. up to 6.5 mm. Disc round, indented radially, uniformly white both dorsally and ventrally due to preservation. Dorsal and ventral disc covered in medium-sized fine disc plates with scattered, tapering, sharp spinelets, no change in spinelet, scale density or size on disc margin. Radial shields long, narrow, spines may be absent. 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, 2-4 asymmetrical apical oral papillae, three spinose distal papillae, two distalmost being on edge of adoral shield. Teeth single, broad with small elongated oral tentacle scale either side. Genital plates

large, lie at angle in which they appear to be overlapping, each plate with two stout spines at dorsal end. Arms long and thin, first 2-4 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 shields, second arm plate 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 wide. Arm spines six, with first 7-9 arm plates with 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 1- *c.*10, outer scale small, inner scale spinose, resembling an arm spine, becoming reduced and eventually completely lost, single tentacle scales after segment ten.

Distribution and habitat – Mozambique (Clark 1974; Clark & Courtman-Stock 1976), South Africa: Umhlali (KZN) to North of Prince's Grant (KZN); depth range: 86-200 m. Habitat: sandy mud.

Remarks – Olbers *et al.* (2015) stated that the holotype in the Iziko South African Museum (SAMC A22784) had disintegrated and they suggested a neotype be erected from the paratype SAMC A22787. Additional paratypes (examined) located in Iziko South African Museum include SAMC A22790, SAMC A22786, SAMC A22785, SAMC A22788, SAMC A22787, SAMC A22789 and SAMC A22791. Type locality off Ballito, depth 118 m.

Fig. 186. Distribution of *Amphilimna cribriformis* in South Africa.

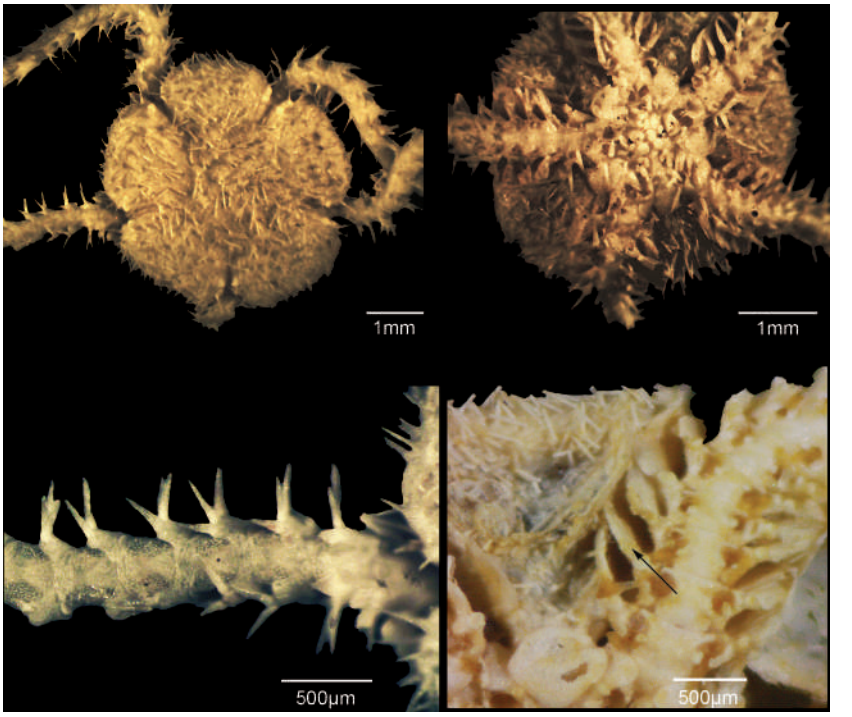

Fig. 187. Dorsal disc (top left), ventral disc (top right), dorsal arm plates (bottom left), webbed arm spines as indicated by the arrow (bottom right) views of *Amphilimna cribriformis* (SAMC A22787).

Amphilimna valida (H.L. Clark, 1939)

Anamphiura valida Clark H.L., 1939: 70-72, figs 26A, 27; Clark 1974: 478-479, fig. 16; Clark & Courtman-Stock 1976: 104, 166-167.
Amphilimna valida: Thomas 1975: 134-135, 137.

Diagnosis – Adapted from Thomas (1975) and Clark & Courtman-Stock (1976). D.D. up to 5 mm, D.D./A.L.= 1/2. Disc pentagonal, primary rosette distinct, disc plates large and convex with some smaller overlapping plates away from primary rosette. Disc with scattered spines, mostly on disc margin and ventral interradial areas. Radial shields short, moderately wide, one-third of disc radius, contiguous on proximal side and gaping distally. Genital plates with spines distal to radial shields which give appearance of arm combs. Genital slits long, genital plates large, no genital papillae. Ventral interradial area covered in overlapping plates. Oral shields diamond-shaped, broad with rounded angles. Adoral shields contiguous. Oral papillae 2-3, infradental papillae on apex of the jaw, flanked by first oral tentacle scale with a diastema before 2-3 oral papillae attached to adoral

shield. Arms short. First dorsal arm plate small, broadly in contact, remaining plates fan-shaped, narrowly in contact. Ventral arm plates constricted by large tentacle pores, distal angle obtuse, contiguous. Arm spines 5-6, short, conical, lowest about one segment length, uppermost shortest, half segment length, spines on first one or two arm segments are flattened and form a flange. Tentacle scales one, large rounded, sometimes two on first segment.

Distribution and habitat – Zanzibar, Tanzania (Clark H.L. 1939), South Africa: off Durban (KZN) to off Umhlanga River mouth (KZN); depth range: 238-350 m. Habitat: sandy mud.

Remarks – Thomas (1975) argued that *Anamphiura valida* belongs to the genus *Amphilimna* Verrill, 1899. Clark & Courtman-Stock (1976) did not agree that *Amphilimna valida* (Clark H.L., 1939) was a valid combination and retained the South African specimen as *Anamphiura valida*. In this study, *Anamphiura valida* was treated as a synonym to *Amphilimna valida* in accordance with Stöhr (2007). Historically *Amphilimna* has been considered an ophiacanthid or an amphiurid, however, O'Hara *et al.* (2017) found that it formed its own family sister to the Ophionereididae.

Clark (1974) recorded the locality of the South African specimen as near the Tugela River mouth, but the co-ordinates are in fact closer to the Umhlanga River mouth. In addition, Clark (1974) placed this species as *Anamphiura valida* into the family Amphiuridae and classified it as *incertae sedis.*

The holotype is in the Natural History Museum in London (NHMUK 1948.5.26.87) and the type locality is off Zanzibar, 238-293 m. In addition, the Smithsonian Institution, holds five specimens from Durban (USNM E42872), collected by the *Anton Bruun*, depth 350 m.

Fig. 188. Distribution of *Amphilimna valida* in South Africa.

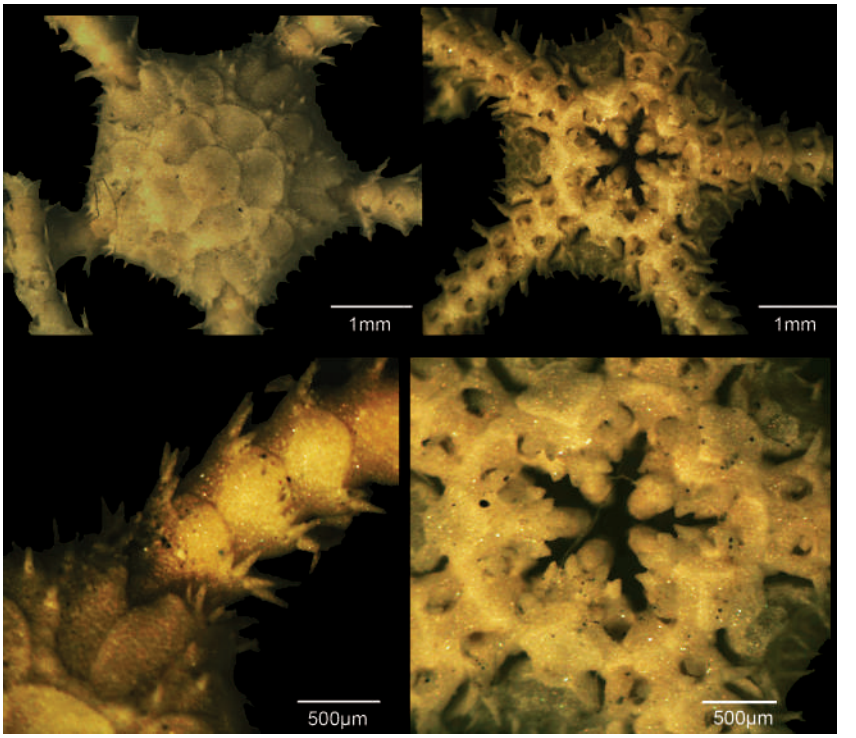

Fig. 189. Dorsal disc (top left), ventral disc (top right), radial shields and basal arms (bottom left), jaws (bottom right) views of *Amphilimna valida* (SAMC A23231).

4.6.4. Family OPHIONEREIDIDAE Ljungman, 1867

Genus ***Ophionereis*** Lütken, 1859

Diagnosis – Adapted from Clark (1953) and Clark & Courtman-Stock (1976). Characteristics as for family and distinguished by presence of a pair of supplementary dorsal arm plates.

Ophionereis australis (Clark, 1923)

Ophiochiton australis Clark, 1923: 345-347, fig. 3, pl. 20, figs 1, 2.
Ophionereis australis: Mortensen 1933a: 374-375, fig. 77; Clark & Courtman-Stock 1976: 106, 124, 179, fig. 195; Clark 1953: 66, 67; Balinsky 1957: 24; Kalk 1958: 207; Rowe & Gates 1995: 407; Macnae & Kalk, 1969: 130.

Diagnosis – Adapted from Clark (1923). D.D. up to 11 mm. Disc pentagonal, fully scaled, plates coarse, distinct with radiating pattern dorsally. Radial shields small, widely separated, oval to pear-shaped, distinct. Oral shields oval to spearhead-shaped, longer than wide, adoral shields distinct, not contiguous. Oral papillae four, distalmost broad, remaining three elliptical leaf-shaped. Teeth broad. Dental papillae absent. Genital slits entire interradial length, genital papillae bordering proximal ends of slits. Dorsal arm plates broad fan-shaped, wider than long, convex, being in contact for at least half of width of proximal margin, bordered by distinct triangular supplementary dorsal arm plates, *c.* no less than half-length of dorsal arm plate. Ventral arm plates fan-shaped, widest distally, distal side convex, longer than wide. Arm spines three, thick, short, blunt, erect, equal in size, just shorter than segment length. Tentacle scale single, oval and large. Colour in life light brown, slightly lighter on ventral side, radial shields whitish with darker brown margin, making them distinct.

Distribution and habitat – Mozambique and Australia (Clark & Courtman-Stock 1976; Rowe & Gates 1995), South Africa: Amanzimtoti (KZN) to Sodwana Bay (KZN); depth range: 0-205 m. Habitat: shell, rock, sand, gravelly bottom with worm tubes.

Remarks – In the original description, Clark noted “a complete absence of supplementary upper arm plates”, but his drawing clearly shows these supplementary plates, especially in the first couple of free segments. Mortensen (1933a) was the first to note Clark’s error, and transferred this species from *Ophiochiton* to *Ophionereis*. We have observed supplementary dorsal arm plates for up to half the length of the arm, in the examined material.

The type material is in the Iziko South African Museum (holotype: SAMC A6439) and the Museum of Comparative Zoology (paratype: MCZ OPH-4357), with the type locality being off the Tugela River mouth, depth 86 m.

Fig. 190. Distribution of *Ophionereis australis* in South Africa.

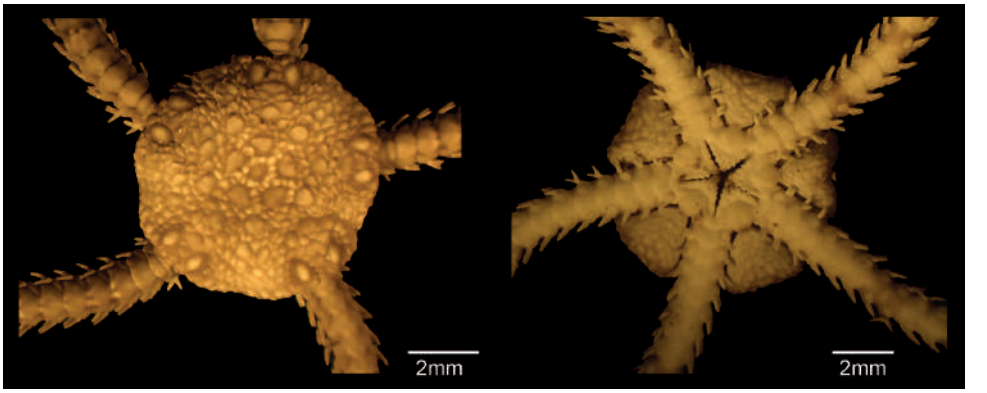

Fig. 191. Dorsal (left) and ventral (right) views of *Ophionereis australis* (SAMC A088277).

Ophionereis dubia dubia (Müller & Troschel, 1842)

Ophiolepis dubia Müller & Troschel, 1842: 94; Day *et al.* 1970: 81.
Ophionereis dubia: Lyman 1865: 146; Ljungman 1867: 310; Duncan 1879: 448, 480; Lyman 1882: 161, 286, 299, 311, 325; Bell 1909: 19; Clark 1915a: 289; Clark 1923: 343-344; Burfield 1924: 152; Mortensen 1933a: 374; Stephenson *et al.* 1937: 380; Clark 1946: 239-240; Clark 1953: 83-88, figs 9, 10; Day *et al.* 1970: 81; Clark & Rowe 1971: 122; Clark & Courtman-Stock 1976: 106, 124, 179-180, fig. 193; Hughes & Gamble 1977: 355; Cherbonnier & Guille 1978: 203-205, figs 67a-f; Irimura 1979: 5; Humpreys 1981: 10, 25; Irimura 1981: 46; Price 1981: 7, 10; Irimura 1982: 71-72, fig. 43, pl. 2, fig. 6, pl. 13, fig. 1; Guille & Vadon 1985: 63; Vine 1986: 195; Rowe & Gates 1995: 408; Price & Rowe 1996: 77; Marsh & Morrison 2004: 296; Putchakarn & Sonchaeng 2004: 423; Milne 2012: 155.
Ophionereis dubia sinensis Duncan, 1879: 464.
Ophiocrasis dictydisca Clark, 1911: 175-177, fig. 179.
Ophiocrasis marktanneri Matsumoto, 1915: 90-91.
Ophionereis stigma Clark, 1938: 325-327; Clark 1946: 237, 239.
Ophionereis dubia dubia: Liao & Clark 1995: 274-275, fig. 151.

Diagnosis – Adapted from Clark & Courtman-Stock (1976) and Cherbonnier & Guille (1978). D.D. up to 9 mm. Disc round, smooth, plates very fine, no armament. Characteristic 'V' or 'Y' at base of radial shields. Disc scaling moderately fine, continuing off disc onto first dorsal arm plates, ventral scaling complete to jaws. Radial shields small, fairly narrow or oval and well-separated. Oral shields large, spearhead-shaped or oval, longer than wide. Adoral shields wide-triangular, moderate in size, not contiguous. Oral papillae 4-5, distalmost papillae being widest. Teeth lowermost rounded, others square. Genital slits reach disc margin, no genital papillae, genital plates slightly enlarged. Arms long and slender, banded

approximately every 3-5 segments. Dorsal arm plates trapezoid, distal edge rounded, as wide as long. Supplementary dorsal arm plates triangular, length of dorsal arm plate becoming smaller distally. Ventral arm plates rhombic or square, distal edge straight or somewhat convex, distally becoming pentagonal. Arm spines three, thick, stout, somewhat appressed to arms, same length as segment, single light brown band, uppermost spine slightly shorter with middle spine longest, tapering to blunt points. Tentacle scale single, oval. Colour in life pale yellow or greyish yellow green with reddish or dark brown reticulation on dorsal disc, arms banded dorsally only, reddish purple, brown or yellow.

Distribution and habitat – Red Sea, Persian Gulf, west India, Pakistan, Maldive area, Ceylon, Bay of Bengal, East Indies, China, south Japan, Philippines and Australia (Burfield 1924; Clark & Rowe 1971; Tortonese 1980; Liao & Clark 1995; Rowe & Gates 1995; Richmond 2002), South Africa: Elands Bay (WC) to Bhanga Nek (KZN); depth range: 0-230 m. Habitat: sand, shell, white mud, coral rubble and rock.

Fig. 192. Distribution of *Ophionereis dubia dubia* in South Africa.

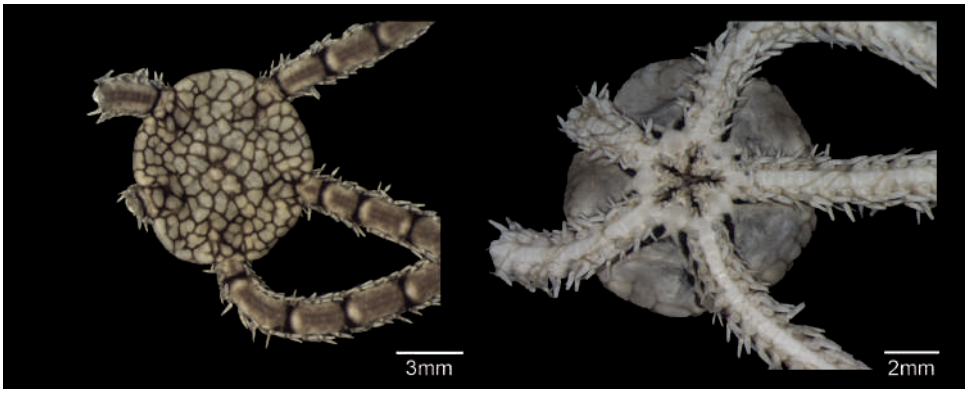

Fig. 193. Dorsal (left) and ventral (right) views of *Ophionereis dubia dubia* (RMCA MT2360).

Remarks – Distribution range was extended both west and east within South Africa. The type material whereabouts is undetermined and the type locality is the Red Sea.

Ophionereis porrecta Lyman, 1861

Ophionereis porrecta Lyman, 1861: 260-261; Lyman 1865: 147, figs 14, 15; Ljungman 1867: 310; Lyman 1882: 161, 162, 305, 311, 314, 325; Marktanner-Turneretscher 1887: 302; Koehler 1898b: 75-77; Koehler 1905a: 53-54; Clark 1915a: 289; Clark 1917: 440; Clark 1921: 117, pl. 12, fig. 6, pl. 33, figs 2, 3; Clark 1923: 344-345; Mortensen 1933a: 373-374; Clark 1946: 238; Clark 1953: 80-81; Balinsky 1957: 24; Kalk 1958: 207; Clark 1967: 44; Macnae & Kalk 1969: 130; Clark & Rowe 1971: 122, fig. 40; Devaney 1974: 108, 114, 174-175; Clark & Courtman-Stock 1976: 106, 124, 180; Hughes & Gamble 1977: 355; Cherbonnier & Guille 1978: 207-211, figs 69, 70; Sloan *et al.* 1979: 111; Humpreys 1981: 25-26; Guille & Vadon 1985: 64; Marsh 1986: 71; Vine 1986: 195; Sastry 1991: 383; Liao & Clark 1995: 275-276, fig.152; Rowe & Gates 1995: 409; Putchakarn & Sonchaeng 2004: 423; Stöhr *et al.* 2008: 547, 553, fig. 5C; Stöhr 2011a: 35-36, figs 14B, 16; Mbongwa 2013: 16.
Ophionereis crassispina Ljungman, 1867: 311.
Ophionereis squamata Ljungman, 1867: 310-311.
Ophionereis sophiae Brock, 1888: 490-491.
Ophionereis aplacophora Murakami, 1943b: 215-217, fig. 2.

Diagnosis – Adapted from Clark & Courtman-Stock (1976) and Cherbonnier & Guille (1978). D.D. up to 15 mm. Disc round, plates imbricating and distinct, dorsal plates naked, interradial plates smaller than peripheral and radial plates, ventral plates slightly smaller with few rounded granules or tubercles close to the oral area. Radial shields small, elongated oval, not always distinct, well-separated. Oral shields large, spearhead or teardrop-shaped, longer than wide. Adoral shields wide-triangular, moderate in size, not contiguous. Oral papillae 5-6, rounded, distalmost pointed and arises from adoral shield. Teeth 4-5, lowermost rounded, others square. Genital slits reach disc margin, genital papillae present. Arms long and slender, banded approximately every third segment. Dorsal arm plates trapezoidal, distal side flat, wider than long, broader in the proximal end, variety of patterns and colours including blotches and spots and alternating pale and dark patches in the lateral edges. Supplementary dorsal arm plates present along whole arm, one segment length becoming smaller distally. Ventral arm plates square with rounded edges, distal end may be concave or straight, becoming longer than wide distally. Arm spines three, conical, middle spine larger, especially in first half of arm, one-and-a-half times segment length, remaining spines slightly shorter *c.* one segment in length, sometimes banded. Tentacle scale single, elongated oval. Colour in life, disc mottled or spotted in brown, white, grey and yellow with irregular darker markings or blotches, arms banded with similar colouration to disc.

Distribution and habitat – East coast of Africa, Red Sea, Maldives, India, East Indies, Bay of Bengal, Ceylon, China, south Japan, Philippines, Australia, Gilbert

Islands, Saipan, South Pacific islands, Hawaiian Islands (Clark 1953; Kalk 1958; Clark & Rowe 1971; Sastry 1991; Rowe & Gates 1995), South Africa: Cape Town (WC) to Kosi Bay (KZN); depth range: 0-165 m. Habitat: rock, coral sand, shell and stones.

Remarks – According to Rowe & Gates (1995) the types are in the Museum of Comparative Zoology (holotype: MCZ OPH-1592 and paratype: MCZ OPH-4105). The type locality is the Sandwich Islands, Pacific Ocean. Hoareau *et al.* (2013) found more than one species within what is now considered to be *O. porrecta*.

Fig. 194. Distribution of *Ophionereis porrecta* in South Africa.

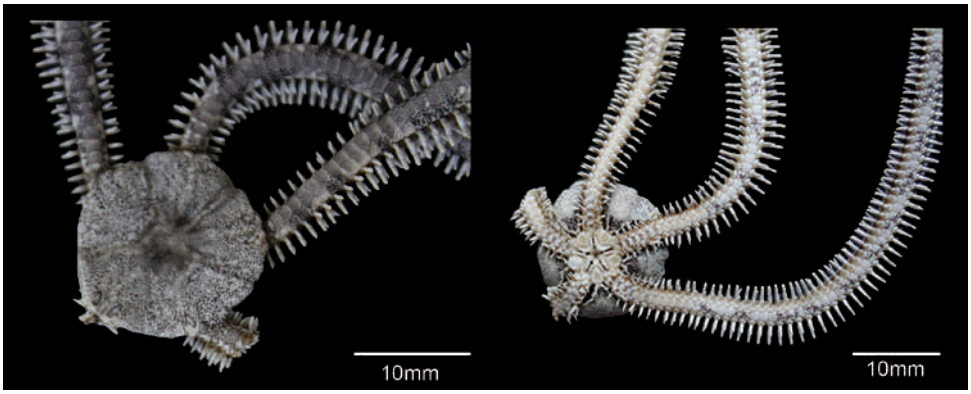

Fig. 195. Dorsal (left) and ventral (right) views of *Ophionereis porrecta* (EKZNW AS_2_JMO_2008).

Ophionereis vivipara Mortensen, 1933

Ophionereis vivipara Mortensen, 1933b: 191-192, fig. 7; Clark 1953: 66, 70; Balinsky 1957: 24; Kalk 1958: 237; Macnae & Kalk 1969: 130; Clark & Rowe 1971: 122; Clark & Courtman-Stock 1976: 106, 124, 180-181; Clark 1980: 545.

Diagnosis – Adapted from Mortensen (1933b) and Clark & Courtman-Stock (1976). D.D. up to 3 mm, D.D./A.L. = 1/5. Disc pentagonal, scaling minute with primary plates not distinguishable, scaling extending onto first segment of dorsal arms. Ventrally, the scaling becomes coarser towards oral area. Radial shields small, narrow or not distinguishable, well-separated. Oral shields rounded-triangular. Adoral shields well-developed, wide, contiguous. Oral papillae four, erect, apical papillae slightly larger and distalmost widest. Teeth lowermost rounded. Genital slits reach disc margin, genital papillae absent. Arms long and slender, banded approximately every 4-6 segments. Dorsal arm plates elongated rhomboidal or diamond-shaped, narrowly contiguous, longer than wide. Supplementary dorsal arm plates large, distinct concentric lines on distal side of plates. Ventral arm plates only just contiguous, longer than wide, proximal side pointed, distal side slightly convex, first ventral arm plate elongated and narrow, second plate broadly contiguous with first plate. Arm spines three, slender, only just as long as segment. Tentacle scale single, large, elongated-oval. Colour in life, disc white with large reddish-brown dense spot in middle of disc, sometimes star-shaped with 'arms' of star reaching towards each arm, arms banded narrowly with same reddish-brown colour on every 4-6 segments.

Distribution and habitat – East Africa and Madagascar (Kalk 1958; Clark & Rowe 1971), South Africa: East London (EC); depth range: 0-84 m. Habitat: among green algae, occurring with *Amphipholis squamata* on shallow sandy bottom in intertidal zone.

Remarks – No specimens were available for examination. The material referred to by Clark & Courtman-Stock (1976) was not located during this study. Type material is recorded in the Museum of Comparative Zoology (syntype: MCZ OPH-5904)

Fig. 196. Distribution of *Ophionereis vivipara* in South Africa.

and the Natural History Museum of Denmark (paratype: ZMUC OPH-318). Type locality Cannoniers Point, Mauritius.

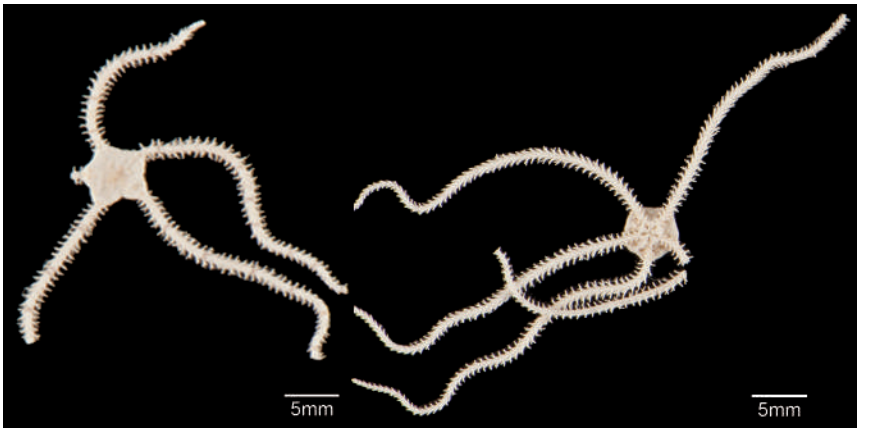

Fig. 197. Dorsal (left) and ventral (right) views of *Ophionereis vivipara* (ZMUC OPH-318).

4.6.5. Family OPHIOPSILIDAE Matsumoto, 1915

Genus ***Ophiopsila*** Forbes, 1843

Diagnosis – Adapted from Clark & Courtman-Stock (1976). Moderate size, disc with fine plates, radial shields distinct, bar-like. Oral shields rhombic with rounded angles or spearhead-shaped, proximal lobe may be truncated. Oral papillae 2-3, rounded or spiniform, separated from apical tooth by diastema in which the first oral tentacle scale can be seen. Dental papillae 3-7. Dorsal arm plates fan-shaped or hexagonal. Ventral arm plates pentagonal with rounded angles distally, may be contiguous. Arm spines numerous, about ten, flattened, lowermost longest, middle shortest. Tentacle scales two, inner one placed on ventral arm plate, long, sword-like and lying obliquely across ventral arm plate, outer scale short, papilliform or spiniform.

Ophiopsila bispinosa Clark,1974

Ophiopsila bispinosa Clark, 1974: 472-475, fig. 13; Clark & Courtman-Stock 1976: 105, 122, 177, figs 185, 188.

Diagnosis – Adapted from Clark (1974). D.D. up to 10 mm, D.D./A.L = 1/5. Arms 5-6. Disc round and puffy. Dorsal disc plates fine. Radial shields distinct, length two-thirds disc radius, narrow, not contiguous. Oral shields large, tumid, spearhead-shaped, with distal lobe longer than wide. Adoral shields usually contiguous, with distal lobe between oral shield and first lateral arm plate. Dental papillae 3-5

at apex, some have typical amphiurid-like pair with gap separating them. Oral papillae 2-3, spiniform, slightly flattened, separated from apical tooth by diastema in which the first oral tentacle scale can be seen, this being spiniform. Dorsal arm plates not distinct, equally wide as long, becoming fan-shaped, contiguous for less than half their breadth, longitudinal ridge running down arm. Ventral arm plates proximally wider than long, with middle of distal edge concave, becoming longer than wide and not contiguous distally. Arm spines up to ten, flattened, paddle-like, equal or just more than one segment length, lowest arm spine spiniform, narrow and sharp. Genital slits large, genital papillae absent. Tentacle scales two, inner one placed on ventral arm plate, long, sword-like and lying obliquely across ventral arm plate after second or third segment, outer tentacle scale short, less than half innermost scale.

Distribution and habitat – South Africa: Tongaat (KZN) to off Umhlali (KZN); depth range: 38-150 m. Habitat: mud, coarse sand and coral.

Remarks – Endemic to South Africa. Type material is in Iziko South African Museum (holotype: SAMC A22793, paratype: SAMC A22794) and the type locality is off the Tugela River mouth, depth 138 m.

Fig. 198. Distribution of *Ophiopsila bispinosa* in South Africa.

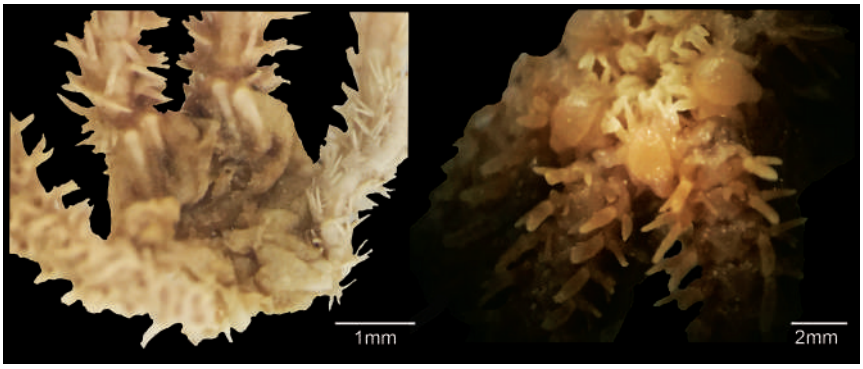

Fig. 199. Dorsal (left) and ventral (right) views of *Ophiopsila bispinosa*, dorsal (SAMC A22794) and ventral (SAMC A22793).

Ophiopsila seminuda Clark A.M., 1952

Ophiopsila seminuda Clark A.M., 1952: 200, 218-219, fig. 3a, b; Day *et al.* 1970: 81; Clark 1974: 470-472, fig. 12; Clark & Courtman-Stock 1976: 105, 122, 178, figs 184, 187.

Diagnosis – Adapted from Clark (1952). D.D. up to 8 mm, disc round. Dorsal disc plates fine, slightly larger around radial shields. Radial shields moderately distinct, long, narrow, not contiguous, separated by two rows of plates, length about one-third disc radius. Oral shields round, rhombic or hexagonal, either as wide as long or wider than long. Adoral shields may or may not be contiguous, outwardly extended, separating oral shield and lateral arm shield. Oral papillae two, broad, flat and blunt, appear similar to those of an amphiurid. Dental papillae up to seven. Teeth 4-5, in series. Second oral tentacle scale smaller than oral papillae. Dorsal arm plates not distinct, hexagonal or oval, much longer than wide basally, becoming slightly wider than long. Ventral arm plates slightly longer than wide, pentagonal, truncated, distal edge slightly concave. Arm spines up to ten, spatulate, broad round tips, lowermost spines largest in length and thickness, uppermost half segment length, lowermost twice segment length. Genital slits wide and large, genital papillae absent. Tentacle scales two, outer one relatively short and blunt, inner one long, blunt, not tapering.

Distribution and habitat – Reunion, South Africa: Cape Town (WC) to Tugela River mouth (KZN), depth range: 9-182 m. Habitat: mud, sand, shell, limestone reef, shingle and gravel.

Remarks – Apart from the geographical distinction between *Ophiopsila seminuda* and *O. bispinosa*, *O. bispinosa* has i) finer disc scaling; ii) a spiniform distal oral papillae; iii) more pointed arm spines and iv) a spiniform second tentacle scale.

Clark & Courtman-Stock (1976) reported the lowermost arm spines being half segment length, contradicting the original description, which reads “the lowest is much the largest, both in thickness and in length, being nearly twice in length of a segment, while uppermost is only half as long”. The latter is here confirmed.

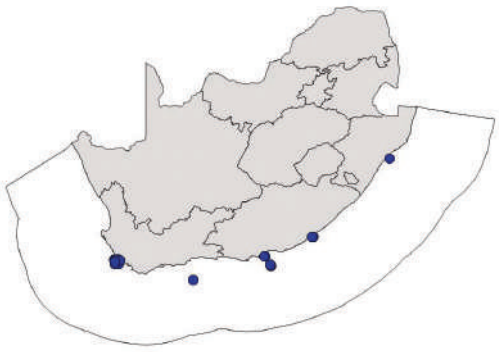

Fig. 200. Distribution of *Ophiopsila seminuda* in South Africa.

Only one other *O. seminuda* specimen has been found outside South Africa (MNHN-IE-2012-1353). Found off Reunion (-20.9916°S; 55.2516°E), on 27 August 1982 at a depth of 58-70 m the RV *Marion Dufresne*.

The location of the type material is unknown, type locality False Bay, South Africa, depth 27-28 m.

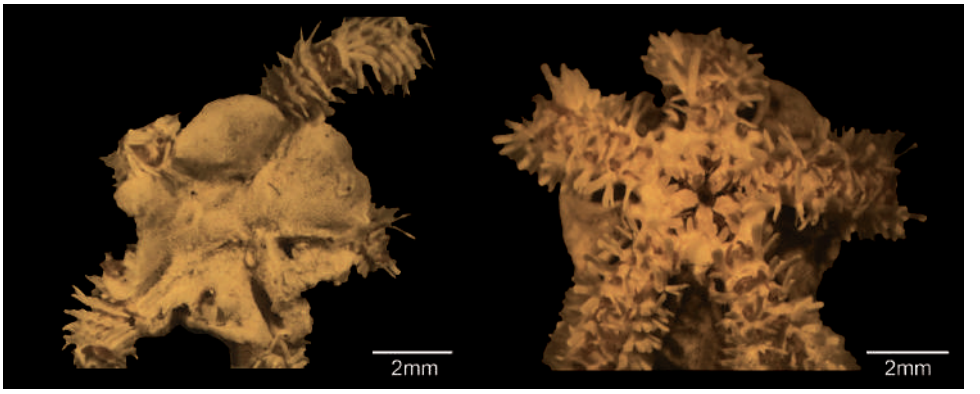

Fig. 201. Dorsal (left) and ventral (right) views of *Ophiopsila seminuda* (SAMC A084230).

4.6.6. Family AMPHIURIDAE Ljungman, 1867

Genus ***Amphioplus*** Verrill, 1899

Diagnosis – Adapted from Clark (1970), Clark & Courtman-Stock (1976) and Verrill (1899b). Disc usually fully scaled, lacking armament, primary rosette usually distinct. Radial shields contiguous distally, or at least for some of their length, rarely fully separated. Jaws armed with three or four papillae either side, may be spaced or in a series, incapable of closing the oral slit. Tentacle scales one or two, rarely absent or rudimentary.

Three subgenera of *Amphioplus* are recognised as follows:

Amphioplus: first oral tentacle scale present in oral slit;

Lymanella: four superficial papillae in a straight row, the third enlarged, and no distinct oral tentacle scale; and

Unioplus: only three papillae and a single oral tentacle scale, more or less in sequence.

Amphioplus (Amphioplus) pectinatus Mortensen, 1933

Amphioplus pectinatus Mortensen, 1933a: 367-368, fig. 72.
Amphioplus (*Amphioplus*) *pectinatus*: Clark 1974: 456-459, fig. 8; Clark & Courtman-Stock 1976: 102, 119, 148, fig. 153.

Diagnosis – Adapted from Clark & Courtman-Stock (1976) and Mortensen (1933a). D.D. up to 6 mm. Disc plates moderately coarse, primary rosette sometimes distinct, disc fully scaled ventrally, scales finer than dorsal. Radial shields slender, length *c.* more than one-third disc radius, wedge of scales between them, contiguous or nearly so distally. Plate below and distal to each radial shield hosting a disc scale with a comb of 3-5 hyaline thorns. Oral shields spearhead-shaped, longer than wide, truncated distally. Adoral shields contiguous. Oral papillae four with a diastema between first infradental papillae and second, revealing second oral tentacle scale which are in sequence with papillae, third oral papillae slightly enlarged. Arms slender. Dorsal arm plates triangular with rounded edges, almost elliptical or hexagonal, only just contiguous. Ventral arm plates pentagonal or squarish when proximal angle truncated, contiguous. Arm spines 3-6, tapering. Tentacle scales two.

Distribution and habitat – South Africa: Bluff (KZN) to North of Prince's Grant (KZN); depth range: 77-410 m. Habitat: mud and sand.

Remarks – Endemic to South Africa. No whole specimens were examined. Most of the specimens examined by Clark (1974) were disc-less or damaged. The syntypes are in the Natural History Museum of Denmark (ZMUC OPH-240 and ZMUC OPH-235) and the type locality is off Durban, depth 410m.

Fig. 202. Distribution of *Amphioplus* (*Amphioplus*) *pectinatus* in South Africa.

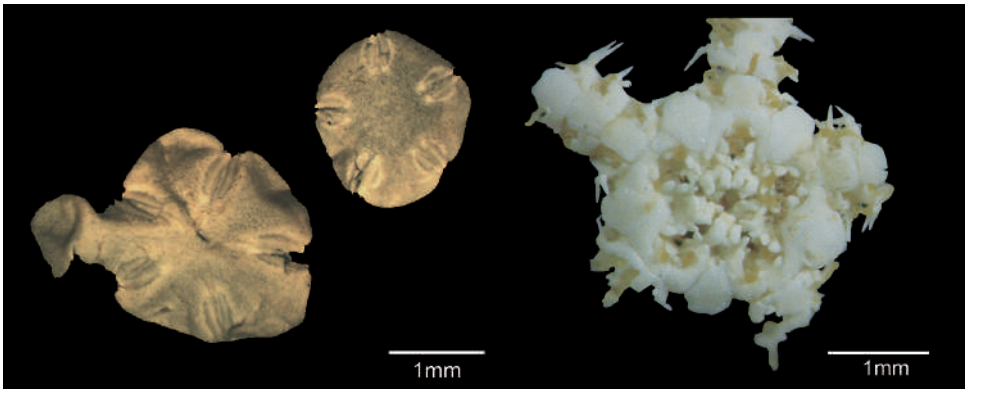

Fig. 203. Dorsal (left) and ventral (right) views of *Amphioplus* (*Amphioplus*) *pectinatus* (SAMC A23220).

Amphioplus (Lymanella) depressus (Ljungman, 1867)

Amphipholis depressa Ljungman, 1867: 312.
Amphipholis hastata Ljungman, 1867: 313.
Ophiophragmus affinis Duncan, 1887: 89-90, pl. 8, figs 4-6.
Amphiura relicta Koehler, 1898b: 69, pl. 4, figs 37, 38; Koehler 1900: 4, pl. 16, figs 15, 16.
Amphioplus relictus: Clark 1915a: 256; Clark 1938: 251.
Amphioplus depressus: Clark 1915a: 254; Clark 1946: 205; James 1970: 142-144, fig. 1g-k.
Amphioplus hastatus: Clark 1915a: 257; Clark 1923: 331; Clark H.L. 1939: 75-76; Day & Morgans 1956: 308; Clark 1967: 47; Vine 1986: 195.
Amphioplus (*Lymanella*) *hastatus*: 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*: Clark 1970: 54; Clark & Rowe 1971: 102; Gibbs *et al.* 1976: 117-118; Baker 1979: 46; Liao & Clark 1995: 190, fig. 88; Olbers *et al.* 2015: 92-93, pl. 2E, F.

Diagnosis – Adapted from Clark (1970) and Clark & Rowe (1971). D.D. up to 10 mm. D.D./A.L. = 1/6. Primary rosette may or may not be distinct. Disc plates moderate in size, overlapping, central plates may be larger than peripheral plates. Disc margin vertical, sometimes with small projections or thorns. Radial shields contiguous for at least 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 rectangular, wider than long, distal margin convex or straight, contiguous. Ventral arm plates pentagonal, flat distally, narrowly contiguous. Arm

spines up to three, blunt-pointed, *c.* as long as segment. Tentacle scales two, large, covering pore.

Distribution and habitat – Mozambique, Madagascar, Red Sea, Persian Gulf, Arabian Sea, Bay of Bengal, Indonesia, Japan, Philippines, Australia, Fiji (Clark & Rowe 1971; Cherbonnier & Guille 1978; Baker 1979; Rowe & Gates 1995), South Africa: Durban (KZN) to Sodwana Bay (KZN); depth range: 0-160 m. Habitat: associated with seagrass (*Syringodium isoetifolium* and *Cymodocea serrulata*), mud, sand and detritus (James 1970; Cherbonnier & Guille 1978).

Fig. 204. Distribution of *Amphioplus* (*Lymanella*) *depressus* in South Africa.

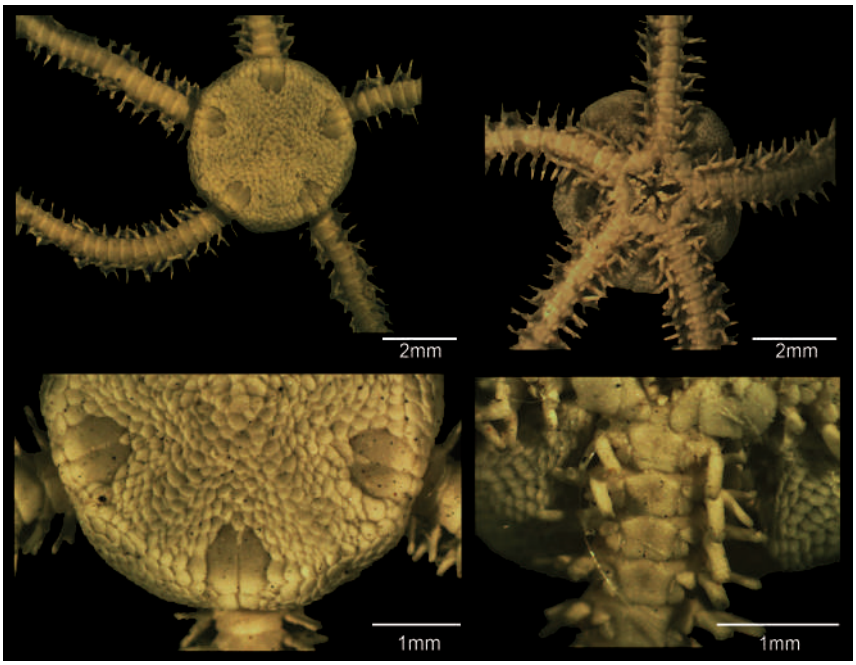

Fig. 205. Dorsal whole (top left), ventral whole (top right), portion of dorsal disc (bottom left), ventral disc and basal arms (bottom right) views of *Amphioplus* (*Lymanella*) *depressus* (SAMC A74078).

Remarks – Olbers *et al.* (2015) noted this was a new record for South Africa and synonymised *Amphioplus* (*Lymanella*) *hastatus* with *Amphioplus* (*Lymanella*) *depressus* based on the South African material.

The holotype is in the Swedish Museum of Natural History (*Amphipholis depressa*: SMNH-Type-1430) and the type locality is between Batavia and Singapore, depth unknown.

Amphioplus (Lymanella) furcatus Mortensen, 1933

Amphioplus furcatus Mortensen, 1933a: 370-372, fig. 75; Mortensen 1940: 96.
Amphioplus (*Lymanella*) *furcatus*: Clark 1970: 52; Clark 1974: 452-453; Clark & Courtman-Stock 1976: 102, 117, 149, fig. 149; Cherbonnier & Guille 1978: 81, 82-83, fig. 35.

Diagnosis – Adapted from Mortensen (1933a) and Cherbonnier & Guille (1978). D.D. up to *c*. 8 mm, D.D./AL = 1/5-8. Primary rosette may be distinct, disc scaling fine. Edge of disc vertical, with small spines on disc margin. Radial shields almost fully contiguous, one-third to half disc radius, 13 plates between radial shields interradially. Oral shields diamond-shaped, longer than wide, rounded distal lobe, inner angle rounded. Adoral shields triangular, contiguous. Oral papillae four in straight row, third papillae enlarged. Arms slender. Dorsal arm plates oval, wider than long, narrowly contiguous. Ventral arm plates pentagonal, broad, narrowly contiguous. Arm spines three, slender, tapering and pointed, *c.* equal to segment length. Tentacle scales two, one on ventral arm plate very large.

Distribution and habitat – Madagascar (Cherbonnier & Guille 1978), South Africa: Zinkwazi (KZN) to Amatikulu (KZN); depth range: 30-70m. Habitat: mud.

Remarks – Clark (1970) transferred *Amphioplus furcatus* to the subgenus *Lymanella*. A single specimen from the Tugela River mouth was examined during this study. The syntypes are in the Natural History Museum of Denmark (ZMUC OPH-363) and the type locality is off the south head, Tugela River, depth 46 m.

Fig. 206. Distribution of *Amphioplus* (*Lymanella*) *furcatus* in South Africa.

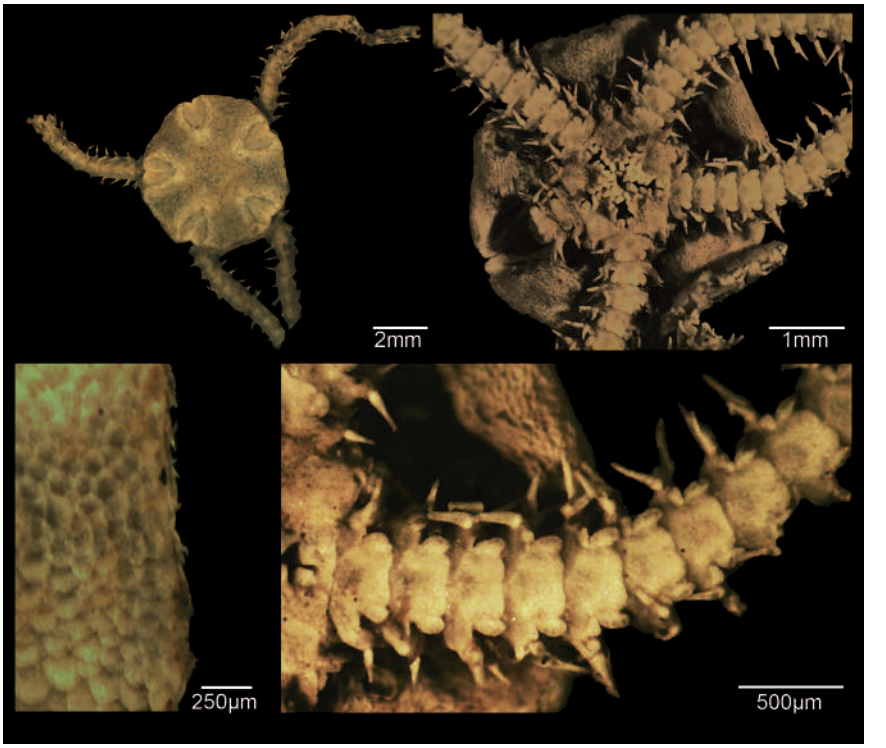

Fig. 207. Dorsal whole (top left), ventral disc (top right), interradial dorsal disc spines (bottom left), ventral disc and basal arms (bottom right) views of *Amphioplus* (*Lymanella*) *furcatus* (SAMC A23219).

Amphioplus (Lymanella) integer (Ljungman, 1867)

Amphipholis integra Ljungman, 1867: 313.
Amphiura integra Lyman 1882: 148; Koehler 1904b: 65-66, figs 16, 17.
Amphioplus integer: Clark 1923: 330-331; Mortensen 1933a: 368-370, figs 73, 74; Tortonese 1936: 219; Stephenson *et al.* 1937: 380; Balinsky 1957: 11; Macnae & Kalk 1962: 107; Macnae & Kalk 1969: 106; Day *et al.* 1970: 80; Vine 1986: 195.
Amphioplus (*Lymanella*) *integer*: Clark 1970: 52; Clark & Rowe 1971: 80, 103; Clark 1974: 453-455, fig. 6; Clark & Courtman-Stock 1976: 102, 117, 149-150, fig. 150; Cherbonnier & Guille 1978: 81, 86-87, fig. 38; Richmond 2002: 326; Mbongwa 2013: 15; Olbers *et al.* 2014: 15, pl. 2D.

Diagnosis – Adapted from Cherbonnier & Guille (1978) and Clark & Courtman-Stock (1976). D.D. up to 6 mm. D.D./A.L. = 1/8. Primary rosette distinct. Disc plates

moderate in size, overlapping. Radial shields contiguous for most of their lengths, some have wedge of plates, 7-11 plates between radial shields interradially. No small thorny projections on disc margin. Oral shields spearhead-shaped, rounded distally, longer than wide. Adoral shields triangular, contiguous. Oral papillae four, arranged in a continuous row forming a straight line, third papillae slightly enlarged. Dorsal arm plates oval, wider than long, distal margin convex, narrowly contiguous. Ventral arm plates pentagonal, distal sides flat or slightly convex, narrowly contiguous. Arm spines up to three, blunt, stout, *c.* as long as segment length, proximal-most spines may be longer than segment, uppermost spatulate flattened, becoming cigar-shaped. Tentacle scales two, large, covering pore. Colour in life grey to dirty white (Balinsky 1957).

Distribution and habitat – Western Indian Ocean, Red Sea (Clark & Rowe 1971; Cherbonnier & Guille 1978; Richmond 2002), South Africa: Lambert's Bay (WC) to Sodwana Bay (KZN); depth range: 0-82 m. Habitat: rock, sand, mud, shell, kelp beds and limestone.

Remarks – Clark & Courtman-Stock (1976) noted a large variation in length and breadth of radial shields in species from South Africa and Mozambique and also that the middle arm spine of specimens from False Bay exceeds the segment length more than in the other specimens. The holotype is in the Swedish Museum of Natural History (*Amphipholis integra*: SMNH-Type-1432) and the type locality is Port Natal (Durban), depth unknown.

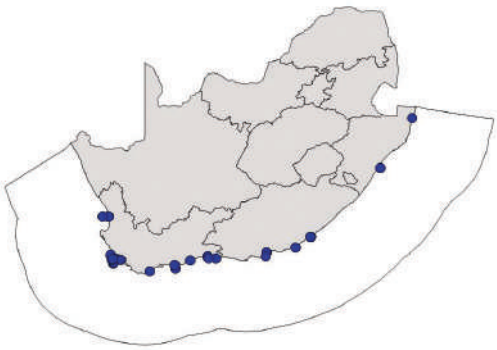

Fig. 208. Distribution of *Amphioplus* (*Lymanella*) *integer* in South Africa.

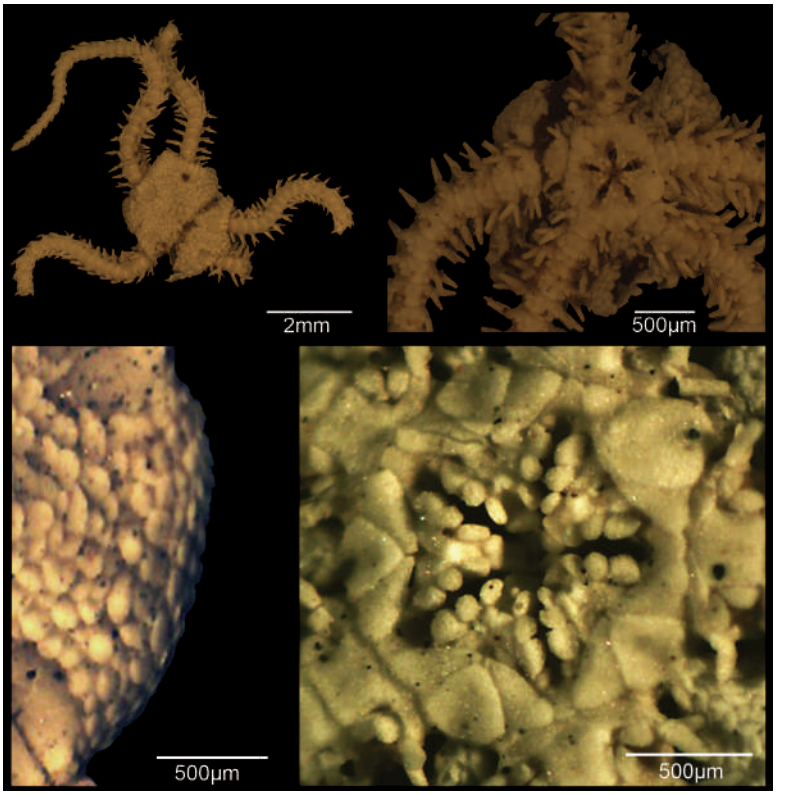

Fig. 209. Dorsal whole (top left), ventral disc (top right), interradial dorsal disc (bottom left), jaws (bottom right) of *Amphioplus* (*Lymanella*) *integer* (DNSM ECH23E).

Amphioplus (Unioplus) falcatus Mortensen, 1933

Amphioplus falcatus Mortensen, 1933a: 365-367, figs 70, 71, pl. 19, figs 18, 19; Fell 1962: 16.

Amphioplus (*Unioplus*) *falcatus*: Clark 1974: 455-456, fig. 7; Clark & Courtman-Stock 1976: 102, 119, 150, figs 151, 152.

Diagnosis – Adapted from Mortensen (1933a). D.D. up to 7 mm, D.D./AL = 1/1.5. Primary rosette not distinct. Disc scaling coarse, overlapping, moderate in size, ventral interradial scales finer. Radial shields narrow, sickle-shaped (falcate), contiguous only on distalmost side, three rows of scales between radial shields interradially, longer than half disc radius. Oral shields triangular, angles rounded, can vary substantially in width. Adoral shields triangular, contiguous. Oral papillae three, with a single oral tentacle scale in series, second oral papillae on lower level than other two, third papillae larger, broader. Dorsal arm plates oval, wider than long, distal margin convex, narrowly contiguous. Ventral arm plates fan-shaped,

truncated proximally, distal sides flat or slightly convex, contiguous. Arm spines three, pointed, middle one longest, ending in small hook. Tentacle scales one, large, elongated, triangular.

Distribution and habitat – South Africa: Durban (KZN) to Prince's Grant (KZN); depth range: 57-411 m. Habitat: sandy mud, coarse sand, coral and mud with polychaetes.

Fig. 210. Distribution of *Amphioplus* (*Unioplus*) *falcatus* in South Africa.

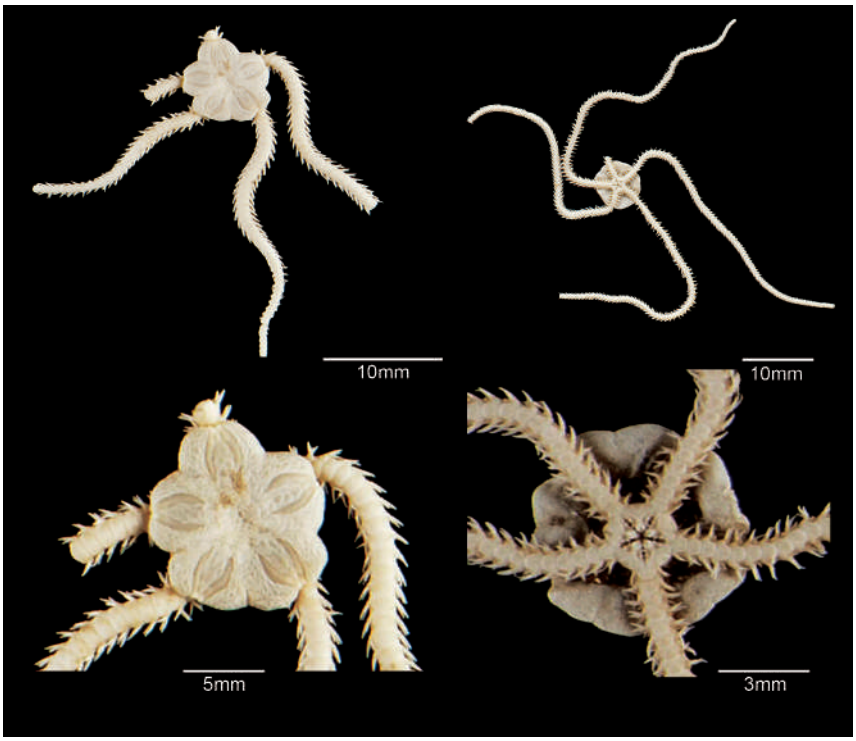

Fig. 211. Dorsal whole (top left), ventral whole (top right), dorsal disc (bottom left), ventral disc (bottom right) views of *Amphioplus* (*Unioplus*) *falcatus* (ZMUC OPH-362).

Remarks – Endemic to South Africa. Fell (1962) originally described *Unioplus* as a new genus primarily based on the single tentacle scale, using *Amphioplus falcatus* as the type specimen. The paratype is at Iziko South African Museum (SAMC A22381) while the syntypes are at the Natural History Museum of Denmark (ZMUC OPH-362), the type locality is Durban, depth 411 m.

Genus ***Amphipholis*** Ljungman, 1867

Diagnosis – Adapted from Clark (1970) and Clark & Courtman-Stock (1976). Disc completely scaled, lacking spines, scaling rarely reduced on ventral side. Rosette often distinct, with the exception of *squamata*, radial shields usually more contiguous for more than half their length, jaws armed with three oral papillae in continuous series, outermost very broad and opercular, no oral tentacle scale visible. Arm spines 3-4. Usually two tentacle scales, sometimes one, rarely none.

Amphipholis similis Mortensen, 1933

Amphipholis similis Mortensen, 1933a: 363-364, fig. 69; Clark 1974: 450, fig. 5a; Clark & Courtman-Stock 1976: 151; Milne 2012: 153; Mbongwa 2013: 15.

Diagnosis – Adapted from Clark & Courtman-Stock (1976). D.D. up to 3 mm. Primary rosette distinct with plates between them. Disc plates large, coarse, overlapping, ventral interradial plates similar. Radial shields fairly wide, D-shaped, almost completely contiguous, length *c.* one-third disc radius. Oral shields rhombic with rounded angles, short distal lobe, as long as wide. Adoral shields contiguous. Oral papillae three in series, outermost very broad and opercular, no oral tentacle scale visible. Genital papillae absent. Dorsal arm plates oval, wider than long, distal margin convex, barely contiguous. Ventral arm plates fan-shaped, as long as wide, distal sides flat or slightly convex, narrowly contiguous. Arm spines three, tapering and pointed, shorter than segment length. Tentacle scales two, fairly large.

Distribution and habitat – South Africa: Gouritz (WC) to Sodwana Bay (KZN); depth range: 8-138 m. Habitat: sand, shells and stones.

Remarks – Endemic to South Africa. During this study, distribution was extended north-east from Amatikulu (KZN) to Sodwana Bay (KZN).

This species may be confused with small specimens of *Amphioplus* (*Lymanella*) *integer* by the presence of the under-developed or concealed fourth papilla (Clark 1974). *Amphipholis* can be distinguished from other Amphiuridae by the third oral papilla being more than twice as broad as the second papilla. In addition, *Amphipholis similis* does not have enlarged tentacle scales and arm spines are all shorter than corresponding segment. Arms on specimens missing.

Holotype in the Natural History Museum of Denmark (ZMUC OPH-275) and the type locality is off Durban, depth 64 m.

Fig. 212. Distribution of *Amphipholis similis* in South Africa.

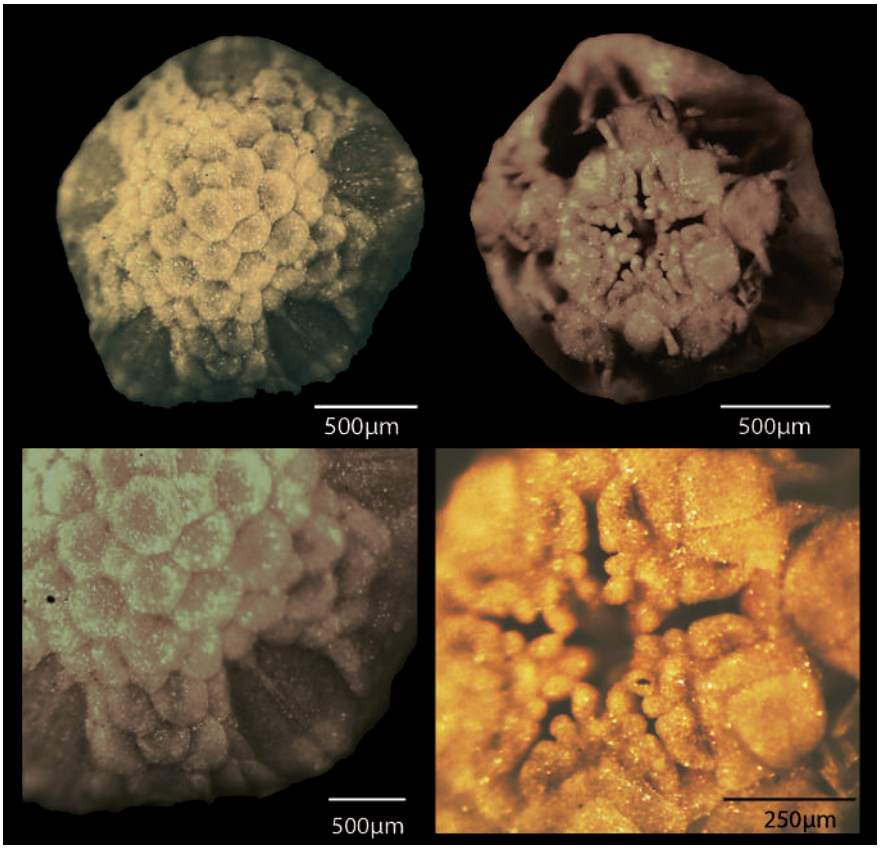

Fig. 213. Dorsal disc (top left), ventral disc (top right), radial shields (bottom left), jaws (bottom right) views of *Amphipholis similis* (SAMC A74058).

Amphipholis squamata (Delle Chiaje, 1828)

Asterias squamata Delle Chiaje, 1828: 74, 77.
Ophiolepis squamata: Müller & Troschel 1842: 92.
Amphipholis kinbergi Ljungman, 1872: 646.
Amphiura squamata: Lyman 1882: 136.
Amphipholis squamata: Verrill 1899b: 24; Koehler 1914a: 66; Clark 1923: 330; Mortensen 1927: 221-222, fig. 125; Koehler 1930: 102-103; Mortensen 1933a: 364-365; Stephenson *et al.* 1937: 380; Bright 1937a: 63; Eyre *et al.* 1938: 110; Murakami 1943a: 172; Clark 1946: 202; Clark A.M. 1952: 200; Balinsky 1957:10; Kalk 1958: 200, 207, 215, 237; Macnae & Kalk 1958: 106; Day 1959: 544; Grindley & Kensley 1966: 12; Clark 1967: 47; Clark 1970: 30-31; Day *et al.* 1970: 81; Penrith & Kensley 1970: 234; Clark & Rowe 1971: 80, 81, 99; Devaney 1974: 125-126; Clark & Courtman-Stock 1976: 102, 117, 151-152, fig. 138; Hughes & Gamble 1977: 355; Cherbonnier & Guille 1978: 105-106, fig. 48; Irimura 1982: 41, fig. 26, pl. 2, fig. 1; Marsh 1986: 70; Alva & Vadon 1989: 829; Sastry 1991: 376, pl. 3, fig. 15; Liao & Clark 1995: 194-195, fig. 92; Rowe & Gates 1995: 346; Richmond 2002: 326; Laguarda-Figueras *et al.* 2009: 200-201, pl. 82; Milne 2012: 155; Mbongwa 2013: 15.
Ophiactis minor Döderlein, 1910: 253, pl. 5, fig. 3.
Amphipholis japonica Matsumoto, 1915: 71; Matsumoto 1917: 186-189, fig. 49; Irimura 1979: 3.
Amphioplus squamata: Macnae & Kalk 1962: 111.

Diagnosis – Adapted from Clark & Courtman-Stock (1976) and Cherbonnier & Guille (1978). D.D. up to 20 mm. Primary rosette not always distinct. Disc plates moderately large, coarse, overlapping, ventral interradial plates similar. Radial shields fairly wide, D-shaped, mostly contiguous, *c.* one-third disc radius. Oral shields rhombic with rounded angles, wider than long. Adoral shields triangular, contiguous. Oral papillae three, in continuous series, outermost very broad, no oral tentacle scale visible. Genital papillae absent. Dorsal arm plates rounded-triangular, wider than long, distal margin convex, barely contiguous. Ventral arm plates pentagonal, wider than long, distal sides flat or slightly concave, narrowly contiguous. Arm spines up to four, short, tapering, pointed. Tentacle scales two, moderate in size. Colour in life very dark, almost black (Mortensen 1933a), beige to black (Deheyn & Jangoux 1999) or greyish with a bright spot ringed by a darker area on the distal sides of each pair of radial shields (Clark & Courtman-Stock 1976).

Distribution and habitat – Cosmopolitan, South Africa: off Orange River (NC) to Kosi Bay (KZN); depth range: 0-1962 m. Habitat: rock, sand, shell, mud, kelp, associated with Patellidae, *Zonaria* and *Zostera.*

Remarks – This cosmopolitan species occurs throughout South Africa in a variety of habitat types in depths up to 720 m. Syntypes of the synonym *Amphipholis japonica* (MCZ OPH-3893) and *Amphipholis kinbergi* (MCZ OPH-1407) are in the Museum of Comparative Zoology. The whereabouts of the holotype is unknown (Rowe & Gates 1995) and the type locality is Naples (Clark & Courtman-Stock 1976), depth unknown.

Fig. 214. Distribution of *Amphipholis squamata* in South Africa.

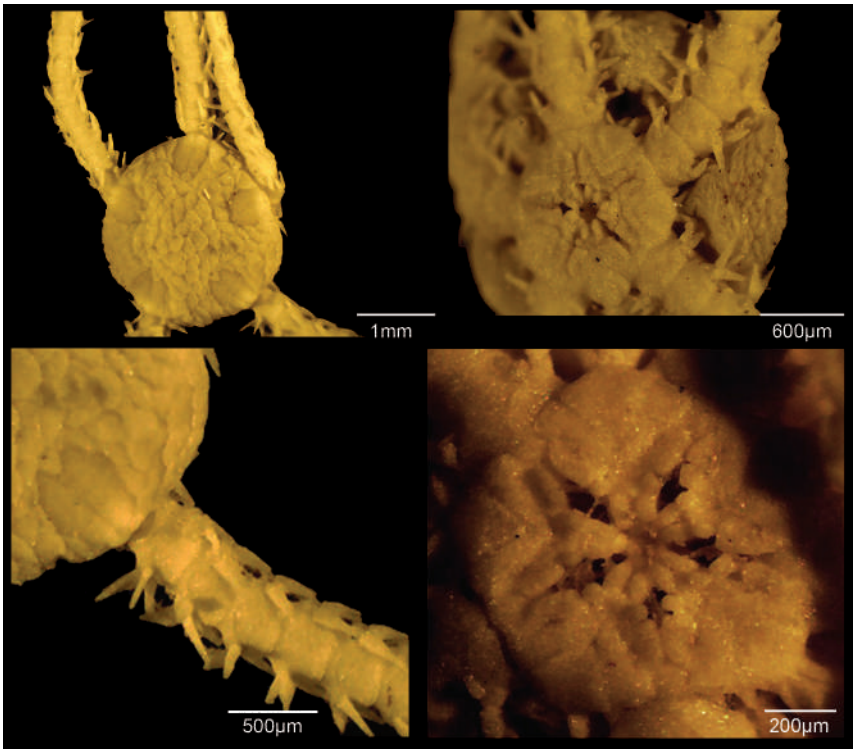

Fig. 215. Dorsal whole (top left), ventral disc (top right), radial shields (bottom left), jaws (bottom right) views of *Amphipholis squamata* (SAMC A084239).