

Additions to and revision of the South African echinoid fauna (Echinodermata: Echinoidea)

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(with 1 figure and 2 plates)

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The last major taxonomic review of the South African Echinoidea was published in 1976 and there have been very few additions to the fauna since that time, although numerous unidentified samples have continued to accumulate in the Iziko South African Museum. This study documents all additions to the fauna reported since the late 1970s. Most of these derive from our examination and identification of specimens in the Iziko South African Museum collections. Also included, though, are new records reported via the EchinoMap Virtual Museum, those published in the non-taxonomic literature and those derived from taxonomic revisions. For each new record we present an image of the species, key references, a brief diagnosis and detailed locality records. These sources together have resulted in 19 additions to the regional echinoid fauna, raising the total number of echinoid species known from the South African Exclusive Economic Zone to 71.

Keywords: biodiversity, taxonomy, Echinoidea, echinoderm, South Africa, new records.

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INTRODUCTION

Many previous authors have contributed to the current state of knowledge of echinoid systematics in South Africa. The first three echinoid species reported from the region (*Echinostrephus molaris*, *Echinometra mathaei* and *Stomopneustes variolaris*) were recorded by A. Agassiz (1872). Agassiz (1885) added three more species from South Africa through the *H.M.S Challenger* Expedition, which spent 51 days in the Cape of Good Hope, and Bell (1904) added seven more, raising the echinoid fauna to 13 species. Soon after, Döderlein (1906) documented ten species from the Valdivia echinoid collection and increased the number to 23, five of which were new to science and two to South Africa. Thereafter, H.L. Clark (1923) reported 11 more South African echinoids, based on the South African Pieter Faure collections, increasing the South African sea urchin fauna to 34 species. H.L. Clark (1924) then documented seven more species from the Pickle collection, four of which were new to science. Mortensen (1932) added five new South African records, two of which were new to science. The number of South African species reported then remained unchanged for 30 years (Fig. 1) until the regional monograph by Clark & Courtman-Stock (1976), who reported a total of 50 species within 25 families, 19 of which were endemic to South Africa (this number excludes Namibia and Mozambique records

given in that publication). A year later, A.M. Clark (1977) reported on the *Meiring Naude* (1976–1977) surveys and documented the extensions of the ranges of two additional species into South Africa, raising the known number of species to 52.

The aim of this paper is to document all additional echinoid records that have come to light since the last taxonomic publication on the topic by A.M. Clark (1977) and to record the locations and other station data from which each of these new records were derived. We also rectify uncertainties concerning the identity of some previously reported species. Following on from this documentation of additions and changes, a full listing of known echinoid species from the region, plus a binary key and fully illustrated guide to all known species, will be presented elsewhere.

METHODS

In the taxonomic section below, taxa are systematically arranged according to the system proposed by Kroh & Smith (2010), which corresponds with that used by the World Echinoidea Database (WED) linked to the World Register of Marine Species (WoRMS). Each species is entered under its current binomial name; followed by the original authors name and year of description. Subsequent synonyms are given in historical order, but only literature that describes the species fully, or which reports the species in South Africa

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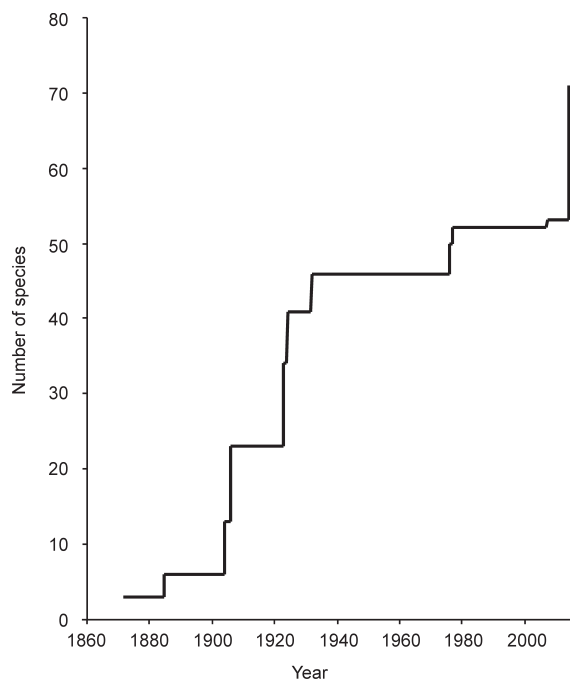


Fig. 1. Temporal growth in the number of Echinoidea species reported from South Africa from 1872 to present.

or in neighboring regions, is provided. A brief paragraph on where each species has been previously reported, together with accession numbers and locations of new regional records, is also included. Photographs of either live specimens in their natural habitat, or of museum specimens, are given under each entry.

Our analysis is based primarily on the numerous samples that have been collected since the study by Clark & Courtman-Stock (1976), but which remained unidentified in the Iziko South African Museum. These include grab, dredge and trawl samples, including those of the University of Cape Town (UCT) Ecological Survey. Other sources includes species reported in the non-taxonomic literature; species recorded by the Department of Forestry and Fisheries (DAFF) demersal survey cruises, and photographic records submitted to an online 'Virtual Museum' EchinoMap, which was established specifically to gather photographic observations of echinoderms from the region.

Identification of the Iziko archived samples sometimes required de-spining, to expose the microscopic differences distinguishing species. A 60% domestic bleach solution was used for the spine removal procedure and specimens were left submerged in this for 10 minutes intervals, in the case of large specimens of >50 mm test diameter, and for five minute intervals for small specimens of <49 mm test diameter, until spines were loose. If there were more than one specimen in a sample then spines were removed on the entire test of one specimen, but if only one specimen was available, then half the body was de-spined.

RESULTS

Species accumulation over time

A species accumulation curve, showing how the total number of reported echinoid species in the region has

increased over time, is shown in Fig. 1. Particularly noticeable is the long period of inactivity between 1932 and 1976 and low rate of increase in species numbers from 1977 to present. The addition of a total of 19 echinoids in this paper represents the largest addition to the regional fauna ever recorded in a single paper, and raises the number of species known from within South Africa's political borders to 71.

Most of these additions represent tropical Indo-Pacific species whose ranges are extended from Mozambique southwards into the KwaZulu-Natal region of South Africa and the majority derive from our analyses of samples accumulated in the Iziko collections.

A few new records are, however, extracted from more general publications. The black sea urchin (*Tetrapyrgus niger*), introduced from Chile to an Alexander Bay oyster farm, was reported on in a paper on introduced marine species by Haupt *et al.* (2010). A photograph of the tropical species *Toxopneustes pileolus* was published by Branch *et al.* (2010), but without exact location data, and its presence and distribution in South Africa are confirmed here, based on museum collections. Three additional species collected during scuba diving surveys in 1999, 2000 and 2001 were included in an analysis of echinoderm biodiversity patterns by Samyn & Thandar (2003), without being mentioned by name, and specific collection data for these records were extracted from the Royal Museum of Central Africa database and are reported below.

The remaining additions to the fauna include an identified sample of *Tromikosoma uranus* from the Iziko collection, but this is now in such bad condition that it is impossible to confirm this identification, also the identity of the person making the original identification is unknown – this record is thus regarded as unconfirmed. Another new record is derived from the elevation of the subspecies *Echinometra mathaei oblonga*, to species status (*Echinometra oblonga*). The two remaining entries, *Acanthocidaris maculicollis* and *Goniocidaris indica* respectively represent confirmation of a previously dubious report from the region, and species level identification of a record previously identified to genus level only.

TAXONOMIC ACCOUNT

Class Echinoidea Leske, 1778

Order Cidaroida Claus, 1880

Family Cidaridae Gray, 1825

Eucidaris metularia (Lamarck, 1816)

Plate 1, Fig. A.

Cidaris metulari: A. Agassiz, 1872: 8, 254, 385; pl. I: figs 23–24, pl. XXXV: fig. 3; Bell 1904: 138.

(*Gymnocidaris*) *metularia*: Döderlein, 1906: 101.

Eucidaris metularia: H.L. Clark, 1923: 370; H.L. Clark, 1925: 20; Mortensen, 1928: 386; Clark & Rowe, 1971: 140, 150, pl. XX1: fig. 13; Richmond, 2003: 295–296; Samyn, 2003: fig. 2A; Schultz, 2010a: 36, figs 61–63.

Description

Best identified by naked apical system; spines stout, short in some cases, and fusiform in others; correspond well with descriptions given by Mortensen (1928).

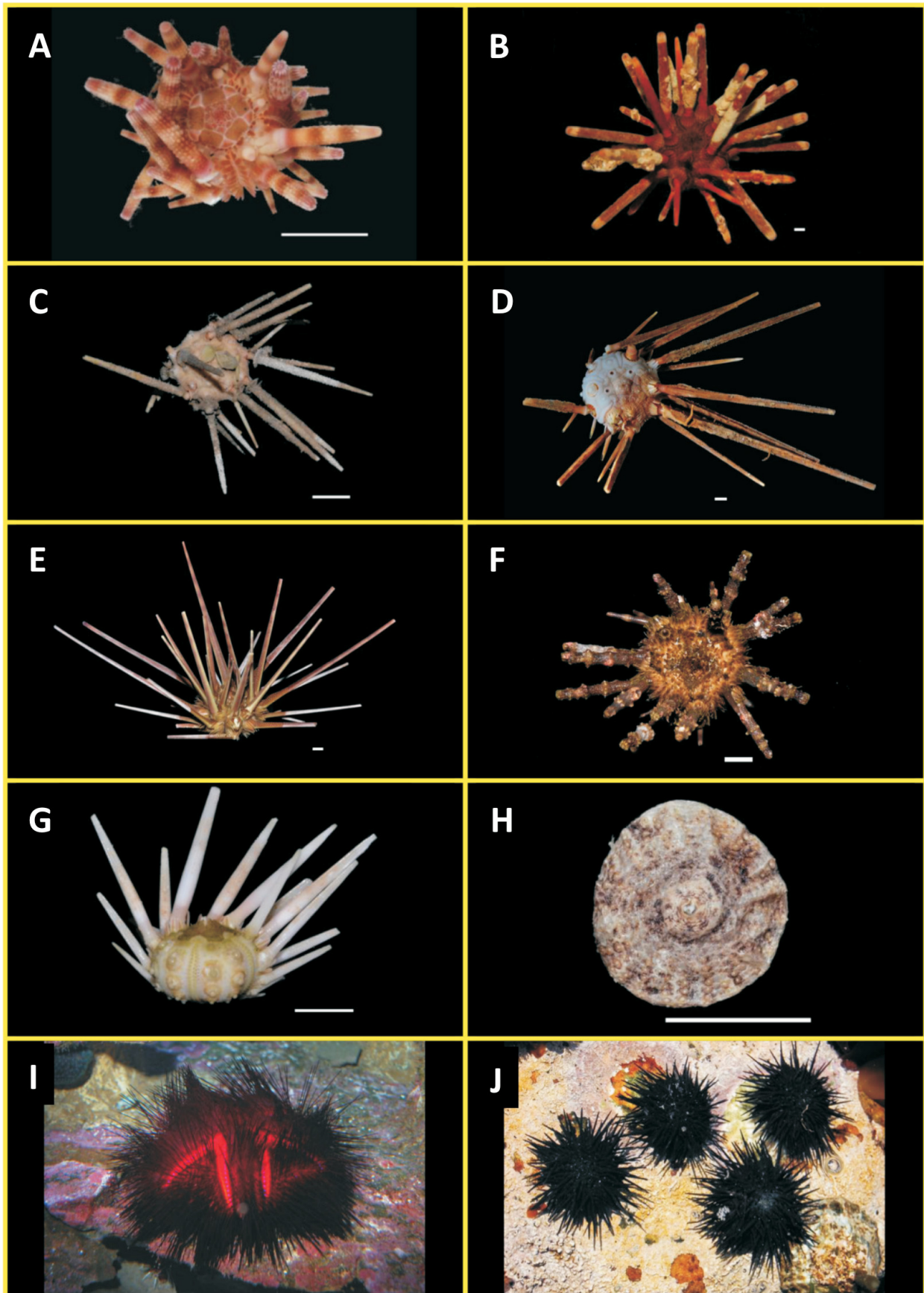


Plate 1.

Distribution

A. Agassiz (1881) previously reported this species from the 'Cape of Good Hope', but at that time this term was used loosely to describe the whole southern African region and this species is unlikely to have originated from the region near Cape Town that is currently referred to as the Cape of Good Hope, as it is a tropical Indo-Pacific species (Mortensen 1928; H.L. Clark 1923). Marshall & Hodgson (1991) reported on a specimen collected in Presley Bay (-31.8833 29.2500) on the east coast and housed in the East London Museum, but gives no accession number for it, so that record also remains dubious. Samyn & Thandar (2003) identified seven samples collected through three expeditions off KwaZulu-Natal. These records are encoded in the Royal Museum of Africa database, and records are listed below. This study adds 17 more records, which are also listed below. Species has previously been recorded from Mozambique (Clark & Courtman-Stock 1976) and Kenya (Samyn 2003), at 5–570 m depth range.

Material examined

SAM A 22206; Durban; -29.8550 31.0572; no other data available. SAM A 22233; Port St. Johns; -32.6299 29.5531; no other data available. SAM A 23712; Jesser Point; -27.5533 32.7167; 85 m; *Meiring Naude Dredge Survey*; 3 June 1987. SAM A 28199; Kosi River mouth; -27.0000 32.9333; 47 m; *Meiring Naude Dredge Survey*; 6 June 1987. SAM A 28200; Jesser Point; -27.6667 32.7100; 68 m; *Meiring Naude Dredge Survey*; 3 June 1987. SAM A 28201; Dog Point; -27.6667 32.8817; 70 m; *Meiring Naude Dredge Survey*; 4 June 1987. SAM A 28202; Kosi River; -26.9667 32.9233; 50 m; *Meiring Naude Dredge Survey*; 7 June 1987. SAM A 28203; -26.8817 32.9833; 49 m; *Meiring Naude Dredge Survey*; 3 June 1990. SAM A 28204; -26.8733 32.9283; 51–53 m; *Meiring Naude Dredge Survey*; 3 June 1990. SAM A 28205; Kosi River mouth; -26.9100 32.8967; 50 m; *Meiring Naude Dredge Survey*; 7 June 1987. SAM A 28206; Boteler Point; -27.0178 32.9006; 50 m; *Meiring Naude Dredge Survey*; 6 June 1987. SAM A 28226; Landers Reef, off Park Rynie; -27.6833 32.7042; 40 m; *SCUBA dive*; 15 December 1984. SAM A 28227; Saxon Reef, Kosi Bay; -26.8667 32.8667; 20 m; *SCUBA dive*; 7 April 2003. SAM A 28228; 7 Mile Reef, Sodwana Bay; 23 m; *VUB Echinoderm EXP*; July 2000. SAM A 28237; off Lala Nek; -27.2167 32.7833; 78 m; *Meiring Naude Dredge Survey*; 8 September 1990.

Additional photographic records

Photographed by C.L. Griffiths on the EchinoMap VM database; from Jesser Point, Sodwana Bay in KwaZulu-Natal; -27.5424 32.6785; 3 March 2013. Photographic record submitted by Kerry Sink on the EchinoMap VM database; from Stringer reef, Sodwana Bay in KwaZulu-Natal; -27.5344 32.6796; 8 January 2004.

Material from the Royal Museum of Central Africa database: Reg nb 2602; Sodwana Bay; KwaZulu-Natal; 23 m; July 2000. Reg nb 2590; Sodwana Bay; KwaZulu-Natal; 15 m; August 1999. Reg nb 2584; Sodwana Bay; KwaZulu-Natal; 8–12 m; February 2001. Reg nb 2585; Sodwana Bay; KwaZulu-Natal; 30 m; August 1999. Reg nb 2573; Alwal Shoal; KwaZulu-Natal; 22 m; August 1999. Reg nb 2593;

Alwal Shoal; KwaZulu-Natal; 20 m; August 1999. Reg nb 2592; Bhanga Neck; KwaZulu-Natal; intertidal; August 1999.

Phyllacanthus imperialis (Lamarck, 1816)

Plate 1, Fig. B.

Phyllacanthus imperialis: A. Agassiz, 1872: 151, 391, pl. I: figs 1–6, pl. I: fig. 2; Döderlein, 1906: 98, pl. XL: fig. 5a–e; Mortensen, 1928: 504–509, pl. LIV: fig. 4, pl. LVII: fig. 3, pl. LXXXIV: fig. 6, pl. LXXXVIII: figs 4–10; Clark & Rowe, 1971: 140, 151, pl. XX111: fig. 2; Samyn, 2003: figs 2B, B'; Schultz, 2010a: 46, figs 80–83.

Description

Primary spines have numerous, close, indistinct series of granules (Mortensen 1928), which are not visible to the naked eye (Schultz 2010).

Distribution

Samyn & Thandar (2003) found eight specimens after three expeditions in KwaZulu-Natal. These records are encoded in the Royal Museum of Central Africa database and are reproduced below. The present study adds two more records. Previously reported along the East coast of Africa in Kenya (Samyn 2003), Zanzibar and Mozambique (A. Agassiz 1863).

Material examined

SAM A 23447; Landers Reef, off Park Rynie, KwaZulu-Natal; -27.6833 32.7042; 30 m; *SCUBA dive*; 7 July 1987.

Additional record

Photographic record submitted by Dr Kerry Sink on EchinoMap VM database; reported from Two Mile Reef, Sodwana Bay, KwaZulu-Natal; -27.5342 32.6785; 9 January 2004.

Material from the Royal Museum of Central Africa database

Reg nb 2531; Sodwana Bay; KwaZulu-Natal; 13 m; August 1999. Reg nb 2577; Sodwana Bay; KwaZulu-Natal; 23 m; July 2000. Reg nb 2578; Sodwana Bay; KwaZulu-Natal; 23 m; July 2000. Reg nb 2580; Sodwana Bay; KwaZulu-Natal; 18 m; August 1999. Reg nb 2598; Sodwana Bay; KwaZulu-Natal; 15 m; August 1999. Reg nb 2570; Sodwana Bay; KwaZulu-Natal; 36 m; August 1999. Reg nb 2586; Sodwana Bay; KwaZulu-Natal; 18 m; February 2001. Reg nb 2582; Umkomaas; KwaZulu-Natal; 25 m; July 2000.

Goniocidaris indica Mortensen, 1939

Plate 1, Fig. C.

Goniocidaris sp: Mortensen, 1928: 149–154; Clark & Courtman-Stock, 1976: 215.

Goniocidaris (Aspidocidaris) indica: Schultz, 2010c: 1006, figs 1730–1731.

Description

As outlined by Schultz (2010), the distinguishing features of this species are the umbrella-like flanges at base of aboral primary spines.

Distribution

Previously reported from the Maldives and Tanzania

(Schultz 2010c), this study therefore extends the distribution into South African waters.

Material examined

SAM A 28224; Still Bay Shelf; -35.3667 22.5167; 200 m; *UCT Ecological Survey*, Dredge; 20 June 1972. SAM A 28207; -34.9500 23.8167; 184 m; *Africana Bottom Trawl*; 30 June 1993. SAM A 28235; -34.7833 24.000; 170 m; *Africana Bottom Trawl*; 23 June 1988. SAM A 28232; -34.8750 23.6650; 230 m; *Africana Bottom Trawl*; 4 May 1993. SAM A 28241; -36.6000 20.6167; 174 m; *Africana Bottom Trawl*; 6 April 2007.

Remarks

Clark & Courtman-Stock (1976) were unable to identify their specimen *Goniocidaris* sp. to species level, due to their only sample being a broken test. This study therefore confirms Clark & Courtman-Stock's (1976) specimen to be *Goniocidaris indica*.

Stereocidaris alcocki (Anderson, 1984)

Plate 1, Fig. D.

Stereocidaris tricarinata: Döderlein, 1906: 112–114, pl. X: fig. 7, pl. XXXVI: fig. 3.

Stereocidaris alcocki: Mortensen, 1928: 266, pl. LXXI: fig. 8, pl. LXXXII: fig. 18; Schultz, 2010c: 1037.

Description

Primary spines have three basal keels, and this agrees with the features outlined by Mortensen (1928) and Schultz (2010c).

Distribution

Restricted to the Indian Ocean (Schultz 2010c). The following record extends the distribution southwards into South African waters.

Material examined

SAM A 28229; South of Durban, KwaZulu-Natal; -30.7511 30.5186; 850 m; *Meiring Naude Dredge Survey*; 11 May 1977.

Acanthocidaris maculicollis (de Meijer, 1904)

Plate 1, Fig. E.

Acanthocidaris maculicollis: Mortensen, 1928: 329–333, pl. XLIII: figs 1–2, pl. XLIV: fig. 1, pl. LIV: figs 5–6, pl. LXXXIII: figs 12–15; Mortensen, 1932: 157–158, pl. V: fig. 6, pl. XI: fig. 5; Clark & Courtman-Stock, 1976: 214.

Acanthocidaris curvatispinis: Schultz, 2010c: 875, figs 1469–1473.

Description

Collar of primary spines with red spots; shaft banded red and white (Mortensen 1928; Mortensen 1932). Schultz (2010c) synonymized this species with *Acanthocidaris curvatispinis*, on the basis of WED 2010 database, but this now recognizes the two as separate, valid species.

Distribution

Previously reported from Japan to the Malay Archipelago (Mortensen 1928), and from the Indian Ocean (Mortensen

1932). The Indian Ocean records are represented by samples examined by Koehler (1927), without any locality. Mortensen (1932) reported on a sample from the Natal Museum that was shipped to him, which he identified as *A. maculicollis*, but which had no locality record label associated with it. The location of that record is thus flagged in Clark & Courtman-Stock (1976) and this is the first confirmed record from the region.

Material examined

SAM A28233; Rocktail Bay; -27.1850 32.8483; 100 m; *Meiring Naude Dredge Survey*; 7 June 1990.

Remarks

This study confirms Mortensen's (1932) record and Clark & Courtman-Stock's (1976) uncertainty of this species occurring in KwaZulu-Natal.

Plococidaris verticillata (Lamarck, 1816)

Plate 1, fig. F.

Plococidaris verticillata: Mortensen, 1928: 428–433, pl. LI: figs 3–7, pl. LXXIV: fig. 5, pl. LXXXIII: figs 19–21; Schultz, 2010a: 50, figs 88–92.

Prionocidaris verticillata: Clark & Rowe, 1971: 140, 151, fig. 61a; Richmond, 2003: 294; Samyn, 2003: figs 2E, E'.

Description

The crown-like structures on spines coincide well with detailed descriptions given by Mortensen (1928) and Schultz (2010a).

Distribution

The only species in this genus, and reported to have a wide Indo-West Pacific distribution (Mortensen 1928; Clark & Rowe 1971; Schultz 2010a), previously reported from Kenya (2003); Eastern Africa & Madagascar (Clark & Rowe 1971); to Fiji and Hawaiian islands (Mortensen 1928; Schultz 2010a), and from southern Japan to Australian east coast (Mortensen 1928; Schultz 2010a), known from intertidal to 50 m depth. This study therefore compliments Olber's *et al.* (2014) record.

Material examined

SAM A 28236; Landers Reef, off Park Rynie; -27.6833 33.1167; 40 m; *SCUBA dive*; 15 December 1984.

Additional record

DNSM ECH 4; Durban harbour; KwaZulu-Natal.

Remarks

Additional record is from the Natal Museum and is reported by Olbers *et al.* (2014).

Stylocidaris cingulata Mortensen, 1932

Plate 1, Fig. G.

Stylocidaris cingulata Mortensen, 1932: 162–164, pl. I: fig. 6, pl. XI: fig. 6, pl. XIII: figs 8–10; Schultz, 2010c: 925, figs 1565–1566.

Description

Mortensen (1932) gives an exceptionally good description

and our specimens conform to this except that ocular plates are not in contact with periproctal membrane.

Distribution

Prior to the present study, this species was known from a holotype specimen presumed to be from the Indian Ocean, but exact locality is unknown (Mortensen 1932). This study reports the species in South African waters and gives locality for species for the first time.

Material examined

SAM A 28217; off Port Edward; -31.1022 30.2856; 120–125 m; *Meiring Naude Dredge Survey*; 8 July 1985. SAM A 28231; off Mtamvuna River, Port Edward; -31.1525 30.2503; 140 m; *Meiring Naude Dredge Survey*; August 1981.

Remarks

Description by Mortensen (1932) seems to be based on one specimen, which may suggest that observation of oculars may be a variation within species.

Family Echinothuriidae Thomson, 1872a

Tromikosoma uranus (Thomson, 1877)

Plate 1, Fig. H.

Phormosoma uranus: A. Agassiz, 1881: 103.

Tromikosoma uranus: Mortensen, 1935: 168–170, pl. VI: figs 2–3, pl. LXXV: figs 19–21; Schultz, 2010c: 1108. figs 1943–1944.

Description

Species has large, irregularly arranged tubercles (Agassiz 1881); where orally, they are found outside the pore-series in distal part of the ambulacra (Mortensen 1935).

Distribution

Species previously reported from Portugal to West Africa; at 850–2750 m depths (Schultz 2010c), this study therefore reports on species in the South African EEZ for the first time.

Material examined

SAM A 22122; -33.8167 16.500; 2743 m; *African Beam trawl*; 7 August 1959.

Remarks

This specimen was in the identified collection of the Iziko Museum, but its presence in South Africa has never been reported in the literature. As the expert who named the specimen is not recorded on the specimen label and the sample is currently in very poor condition, we were unable to confirm this identification and this thus remains a dubious record.

Order Diadematioda Duncan, 1889

Family Diadematidae Gray, 1855

Astropyga radiata (Leske, 1778)

Plate 1, Fig. I.

Astropyga radiata: Clark & Rowe, 1971: 140, 152, pl. XXII: fig. 3; H.L. Clark, 1923: 373; H.L. Clark, 1925: 46–47; Clark

& Courtman-Stock, 1976: 224; Richmond, 2003: 296; Samyn, 2003: figs 2F, F', F"; Schultz, 2010a: 88, figs 157–161.

Description

Test with v-shaped naked zones aborally; with dark spots, iridescent blue in live specimen (Schultz 2010a).

Distribution

Indo-Pacific species reported from Kenya (Samyn 2003); Eastern Africa and Madagascar (Clark & Rowe 1971; Schultz 2010a), and Mozambique (Clark & Courtman-Stock 1976) to Queensland, Australia (Schultz 2010a), and Hawaiian islands (Schultz 2010a); this study reports species for the first time in South African waters.

Material examined

SAM A 22214; Tugela River; KwaZulu-Natal; -29.4376 31.6073; 77 m; SAM A 28211; Sodwana Bay, KwaZulu-Natal; -27.0083 32.9233; 71 m; *Meiring Naude Dredge Survey*; 2 September 1990.

Order Arbacioida Gregory, 1900

Family Arbaciidae Gray, 1825

Tetrapygyus niger (Molina, 1782)

Plate 1, Fig. J.

Tetrapygyus niger: H.L. Clark, 1925: 17; Branch *et al.*, 2010: 236, fig. 106.3; Haupt *et al.*, 2010; Picker & Griffiths, 2011; Schultz, 2010a: 128, figs 233–235.

Description

Spines black having glassy distal caps. Cleaned test white with radiating violet bands, tubercle tips also violet, violet bands disappearing towards the oral side (Schultz 2010a).

Distribution

A shallow-water species reported from West Coast of South America in Peru and Chile. Accidentally introduced with commercial oysters, first reported from the Northern Cape Alexander oyster farm in 2007 and has not been recorded outside of that site (Branch *et al.* 2010; Haupt *et al.* 2010).

Material examined

SAM A 28054; Alexander oyster farm, Northern Cape; -28.6714 16.5028; collected from oyster basket.

Remarks

May be mistaken for indigenous *Stomopneustes varioles*, but differs in geographic distribution range: *S. varioles* being from KwaZulu-Natal and *Tetrapyga niger* from the Northern Cape.

Order Camarodonta Jackson, 1912

Family Echinometridae Gray, 1855

Colobocentrotus (Podophora) atratus (Linnaeus, 1758)

Plate 2, Fig. A.

Colobocentrotus auratus: A. Agassiz, 1872: 102, 424, pl. XXXVI: figs 6–7, pl. XXXVIII: figs 11–12; Clark & Rowe, 1971: 142, 158, pl. XXIII: fig. 7; Samyn, 2003: fig. 3D.

Colobocentrotus (Podophora) auratus: Mortensen, 1943: 434–439, pl. L: figs 1–2, pl. LII: figs 1–2, pl. LXV: fig. 7.
Podophora atratus: Schultz, 2010a: 232, figs 441–443.

Description

Flat, tessellated spines (Agassiz 1872; Mortensen 1943; Schultz 2010a). Mortensen (1943) advises use of *Podophora* as a subgenus of *Colobocentrotus* because of differences in tuberculation of ambulacra, spine outline and arrangement of spines amongst the two are of small generic value. The WoRMS and WED databases recognize species as *Colobocentrotus (Podophora) atratus*.

Distribution

Mortensen (1943) reports this species from 'Natal' but gives no locality information, or information as to where specimen is lodged, so that record remains unconfirmed. Previously reported from Kenya (Samyn 2003), Eastern Africa and Madagascar (Clark & Rowe 1971), and Hawaiian islands (Mortensen 1943). This study therefore confirms Mortensen's (1943) record of the species in KwaZulu-Natal.

Material examined

Addition of the species is based on a photographic record from Sodwana Bay submitted to the EchinoMap VM by C.L. Griffiths. Location Jesser Point, Sodwana Bay in KwaZulu-Natal; –27.5424 32.6785; 4 October 2009.

Family Temnopleuridae Agassiz, 1872

Temnotrema siamense (Mortensen, 1904)

Plate 2, Fig. B.

Temnotrema siamense: Clark & Rowe, 1971: 142, 155; Richmond, 2003: 296; Schultz, 2010c: 1226, figs 2168–2169

Description

Test small, with radiating white and pinkish rows, and deep horizontal sutures; eccentric apical system; banded spines (Schultz 2010c).

Distribution

Widespread Indo-Pacific species (Richmond 1997), occurring from East Africa to North East Australia and South China Sea (Schultz 2010c). Previously reported from Eastern Africa and Madagascar (Clark & Rowe 1971). Reported here for the first time within South African political borders.

Material examined

SAM A28209; Sodwana Bay, KwaZulu-Natal; –27.5300 32.7133; 70 m; *Meiring Naude Dredge Survey*; 2 June 1990. SAM A 23713; Boteler Point, KwaZulu-Natal; –27.0133 32.9183; 70 m; *Meiring Naude Dredge Survey*; 6 June 1987.

Echinometra oblonga (Blainville 1825)

Plate 2, Fig. C.

Echinometra oblonga: A. Agassiz, 1872: 116, 433, pl. XXXVI: fig. 5; Clark, 1925: 144; Schultz, 2010c: 1276, fig. 2275.

Echinometra mathaei oblonga: Mortensen, 1943: 393–395, pl. XLVIII: figs 1–20.

Description

Spines of dark, uniform colour, without white tips (Schultz 2010c).

Distribution

Reported from East Africa, Mauritius and the Maldives through the Philippines, Indonesia and Papua-New Guinea to Okinawa, Guam and Hawaii, from South Pacific Islands to Clarion and Socorro Island of Mexico, Costa Rica and Galapagos Island, strictly littoral (Schultz 2010c). Maher (2012) formally raised the subspecies *Echinometra mathaei oblonga* to *Echinometra oblonga* and reports this species in KwaZulu-Natal as a separate species and not a subspecies, as in Mortensen (1948).

Material examined

Park Rynie; KwaZulu-Natal; –30.3178 30.7424; intertidal; 27 June 2012. Vetchies/Vetch's Reef; KwaZulu-Natal; –30.4077 30.6824; intertidal; 28 June 2012 (Maher 2012).

Remarks

Record of this species is based on a study investigating the phylogeography of the population of *Echinometra mathaei* in KwaZulu-Natal, which revealed that *E. oblonga* is distinct from *E. mathaei* and not a morph (Maher 2012).

Family Toxopneustidae Troschel, 1872

Toxopneustes pileolus (Lamarck, 1816)

Plate 2, Fig. D.

Toxopneustes pileolus: H.L. Clark, 1923: 386; Clark & Rowe, 1971: 142, 156, pl. XXIV: fig. 7, pl. XXXI: fig. 15; Clark & Courtman-Stock, 1976: 234; Richmond, 2003: 298; Samyn, 2003: figs 4F, F'; Branch *et al.*, 2010: 234, fig. 105.7; Schultz, 2010a: 270, figs 518–522.

Description

Tropical reef species easily distinguished by pedicellaria forming a dense, poisonous flower-like appearance. Detailed species description given by Schultz (2010a).

Distribution

Previously reported from Mozambique (Clark & Courtman-Stock 1976) and Kenya (Samyn 2003). This study confirms photographic records of the species at South African localities by Branch *et al.* (2010).

Material examined

SAM A 28208; Jesser Point, KwaZulu-Natal; –27.5267 32.6967; 40 m; *Meiring Naude Dredge Survey*; 9 June 1987.

Order Echinoneoidea H.L. Clark, 1925

Family Echinoneidae L. Agassiz & Desor, 1847

Echinoneus cyclostomus Leske, 1778

Plate 2, Fig. E.

Echinoneus cyclostomus: H.L. Clark, 1925: 177, pl. X: figs 1–3; Mortensen, 1948: 75–80, pl. I: figs 14, 26, pl. XII: figs 21, 23; Clark & Rowe, 1971: 144, 158, fig. 72b; Schultz, 2010a: 287, figs 549–550.

Description

Easily distinguishable by its glassy tubercles; plated peristome, and elongated test (Mortensen 1948; Schultz 2010a).

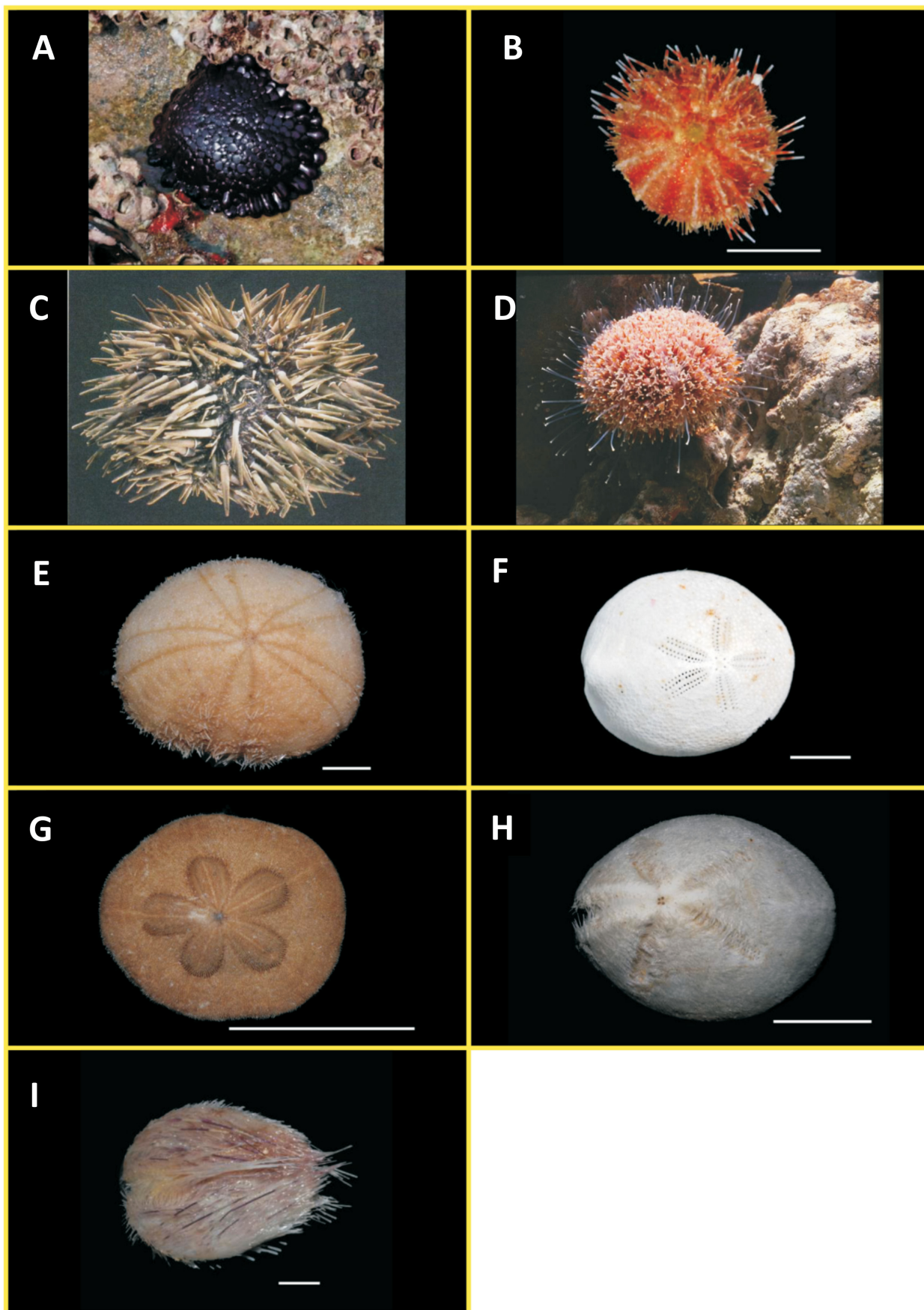


Plate 2.

Distribution

Previously reported from Eastern Africa and Madagascar (Clark & Rowe 1971); Zanzibar (A. Agassiz 1872). Mortensen (1948) reported it from Natal but does not give locality for entry; thus this study confirms this species at South African localities.

Materials examined

SAM A 28212; Aliwal Shoal, North of Scottburgh, KwaZulu-Natal; -30.2833 30.7500; 30 m; *SCUBA dive*; June 1980. SAM A 28221; Umhlali Shore Station; -29.4589 31.2783; intertidal; *UCT Ecological Survey*; 3 December 1938. SAM A 28255; South of Scottburgh, -30.2833 30.7500; KwaZulu-Natal; intertidal; *SCUBA dive*; 18 June 1987. SAM A 28234; Nthlonyane River; -32.2867 29.0917; 345400 m; *Meiring Naude Dredge Survey*; 5 July 1985.

Order Cassiduloida Claus, 1880

Family Cassidulidae L. Agassiz & Desor, 1847

Oligopodia epigonus v. Martens, 1865

Plate 2, Fig. F.

Nucleolites epigonus: A. Agassiz, 1872: 147, pl. XIX: figs b, 4–6.

Oligopodia epigonus: H.L. Clark, 1925: 181; Mortensen, 1948: 228–233, pl. I: figs 5–13, pl. XII: figs 13, 14, 17, 19, 24; Schultz, 2010b: 512, figs 862–864.

Description

Species distinguishable by slightly raised interambulacra forming keel above posterior margin. Species corresponds with the description given by Mortensen (1948) and Schultz (2010b).

Distribution

Reported from the Indo-West Pacific, from East Africa over Malayan region to the Bonin Island, Tonga Island and New Zealand (Schultz 2010b). Mortensen (1948) reported having dredged specimens off the Natal coast; there is, however, no entry of this species in Clark & Courtman-Stock's (1976) report on species in the region. This study therefore confirms this species to occur at South African localities.

Materials examined

SAM A 28218; Sodwana Bay, KwaZulu-Natal; -27.5172 32.7017; 61 m; *Meiring Naude Dredge Survey*; 2 June 1990. SAM A 28222; South east of Umzimbazi River, KwaZulu-Natal; -30.1339 30.9347; 65 m; *Meiring Naude Dredge Survey*; 8 July 1986.

Order Clypeasteroida A. Agassiz, 1872

Family Clypeasteridae L. Agassiz, 1835

Clypeaster fervens Koehler, 1922

Plate 2, Fig. G.

Clypeaster (Raphidoclypus) fervens: Mortensen, 1948: 84–86, pl. XIII: figs 2, 3, pl. XXII: figs 1–11, pl. XXVI: fig. 2, pl. LXV: figs 7–9, 12, 20.

Clypeaster fervens: Clark & Rowe, 1971: 144, 161; Schultz, 2010b: 541, figs 917–920.

Description

Species distinguished by broad, closed petals, except for the anterior one (Schultz 2010b). Detailed descriptions given by Mortensen (1948) and Schultz (2010b).

Distribution

Indo-Pacific species, reported from Eastern Africa and Madagascar (Clark & Rowe 1971), this study reports the species for the first time at South African localities.

Material examined

SAM A 28220; Rocktail Bay; -27.1844 32.8500; 100 m; *Meiring Naude Dredge Survey*; 4 June 1987. SAM A 28214; Liefeldts Rock; -27.7172 32.6519; 50 m; *Meiring Naude Dredge Survey*; 8 June 1988.

Order Spatangoida L. Agassiz, 1840a

Family Brissidae Gray, 1855

Metalia robillardi (de Loriol, 1876)

Plate 2, Fig. H

Metalia robillardi: Mortensen, 1951: 537; Clark & Rowe, 1971: 146, 166; Schultz, 2010a: 394.

Description

Test anteriorly raised, sloping gradually towards posterior end (Mortensen 1951; Schultz 2010a).

Distribution

Shallow-water Indo-Pacific species reported from East Africa, Madagascar and Mauritius (Clark & Rowe 1971; Schultz 2010a). This study thus reports the species at South African localities for the first time.

Material examined

SAM A 28230; Jesser Point; -32.7033 32.7000; 50 m; *Meiring Naude Dredge Survey*; 3 June 1987.

Family Loveniidae Lambert, 1905

Lovenia elongata (Gray 1845)

Plate 2, Fig. I.

Lovenia elongata: A. Agassiz, 1872: 139, 575, pl. XIX: figs 1–4, pl. XXV: fig. 3, pl. XXVI: fig. 35–36, pl. XXXVII: figs 18–19, pl. XXXVIII: figs 27–28; Döderlein, 1906: 265, pl. XLVIII: fig. 5; Mortensen, 1951: 97–104, pl. VII: figs 1–10, pl. VIII: fig. 1, pl. XII: fig. 5, pl. XLVII: figs 10–23; H.L. Clark, 1923: 404; Clark & Rowe, 1971: 146, 164, pl. XXV: figs 14–15; Clark & Courtman-Stock, 1976: 252; Richmond, 2003: 300–301; Schultz, 2010a: 419, fig. 789.

Description

Test delicate, kidney-shaped, as outlined by Mortensen (1951) and Schultz (2010a).

Distribution

Widely distributed throughout the Indo-Pacific, from Red Sea along East Africa, and from southern Japan to east coast of Australia (Clark & Rowe 1971; Schultz 2010a), also Mozambique (Clark & Courtman-Stock 1976). This study reports the species in South Africa for the first time.

Material examined

SAM A 28215; Kosi River; -26.7014 32.9022; 42–44 m; *Meiring Naude Dredge Survey*; 3 June 1990. SAM A 28216; Hully Point; -27.3339 32.7672; 60 m; *Meiring Naude Dredge Survey*; 5 June 1987. SAM A 28219; Kosi River; -26.8681 32.9022; 50 m; *Meiring Naude Dredge Survey*; 8 July 1987.

Remarks

‘Cape of Good Hope’ record of species by A. Agassiz (1881) is dubious, as species is a well-known Indo-Pacific species; and therefore his record has been identified as *Lovenia gregalis* (Mortensen 1951; Clark & Courtman-Stock 1976).

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