

A preliminary account of the shallow-water echinoderms of Rodrigues, Mauritius, western Indian Ocean

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Collections of echinoderms were made from the intertidal, lagoon and reef slopes of Rodrigues over a period of 3 weeks in September to October, 2001. A total of 74 species are reported here, including three species of Crinoidea, 10 species of Asteroidea, 17 species of Ophiuroidea, 15 species of Echinoidea and 29 species of Holothurioidea. These findings include 10 new records for the Mascarene Islands (Réunion, Mauritius and Rodrigues), four species (two in the asteroid genus '*Asterina*', one in the ophiuroid genus *Amphioplus* and one species in the holothurioid genus *Actinopyga*) that remain unnamed due to the need to clarify unresolved taxonomic issues, and one species of crinoid which could not be identified because only the distal parts of four arms were collected. In the dendrochirotid holothurioid family Psolidae, the little-known species *Psolus appendiculatus* (de Blainville) 1821, *P. boholensis* Semper, 1868 and *P. complanatus* Semper, 1868 are referred to the genus *Psolidium* Ludwig, 1887. Despite its seniority, *P. appendiculatus* is treated as a (senior) synonym of the better known and described species *Psolidium ornatum* (Perrier, 1893). In the dendrochirotid holothurioid family Phyllophoridae, *Thyonidiella cherbonnieri* nom. nov. is proposed for misidentified specimens of *Semperiella tenera* (Ludwig, 1875) in the western Indian Ocean, and *Semperiella* Hedding and Panning, 1954 is reduced to the synonymy of *Thyonidiella* Hedding and Panning, 1954. In the apodid holothurioid family Chiridotidae the species *Chiridota eximia* Haacke, 1880 is reduced to the synonymy of *C. rigida* Semper, 1868.

Given the small size of the area of shallow water around Rodrigues that has been sampled, the relatively small range of marine habitats present and the geographic isolation, this is an impressive diversity. The biogeography of the 69 identified species of Rodrigues is discussed.

KEYWORDS: Echinoderms, Indian Ocean, Mascarene Islands, Rodrigues.

Introduction

It is over 120 years since the first records of echinoderms from Rodrigues were published. Smith (1876a) described the crinoid *Comatula indica* (= *Stephanometra*

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indica) and in the same year (1876b) described two species of *Ophiocoma*, *O. variegata* (= *O. dentata* Müller and Troschel, 1842; see Devaney, 1970) and *O. brevispinosa* (= *O. brevipes* Peters 1851, see Devaney, 1970). He also recorded *O. erinaceus* Müller and Troschel and *Ophiomastix venosa* Peters, and subsequently provided detailed figures of his new taxa from the island (see Smith, 1879).

No further echinoderms have been reported from this remote island, although the fauna of other islands to the north and west of Rodrigues (e.g. Aldabra, Seychelles, Chagos, Maldives, Madagascar) have received more recent attention (see Clark and Rowe, 1971; Cherbonnier and Guille, 1978; Sloan *et al.*, 1979; Clark, 1984; Cherbonnier, 1988; James, 1989; Arakaki and Fagoonee, 1996). Clark and Rowe (1971) report a total of 155 echinoderm species from the Mascarene group, comprising the significantly larger Réunion and Mauritius Islands as well as Rodrigues. The taxa comprised eight feather stars, 32 sea stars, 36 brittle stars, 39 sea urchins and 40 sea cucumbers, among which only the species reported by Smith (1876a, 1876b, 1879) refer to records from Rodrigues. The Shoals of Capricorn Programme has, therefore, provided a unique opportunity to sample the echinoderm fauna of Rodrigues in greater detail. All species records, with the exception of those recorded by Smith, are therefore new records for the island.

Methods

Collections were made over 3 weeks in September to October 2001 from over 40 stations covering the range of intertidal and shallow subtidal habitats around the island, with the emphasis on sampling from the greatest diversity of habitats. Due to the prevailing weather during the visit, most subtidal sampling using scuba was concentrated on the more sheltered northern and north-western shores, collecting from fringing coral reefs to a depth of about 20 m. On two occasions night-time collection was also undertaken from a shallow 10 m deep reef on the northern shore. Sampling locations are indicated on figure 1.

Fresh material was photographed, where possible *in situ*, and preserved for subsequent identification. A collection of the typical fauna, identified locally by M.D.R. remains (uncatalogued) at the Shoals office on Rodrigues with duplicate specimens of the more difficult taxa removed for further study by F.W.E.R.; these will be deposited at The Natural History Museum (London) at the completion of this study.

Identification of specimens was substantially achieved using Clark and Rowe (1971). However, preliminary comparisons of unnamed taxa in this report have been conducted by F.W.E.R. using the following type and non-type material: Muséum national d'Histoire naturelle, Paris, France: '*Asterina*' *wega* (Perrier, 1869) EcAS 2713 (lectotype); *Bohadschia subrubra* (Quoy and Gaimard, 1833) EcHh 3283 (?type specimen); The Natural History Museum, London, UK: '*Asterina*' *burtoni* Gray, 1840, 1940.3.23.54 (lectotype); 1940.3.23.55; '*Asterina*' *anomala* H. L. Clark, 1921, 1939.6.15.88–90; The Australian Museum, Sydney, NSW, Australia: '*Asterina*' *burtoni* Gray, 1840, J17892; '*Asterina*' *heteractis* H. L. Clark, 1938, J16401, J20740.

Results

A total of 74 species of echinoderms was collected, with three Crinoidea, 10 species of Asteroidea, 17 species of Ophiuroidea, 15 species of Echinoidea and 29

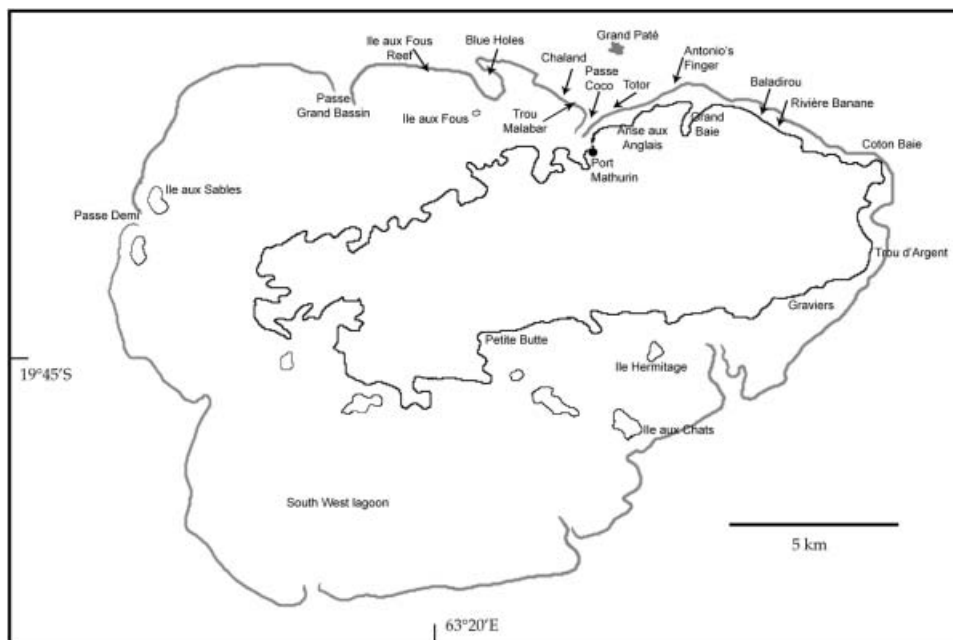


FIG. 1. Sampling locations around Rodrigues.

Holothurioidea. All species are listed below with comments on their taxonomy, where appropriate (F.W.E.R.), distribution around the island, and where field notes are available, on the ecology and coloration (M.D.R.). Photographs of some of the more interesting species are included in this account.

Systematic account

References are restricted to the monographic work of Clark and Rowe (1971), which provides illustrated keys to and distribution tables for the majority of species in this report. Additional references are included only where they add material taxonomic, or other, information for the species which is not included by Clark and Rowe (1971). An up-to-date summary of the distribution of each of the species collected is provided in table 1.

Class CRINOIDEA

Comatulid indet.

Material. Four individual arms of a specimen, collected from Chaland Reef, 10m depth. Numerous individuals were observed attached deep in crevices among coral with only the distal part of the arms extended. Removal of intact specimens was unsuccessful.

Coloration. In life, arm pinnules uniformly pale yellow-orange.

Family MARIAMETRIDAE

Stephanometra indica (Smith, 1876a)

See: Clark and Rowe, 1971: 8 (distribution), 24 (key).

Table 1. Echinoderm fauna of Rodrigues and its distribution.

Taxa	East Africa	Seychelles Mascarenes	SE Arabia- Gulf etc.	Red Sea	W India- Pakistan	Laks- Chagos	Lanka- Bengal	Malay- Indon- Phil.	N Australia	China- Japan	W Pacific Is Hawaii	E Pacific	Trop. Atlantic
Class													
CRINOIDEA													
COMATULIDA													
Sp. indent. (incomplete)	-	6	-	-	-	-	-	-	-	-	-	-	-
MARIAMETRIDAE													
<i>Stephanometra indica</i> (Smith)	1	1	1	-	1	1	1	1	1	1	1	-	-
TROPIOMETRIDAE													
<i>Tropiometra carinata</i> (Lamarck)	1	1	1	1	1	-	1	?	-	-	-	-	-
Class ASTEROIDEA													
OPHIDIASTERIDAE													
<i>Dactylosaster cylindricus</i> (Lamarck)	1	1	1	1	-	-	1	1	1	5	13	1	1
<i>Fromia milleporella</i> (Lamarck)	1	1	4	14	?	-	1	1	1	1	1	-	-
<i>Gomophia watsoni</i> (Livingstone)	-	nr	-	-	-	-	-	-	5	5	-	-	-
<i>Leiaster leachi</i> (Gray)	-	1	?	19	1	-	1	-	1	1	1	1	-
<i>Linckia multifora</i> (Lamarck)	1	1	1	1	1	1	1	1	5	1	1	1	-
<i>Nardoa variolata</i> (Retzius)	1	1	1	14	-	-	-	-	-	-	-	-	-
<i>Neoferdina offreti</i> Müller and Troschel	6	nr	4	-	-	-	21	1	18	-	18	18	-
ASTERINIDAE													
' <i>Asterina</i> ' sp. 1	-	6	-	-	-	-	-	-	-	-	-	-	-
' <i>Asterina</i> ' sp. 2	6	6	-	-	-	-	-	-	-	-	-	-	-
ECHINASTERIDAE													
<i>Echinaster purpureus</i> (Gray)	1	1	1	19	1	-	-	1	-	-	-	-	-

Table 1. (Continued).

Taxa	East Africa	Mascarenes	Seychelles etc.	SE Arabia– Gulf	Red Sea	W India– Pakistan	Laks– Chagos	Lanka– Bengal	Malay– Indon– Phil.	N Australia	China– Japan	W Pacific Is	Hawaii	E Pacific	Trop. Atlantic
Class OPHIUROIDEA															
OPHIOMYXIDAE															
<i>Ophiomyxa australis</i> Lutken	1	1	1	19	7	–	–	1	1	1	1	1	–	–	–
GORGONOCEPHALIDAE															
<i>Astrocladus tonganus</i> Doderlein	3	nr	–	–	–	–	–	–	–	–	–	1	–	–	–
AMPHIURIDAE															
<i>Amphiodia (Amphiodia)</i> <i>dividua</i> (Mortensen)	3	1	4	–	–	–	–	–	–	–	–	–	–	–	–
<i>Amphipholis squamata</i> (D. Chiaje)	1	nr	1	1	1	1	–	–	1	1	13	1	1	–	3
<i>Amphioplus</i> sp. nov.	–	6	–	–	–	–	–	–	–	–	–	–	–	–	–
OPHIACTIDAE															
<i>Ophiactis savignyi</i> Müller and Troschel	1	1	1	1	1	1	1	1	1	1	1	1	1	–	3
OPHIOTRICHIDAE															
<i>Macrophiothrix longipeda</i> (Lamarck)	1	1	1	–	–	–	1	1	1	1	1	1	–	–	–
<i>M. robillardi</i> (de Loriol)	–	1	?	–	–	–	–	–	16	5	16	16	–	–	–
OPHIOCOMIDAE															
<i>Ophiarthrum elegans</i> Peters	1	nr	1	3	3	–	–	1	1	1	1	1	–	–	–
<i>Ophiocoma brevipes</i> Peters	1	1	1	9	3	–	1	1	1	1	1	1	1	–	–
<i>Ophiocoma dentata</i> Müller and Troschel	1	1	1	–	–	–	1	–	1	1	1	1	1	–	–
<i>Ophiocoma erinaceus</i> Müller and Troschel	1	1	1	1	1	–	1	1	1	1	1	1	1	–	–

Table 1. (Continued).

Taxa	East Africa	Mascarenes	Seychelles etc.	SE Arabia- Gulf	Red Sea	W India- Pakistan	Laks- Chagos	Lanka- Bengal	Malay- Indon- Phil.	N Australia	China- Japan	W Pacific Is	Hawaii	E Pacific	Trop. Atlantic
<i>Ophiocomella sexradia</i> (Duncan)	1	nr	1	19	1	-	1	1	1	1	1	1	1	-	-
<i>Ophiomastix venosa</i> Peters	1	1	1	14	-	-	-	1	1	-	-	-	-	-	-
OPHIONEREIDAE															
<i>Ophionereis porrecta</i> Lyman	1	1	1	-	1	-	1	1	1	1	1	1	1	-	-
OPHIODERMATIDAE															
<i>Ophiarachnella gorgonia</i> (M. and Troschel)	1	1	1	9	-	-	-	1	1	1	1	1	-	-	-
OPHIURIDAE															
<i>Ophioplocus imbricatus</i> Müller and Troschel	1	1	1	9	-	1	-	1	1	1	1	1	1	-	-
Class ECHINOIDEA															
CIDARIDAE															
<i>Phyllacanthus imperialis</i> (Lamarck)	1	1	1	-	1	-	-	1	1	1	1	1	-	-	-
DIADEMATIDAE															
<i>Diadema savignyi</i> Michelin	1	1	1	1	-	-	1	1	1	1	1	1	-	-	-
<i>Echinothrix diadema</i> (L.)	1	1	1	1	1	-	1	1	1	1	1	1	1	-	-
STOMOPNEUSTIDAE															
<i>Stomopneustes variolaris</i> (Lamarck)	1	1	4	1	-	1	1	1	1	1	1	1	-	-	-
TEMNOPLEURIDAE															
<i>Microcyphus maculatus</i> L. Agassiz	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
TOXOPNEUSTIDAE															
<i>Toxopneustes pileolus</i> (Lamarck)	1	1	1	1	10	-	-	1	1	5	1	1	-	-	-

Table 1. (Continued).

Taxa	East Africa	Mascarenes	Seychelles etc.	SE Arabia- Gulf	Red Sea	W India- Pakistan	Laks- Chagos	Lanka- Bengal	Malay- Indon- Phil.	N Australia	China- Japan	W Pacific Is	Hawaii	E Pacific	Trop. Atlantic
<i>Tripneustes gratilla</i> (L.)	1	1	1	1	1	-	1	1	1	1	1	1	1	-	-
ECHINOMETRIDAE															
<i>Colobocentrotus atratus</i> (L.)	1	1	1	14	-	-	-	1	1	-	-	-	1	-	-
<i>Echinometra mathaei</i> (de Blainville)	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-
<i>Echinostrephus molaris</i> (de Blainville)	1	1	7	1	1	1	1	1	1	1	1	1	-	-	-
<i>Heterocentrotus mammillatus</i> (L.)	1	1	?	1	1	-	1	1	1	1	1	1	1	-	-
ECHINONEIDAE															
<i>Echinoneus cyclostomus</i> Leske	1	1	1	1	-	-	1	1	1	1	1	1	1	-	13
CLYPEASTERIDAE															
<i>Clypeaster reticulatus</i> (L.)	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-
SPATANGIDAE															
<i>Maretia planulata</i> (Lamarck)	1	1	1	1	1	-	1	1	1	1	1	1	-	-	-
BRISSIDAE															
<i>Metalia sternalis</i> (Lamarck)	1	1	1	1	1	-	-	1	1	1	1	1	1	-	-
Class HOLOTHURIOIDEA															
HOLOTHURIIDAE															
<i>Actinopyga echinites</i> (Jaeger)	1	1	1	1	2	-	8	1	1	1	1	1	-	-	-
<i>Actinopyga mauritiana</i> (Quoy and Gaimard)	1	1	1	14	1	1	1	1	1	1	1	1	1	-	-
<i>Actinopyga</i> sp. nov.	-	6	-	-	-	-	-	-	?	-	-	-	-	-	-
<i>Bohadschia vitiensis</i> (Semper)	2	6	?	-	-	-	1	1	1	1	1	1	-	-	-

Table 1. (Continued).

Taxa	East Africa	Mascarenes	Seychelles etc.	SE Arabia- Gulf	Red Sea	W India- Pakistan	Laks- Chagos	Lanka- Bengal	Malay- Indon- Phil.	N Australia	China- Japan	W Pacific Is	Hawaii	E Pacific	Trop. Atlantic
<i>Stichopus monotuberculatus</i> (Quoy and Gaimard)	1	1	?	1	1	-	-	-	17	5	17	17	-	-	-
PSOLIDAE															
<i>Psolidium ornatum</i> (Perrier)	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-
CUCUMARIIDAE															
<i>Plesiocolochirus dispar</i> (Lampert)	2	nr	-	1	2	-	-	-	-	5	-	-	-	-	-
SCLERODACTYLIDAE															
<i>Ohshimella ehrenbergi</i> (Selenka)	1	nr	-	1	1	1	1	1	22	-	13	-	-	-	-
PHYLLOPHORIDAE															
<i>Thyonidiella cherbonnieri</i> nom. nov.	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-
SYNAPTIDAE															
<i>Euapta godeffroyi</i> (Semper)	1	1	4	-	1	-	1	-	1	1	13	1	1	-	-
<i>Opheodesoma grisea</i> (Semper)	1	nr	?	1	1	-	-	1	1	1	13	12	1	-	-
<i>Synapta maculata</i> (Chamisso and Eysenhardt)	1	1	1	1	1	-	1	1	1	1	1	1	-	-	-
CHIRODOTIDAE															
<i>Chiridota rigida</i> Semper	15	6	-	-	-	-	-	-	1	1	1	1	-	-	-

Numbers correspond to sources: 1, Clark and Rowe (1971); 2, Cherbonnier (1988); 3, Cherbonnier and Guille (1978); 4, Sloan *et al.* (1979); 5, Rowe and Gates (1995); 6, specimen collected and photographed by M.D.R.; 7, Vine (1986); 8, Clark and Taylor (1971); 9, Campbell and Morrison (1988); 10, Roman (1979); 11, Tahera and Tirmizi (1995); 12, Kerr (1994); 13, Liao and Clark (1995); 14, Tortonese (1980); 15, Thandar and Rowe (1989); 16, Hoggett (1991); 17, Massin (1996); 18, Jangoux (1973); 19, Price (1982); 20, Rowe (1985b); 21, Moosleitner (1997); 22, Massin (1999).

Records marked '?' equivalent to doubtful records in Clark and Rowe (1971); nr, new record for Mascarene Islands; numbers in italics correspond to synonyms.

Material. One specimen, Grand Baie reef slope, 15 m depth, amongst coral; one specimen Chaland Reef, 15 m depth, amongst coral; one specimen, Grand Baie, 16 m; one specimen, Passe Demi, 18 m, among black corals.

Coloration. In life, various patterns of purple, pink and white banding (figure 2).

Comments. The type locality, from which *S. indica* was described by Smith (1876a) is Rodrigues. The specimens accord in all aspects with the original and subsequent descriptions for the species.

Distribution. Widespread throughout the Indo-west Pacific region, though not reported from the north-western parts of the Indian Ocean or Hawaii.

Family TROPIOMETRIDAE

Tropiometra carinata (Lamarck, 1816)

See: Clark and Rowe, 1971: 10 (distribution), 25 (key).

Material. One specimen, Totor Reef, 5–7 m depth, amongst coral.

Coloration. Uniformly coloured pale orange pinnules, with arms more brownish and finely banded with white.

Distribution. An Indian Ocean species (type locality Mauritius), but not recorded from the Arabian Gulf or Maldives. Records of *T. carinata* occurring further east of Bay of Bengal are queried by Clark and Rowe (1971).

Class ASTEROIDEA

Family OPHIDIASTERIDAE

Dactylosaster cylindricus (Lamarck, 1816)

See: Clark and Rowe, 1971: 34 (distribution), 59 (key); Rowe and Gates, 1995: 195.

Material. Two specimens ($R=60-90$ mm, $r=9$ mm; $R=33.5-66.5$ mm, $r=9.5$ mm), Coton Baie, reef crest; one specimen ($R=41.6$ mm, $r=4.5$ mm), Rivière Banane, under boulder, reef crest; one specimen ($R=60$ mm, $r=6$ mm), Grand Paté, hidden deep inside coral crevices, 15 m.

Coloration. Mottled black and lilac/silvery blue.

Comments. There is some doubt as to the type locality of this species, whether it is from Australian or from Mauritian waters (see Rowe and Gates, 1995). The specimens from Rodrigues are typical of the species though those from Coton Baie show signs of regenerative growth from damaged arms.

Distribution. Widespread though with a patchy distribution throughout the Indo-west Pacific region.

Fromia milleporella (Lamarck, 1816)

See: Clark and Rowe, 1971: 34 (distribution), 63 (key).

Material. Several specimens were found, mostly between 3 and 5 cm diameter, among coral at depths from 5 to 20 m on reefs at Totor and Rivière Banane, and deposited at the Shoals Rodrigues office.

Coloration. Brick red.

Distribution. Widespread in the Indo-west Pacific region, though not recorded from north-western Indian Ocean or Hawaii.

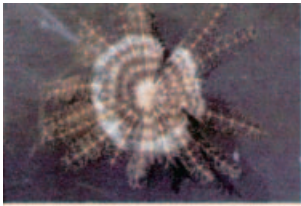


FIG. 2.

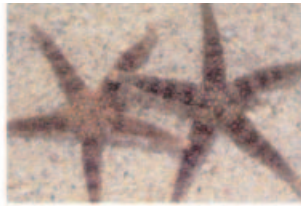


FIG. 3.



FIG. 4.

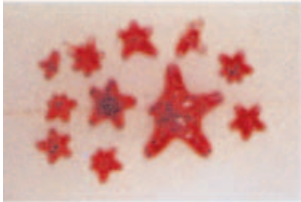


FIG. 5.

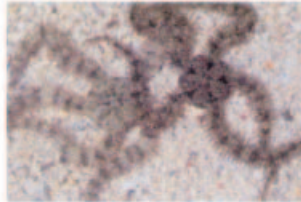


FIG. 6.

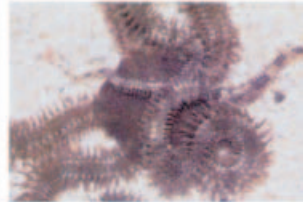


FIG. 7.



FIG. 8.



FIG. 9.



FIG. 10.



FIG. 11.



FIG. 12.

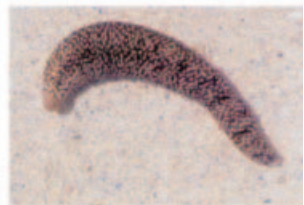


FIG. 13.



FIG. 14.



FIG. 15.

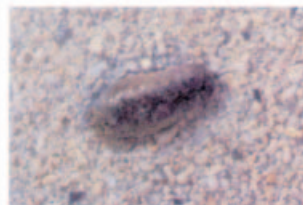


FIG. 16.

FIGS 2–16. (2) *Stephanometra indica* (© RGS/Jeremy Neech). (3) *Gomophia watsoni* (© RGS/Jeremy Neech). (4) ‘*Asterina*’ sp. 1. (M. Richmond). (5) ‘*Asterina*’ sp. 2. (M. Richmond). (6) *Ophiocoma brevipes* (© RGS/Jeremy Neech). (7) *Ophiocoma dentata* (© RGS/Jeremy Neech). (8). *Microcyphus maculatus* (M. Richmond). (9) *Bohadschia* sp. 1 (M. Richmond). (10). *Bohadschia* sp. 2 (© RGS/Jeremy Neech). (11) ?*Bohadschia* sp. 3 (© RGS/Jeremy Neech). (12) *Holothuria impatiens* s. s. (© RGS/Jeremy Neech). (13) *Holothuria impatiens bicolor*. (© RGS/Jeremy Neech). (14) *Holothuria impatiens concolor*. (© RGS/Jeremy Neech). (15) *Psolidium ornatum* (© RGS/Jeremy Neech). (16) *Plesiocolochirus dispar* (© RGS/Jeremy Neech).

Gomophia watsoni (Livingstone, 1936)

See: Clark, 1967: 176; Rowe and Gates, 1995: 84; Erhardt and Moosleitner, 1995: 972 (coloured photograph).

Material. One specimen (R=52.0 mm, r=9.0 mm), Totor Reef, among coral, 7 m; one specimen with six arms (R=21.8–30.5 mm, r=7.0 mm), Grand Paté, 15 m. An additional specimen found at Totor Reef was deposited at the Shoals Rodrigues office.

Coloration. Arms banded with darker shades of grey; centre paler grey with conspicuous lighter-coloured tubercles (see figure 3).

Comments. The identification of this species from the western Indian Ocean is a surprise. That *Ophidiaster watsoni* Livingstone, 1936 is congeneric with *egyptiaca* Gray, 1840 (the genotype of *Gomophia*, Gray, 1840) as A. M. Clark (1967) concluded and not conspecific with it, as later considered by Rowe and Pawson (1977) cannot be doubted. In fact, Rowe and Gates (1995) reinstated *Gomophia watsoni* for Australian waters along the Great Barrier Reef and westwards to Christmas Island in the Indian Ocean. Within this genus three species (*G. egyptiaca*, *G. egeriae* A. M. Clark, 1967 and *G. watsoni*) share the possession of intermarginal plates and distinctive, conical abactinal/superomarginal tubercles, at the apex of which is usually a single (rarely two or three, *G. egeriae*), simple, conical nipple-like granule. *G. egeriae* A. M. Clark, 1967, similarly has conical tubercles, but lacks a prominent apical granule, instead the tubercles are covered by an even layer of granules. The differences between *G. egyptiaca* and *G. watsoni* appear to be very marked [see Erhardt and Moosleitner, 1995, cf. p. 969 (*G. egyptiaca*) versus p. 972 (*G. watsoni*)] with *G. watsoni* having a distinct row of supermarginal plates within which the larger, convex plates are spaced between one and three smaller plates (as is the case in the two Rodrigues specimens). The intermarginal plates are well defined between the inferomarginal/superomarginal boundary. There are three rows of intermarginal plates in the larger Rodrigues specimen, a prominent median row extending to *ca* $\frac{1}{2}$ R, with a shorter row to *ca* $\frac{1}{3}$ R above and *ca* $\frac{1}{4}$ R below, and a single row to *ca* $\frac{1}{2}$ R in the smaller specimen. The conical abactinal tubercles are much smaller (<2 mm) than *G. egyptiaca* and usually more numerous (>20). The Rodrigues specimens have about 20 abactinal tubercles per arm.

Distribution. Following the recent recognition of *G. watsoni* as a valid species it is now known with certainty from northern Australia to Christmas Island (eastern Indian Ocean) and Rodrigues Island—the present record being an extension of the range into the western Indian Ocean. This interesting new record strongly suggests that a reassessment of published specimens and records of *G. egyptiaca* is required. Such a study would eliminate confusion of identity and distribution for each of these species, since sympatry seems likely. *G. egyptiaca* is reported from East Africa, Mauritius, Red Sea (the type locality) eastwards to Sri Lanka, Bay of Bengal, Indo-Malay region, northern Australia (off Mackay, Queensland being the type locality of *G. watsoni*) and islands of the south-west Pacific Ocean (see Clark and Rowe, 1971; Marsh, 1974: table 1).

Leiaster leachi (Gray, 1840)

See: Clark and Rowe, 1971: 36 (distribution), 58 (key); Jangoux, 1980: 91; Price, 1983: 43.

Material. One specimen (R=166–11 mm, r=14 mm, br=13–14 mm), Totor Reef, among corals, 7 m.

Coloration. The specimen is typically coloured patchy red, purple and white.

Comments. Jangoux (1980) has reviewed the species of *Leiaster*.

Distribution. Described originally from Mauritius, this species is widely distributed throughout the Indo-west Pacific region.

***Linckia multifora* (Lamarck, 1816)**

See: Clark and Rowe, 1971: 36 (distribution), 62 (key).

Material. One specimen (R=75.0 mm, r=9.3 mm, r=10.6 mm), Ile aux Chats, reef crest; one specimen, Ile Hermitage passage (R=125.0 mm, r=11.0 mm, 12.6 mm).

Comments. This starfish was encountered at numerous and diverse sites throughout the shallow subtidal and lower intertidal. The longest arm length of the specimen from Ile Hermitage, at R=125.0 mm, exceeds that of specimens reported from Aldabra (Sloan *et al.*, 1979; R=114 mm) and the Maldives (James, 1989; R=110 mm) and suggests that this fissiparous species reaches a considerable size. Each of the specimens from Rodrigues is typical of the species in having five unequal arms, two madreporites and mottled coloration with blue-tipped arms. The taxonomy of this species, whether the fissiparous *L. multifora* (Lamarck, 1816) is a valid species or a junior synonym of the non-fissiparous *L. laevigata* (Linnaeus, 1758), is currently a matter of debate, following the recent molecular study carried out by Williams (2000). Williams (2000) paints a complex picture of *L. laevigata* whereby, based on molecular analysis, it can be divided into two groups: (1) Indian Ocean and (2) a south-west Pacific group. Until the relationship of *multifora* within *laevigata* is more satisfactorily concluded (*multifora* appears more related within the Indian Ocean group of *laevigata*), then on the grounds of traditionally accepted morphological/colour pattern characters, we continue to recognize the validity of *Linckia multifora*. We agree with Williams' concluding statement that 'a revision of this genus (*Linckia*) is probably needed'.

Distribution. Widespread throughout the Indo-west Pacific.

***Nardoia variolata* (Retzius, 1805)**

See: Clark and Rowe, 1971: 36 (distribution), 25 (key).

Material. Specimens were collected and observed at various rocky and coral-line sites, being particularly common at Grand Baie. These were all deposited at the Shoals Rodrigues office.

Coloration. Characteristic brick red with blackened edges to plates.

Comments. Possibly one of the most commonly encountered starfish species on Rodrigues.

Distribution. Restricted to the western part of the Indian Ocean.

***Neoferdina offreti* (Koehler, 1910)**

See: Clark and Rowe, 1971: 36 (distribution), 65 (key); Jangoux, 1973: 778; Sloan *et al.*, 1979: 98; Clark, 1984: 94; Jangoux and Aziz, 1984: 867.

Material. One specimen (four arms, R=21.8 mm, r=6.3 mm), Ile aux Fous, fringing reef, among coral, 9 m.

Coloration. Creamy white with honeycomb appearance due to red edging of plates, being thicker and darker towards the tips of the arms.

Comments. Jangoux (1973) has reviewed the species in the genus *Neoferdina*.

Distribution. A new record for the Mascarene Islands, extending the range southwards from the Seychelles. Recorded also from the Andaman Islands (type locality), Okinawa, Japan and New Caledonia, south-west Pacific Ocean (Jangoux, 1973). The latter report requires confirmation in light of the more recent record from there of *N. cummingi* (Gray, 1840) by Jangoux (1986). The inclusion of *N. cummingi* in the faunal complement of the eastern African and western Indian Ocean field guide (Rowe and Richmond, 1997) is an error and refers to the occurrence of *N. offreti* (see Rowe and Richmond, 2002).

Family ASTERINIDAE

The western Indian Ocean (including the Maldives Islands) appears pauperate of asterinid asteroids. With the exceptions of a record from the coast of Mozambique (East Africa) for *Patiriella exigua* (Lamarck, 1816), and from the coasts of Pakistan and western India for *Asterina lorioli* Koehler, 1910, Clark and Rowe (1971) record only *Asterina burtoni* (Gray, 1840) as occurring throughout the western Indian Ocean (and indeed, the Indo-west Pacific) region. The extent of the distribution of *A. burtoni* given by Clark and Rowe (1971) is, however, misleading. Included within it are locality records for three species of doubtful status. These are the pentaradiate, non-fissiparous *A. cepheus* (Müller and Troschel, 1842) (described from Indonesian waters, and long held to be conspecific with *burtoni*, e.g. see Smith, 1927), the pluriradiate, fissiparous species *A. wega* (Perrier, 1869) (described, as is *burtoni*, from the Red Sea, and also long held to be conspecific with *burtoni*, see Smith, 1927) and the pluriradiate, fissiparous species *A. anomala* H. L. Clark, 1921 (described from tropical Australian waters) which A. M. Clark (in Clark and Rowe, 1971) considered to be conspecific with *burtoni*, as well as any records for *burtoni* s. s., itself. More recently, Jangoux (1973) and Jangoux and Aziz (1984) have recorded *A. burtoni* as widespread both throughout the Indo-west Pacific region (Jangoux, 1973) and within the western Indian Ocean (Jangoux and Aziz, 1984). In light of the fact that both *cepheus* and *anomala*, at least, have subsequently been recognized as valid species (see Liao and Clark, 1995; Rowe, and Gates, 1995), it is clear that the extent of the distributions of these individual species remains to be resolved and all records for *A. burtoni* need rigorous re-examination and taxonomic re-assessment.

Further records of asterinids recorded from the western Indian Ocean also require investigation and taxonomic resolution. A. M. Clark (in Clark and Rowe, 1971) has identified two specimens from Zanzibar (East Africa) which she considers possibly referable to the genus *Paranepanthia* Fisher, 1917 (a genus otherwise known from Philippine, Indonesian and Australian waters). Interestingly, H. L. Clark (1938) comments on a specimen he examined, originating also from Zanzibar, and which he identified as *Asterina coronata fascicularis* Fisher, 1918, though he thought it might prove to be a distinct species. [H. L. Clark's (1938) record of this

species was clearly missed by Clark and Rowe (1971) in their tables of asteroid distributions.]. More recently, Jangoux (1973) recorded three specimens he identified as *Asterina coronata* von Martens, 1866, from Inhaca Island, Mozambique (East Africa), though Clark and Courtman-Stock (1976) and Walenkamp (1990) have identified other, similar, large, non-fissiparous specimens from south-eastern Africa as *A. burtoni*, referring Jangoux's (1973) identification of *A. coronata* from Mozambique to *burtonii*. Records of *Asterina* sp., reported by Rowe and Richmond (1997, 2002) are also based on specimens collected in the Zanzibar area by one of us (M.D.R.). We are inclined to believe all these records refer to a single, eastern African species that is likely to prove, as H. L. Clark (1938) suspected, as yet undescribed. However, resolution of this latter problem is outside the scope of this present account, though this shows that our knowledge of this family of Asteroidea within the region of the south-west Indian Ocean is far from accurate or complete.

It is with particular interest, therefore, that we can identify two species of '*Asterina*' from Rodrigues (see figures 4, 5). Both species are represented by small specimens, one species being fissiparous and both pentaradiate and pluriradiate, the other simply pentaradiate and non-fissiparous. Due to the taxonomic confusion surrounding the identification of asterinids from the region, and in particular the identification of '*A. burtoni*', we refrain from naming the taxa beyond referral, in inverted commas, to the genus '*Asterina*'. In taking this latter action we concur with the views expressed previously by one of us (F.W.E.R.) that non-Atlantic Ocean species referred to the genus *Asterina* (type species *A. gibbosa* Pennant, 1777) should be re-assigned to other, or new genera within the family Asterinidae (see Rowe and Gates, 1995; Campbell and Rowe, 1997). It is our opinion that both the species reported herein are congeneric with '*A. burtoni*' Gray, 1840, and a number of other species referred to the genus '*Asterina*' in Clark and Rowe (1971), but resolution of their generic and species status requires further research and will be dealt with by us elsewhere (O'Loughlin, Rowe and Richmond, in preparation).

'Asterina' sp. 1

Material. One specimen, Grand Paté, coral, 20 m; two specimens, Trou Malabar, coral rubble, 10 m.

Coloration. Mottled with red, magenta, cream and bluish grey (see figure 4).

Comments. The three specimens range in size from $R=3.6$ mm, $r=2.4$ mm to $R=8.3$ mm, $r=4.7$ mm. Each has a single, prominent madreporite and five arms. Some minor differences can be seen in the abactinal spinulation, but all three bear one to three (usually two) spines on the actinal plates. Further differences include the occurrence of one (in the smallest specimen), two (in specimen $R=8.3$ mm) or three (in specimen $R=7.5$ mm) elongate, slender sub-oral spines. The specimens appear to most closely resemble small specimens of '*A. coronata*' von Martens, 1866, but lack the characteristic, prominent abactinal plates (see Fisher, 1919; H. L. Clark, 1938).

Distribution. Rodrigues, 10–20 m.

'Asterina' sp. 2

Material. One specimen (five arms), Rivière Banane, in algae; one specimen (six arms), Antonio's Finger Reef, on dead coral, 9 m; four specimens (one with

five arms, three with six arms), Antonio's Finger Reef, off Grand Baie; one specimen (juvenile, ?six arms), Passe Coco, under rubble, 6 m; one specimen (six arms), Trou Malabar, under rubble, 10 m; 10 specimens (five with five arms, five with six arms), Ile aux Fous, on coral and among coralline lumps.

Coloration. Predominantly red or with some cream/white mottling (see figure 5).

Comments. Of the 18 specimens examined from Rodrigues, seven have five arms and 11 have six arms. They range in size from the largest five-armed specimens with $R=7.5$ mm, $r=3.6$ mm (one arm is regenerating and measures approximately $R=4$ mm) to the smallest, six-armed specimens with arm lengths ranging between $R=1.8$ and $R=3.2$ mm. The largest, five-armed specimen ($R=7.5$ mm) has two madreporites, though the madreporites have yet to be detected in the smaller specimens. The most consistent character exhibited by all these specimens is the occurrence of only a *single* sub-oral spine on each of the oral plates. In this character alone the Rodrigues specimens differ from all other described, fissiparous, tropical Indo-west Pacific species included in the genus '*Asterina*' [i.e. *burtoni* (Gray, 1840) (with synonym *wega* (Perrier, 1869)); *anomala* H. L. Clark, 1921; *hexactis* H. L. Clark, 1938 and *coralicola* Marsh, 1977] and we therefore do not consider the present specimens to be conspecific with the supposedly sympatric '*A.*' *burtoni* (which we now doubt occurs in the local region).

On the basis of a specimen collected by one of us (M.D.R.) from Zanzibar (recorded in Rowe and Richmond, 1997, 2002, under the mantle name of *Asterina burtoni*) and some 24 specimens from Réunion sent to F.W.E.R. by Dr Chantal Conand (identified as *Asterina burtoni*), we conclude that these specimens and the Rodrigues specimens are conspecific and thus that '*Asterina*' sp. 2 occurs at least in the Mascarene Islands and on the east coast of Africa. Interestingly, the specimen from Zanzibar and seven specimens from Réunion have seven arms, a character not yet seen in specimens from Rodrigues. These specimens also differ in colour from the Rodrigues material in being more varied in colour and finely mottled (C. Conand, personal communication).

Distribution. Rodrigues, Réunion, Zanzibar (East Africa); 0–10 m.

Family ECHINASTERIDAE

Echinaster purpureus (Gray, 1840)

See: Clark and Rowe, 1971: 40 (distribution), 73 (key).

Material. Two specimens (R to 80 mm, r to 11.3 mm), Grand Baie, lagoon, low tide, common.

Coloration. Pale creamy pink or brown with fine, darker mottling.

Comments. Both specimens have sustained damage to one arm, which are showing signs of regeneration.

Distribution. Endemic to the Indian Ocean.

Class OPHIUROIDEA

Family GORGONOCEPHALIDAE

Astrocladus tonganus Doderlein, 1911

See: Clark and Rowe, 1971: 78 (distribution), 92 (key); Cherbonnier and Guille

1978: 14.

Material. One specimen (d.d. = 18 mm), Totor Reef (night-time, 19:00 h), 0.6 m, among coral. Two specimens deposited at the Shoals Rodrigues office.

Coloration. Live animals pale pink-yellow showing slight banding on main arms; entire animal becoming darker purple following collection, anaesthetization and preservation.

Comments. On the basis that the arm spines occur distally between the second and third fork of the arms and certainly immediately after the third fork, the specimen examined herein conforms satisfactorily to the genus *Astrocladus* and to *A. tonganus* according to both Clark and Rowe (1971: 92) and Cherbonnier and Guille (1978: 10–11). This new record thus confirms the latter's first record of this otherwise south-western Pacific Ocean species in the western Indian Ocean at Madagascar. The more widespread species *Astroboa clavata* (Lyman, 1861; type locality Zanzibar) and *A. nuda* (Lyman, 1874; type locality Philippines), each of which have been recorded in the western Indian Ocean (see Clark and Rowe 1971: 78–79) are distinguished generically by the absence of arm spines before the fourth arm fork. Several specimens were observed at the collection site, but not collected.

Distribution. A new record for the Mascarene Islands, adding to the only other records for the species from Madagascar and Tonga.

Family OPHIOMYXIDAE

Ophiomyxa australis Lutken, 1869

See: Clark and Rowe, 1971: 78 (distribution), 92 (key); Cherbonnier and Guille, 1978: 18.

Material. One specimen (d.d. = 10 mm, a.l.:d.d. = ca 3:1), Rivière Banane, under rock (basalt), mid-upper shore, near beach.

Coloration. Disc uniformly orange-red, with small black dots; arms banded red and pink.

Comments. Only a single specimen was found.

Distribution. This distinctive species described from Bass Strait (between south-eastern mainland Australia and Tasmania) not only circumscribes Australia (see Rowe and Gates, 1995) but extends, more or less, throughout the Indo-west Pacific region in shallow waters, but recorded to depths of over 1000 m! It is notably absent from Hawaii to the east and in the western extreme of the region, from the north-west Indian Ocean (Arabian coast, Arabian Gulf and Red Sea), including the west coast of India.

Family OPHIACTIDAE

Ophiactis savignyi Müller and Troschel, 1842

See: Clark and Rowe, 1971: 82 (distribution), 103 (key); Cherbonnier and Guille, 1978: 125.

Material. One specimen, Grand Baie, dead coral rock on spurs, 17–19 m; three specimens, Graviers; one specimen, Ile aux Fous, Blue Holes, among coral, 2 m.

Coloration. Live specimens pale green and dark green (almost black); disc pale pink with dark green mottling.

Comments. The five specimens exhibit an interesting range of morphological characters for which this polymorphic, tropicopolitan species is renowned (see Clark and Rowe, 1971; Cherbonnier and Guille, 1978). The specimens range in size with d.d. = 1.4–4.8 mm and a.l:d.d. = ca 2–2.5:1. The smallest specimen has a single, peg-like oral papilla and four proximal arm spines; two specimens, with d.d. = 2.4 mm and 4.4 mm, each have two oral papillae and six proximal arm spines. The remaining two specimens, with d.d. = 2.4 mm and 4.8 mm, each have three oral papillae—a condition noted for a specimen from the Mediterranean by Guille (1968). The smaller of these last two specimens has five proximal arm spines whereas the larger specimen has not only seven arm spines, but the dorsal arm plates from about 5–17 are longitudinally divided, a condition not hitherto recorded for the species. There is little doubt that this small, fissiparous species, originally described from Red Sea specimens, would benefit from an investigation using molecular analysis, which should help unravel the relationship between *O. savignyi* (s. s.) and the host of subsequently described species currently considered conspecific with it.

Distribution. Tropicopolitan.

Family AMPHIURIDAE

Amphiodia (Amphiodia) dividua (Mortensen, 1933)

See: Clark and Rowe, 1971: 78 (distribution), 99 (key); Cherbonnier and Guille, 1978: 92; Sloan *et al.*, 1979: 101.

Material. One specimen, Chaland Reef, among sediment.

Comments. This six-armed specimen accords well with the detailed description for the species given by Cherbonnier and Guille (1978).

Distribution. The type locality for the species is Mauritius; now known from Aldabra, Madagascar, Mauritius and Rodrigues.

Amphipholis squamata (D. Chiaje, 1829)

See: Clark and Rowe, 1971: 80 (distribution), 99 (key).

Material. Two specimens, Ile aux Fous, Blue Holes, in sand, 6 m; one specimen, Graviers, in sand in rock pool; one specimen, Anse aux Anglais, sand/stone sieving; one specimen Coton Baie beach, rocks, near hotel; six specimens, Petite Butte, among green alga *Cladophoropsis*, lower shore on calcareous rock; four specimens, Trou Malabar, Mathurin Bay, semi-mobile sand subtidal in gully; one specimen, Chaland Reef, in sediment.

Coloration. White.

Comments. Widely present among various habitats, the occurrence of this ubiquitous, yet small (<3 cm), species on Rodrigues was to be expected.

Distribution. A new record for the Mascarene Islands.

Amphiplus sp. nov.

Material. Three specimens, Passe Coco; 20 specimens from a shallow coral reef area (no further data).

Coloration. Red and white banded.

Comments. Clark and Rowe (1971) record only one amphiuroid (*Amphiudia dividua*) from the Mascarene Islands. The occurrence of *A. squamata* (above) was to be expected, although the discovery of a species of *Amphioplus* suggests the family may be better represented among these islands than present records portend. Further analysis is required before a species name can be assigned to these specimens.

Distribution. Rodrigues.

Family OPHIOTRICHIDAE

Macrophiothrix longipeda (Lamarck, 1816)

See: Clark and Rowe, 1971: 82 (distribution), 114 (key); Hoggett, 1991: 1103.

Material. One specimen, Grand Paté, 15 m, under rock.

Coloration. Disc pale with patterns of white, dark brown and black; arms sandy beige with darker brown banding.

Comments. Numerous other specimens were found under boulders and coral lumps at the reef crest of Rivière Banane.

Distribution. Originally described from Mauritius, this is a widespread species in the Indo-west Pacific, although not recorded from the Red Sea, south-east Arabia, Arabian Gulf or Hawaii.

Macrophiothrix robillardi (de Loriol, 1893)

See: Clark and Rowe, 1971: 82 (distribution: Mauritius as *M. robillardi*; northern Australia as *M. rugosa* H. L. Clark, 1938), 114 (key); Hoggett, 1991: 1136, figures.

Material. One specimen (d.d.=8.5 mm, a.l.=ca 78 mm); Totor Reef, 1–2 m, corals; one specimen (d.d.=16 mm, a.l.=230 mm), Rivière Banane, under stones below reef crest.

Coloration. Dark, blackish disc with lighter radial shields; tapering arms greenish and cream with brown banding.

Comments. A distinctive character exhibited by each of the specimens above, and not described by Hoggett (1991) is a median, longitudinal cleft in the dorsal arm plates, which coincides with the longitudinal markings of the arms.

Distribution. Originally described from Mauritius. In referring *M. rugosa* to the synonymy of *M. robillardi*, Hoggett (1991) has shown the species to be more widespread, extending eastwards from Mauritius to include Rodrigues (new record herein), northern Australia, Philippines, southern China and islands of the south-western Pacific Ocean.

Family OPHIOCOMIDAE

Ophiarthrum elegans Peters, 1851

See: Clark and Rowe, 1971: 86 (distribution), 121 (key).

Material. One specimen (d.d.=15.5 mm, a.l.=73 mm), Coton Baie, reef crest.

Coloration. Disc uniformly velvet black; arms conspicuously banded red and white.

Comments. Only a single specimen found.

Distribution. Described from off Mozambique, East Africa, this is a new record for the Mascarene Islands for this otherwise widespread Indo-west Pacific species. The species has yet to be recorded from the north-western Indian Ocean and Maldivian regions, or from Hawaii.

***Ophiocoma brevipes* Peters, 1851**

See: Devaney, 1970: 12–13; Clark and Rowe, 1971: 86 (distribution), 119 (key).

Material. One specimen (d.d.=8 mm), Grand Baie, reef crest; five specimens (d.d.=9.2, 13.6, 13.9, 14.0, 15.7 mm), Coton Baie, low tide under rocks; one specimen (d.d.=14 mm), Coton Baie; one specimen (d.d.=18.3 mm), Graviers, under boulders; one specimen (d.d.=16.4 mm) Coton Baie, reef crest.

Coloration. Some specimens with mottled disc of green/grey/black and white; arms cream-coloured with darker grey banding; others almost uniformly light brown with beige patterns and bands (see figure 6).

Comments. This species differs in colour from *O. dentata* (see below) and can be otherwise distinguished by its generally smaller size and occurrence of five arm spines on the proximal arm plates. *Ophiocoma brevispinosa* Smith, 1876b, described from Rodrigues, is a synonym of *brevipes* (see Devaney, 1970).

Distribution. Throughout the Indo-west Pacific region, except the Red Sea and north-western parts of the Indian Ocean.

***Ophiocoma dentata* Müller and Troschel, 1842**

See Devaney, 1970: 12; Clark and Rowe, 1971: 86 (distribution), 119 (key).

Material. One specimen (d.d.=11.6 mm), Ile aux Chats, inner reef crest; three specimens (d.d.=22–29 mm), no other data one specimen (d.d.=18 mm), Coton Baie.

Coloration. The smallest specimen has a dark disc with a pale centre and banded arms. The paler plates have a pale brown, square pattern, while the spines have a longitudinal reddish, mid-line stripe. The four larger specimens have a uniformly dark disc and banded arms, though two of the specimens bear some whitish granules over the radial shields (see figure 7).

Comments. This species differs from *O. brevipes* principally in its coloration and in having only four arm spines proximally (though occasionally an isolated proximal arm plate may bear five spines). This latter character appears to be more consistently recognizable for the species than the measurement of length of the longest arm spine versus width of dorsal arm plate, used by Devaney (1970) to separate the species from *O. brevipes*. *Ophiocoma variegata* Smith, 1876b, described from Rodrigues, is a synonym of *dentata* (see Devaney, 1970).

Distribution. Throughout the Indo-west Pacific with the apparent exception of the Red Sea and north-western Indian Ocean.

***Ophiocoma erinaceus* Müller and Troschel, 1842**

See Devaney, 1970: 32–38; Clark and Rowe, 1971: 86 (distribution), 119 (key).

Material. One specimen, Grand Paté, in coral, 20 m.

Coloration. The typical uniformly black disc and arms describes all specimens found.

Comments. Common at various lower intertidal sites under boulders. The present record confirms the occurrence of this common Indo-west Pacific species at Rodrigues, reported by Smith (1876b).

Distribution. Widespread in the Indo-west Pacific region, with the exception of the Arabian Gulf and coasts of Pakistan and western India.

Ophiocomella sexradia (Duncan, 1887)

See: Clark and Rowe, 1971: 86 (distribution), 118 (key); Cherbonnier and Guille, 1978: 178.

Material. Three specimens, no data; three specimens, Ile aux Fous, among coral lumps.

Coloration. Arms banded green and purple.

Comments. The six specimens accord well with the specimens reported from Pula Wé, Sumatra by Price and Rowe (1996). These authors commented on the relationship between *O. sexradia* and *Ophiomastix sexradiata* A. H. Clark, 1952, the latter species being considered conspecific with *O. sexradia* by Clark and Rowe (1971) and Cherbonnier and Guille (1978).

Distribution. New record for the Mascarene Islands, but otherwise distributed across the Indo-west Pacific region except for the north-western parts of the Indian Ocean.

Ophiomastix venosa Peters, 1851

See: Clark and Rowe, 1971: 88 (distribution), 120 (key); Devaney, 1978: 350; Clark, 1984: 100.

Material. Several specimens collected, photographed and deposited at the Shoals Rodrigues office.

Coloration. The usual appearance of gold with fine black patterns; arms pale orange with single, central, dark brown stripe.

Comments. This species has been recorded from Rodrigues by Smith (1876b); the identification of the specimen having been verified by Clark (in Clark and Rowe, 1971: 91 footnote). Clark (1984) comments of *venosa* that it is 'the largest ophiuran in the western Indian Ocean, with specimens sometimes exceeding 400 mm'.

Distribution. According to Devaney (1978) *O. venosa* is distributed along the east African coast from Inhaca Island to Zanzibar, Madagascar, Aldabra and Rodrigues. Records from east of this area need verification because the specimens have been misidentified, according to Devaney.

Family OPHIONEREIDAE

Ophionereis porrecta Lyman, 1860

See: Clark and Rowe, 1971: 88 (distribution), 122 (key); Cherbonnier and Guille, 1978: 207.

Material. One specimen (d.d. = 14.2 mm, a.l. = ca 100+ mm), Totor Reef, 2–5 m, coral; one specimen (d.d. = 11 mm, a.l. = ca 80 mm), Graviers.

Coloration. Disc mottled red/yellow/cream; arms similar.

Comments. The specimens from Rodrigues accord well with specimens described and figured by Cherbonnier and Guille (1978), particularly regarding the two colour forms they illustrate. The specimen from Graviers has the darker markings described by Cherbonnier and Guille (1978), though the oral shield is not as spearhead-shaped as those authors illustrate, being simple and more elongate to oval in shape.

Distribution. Widespread Indo-west Pacific, though not recorded from the north-western parts of the Indian Ocean.

Family OPHIODERMATIDAE

Ophiarachnella gorgonia (Müller and Troschel, 1842)

See: Clark and Rowe, 1971: 88 (distribution), 125 (key).

Material. Photographic record only of specimens from Coton Baie, found under boulders. Present also at Grande Paté reef crest. Specimens deposited at the Shoals Rodrigues office.

Coloration. Variable, with predominant colour of disc and arms being pale green or pale brown, with arm banding comprising a combination of two darker colours (black–red–black or red–brown–red).

Comments. Found under boulders on limestone reef crest. Present also at Grand Paté reef crest.

Distribution. Widespread in the Indo-west Pacific region, but not recorded from the Red Sea and north-western parts of the Indian Ocean, as far east and including the Maldives.

Family OPHIURIDAE

Ophioplocus imbricatus (Müller and Troschel, 1842)

See: Clark and Rowe, 1971: 90 (distribution), 128 (key); Rowe and Gates, 1995: 435.

Material. One specimen (d.d. = 12.4 mm, a.l. = ca 55 mm), Coton Baie, reef crest.

Coloration. Dark grey and medium brown banding and patterned disc.

Comments. This species was described from syntypic specimens collected from Mauritius (Ile de France) and Timor (see Rowe and Gates, 1995), though Clark and Rowe (1971) record Mauritius as the type locality.

Distribution. The species occurs widespread in the Indo-west Pacific region, but has yet to be recorded from the Red Sea, south-east Arabia, Arabian Gulf or Maldives.

Class ECHINOIDEA

Family CIDARIDAE

Phyllacanthus imperialis (Lamarck, 1816)

See: Clark and Rowe, 1971: 140 (distribution), 150 (key).

Material. Loose spines and broken test found among coral at Chaland Reef; intact specimen found at Totor Reef. Present also at Ile aux Fous. Specimens deposited at the Shoals Rodrigues office.

Coloration. The usual pale-banded thick spines with finely grooved tips.

Distribution. Widespread in the Indo-west Pacific region, though not recorded from the north-western part of the Indian Ocean or Hawaii.

Family DIADEMATIDAE

Diadema savignyi Michelin, 1845

See: Clark and Rowe, 1971: 140 (distribution), 153 (key).

Material. Found at several locations, usually at the seaward edges of the lower intertidal and among coral in the shallow subtidal to 20 m, including Totor Reef at 6 m and Grand Paté among coral, at 12 m depth. Specimens deposited at the Shoal Rodrigues office.

Coloration. Generally greyish black. Some specimens with pale pink and white-banded spines. Typically with blue, iridescent lines radiating from the apical region and into each of the interradial areas and five interradial white dots.

Comments. Further work is needed to establish whether the equally widely distributed sister species, *D. setosum* (Leske, 1778) (which lacks the iridescent blue lines, but has a conspicuous reddish orange ring around the anal opening), is present on Rodrigues, though it is also known from Mauritius.

Distribution. Described from Mauritius, *D. savignyi* occurs widespread in the Indo-west Pacific region, but is apparently absent from the Red Sea and parts of the north-western Indian Ocean.

Echinothrix diadema (Linnaeus, 1758)

See: Clark and Rowe, 1971: 140 (distribution), 153 (key).

Material. Specimens were collected from Rivière Banane, test diameter 30 mm, from under boulders (common); Ile aux Fous, test diameter 80 mm; Grand Paté reef, among coral 12 m depth. All are deposited at the Shoals Rodrigues office.

Coloration. Typically black with an overall bluish green hue and with faint lighter banding on spines.

Comments. Analysis of all material revealed *E. diadema* to be the only species present. No spines were found to bear the characteristic transverse banding of fine thorns of *E. calamaris* (Pallas, 1774), despite the coloration patterns suggesting otherwise. Similarly, no specimens were observed with the typical pale grey and fine black-spotted anal sac of *E. calamaris*. Further work is therefore required to ascertain the presence of the equally widespread species, *E. calamaris*, on Rodrigues, though it is known from Mauritius.

Distribution. *E. diadema* is widely distributed throughout the Indo-west Pacific region.

Family STOMOPNEUSTIDAE

Stomopneustes variolaris (Lamarck, 1816)

See: Clark and Rowe, 1971: 140 (distribution), 153 (key); Clark, 1984: 98.

Material. Two specimens collected and deposited at the Shoals Rodrigues office. Found in lagoons and pools along the northern shores between Baladirou and Grand Baie.

Coloration. Characteristically uniformly black.

Distribution. Widely distributed in the Indo-west Pacific, but not recorded from the Red Sea, parts of the north-western Indian Ocean, Philippines or Hawaii.

Family TEMNOPLEURIDAE

Microcyphus maculatus L. Agassiz, 1846

See: Clark and Rowe, 1971: 140 (distribution), 155 (key).

Material. One specimen (h.d.=31.6 mm, v.d.=21.3 mm, spine length to 5.2 mm), Ile Hermitage, under rocks, 10 m; one specimen (h.d.=30.5 mm, v.d.=20.2 mm, spine length to 4.8 mm), Ile Hermitage, among stones on sandy mud, 10 m.

Coloration. The inter-radial bare areas on the smaller specimen (h.d.=30.5 mm) are a light dusky pink, whereas for the larger specimen (h.d.=31.6 mm) they are a dusky olive with a pink hue. The spines of both are either almost entirely green with a narrow reddish brown base and white at the very tip of the spine, or coloured in proportions of 1:2:1, brown-green-white (see figure 8).

Distribution. The distribution of this endemic Mascarene species, known previously only from Mauritius, is extended eastward to Rodrigues (see Discussion).

Family TOXOPNEUSTIDAE

Toxopneustes pileolus (Lamarck, 1816)

See: Clark and Rowe, 1971: 142 (distribution), 156 (key).

Material. A single specimen collected from Coton Baie, in shallow lagoon, deposited at the Shoals Rodrigues office.

Coloration. Predominantly pink with fine white bands on spines and yellowish tinge to tube feet.

Distribution. Described from Mauritius, this species is generally widespread in the Indo-west Pacific region, though not recorded from parts of the north-western Indian Ocean or Hawaii.

Triploneustes gratilla (Linnaeus, 1758)

See: Clark and Rowe, 1971: 142 (distribution), 156 (key).

Material. Specimens were common and collected from shores around Totor Reef, off Anse aux Anglais, deposited at the Shoals Rodrigues office.

Coloration. Typical variation in colour of the bare ambulacral areas, including black or blue, and with the usual white spines.

Distribution. This widespread Indo-west Pacific species appears to be unrecorded only from the Arabian Gulf and coasts of Pakistan and western India.

Family ECHINOMETRIDAE

Colobocentrotus atratus (Linnaeus, 1758)

See: Clark and Rowe, 1971: 142 (distribution), 158 (key).

Material. A single specimen was found under boulders on the exposed coast of Pointe Coton, and deposited at the Shoals Rodrigues office.

Coloration. Typically uniformly blackish purple.

Comments. The more exposed sites around Trou d'Argent are likely to provide further specimens of this species.

Distribution. The distribution of this distinctive Indo-west Pacific species is patchy across the region, being recorded from the western Indian Ocean, Sri Lanka to the Indo-Malay region and Hawaii.

Echinometra mathaei (de Blainville, 1825)

See: Clark and Rowe, 1971: 142 (distribution), 157 (key).

Material. Specimens were examined from various localities where this species occurred in abundance. Rivière Banane, Baladirou and Graviers are some of the locations supporting very high densities. Specimens deposited at the Shoals Rodrigues office.

Coloration. Occurring in a wide range of spine colours, from lilac to dark purple to almost black and cream.

Comments. Likely to be the most common urchin on Rodrigues, occurring widely in shallow lagoons and in channels burrowed in the reef crest limestone.

Distribution. Described from Mauritius, this species is widespread throughout the Indo-west Pacific region.

Echinostrephus molaris (de Blainville, 1825)

See: Clark and Rowe, 1971: 142 (distribution), 157 (key); Clark, 1984: 98.

Material. Collected from Grand Baie, at 10 m depth, among coral; deposited at the Shoals Rodrigues office.

Coloration. Usual pale purple spines.

Comments. Generally found in low numbers and only at depths exceeding 5 m.

Distribution. This widespread Indo-west Pacific species is unrecorded only from the Arabian Gulf and Hawaii.

Heterocentrotus mammillatus (Linnaeus, 1758)

See: Clark and Rowe, 1971: 142 (distribution), 158 (key); Clark, 1984: 98.

Material. One specimen collected from Totor Reef, 6 m depth among coral and deposited at the Shoals Rodrigues office. Also seen at Ile aux Fous.

Coloration. Typical chocolate-brown spines, white at base and with a single, narrow, pale yellow band towards the tips.

Comments. Anecdotal reports suggest the reef-flat dwelling *H. trigonarius* (Lamarck, 1816) also occurs on Rodrigues, but despite focused searches no specimens were found. Further visits to the more exposed shores on the eastern seaboard may reveal the presence of this equally widespread, Indo-west Pacific species.

Distribution. Widespread throughout the Indo-west Pacific region but unrecorded from the Arabian Gulf, and coasts of Pakistan, western Indian Ocean and Bay of Bengal.

Family ECHINONEIDAE*Echinoneus cyclostomus* Leske, 1778

See: Clark and Rowe, 1971: 144 (distribution), 158 (key).

Material. Two specimens, Coton Baie (specimen 1: length=27.5 mm, w=23.4 mm, ht=31 mm; glassy bumps smaller than spine tubercles; specimen 2: length=29.0 mm, w=22.3 mm, ht=12.6 mm; glassy bumps larger than spine tubercles, apical system sunken), under stones, reef crest; one specimen, Coton Baie (length=30.0 mm, w=25.3 mm, ht=13.4 mm, glassy bumps larger than spine tubercles); one specimen Ile aux Chats (test only, length=20.8 mm, w=16.1 mm, ht=9.6 mm; glassy bumps larger than spine tubercle), inshore of reef crest.

Coloration. Characteristic pale pink.

Comments. It is no surprise to record this tropicopolitan species from Rodrigues.

Distribution. This widespread Indo-west Pacific species remains unrecorded from the Red Sea, Arabian Gulf and coasts of Pakistan and western India.

Family CLYPEASTERIDAE*Clypeaster reticulatus* (Linnaeus, 1758)

See: Clark and Rowe, 1971: 144 (distribution), 160 (key).

Material. One specimen (length=46.0 mm, w=29.6 mm, ht=12.1 mm, rim ht=10.6 mm, petal length: width=28.9:18.8 mm), Coton Baie, east shore, under stones. Second specimen found also at Coton Baie, deposited at the Shoals Rodrigues office.

Coloration. Various shades of brown.

Distribution. Widespread throughout the Indo-west Pacific region.

Family SPATANGIDAE*Maretia planulata* (Lamarck, 1816)

See: Clark and Rowe, 1971: 146 (distribution), 165 (key).

Material. One live but broken specimen (length=*ca* 56.0 mm, w=*ca* 41.0 mm, ht=*ca* 16.0 mm—anal and part of right posterior inter-radial areas missing), Coton Baie, in sandy area.

Distribution. This species occurs widely in the Indo-west Pacific region, but is unrecorded from the Arabian Gulf, coasts of Pakistan and western India, and from Hawaii.

Family BRISSIDAE*Metalia sternalis* (Lamarck, 1816)

See: Clark and Rowe, 1971: 146 (distribution), 166 (key).

Material. One damaged specimen found at Shoals Exhibition; washed up, but exact origin unknown; retained at the Shoals Rodrigues office.

Distribution. This species is widespread in the Indo-west Pacific region but remains unrecorded from the coasts of south-eastern Arabia, Pakistan and western India and from the Maldives.

Class HOLOTHURIOIDEA**Family HOLOTHURIIDAE***Actinopyga echinites* (Jaeger, 1833)

See: Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 31; James, 1989: 128.

Material. One specimen, Grand Baie, reef edge. Specimens from Grand Baie sandy lagoon, and Coton Baie deposited at the Shoals Rodrigues office.

Coloration. Typical pale creamy browns on dorsal surfaces with darker creases and lighter yellow papillae.

Distribution. Widespread throughout the Indo-west Pacific region but unrecorded from the Arabian Gulf, coasts of Pakistan and western India and from Hawaii.

Actinopyga mauritiana (Quoy and Gaimard, 1833)

See: Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 16.

Material. Specimens collected from Grand Baie, deposited at the Shoals Rodrigues office.

Coloration. Creamy brown with darker chocolate brown and black creases on dorsal surfaces, with much more white to sides.

Distribution. Described from Mauritius, this species is found widespread throughout the Indo-west Pacific region, but remains unrecorded from the coast of south-eastern Arabia and the Arabian Gulf.

Actinopyga sp. nov.

Material. One specimen, Grand Baie, reef crest 22.09.01; one specimen, Grande Baie, 16.09.01 (tiny yellow teeth, 1 cm papillae all over (dorsal) body); one specimen, Graviers, upper shore, under stones 19.01.01.

Colouration. Cream with irregular light to dark brown patches (see figure 9).

Comments. The body tapers from the anterior to the posterior end. Tube feet occur regularly distributed on the ventral surface, but elongate, extended, modified tube feet are scattered on the dorsal surface. Five small, but prominent, terminal tube-feet, packed with spicules surround the anal opening. Spicules comprise delicate rods in the wall of the ventral tube-feet, with the terminal disc containing a multi-fractured terminal plate. Fine, delicate rods and rosettes occur elsewhere in the ventral and dorsal body wall and modified dorsal tube-feet. There is a single, small terminal plate at the tip of these dorsal tube-feet. Two of the specimens are very contracted, but the third (Grand Baie, 16.09.01) is more or less relaxed in preservation and measures 120 mm long \times 30 mm wide (at about mid-length). Internal investigation reveals the presence of three typical *Actinopyga*-type cuvierian tubules, each with a proximal trunk section from which arises a pair of primary branches and a subsequent secondary branch; and each attached separately to the base of the respiratory tree. The body shape, form and arrangement of the dorsal modified tube-feet and spicule complement are all distinctive and set this species apart from others in the genus *Actinopyga*.

Distribution. Possibly widespread in the Indo-west Pacific region. Although the present collection is from Rodrigues, evidence (including photographic evidence) shows this species also occurs in Mauritius (as *Labidodemas semperianum*

(Selenka, 1867), Araraki and Fagoonee, 1996; as *Bohadschia subrubra* (Quoy and Gaimard, 1833), Muller, 1998, unpublished MSc Thesis) and Philippines (as ?*Actinopyga* sp., Erhardt and Baensch, 2000 (p.960)).

Bohadschia vitiensis (Semper, 1868)

See: Panning, 1944: 40 (as *Bohadschia marmorata vitiensis*); Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 42; Samyn and Vanden Berghe, 2000: 21 (as *Bohadschia marmorata* (Jaeger, 1833)); Conand and Mangion, 2002: 28; Rowe and Richmond, 2002: 312.

Material. Two specimens from Ile aux Chats, in large, open, sandy patch, 1 m (but probably dries on very low spring tides).

Colouration. Pale creamy/uniformly orange all over (see figure 10).

Comments. In preserved state the colour of these specimens has faded to grey dorsally and a distinctly paler grey ventrally. However, the dorsal and ventral tube-feet are basally encircled by a darker ring, a characteristic colour pattern of the species (e.g. see Panning, 1944; Cherbonnier, 1988). The spicule complement is also that described for the species by Panning (1944) and Cherbonnier (1988).

Distribution. Apparently widespread throughout the Indo-west Pacific region, though not recorded from Hawaii or from Red Sea east to the Maldives. Recent records (e.g. Cherbonnier (1988), Samyn and Vanden Berghe (2000) and Conand and Mangion (2002)) have extended the range westward to the Mascarene Islands and East Africa.

Holothuria (Cystipus) rigida (Selenka, 1867)

See: Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 126; Sloan *et al.*, 1979: 121; Price, 1983: 89; Clark, 1984: 99; Liao and Clark, 1995: 434; Samyn and Vanden Berghe, 2000: 21.

Material. One specimen, Totor Reef, among sand off reef, 7m; one specimen, Coton Baie, in sand.

Coloration. Typically pale creamy brown, with sand-embedded surface giving a coarse feel when handled.

Distribution. Known throughout the Indo-west Pacific (but not so far recorded from the coasts of Pakistan, western India, Sri Lanka, Bay of Bengal or from Hawaii) as well as the west coast of North America, Panamic region and Caribbean.

Holothuria (Halodeima) atra (Jaeger, 1833)

See: Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 73.

Material. Common in many parts of the lagoon and reef crests, especially from the more sheltered locations of Baladirou and Grand Baie.

Coloration. Characteristically black, with a covering of silt and sand, but leaving six or more pairs of bare patches of body wall on the anterior half on the dorsal side of the body.

Distribution. Widespread throughout the Indo-west Pacific region.

Holothuria (Halodeima) edulis Lesson, 1830

See: Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 75.

Material. One specimen collected from Chaland Reef at 8 m, among silty sand slope; deposited with the Shoals Rodrigues Office.

Coloration. Characteristically slate-grey to black dorsally, pink ventrally.

Comments. Other specimens seen at the site, distinctive for its prevalent silty conditions.

Distribution. A new record for the Mascarene Islands, this species is widespread throughout the Indo-west Pacific region. It remains unrecorded from the minor islands of the western Indian Ocean and the coasts of Pakistan and western India.

Holothuria (Lessonothuria) pardalis Selenka, 1867

See: Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 117.

Material. Two specimens, Grand Baie, reef crest; two specimens, Coton Baie; one specimen, Grand Baie, in sea grass; three specimens, Ile aux Chats, among brown alga *Chroospora implexa*; one specimen, Ile Hermitage, under stones, 1 m (with eulimid snails); two specimens, Chaland Reef, intertidal, under rocks.

Coloration. Variable, dorsal surfaces pale creamy brown or pale purple with six to eight pairs of darker patches along length of body.

Distribution. This species is widespread in the Indo-west Pacific region.

Holothuria (Mertensiothuria) hilla Lesson, 1830

See: Clark and Rowe, 1971: 178 (distribution); Cherbonnier, 1988: 85; Samyn and Massin, 2003: 2500.

Material. One specimen, Grand Baie, reef crest; one specimen (no data).

Coloration. Typical and distinctive dorsal surface chocolate-orange, with scattered pale yellow papillae.

Distribution. Extending across the Indo-west Pacific region from the Red Sea to Hawaii, but unrecorded from the coasts of Pakistan and western India.

Holothuria (Mertensiothuria) leucospilota (Brandt, 1835)

See: Clark and Rowe, 1971: 176 (distribution); Cherbonnier, 1988: 112.

Material. Commonly encountered in many parts of the lagoon, from Baladirou to Totor reef flat.

Coloration. The usual dark, shiny purplish black surface with a reddish tinge below skin.

Distribution. Widespread throughout the Indo-west Pacific region.

Holothuria (Microthele) nobilis (Selenka, 1867)

See: Clark and Rowe, 1971: 178 (distribution); Cherbonnier, 1988: 142; Rowe and Gates, 1995: 295.

Material. A single specimen from the northern reefs at Grand Paté, approximately 20 m depth on sand. Specimen retained at the Shoals Rodrigues office.

Coloration. Generally black but with several large, lateral, white-golden patches and some smaller light patches dorsally.

Comments. Described by Selenka (1867) from Zanzibar, East Africa as a black and white (golden) coloured form and from Hawaii as uniformly black. However, Rowe (in Rowe and Gates, 1995) recently recognized two species: *nobilis* s. s. (coloured form) and *whitmaei* Bell, 1887 (black form). Simultaneously, Rowe synonymized a cream/black mottled form (*fuscogilva* Cherbonnier, 1980) described from New Caledonia, south-western Pacific, with *nobilis* (though it is now thought that *fuscogilva* will prove to be a valid species: F.W.E.R., herein).

Distribution. Appears to be distributed widely in the Indo-west Pacific region, though individual records require substantiation in line with the recent taxonomic conclusions of Rowe and Gates (1995) (see also comments included above).

***Holothuria (Platyperona) difficilis* Semper, 1868**

See: Clark and Rowe, 1971: 178 (distribution); Cherbonnier, 1988: 99; Samyn and Vanden Berghe, 2000: 25.

Material. One specimen, no data; one specimen, Coton Baie.

Coloration. Uniformly pale brown with black tips to the scattered dorsal papillae.

Distribution. Widespread throughout the Indo-west Pacific region but not recorded from the coasts of the Arabian Sea.

***Holothuria (Semperothuria) cinerascens* (Brandt, 1835)**

See: Clark and Rowe, 1971: 178 (distribution); Cherbonnier, 1988: 70.

Material. Probably the most abundant on Rodrigues, occurring along the more exposed shores, such as around the bases of cliffs south from Coton Baie towards Pointe Coton, at densities of over 20 per m².

Coloration. Dorsal surface pale or dark brown with darker patches and yellow-tipped papillae; feeding tentacles conspicuous, yellow and white.

Distribution. Widespread throughout the Indo-west Pacific region, but unrecorded from the Arabian Gulf and coasts of Pakistan and western India.

***Holothuria (Stauropora) dofleinii* Augustin, 1908**

See: Rowe and Gates, 1995: 298; Rowe and Richmond, 2002: 314.

Material. One specimen, Grand Baie, among sea-grass, 0.5 m, in lagoon.

Colouration. Uniformly orange dorsally, with defined yet wavy border, scattered with darker patches; white ventrally (see figure 11).

Comments. Although sharing a similar spicule combination and form with *H. (S.) pervicax* Selenka, 1867, the distinctive colour form of this species easily distinguishes the one from the other. An additional characteristic is the stippling effect of the dark-walled tube-feet against the white ventral body wall. Rowe (in

Rowe and Gates, 1995) raised *H. (S.) dofleinii* from the synonymy of *H. (S.) pervicax*.

Distribution. Apparently widespread in the Indo-west Pacific region, from eastern Africa to Hawaii (FWER, pers obs.).

***Holothuria (Stauropora) pervicax* Selenka, 1867**

See: Clark and Rowe, 1971: 176 (distribution; as *Mertensiothuria*); Clark, 1984: 99 (as *Mertensiothuria*); Cherbonnier, 1988: 102 (as *Mertensiothuria*); Rowe and Gates, 1995: 300 (as *Stauropora*).

Material. One specimen, Coton Baie; one specimen, Rivière Banane reef crest, under upturned dead *Acropora* table corals.

Coloration. Dorsal surfaces cream and brown banded, with conspicuous swollen bases to papillae, the latter being reddish-tipped; ventral surfaces white.

Distribution. Described from Zanzibar, East Africa, this species occurs widespread throughout the Indo-west Pacific region.

***Holothuria (Thymiosycia) arenicola* Semper, 1868**

See: Clark and Rowe, 1971: 178 (distribution); Sloan *et al.*, 1979: 123; Clark, 1984: 88 (text), 99 (list); Price, 1983: 93; Cherbonnier, 1988: 82; James, 1989: 125; Samyn and Vanden Berghe, 2000: 27.

Material. One specimen (180 mm long), Grand Baie, burrowing, mud flat, low tide; one specimen (43 mm long), Ile aux Fous, Blue Holes, under coral, 4 m; one specimen (200 mm long), Coton Baie, on sand.

Coloration. Whitish or orange background with 6–18 pairs of small reddish/purple patches along the dorsal surface.

Distribution. Described from the Philippines, and widely distributed throughout the Indo-west Pacific.

***Holothuria (Thymiosycia) impatiens* (Forskål, 1775)**

See: Clark and Rowe, 1971: 178 (distribution); Price, 1983: 95; Cherbonnier, 1988: 89.

Material. Six specimens, Grand Baie, reef crest; six specimens, Coton Baie; one specimen, Totor Reef; one specimen (no data); two specimens, Graviers, under stones, reef crest; two specimens, Rivière Banane.

Coloration. The majority of the specimens reported here accord with H. L. Clark's (1921: 179, pl. 19, figure 5) 'typical' colour form for *impatiens* (see figure 12). However, at least four specimens are dark purplish black/reddish brown, with pale yellow/cream tube feet and papillae (*impatiens bicolor* H. L. Clark, 1938; see figure 13) and two specimens are uniformly purplish black (*impatiens concolor* H. L. Clark, 1921; see figure 14).

Comments. Clark's (1921) comment of over 80 years ago that this species is 'the most perplexing to systematists...' remains as cogent today, for no attempt has been made in the intervening years to critically correlate the colour forms with any other species character either within local or between geographically distant populations.

Distribution. Described from the Red Sea, this species is tropicopolitan, extending through the Mediterranean, Caribbean, Panamic and Indo-west Pacific regions.

Family STICHOPODIDAE

***Stichopus chloronotus* Brandt, 1835**

See: Clark and Rowe, 1971: 178 (distribution); Price, 1982: 11; Cherbonnier, 1988: 146.

Material. Abundant at Grand Baie reef crest, also common on rocky flats by Totor Reef, off Anse aux Anglais.

Coloration. Typically dark green with yellow-orange tipped dorsal lateral papillae.

Distribution. This species extends across the Indo-west Pacific region, from the Red Sea to Hawaii, but is unrecorded from the coasts of south-eastern Arabia, Pakistan and western India.

***Stichopus herrmanni* Semper, 1868**

See: Rowe and Gates, 1995: 342; Rowe and Richmond, 1997: 306; Massin *et al.*, 2002: 77; Samyn and Vanden Berghe, 2000: 31; Conand and Mangion, 2002: 28.

Material. One specimen, Grand Baie.

Coloration. Predominantly uniformly mid-grey with a few darker creases and tips to scattered papillae.

Comments. *Stichopus variegatus* var. *herrmanni* Semper, 1868 has been included within the synonymy of *S. variegatus* Semper, 1868, following the opinion of H. L. Clark (1921, 1922). On the basis of its consistent body form and colour, and on body wall spicule form, Rowe (in Rowe and Gates, 1995) recognized *herrmanni* as a valid species. Without examination of all records and material identified as *S. variegatus*, it is difficult to be precise about the true extent of the distribution of *herrmanni*.

Distribution. Probably throughout the Indo-west Pacific region with the exception of Hawaii.

***Stichopus horrens* Selenka, 1867**

See: Clark and Rowe, 1971: 178 (distribution); Cherbonnier 1988: 147; Rowe and Gates, 1995: 324; Massin *et al.*, 2002: 81; Conand and Mangion, 2002: 28.

Material. One specimen, Rivière Banane, under stones on sand/rock; one specimen. Grand Baie, inter-tidal.

Coloration. Variable patterning of mottled cream, brown and black.

Comments. Rowe (in Rowe and Gates, 1995) did not accept H. L. Clark's (1922) broad concept of *Stichopus variegatus* Semper, 1868, and re-assigned, or re-instated as valid, species formerly included by Clark in the synonymy of *variegatus*. Consequently, Rowe (in Rowe and Gates, 1995) referred Semper's species (*variegatus*) to the synonymy of *S. horrens* Selenka, 1867, by designation of a remaining syntypic specimen of *variegatus* from Samoa, as the lectotype, he considered conspecific with *horrens*.

Distribution. Madagascar, Réunion, Rodrigues, Maldives, Indonesia to Hawaii.

Stichopus monotuberculatus (Quoy and Gaimard, 1833)

See: Rowe and Gates, 1995: 325; Rowe and Richmond, 1997: 306.

Material. One specimen, Grand Baie.

Coloration. Pale orange-brown with darker concentric creases around bases of dorsal papillae.

Comments. Rowe (in Rowe and Gates, 1995) considered that the figure of *Stichopus variegatus* Semper, 1868 (and other, missing specimens from Bohol, Philippines) should be referred to *Stichopus monotuberculatus* (Quoy and Gaimard, 1833). As with *S. herrmanni*, without re-examination of all records and identified material of *S. variegatus*, the precise extent of the distribution of *monotuberculatus* is difficult to determine.

Distribution. Originally described from Mauritius, this species is probably distributed throughout the Indo-west Pacific region.

Family PSOLIDAE

Psolidium ornatum (E. Perrier, 1893)

See: Cherbonnier, 1988: 161.

Material. Three specimens, Grand Baie, among crevices in coral lumps.

Coloration. See comments.

Comments. The three specimens range in size (length \times width) from 8.5 mm \times 3.5 mm, 9.0 mm \times 4.0 mm to 14.3 mm \times 4.2 mm and in almost all respects, including the form of the spicules they accord well with the three specimens identified by Cherbonnier (1988) for this species collected from Madagascar. The Rodrigues specimens differ only in colour, being charcoal grey, with the ventral inter-radii whitish (see figure 15), whereas Cherbonnier's material was 'blanc jaunâtre'. Interestingly, Gravely (1927) identified a single specimen as *Psolus complanatus* Semper, 1868, from Sri Lanka with similar colour to the Rodrigues material, but he gives insufficient detail both of body form and size or of the spicules (which he did not illustrate) to determine whether a closer relationship exists between his *P. complanatus* (known otherwise only from Philippines, see Clark and Rowe, 1971) and the species from Madagascar and Rodrigues. A more intriguing question arises with the species *Psolus appendiculatus* (de Blainville, 1821) reported only from its type locality Mauritius, about half way between Madagascar and Rodrigues. Theel (1886: 132) considered this species unrecognizable from the brief description given by de Blainville (1821), though Clark and Rowe (1971: 180) included the species, together with *boholensis* and *complanatus* (both from Semper, 1868) in their distribution tables. Almost certainly each of these species ought to be referred to the genus *Psolidium* (F.W.E.R., herein). In which case, it is probable that at least Perrier's species is conspecific with *P. appendiculatus* (de Blainville, 1821). However, since no type, or other specimens of *P. appendiculatus* are known to exist, and Cherbonnier (1988) has given a very detailed description of *P. ornatum* (Perrier,

1893) and established a neotype for the species we have preferred to recognize *ornatum*, understanding that a case should be put to the ICZN for suppressing *Holothuria appendiculatus* de Blainville (= *Psolidium* herein).

Distribution. Extending the range eastwards from Madagascar to (?) Mauritius, and Rodrigues.

Family CUCUMARIIDAE

Plesiocolochirus dispar (Lampert, 1889)

See: Clark and Rowe, 1971: 180 (distribution: as *Pentacta*); Cherbonnier, 1988: 164 (as *Pentacta*); Rowe and Gates, 1995: 278 (as *Plesiocolochirus*).

Material. One specimen, Graviers, under boulders; one specimen (no data).

Coloration. Dark and light brown mottling dorsally (see figure 16).

Comments. The specimens accord well with those described by Cherbonnier (1988) from Madagascar.

Distribution. A new record for the Mascarene Islands. The type locality is Mermaid Strait, north-west Australia, though it is known as far east along the tropical Australian coast to Swain Reef, southern Great Barrier Reef (Rowe and Gates, 1995). Cherbonnier (1988) records the species as far west as the Red Sea.

Family SCLERODACTYLIDAE

Ohshimella ehrenbergi (Selenka, 1867)

See: Clark and Rowe, 1971: 182 (distribution); Clark and Taylor, 1971: 92; Price, 1983: 97; Cherbonnier, 1988: 216; Thandar, 1989: 302; Liao and Clark, 1995: 492; Massin, 1999: 98.

Material. Two specimens, Grand Paté, among dead coral rock, 13–15 m.

Coloration. Not recorded.

Distribution. A new record for the Mascarene Islands. Originally described from the Red Sea, this generally western Indian Ocean species occurs also on the east coast of Africa and eastwards to Sri Lanka. It is more recently recorded from southern China (Liao and Clark, 1995) and from Indonesia (Massin, 1999).

Family PHYLLOPHORIDAE

Thyonidiella cherbonnieri nom. nov.

See: Heding and Panning, 1954: 172 (*Thyonidiella oceana* part: Mauritius only); Cherbonnier, 1988: 229 (as *T. oceana*); [non-Heding and Panning 1954: 172, *Thyonidiella oceana*: part: Ambon = *T. tenera* (Ludwig, 1875)].

Material. Two specimens; Grand Paté, among dead coral rock, 13–15 m; one specimen, Grand Baie.

Coloration. Not noted.

Comments. Heding and Panning (1954) based their description of *T. oceana* on a specimen (holotype) collected from Ambon (Indonesia) but included, also, two further specimens collected from Mauritius. According to Heding and

Panning their species lacks body wall ossicles. On the basis of this action, Clark and Rowe (1971) considered Ambon (i.e. 'East Indies') as the type locality for the species. Cherbonnier (1988) identified 25 specimens from Madagascar (Tulear) with Heding and Panning's (1954) species on the basis of absence of all ossicles, except perforated plates in the tube feet, rods in the tentacles and tube feet, rosettes in the tentacles, introvert and anal body wall. However, he discovered, through Dr Madsen who re-examined Heding and Panning's type specimen on Dr Cherbonnier's behalf, that the Ambon specimen was a misidentified *Semperiella tenera* (Ludwig, 1875), since Madsen (personal communication to Cherbonnier) had found tables in the dorsal body wall. Cherbonnier (1988) clearly misread Heding and Panning's (1954) work for he believed Heding and Panning had not established a holotype from their material of *T. oceana*. Cherbonnier therefore believed the Mauritius specimens to be syntypes of *T. oceana* and Mauritius to be the type locality. The fact of the matter is that Cherbonnier has inadvertently shown *T. oceana* Heding and Panning, 1954 to be a junior synonym of *S. tenera* (Ludwig, 1875) thus also relegating *Semperiella* to the synonymy of *Thyonidiella*.

The specimens collected from Rodrigues, though they are in poor condition, accord with the description given by Cherbonnier (1988) for his 25 Madagascan specimens, which appears also to apply to the Heding and Panning (1954) specimens from Mauritius and these specimens require a new species epithet. On the basis of the full description given by Cherbonnier (1988: 229), we propose the new name *Thyonidiella cherbonnieri* nom. nov., nominating Cherbonnier's material from Madagascar as the syntypes, with added records from both Mauritius and Rodrigues.

In lacking table ossicles in the body wall, *T. cherbonnieri* is immediately distinguished from its congener *T. tenera* (Ludwig, 1875), though all other characters indicate the two species to be congeneric. The inclusion of a third species *T. exigua* Cherbonnier, 1988, also from Tulear, Madagascar, is highly doubtful. It is based on a single juvenile (<9 mm long) which, despite sharing the character of possessing 15 tentacles, on the basis of form of the calcareous ring and tabular ossicles from the body wall and tube feet does not appear to be congeneric with *cherbonnieri* and *tenera*. Were it not for the low number of tentacles (15) counted by Cherbonnier (1988) then all other aspects of the species would suggest that *T. exigua* was a juvenile specimen of the 25 tentacle species *Selenkiella paradoxa* Cherbonnier, 1970 which Cherbonnier (1988: 234) also records from Tulear.

Distribution. Madagascar, Mauritius and Rodrigues.

Family SYNAPTIDAE

Euapta godeffroyi (Semper, 1868)

See: Clark and Rowe, 1971: 184 (distribution); Cherbonnier, 1988: 249.

Material. One specimen, Baladirou, lagoon.

Coloration. Patchy and banded white and pale brown with distinctive yellow longitudinal stripes.

Distribution. Described originally from Samoa, in the south-west Pacific Ocean, this species is distributed throughout the Indo-west Pacific region, being

unrecorded only from the coasts of north-western Indian Ocean, Sri Lanka and the Bay of Bengal.

Opheodesoma grisea (Semper, 1868)

See: Clark and Rowe, 1971: 186; Cherbonnier, 1988; James, 1989: 132.

Material. One specimen, Grand Baie; one specimen, Baladirou.

Coloration. Patchy shades of pale brown and cream or black, with fine black or white spots.

Comments. Cherbonnier (1988) includes *O. mauritiae* Heding, 1931 (from Mauritius) and *O. africana* Heding, 1931 (from Zanzibar, East Africa) in the synonymy of *O. grisea*.

Distribution. Originally described from the Philippines, this species is widely distributed across the Indo-west Pacific region, though, notably, has not been recorded from the minor Islands of the western Indian Ocean, Arabian Gulf, coasts of Pakistan and western India or Islands in the south-west Pacific.

Synapta maculata (Chamisso and Eysenhardt, 1821)

See: Clark and Rowe, 1971: 186 (distribution); Cherbonnier, 1988: 251.

Coloration. Banded black and cream and brown as usual.

Comments. Abundant in sheltered subtidal sites, especially around Totor Reef.

Distribution. Distributed throughout the Indo-west Pacific region, though unrecorded from the Arabian Gulf and coasts of Pakistan and western India.

Family CHIRODOTIDAE

Chiridota rigida (Semper, 1868)

See: Clark and Rowe, 1971: 188; Thandar and Rowe, 1989: 153; Liao and Clark, 1995: 524; Massin 1996: 170.

Material. Eight specimens, Ile aux Sables, Passe Grand Bassin, buried in sand (5–10 cm deep) on edge of sand bank.

Coloration. Dark red.

Comments. The Rodrigues specimens accord well with the specimens identified as *C. rigida* by Thandar and Rowe (1989) from Mozambique and Natal. The material also supports their comments regarding the relationship between *C. hawaiiensis* Fisher, 1907 and *C. rigida* and the probable synonymy of the former with the latter species. Haacke (1880) described *C. eximia* from Mauritius. His description is very short but refers to his species having 12 seven-digit tentacles of which the ‘unpaired’ digit is longest. The wheel papillae occur in single inter-radial rows. Besides the wheels he found numerous regularly distributed delicate button-like ossicles in the body wall (‘schmallenformiger Haukalkkorper’). The differences between both the South African and Rodrigues specimens and the Mauritian *C. exigua*, despite the brevity of, and the errors in Haacke’s description (e.g. digit counts and arrangements of wheel papillae a single row in each inter-radial) seem relatively minor and it is with little hesitation that we commit *eximia* also to the synonymy of the widespread, Indo-west Pacific species *C. rigida*. Interestingly, Cherbonnier (1988) did not record *C. rigida* from Madagascar.

Distribution. South-east Africa, Mauritius, Rodrigues and western Pacific, including Indonesia, Philippines, southern China, northern Australia and south-west Pacific Islands.

Discussion

The taxa typical of the inshore habitats of Rodrigues include, among the brittlestars, the black *Ophiocoma erinaceus*, the dark mottled *O. brevipes* and the smaller green, six-armed *Ophiactis savignyi* present in a range of habitats throughout the shallow subtidal. A single basket star, *Astrocladus tonganus*, was found at night on the inshore northern reefs of Rodrigues. Sea urchins are a conspicuous component of the shore life, with the variable-coloured *Echinometra mathaei* common from the intertidal to depths of 20 m, in places occurring at densities of 20 per m². Possibly intense fishing and removal of predator fish species has contributed to the alarmingly high densities of these bio-eroders, a feature well documented from the lagoons of Kenya (see McClanahan and Shafir, 1990). Other common sea urchins include *Echinothrix diadema*, *Diadema savignyi* and in deeper water *Echinostrephus molaris*. Sea cucumbers are typically represented by the long, snake-like *Synapta maculata*, the two inshore black species *Holothuria leucospilota* and *H. atra* and the dark green *Stichopus chloronotus*, with *Holothuria cinerascens* more common on the exposed eastern shores. Sea stars are in general far less frequently encountered than the above classes with *Nardoa variolata* being the most common throughout the island. The smaller, bright red *Fromia milleporella* is the most common on the shallow reefs, and the even smaller red or mottled '*Asterina*' sp. 2 is found in small crevices among shallow corals. Notable by their absence were the larger starfish such as the species of *Pentaceraster*, *Protoreaster* and *Acanthaster planci*. Local members of the research team reported the latter but specimens were not found during the visit.

We have recorded 74 species of echinoderms from Rodrigues, represented by three crinoids, 10 asteroids, 17 ophiuroids, 15 echinoids and 29 holothurioids, from which five species are unnamed in this account. Within the 69 named species, four distribution patterns appear to emerge (see table 2). The vast majority (59 = 85.5%) are widely distributed throughout the shallow waters of the Indo-west Pacific region (*sensu* Clark and Rowe, 1971). Of these 59 species, 10 are amphi-Pacific, and of

Table 2. Summary of biogeographic distribution of the 69 named echinoderm species from Rodrigues.

Biogeographic areas	Indo-Pacific	Indian Ocean	Western Indian Ocean	Mascarene Islands
Taxa	e.g. <i>Stephanometra indica</i> <i>Fromia milleporella</i> <i>Echinometra mathaei</i> <i>Diadema savignyi</i> <i>Holothuria hilla</i> <i>Synapta maculata</i>	<i>Echinaster purpureus</i> <i>Tropiometra carinata</i> <i>Plesiocolochirus dispar</i> <i>Oshimella erhenbergi</i>	<i>Nardoa variolata</i> <i>Ophiomastix venosa</i> <i>Amphiodia dividua</i> <i>Psolidium ornatum</i> <i>Thyonidiella cherbonnieri</i>	<i>Microcyphus maculatus</i>
Total species number	59	4	5	1

these 10, three are tropicopolitan and one cosmopolitan in distribution. The remaining 10 species of the 69 named taxa appear to be endemic within the Indian Ocean: four species (*Echinaster purpureus*, *Tropiometra carinata*, *Plesiocolochirus dispar*, *Oshimella erhenbergi*) occur across the Indian Ocean and may extend into Indonesian waters; five species (*Nardoa variolata*, *Ophiomastix venosa*, *Amphiodia dividua*, *Psolidium ornatum*, *Thyonidiella cherbonnieri*) appear to be endemic to the western part of the Indian Ocean; and a single species (*Microcyphus maculatus*) appears to be endemic to the Mascarene Islands.

It is clear that the majority of species (59 with Indo-Pacific distribution) which occur on this remote coral-fringed island comprise widespread 'reef species' *sensu* Endean (1957) and Rowe (1985a, 1985b) and, where it is known, comprise species whose life cycle includes planktotrophic larvae. In his analysis of the non-endemic, tropical Australian echinoderm fauna, Rowe (1985a) concluded that such an Indo-west Pacific distribution reflects antiquity, with tropicopolitan species signifying ancient, disjunct remains of pan-Tethyan distributions, these having been effected by large-scale vicariant events. Examples of such events include tectonic plate movement such as that which restricted the Tethyan Sea resulting from the northward movement of the African continent towards Europe and the changes in relative land and sea levels in present-day South-East Asia. These latter events would have led to extensive modification of, and restricted, oceanic currents, leading to their present-day complexities.

Rodrigues is a small, relatively isolated and young (1.5 million years) volcanic island. Although details of the local oceanic currents washing its shores are unknown, it can be assumed that major influences in the distribution of the echinoderm fauna to the island would be the South Equatorial Current and, possibly, Madagascan Current. These would sweep larvae southward from the islands of the Mascarene plateau north of Rodrigues as currents moving westward are deflected southward by the Mascarene plateau itself. Such distribution would be aided during Pleistocene changes in sea level.

Of the remaining 10 species, with more restricted, Indian Ocean distributions, at least four extend across the Indian Ocean as far as the Indo-Malay archipelago. For these, it is probable that their arrival at Rodrigues followed a similar route to that of the widespread 'reefal species'. Although at least the crinoid and dendrochirotid holothurian species are known to be direct developers with a shorter larval life span, the distance to Rodrigues from the Mascarene plateau would not be too far for them to travel.

Of the species apparently endemic to the western part of the Indian Ocean (i.e. coast of East Africa eastward to Rodrigues), *Nardoa variolata* and *Ophiomastix venosa* are the most well known and widely distributed in the area, though their reproductive strategies remain unreported. Clearly the limits of distribution for *Amphiodia dividua*, *Psolidium ornatum* and *Thyonidiella cherbonnieri* have yet to be determined as each are newly recorded from Rodrigues. The proximity of all of these species at Mauritius supports their probable origin via the Mascarene plateau.

Finally, the extension of the reported range of *Microcyphus maculatus* from Mauritius to Rodrigues cannot be surprising, as this species, which almost certainly has a planktotrophic (echinopluteus) larva, would have little difficulty, in appropriate oceanic currents between the two islands, in reaching Rodrigues. Whether the taxonomy of *M. maculatus* is sufficiently sound to consider it an endemic Mascarene species, or whether differences based on colour patterns of test

and spines from two other Indian Ocean species in the genus (*M. rousseaui* L. Agassiz, 1846—known from East Africa/Red Sea/Arabian coast and *M. ceylanica* Mortensen, 1942—known from Sri Lanka (Ceylon) and Bay of Bengal) are sufficient to maintain species differences, requires further investigation.

Further investigations are under way to resolve the remaining taxonomic ambiguities. These refer specifically to a species of *Actinopyga*, two 'Asterina' species, and the single *Amphioplus* species. Additional field work is also required to collect an intact specimen of the comatulid feather star and to confirm the presence of *Acanthaster planci*, *Heterocentrotus trigonarius* and *Diadema setosum*.

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