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Part 6

Echinoderms of Ashmore Reef and Cartier Island

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Abstract

A total of 178 species of echinoderms is recorded from Ashmore and Cartier Reefs compared with 119 from Scott and Seringapatam Reefs and 90 from the Rowley Shoals.

Background and discussion

There are no published data on the echinoderm fauna of Ashmore and Cartier Reefs but an unpublished report on collections made by the USSR R.V. *Bogorov* expedition (17-20 October 1978) lists 59 species of Asteroidea, Ophiuroidea, Echinoidea and Holothurioidea, of which voucher specimens were deposited in the Western Australian Museum and identified by the first author and Dr F.W.E. Rowe (Holothurioidea).

The R.V. *Bogorov* occupied 14 stations at Ashmore Reef, eight in the lagoon, three on the outer reef slope and three intertidal and reef flat stations of which the most productive was the north side of middle reef. The Western Australian Museum (WAM) collections from Ashmore and Cartier Reefs were made from 5 reef flat and 2 sand flat sites, 6 lagoon sites and 11 outer reef slope sites, sampled over 11 days (described in Part 1, Table 1 and Figures 2 and 3). The Northern Territory Museum (NTM) collections were made from 8 reef flat and intertidal rock sites, 2 sand flat sites, 2 lagoon sites and 8 outer reef slope sites, (described in Part 1, Table 2). Some sites were visited on a number of occasions in July 1986, April and September 1987; sampling took place on 37 days in all. Thus the sampling effort at Ashmore Reef by both museum parties totals 48 days compared with 9 days at Scott Reef and 9 days at the Rowley Shoals. It is not surprising therefore that the total number of species recorded is much greater at Ashmore Reef.

A total of 178 species of echinoderms is recorded from Ashmore and Cartier Reefs compared with 119 from Scott and Seringapatam Reefs and 90 from the Rowley Shoals (Marsh 1986).

A numerical comparison of all the species recorded (Table 1) shows that 51% of the species are in common between Ashmore Reef and Scott Reef while 43% are in common between Ashmore Reef and the Rowley Shoals. If species records from single sites are eliminated (Table 2) 61% of species are in common between Ashmore and Scott Reefs and 47% between Ashmore Reef and the Rowley Shoals.

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Table 1. A comparison of the total number of echinoderm species found on three reef groups and the proportion of species in common. Scott/ Seringapatam and Rowley Shoals data from Marsh (1986) and notes in text.

	Ashmore Cartier	Scott Seringapa-patam	Rowley Shoals	In common Ashmore/ Scott	In common Ashmore/ Rowley
Crinoidea	38	16	10	13 = 34.2%	8 = 21.1%
Asteroidea	28	21	17	16 = 57.1%	14 = 50.0%
Ophiuroidea	42	38	28	26 = 61.9%	22 = 52.4%
Echinoidea	23	19	14	14 = 60.9%	13 = 56.5%
Holothurioidea	47	25	21	21 = 44.7%	20 = 42.5%
Total echinoderms	178	119	90	90 = 50.6%	77 = 43.3%

Table 2. A comparison of echinoderm species between the three reef groups excluding records from single stations.

	Ashmore Cartier	Scott Seringapa-patam	Rowley Shoals	In common Ashmore/ Scott	In common Ashmore/ Rowley
Crinoidea	21	11	6	10 = 47.6%	4 = 19.0%
Asteroidea	17	16	12	14 = 82.4%	11 = 64.7%
Ophiuroidea	29	26	19	22 = 75.9%	18 = 62.1%
Echinoidea	16	16	11	13 = 81.3%	10 = 62.5%
Holothurioidea	33	12	12	12 = 36.4%	12 = 36.4%
Total echinoderms	116	81	60	71 = 61.2%	55 = 47.4%

The richer echinoderm fauna at Ashmore Reef than at the other offshore atolls can be attributed to three probable factors, apart from the greater sampling effort: firstly, the large areas of sand and seagrass flats at Ashmore Reef which provide a habitat not found at either Scott Reef or the Rowley Shoals, secondly, the position of Ashmore Reef on the edge of the Sahul Shelf with shallow water connections to the north coast of Australia, the Aru Islands and Papua New Guinea which may provide a route for colonisation by species with demersal larvae. Lastly, the greater proximity of Ashmore Reef to the Indonesian Archipelago must increase the chances of colonisation by species with short pelagic larval stages. Rowe (1985) supports the recognition of two faunal suites in northern Australia, a "reef" suite and a "mainland" suite (Endean 1957) but as Marsh and Marshall (1983) showed the two suites are separated ecologically but often not geographically in north-western Australia. Ashmore Reef is a good example of a reef where "mainland" or continental species occur on the same reef as "reef" species but in separate habitats while Scott Reef and Rowley Shoals have a fauna of "reef" or widely distributed species. Yamaguchi (1977) has shown, for four species studied of Asteroidea, that the continental species have a slightly shorter pelagic larval life although all four species have small eggs and planktotrophic larvae. The main difference is in larval behaviour: the continental species have semi-demersal larvae while the widely distributed

species have surface swimming larvae giving them more chance of wide distribution by ocean currents. However some widely distributed coral reef species such as *Ophidiaster granifer* and *Fromia indica* have lecithotrophic, demersal larvae with abbreviated development (Yamaguchi and Lucas 1984, Marsh 1988, respectively). *O. granifer* is found from Madagascar (WAM specimen) to Samoa and *F. indica* from the Maldive Is to Fiji (Clark and Rowe 1971). No explanation is offered for these anomalies although Yamaguchi and Lucas (1984) showed that larval life of *O. granifer* can be prolonged to 7-10 weeks.

The echinoderm fauna of Ashmore and Cartier Reefs has strong affinities with that of Indonesia and consists of a mixture of continental species with a limited distribution and coral reef species with a wide distribution in the tropical Indo-West Pacific.

Crinoidea

The crinoid fauna of Ashmore Reef, with 38 species recorded, is considerably more diverse than that of either Scott Reef (16 species) or the Rowley Shoals (10 species) (Marsh 1986).

The progression of an increasing number of species from the Rowley Shoals to Ashmore Reef is consistent with the opinion expressed by Marsh (1986) that proximity to the rich fauna of the Indonesian archipelago is responsible for the richer crinoid fauna found at Scott Reef than at the Rowley Shoals. Mortensen (1938) has shown that at least some coral reef crinoids have a short larval stage with lecithotrophic demersal larvae which would tend to restrict their distribution to reefs on the continental shelf and make it difficult for them to colonise isolated reefs, rising from relatively deep water, such as Scott Reef and the Rowley Shoals.

A comparison of the crinoid fauna of Ashmore Reef with that of Scott Reef and the Rowley Shoals (Tables 1 and 3), while of limited value because of the short collecting period spent at each reef, nevertheless gives some indication of the fauna in common. Twenty-five of the 38 species found at Ashmore Reef were not found at either Scott Reef or the Rowley Shoals and only 13 and 8 respectively were in common. Only three species (*Comanthus briareus* (Bell, 1882), *Oxycomanthus comanthipinna* (Gislén, 1922) and *Decametra parva* (A.H. Clark, 1912) found at Scott Reef or the Rowley Shoals, were not found at Ashmore or Cartier Reefs.

Habitat differences may account for some variation in species composition as Ashmore Reef lacks the coral rich back reef areas which make up a large part of the lagoon edge reef habitat at Scott Reef and the Rowley Shoals and are the preferred habitat of some species. Most of the Ashmore Reef crinoids were found on the outer slopes with the majority on the protected northern side of the reef (sites 5,8,11 and 13), a habitat more similar to that of many Indonesian reefs than the more exposed outer slopes of Scott Reef and the Rowley Shoals.

Asteroidea

Twenty-eight species of Asteroidea are recorded from Ashmore and Cartier Reefs, compared with 21 from Scott Reef and 17 from the Rowley Shoals (Marsh 1986).

Sixteen species are in common between Ashmore and Scott Reefs and 14 between Ashmore Reef and the Rowley Shoals (Tables 1 and 3). While some of the differences are probably due to collecting effort most of them appear to reflect differences in habitat and in the geographical position of the reefs.

Five species were found at Scott Reef or the Rowley Shoals but not at Ashmore Reef. Three of these (*Celerina heffernani* (Livingstone, 1931), *Fromia eusticha* Fisher, 1913 and *Euretaster insignis* (Sladen, 1882)) were single specimens and therefore probably chance collections but two (*Ophidiaster cribrarius* Lütken, 1872, and *Disasterina abnormalis* Perrier, 1875) were collected at four sites on Scott Reef and one at the Rowley Shoals. No reason can be suggested for their apparent absence from Ashmore Reef.

The presence at Ashmore Reef of four species of large oreasterids, *Pentaceraster multispinus, P. regulus, Protoreaster lincki* and *P. nodosus* (found on sand and seagrass flats) reflects both habitat differences and the position of Ashmore Reef on the edge of the Sahul Shelf with a continuous shelf connection to the north coast of Australia and the Aru Islands of Indonesia. *Pentaceraster regulus* and *Protoreaster lincki* have been found on shelf and reef areas (respectively) to the south in Western Australia but *Protoreaster nodosus* is replaced on the north-west coast by *P. nodulosus*, an endemic Western Australian species (Marsh 1976, Marsh and Marshall 1983). Yamaguchi (1977) found that *P. nodosus* has a demersal lecithotrophic larva and is therefore unlikely to be able to colonise isolated reefs separated by deep water.

The occurrence at Ashmore and Cartier Reefs of *Bunaster ritteri* and *Cistina columbiae* are new records for Australia while *Neoferdina cumingi* is a new record for the western half of Australia. *B. ritteri* was previously known only from the Philippines, as *B. lithodes* (Marsh 1991) and Indonesia while *N. cumingi* occurs from Christmas Island in the Indian Ocean to the central Pacific. *C. columbiae* is a very rare but widespread Indo-West Pacific species. *Archaster typicus* is newly recorded for the western half of Australia, it is replaced by *A. angulatus* elsewhere in Western Australia.

The most abundant species, as on most Indo-West Pacific coral reefs, was *Linckia laevigata. L. guildingi* was moderately common but *L. multifora* was rare in comparison with Scott Reef and the Rowley Shoals. *Nardoa tuberculata* was much less common than at Scott Reef although represented at a similar number of reef flat sites. *Fromia indica, F. milleporella* and *F. monilis* were found at a similar number of sites and appeared to have a similar frequency of occurrence to that at Scott Reef.

Ophiuroidea

Forty-two species were collected at Ashmore Reef, compared with 38 from Scott and 28 from the Rowley Shoals (Marsh 1986 and note below). Twenty-six of the species at Ashmore Reef are in common with Scott Reef and 22 with the Rowley Shoals (Tables 1 and 3). As at Scott Reef the most abundant reef flat species were *Ophiomastix annulosa* and *Ophiocoma erinaceus*.

Nine ophiuroid species and two of uncertain identification were found at Scott Reef and/or the Rowley Shoals but not at Ashmore Reef. These are *Astroboa nuda* (Lyman, 1874), *Amphipholis squamata* (Delle Chiaje, 1829), *Macrophiothrix demessa* (Lyman, 1861), *Ophiothrix (Acanthophiothrix) armata* Koehler, 1905, *Ophiocoma doederleini* de Loriol, 1899, *Ophiomastix variabilis* Koehler, 1905) with the probable synonym *O. palaoensis* Murakami, 1943, *Ophionereis porrecta* Lyman, 1860, *Ophiarachna affinis* Lütken, 1869, *Ophiarachnella snelliusi* (A.H. Clark, 1964) and *Ophiactis* sp. cf. *maculosa* von Martens, 1870 and *Ophiothrix* sp. cf. *savignyi* (Müller and "Troschel, 1842). It is likely that further collecting will reveal these species at Ashmore Reef as most of them were from single localities. Hoggett (1991) has found specimens of *Macrophiothrix lorioli* and *M. koehleri* among collections of *M. longipeda* from Scott Reef and the Rowley Shoals. Two new species, *Macrophiothrix leucosticha* (with type locality Ashmore Reef) and *M. paucispina* were described by Hoggett (1991). *Ophioconis cupida* (recorded by Marsh 1986) is regarded as a junior synonym of *O. cincta* by Rowe, Vail and Hoggett (in prep.).

Habitat differences probably account for some variations in the ophiuroid faunas. For instance *Macrophiothrix paucispina, Ophiarachnella gorgonia, Cryptopelta granulifera, Ophiolepis superba* and *Ophioplocus imbricatus* probably owe their occurrence at Ashmore Reef to the extensive sandy areas on the reef flats.

Echinoidea

Twenty-three species of Echinoidea were recorded from Ashmore Reef, compared with 19 from Scott Reef and 14 from the Rowley Shoals (Marsh 1986). Of these 14 species were in common between Ashmore Reef and Scott Reef and 13 between Ashmore Reef and the Rowley Shoals (Tables 1 and 3).

The following five species of echinoid were recorded from Scott Reef but not from Ashmore Reef or the Rowley Shoals: *Diadema setosum* (Leske, 1778), *Parasalenia gratiosa* A. Agassiz, 1863, *Fibularia ovulum* Lamarck, 1816, *F. volva* L. Agassiz, 1846 and *Schizaster* sp.; *Peronella orbicularis* (Leske, 1778) was recorded from the Rowley Shoals but not from Ashmore or Scott Reefs. Further collecting at Ashmore Reef may yet reveal these species.

As would be expected from the extensive areas of sand habitat at Ashmore Reef heart urchins are abundant around the sand cays and islets. The most common were *Breynia australasiae, Echinolampas ovata* and *Metalia spatagus*, less common were *Brissus latecarinatus* and *Metalia dicrana* while *M. sternalis* and *Rhynobrissus tumulus* were rare.

Prionocidaris verticillata and *Metalia sternalis* are new records for the western half of Australia.

On the reef flats, the large diadematid echinoids *Echinothrix calamaris* and *E. diadema* were common but the genus *Diadema* was represented only by *D. savignyi*, most of which were juveniles.

Holothurioidea

Ashmore Reef has an exceptionally diverse holothurian fauna with 47 species recorded compared with 25 for Scott Reef and 21 for the Rowley Shoals (Marsh 1986). Only 21 species are in common with Scott Reef and 20 with the Rowley Shoals (Tables 1 and 3).

The following four species of holothurians were found at Scott Reef but not at the Rowley Shoals or Ashmore Reef: *Pentacta lutea* (Sluiter, 1901), *Cladolabes acicula* (Semper, 1868), *Labidodemas pertinax* (Ludwig, 1875) and *Holothuria (Stauropora) olivacea* (Ludwig, 1888); *Holothuria (Thymiosycia) remollescens* Lampert, 1885 was found at the Rowley Shoals but not at Scott or Ashmore Reefs. All these species were collected from single sites and no significance is attached to their apparent absence from Ashmore Reef. Despite the high diversity of holothurian species many are uncommon and 17 species are recorded only from one station.

The preferred bêche-de-mer species i.e. *H. (Microthele)* spp. and *Thelenota ananas* are quite rare, whereas at the Rowley Shoals, where there is no fishing pressure on these species, they are very common in back reef areas.

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List of Echinoderms

Key to symbols

Numbers = W.A. Museum sampling stations (See Part 1, Figures 2 and 3 and Table 1)
B = R.V. *Bogorov* collection
C = Cartier I. stations
N = N.T. Museum sampling stations (See Part 1, Table 2)
V = Visual record
\+ = Present

	Ashmore Reef/ Cartier I.	Scott/ Seringapatam	Rowley Shoals
Crinoidea			
COMASTERIDAE			
Capillaster multiradiatus (Linnaeus, 1758)	11,N2	-	-
C. sentosus (Carpenter, 1888)	8,N5	-	-
Comanthina schlegelii (Carpenter, 1881)	4,7,8,17,N5, N7,N9,N12	-	-
Comanthus alternans (Carpenter, 1881)	5,N7	-	-
C. gisleni Rowe *et al.*, 1986	4,N17	+	+
C. parvicirrus (Müller, 1841)	N5,N6,N7, N12,N17	+	-
C. suavia Rowe *et al.*, 1986	N5,N14		
C. wahlbergi (Müller, 1843)	13,20,N12	+	-
Clarkcomanthus luteofuscum (H.L. Clark, 1915)	10,11,N5,N7,C2	+	+
C. littoralis (Carpenter, 1888)	N5	+	-
Oxycomanthus bennetti (Müller, 1841)	5,N5,N7	+	+
O. exilis Rowe *et al.*, 1986	7,N7,N17	-	-
O. n. sp. aff. *mirus*	N1	+	-
Comaster multifidus (Müller, 1841)	2,N5,N7	+	+

	Ashmore Reef/ Cartier I.	Scott/ Seringapa-tam	Rowley Shoals
Comatella sp. cf. *maculata* (Carpenter, 1888)	N3,N8	-	-
C. stelligera (Carpenter, 1880)	16	-	-
HIMEROMETRIDAE			
Himerometra robustipinna (Carpenter, 1880)	7,N18		
MARIAMETRIDAE			
Lamprometra palmata (Müller, 1841)	20,N2,N3,N7	+	+
L. klunzingeri (Hartlaub, 1890)	N2	-	-
Stephanometra indica (Smith, 1876)	2,16,N2,N3, N7	+	+
S. sp. cf. *oxyacantha* (Hartlaub, 1890)	N2	-	-
S. spicata (Carpenter, 1881)	N2	+	+
S. spinipinna (Hartlaub, 1890)	16,N2	-	-
COLOBOMETRIDAE			
Basilometra boschmai A.H. Clark, 1936	8	-	-
Cenometra bella (Hartlaub, 1890)	8,N7	-	-
C. sp. cf. *emendatrix* (Bell, 1892)	5	-	-
C. sp. cf. *herdmani* A.H. Clark, 1909	8,N9	-	-
Colobometra perspinosa (Carpenter, 1881)	11	-	-
Decametra laevipinna (A.H. Clark, 1912)	2,N5,N6	-	-
Iconometra anisa H.L. Clark, 1915	N9	-	-
Oligometra serripinna (Carpenter, 1881)	N5	+	-
Petasometra clarae (Hartlaub, 1890)	N12	-	-
P. helianthoides A.H. Clark, 1912	4	-	-
Pontiometra sp. cf. *andersoni* (Carpenter, 1888)	C1	-	-
Colobometrid sp. (aff. *Cenometra* ?)	N2	-	-
ANTEDONIDAE			
Dorometra nana (Hartlaub, 1890)	4	+	+
D. parvicirra (Carpenter, 1888)	13,N7,N12	-	-
E. sp. cf. *polytes* A.H. Clark, 1936	13,N7	-	-
Asteroidea			
ARCHASTERIDAE			
Archaster typicus Müller and Troschel, 1840	N1	-	-
OREASTERIDAE			
Choriaster granulatus Lütken, 1869	8	+	+
Culcita novaeguineae Müller and Troschel 1842	3,16,17,V, B,N2,N5, N7V,N8,N9V	+	+
Pentaceraster multispinus (Von Martens, 1866)	B	-	-
P. regulus (Müller and Troschel, 1842)	16,B	-	-
Protoreaster lincki (de Blainville, 1834)	16	-	-
P. nodosus (Linnaeus, 1758)	16,N1,N2,N8	-	-

	Ashmore Reef/ Cartier I.	Scott/ Seringapatam	Rowley Shoals
ASTEROPSEIDAE			
Asteropsis carinifera (Lamarck, 1816)	20,B	+	+
OPHIDIASTERIDAE			
Bunaster ritteri Döderlein, 1896	16,N1,C2	-	-
Cistina columbiae Gray, 1840	N12	-	-
Dactylosaster cylindricus (Lamarck, 1816)	N5	-	+
Fromia indica (Perrier, 1869)	4,5,8,13,15, 17,B,N7,C3	+	-
F. milleporella (Lamarck, 1816)	6,8,10,B,N7	+	-
F. monilis Perrier, 1875	2,7,10,11, N2,N5,N7	+	+
Gomophia gomophia (Perrier, 1875)	11	-	-
Linckia guildingi Gray, 1840	8,9V,13V, 15V,16,20V, B,N5,N6,N7,N12	+	+
L. laevigata (Linnaeus, 1758)	1,3V,4,5V, 6V,8V,9V, 10V,16V,18V, 20V,B,N1,N2, N3,N5,N7,C2	+	+
L. multifora (Lamarck, 1816)	10,N5,N7,N17	+	+
Nardoa tuberculata Gray, 1840	2,3,6V,16,18, B,N2,N14	+	+
Neoferdina cumingi (Gray, 1840)	5,8,17,N5,C1	-	-
Ophidiaster granifer (Lütken, 1872)	3,6,9,20,B,N8	+	+
O. hemprichi Müller and Troschel, 1842	9,16,B,N7	+	+
MITHRODIIDAE			
Mithrodia clavigera (Lamarck, 1816)	16	+	+
ASTERINIDAE			
Asterina cepheus (Müller and Troschel 1842)	16,N1,N3,N8 C2	+	-
A. anomala H.L. Clark, 1921	7,C	+	-
ACANTHASTERIDAE			
Acanthaster planci (Linnaeus, 1758)	2V	+	+
ECHINASTERIDAE			
Echinaster luzonicus (Gray, 1840)	2V,6,8,12, 16,20,N2, N9,B	+	+
E. superbus H.L. Clark, 1916	N7	-	-
Ophiuroidea			
OPHIOMYXIDAE			
Ophiomyxa australis Lütken, 1869	N7	+	+

	Ashmore Reef/ Cartier I.	Scott/ Seringapa-tam	Rowley Shoals
AMPHIURIDAE			
Amphiura sp. cf *microsoma* H.L. Clark, 1915	N7	-	-
OPHIACTIDAE			
Ophiactis hemiteles H.L. Clark, 1915	N7	-	-
O. savignyi (Müller and Troschel, 1842)	1,N2,N13	+	+
O. sp. cf. *sinensis* Mortensen, 1934	N7	-	-
OPHIOTRICHIDAE			
Macrophiothrix koehleri A.M. Clark, 1968	3,N1,N3,N4	+	-
M. longipeda (Lamarck, 1816)	N7	+	+
M. lorioli A.M. Clark, 1968	3,6,10,16, N1,N3,N4,N7, N8,N14,N17,C2	+	+
M. robillardi (de Loriol, 1893)	16,20	-	-
M. propinqua (Lyman, 1861)	1,13,15,N3, N6,N7,N12	+	+
M. paucispina Hoggett, 1991	14,N3	-	-
M. leucosticha Hoggett, 1991	N7	-	-
Ophiothrix ciliaris (Lamarck, 1816)	11	-	-
O. trilineata Lütken, 1869	13,N5,N7,N17	-	-
	N18	+	+
O. (Keystonea) nereidina (Lamarck, 1816)	N5,N7,N17,N18	+	-
O. (Acanthophiothrix) purpurea von Martens, 1867	8,11,N5,N7, N17,C1	+	+
O. (A.) picteti de Loriol, 1893	N7,N12,N17	-	-
Ophiothela danae Verrill, 1869	N7,N18	+	+
OPHIOCOMIDAE			
Ophiarthrum elegans Peters, 1851	3,16,20,B, N1,N3,N4,N8,C2	+	+
O. pictum Müller and Troschel, 1842	3,16,N1,N2	+	+
Ophiocoma anaglyptica Ely, 1944	C2	+	+
O. brevipes Peters, 1851	1,3,16,B,N1, N3,N12,N13	-	+
O. dentata Müller and Troschel, 1842	1,3,16,N1, N3,C2	+	-
O. erinaceus Müller and Troschel, 1842	3,6V,9V,10,11,13, 15,16,18,20,B,N1, N2,N3,N5,N7,C2	+	+
O. pica Müller and Troschel, 1842	3,13,16V,N5, N7,C2	+	+
O. pusilla (Brock, 1888)	13,16,N5,N17	+	+
O. scolopendrina (Lamarck, 1816)	3,14,N3,N4, N13,C2	+	+
Ophiocomella sexradia (Duncan, 1887)	13	+	-
Ophiomastix annulosa (Lamarck, 1816)	1,3,16,20, B,N1,N3,N8,C2	+	+

	Ashmore Reef/ Cartier I.	Scott/ Seringapatam	Rowley Shoals
O. asperula Lütken, 1869	N7	-	-
OPHIODERMATIDAE			
Ophiarachna incrassata (Lamarck, 1816)	1,3,N1,C2	+	-
O. delicata (H.L. Clark, 1932)	N7	-	-
Ophiarachnella gorgonia (Müller and Troschel, 1842)	3,13,16,20, B,N1,N3,N7	-	-
O. infernalis (Müller and Troschel, 1842)	16,18,N3	+	-
O. septemspinosa (Müller and Troschel, 1842)	11V	+	+
Ophiochaeta hirsuta Lütken, 1869	N6	-	+
Ophiopeza spinosa (Ljungman, 1867)	3,N7	+	+
Ophioconis cincta Brock, 1888	13,N1,N7	+	+
Cryptopelta granulifera H.L. Clark, 1909	16,20	-	-
OPHIURIDAE			
Ophiolepis cincta Müller and Troschel, 1842	1,13,14,16, 20,N3,N5,N7, N15	+	+
O. superba H.L. Clark, 1915	B,N1	-	-
Ophioplocus imbricatus (Müller and Troschel, 1842)	3,16,20,B, N3,N8	-	-
Echinoidea			
CIDARIDAE			
Eucidaris metularia (Lamarck, 1816)	3,11,16,B, N5,N7,C2	+	+
Prionocidaris verticillata (Lamarck, 1816)	16	-	-
DIADEMATIDAE			
Diadema savignyi Michelin, 1845	3,6V,9V,16V, 20V,N2,N7, N8,N10V	+	+
Echinothrix calamaris (Pallas, 1774)	6,16,20V,N5, N8,N10,N12	+	+
E. diadema (Linnaeus, 1758)	3,9V,16V, 20V,N3,N8,C2	+	+
TEMNOPLEURIDAE			
Mespilia globulus (Linnaeus, 1758)	B	+	-
Temnopleurus alexandri (Bell, 1884)	B	-	-
TOXOPNEUSTIDAE			
Pseudoboletia maculata Troschel, 1869	B	-	-
Toxopneustes pileolus (Lamarck, 1816)	N3	+	-
Tripneustes gratilla (Linnaeus, 1758)	1,16,B,N3,N4	+	+

	Ashmore Reef/ Cartier I.	Scott/ Seringapa-tam	Rowley Shoals
PARASALENIIDAE			
Parasalenia poehli Pfeffer, 1887	11,N7,N17	+	-
ECHINOMETRIDAE			
Echinometra mathaei (de Blainville, 1825)	3,20,B,N1, N3,N10V,C2	+	+
Echinostrephus molaris (de Blainville, 1825)	9	+	+
Heterocentrotus mammillatus (Linnaeus, 1758)	4,9,B	-	+
ECHINONEIDAE			
Echinoneus cyclostomus Leske, 1778	1,16,B,N16,C2	+	+
CLYPEASTERIDAE			
Clypeaster reticulatus (Linnaeus, 1758)	1,3,16,N1,C2	+	+
ECHINOLAMPADIDAE			
Echinolampas ovata (Leske, 1778)	1,3,12,14, B,N1,N3	-	-
LOVENIIDAE			
Breynia australasiae (Leach, 1815)	1,14,B,N1,N3	-	-
BRISSIDAE			
Brissus latecarinatus (Leske, 1778)	1,20	+	+
Metalia dicrana H.L. Clark, 1917	1,14,B,N2,N3	-	+
M. spatagus (Linnaeus, 1758)	1,3,5,6,11, 14,C2	+	+
M. sternalis (Lamarck, 1816)	1,C2	-	-
Rhynobrissus tumulus McNamara 1982	C2	-	-
Holothurioidea			
HOLOTHURIIDAE			
Actinopyga echinites (Jaeger, 1833)	3,N1,N3,N4	-	-
A. lecanora (Jaeger, 1833)	18,B,N7	-	-
A. mauritiana (Quoy and Gaimard, 1833)	16V,B,N5,N7V, N8,N10V,C2	+	+
A. obesa Selenka, 1867	2,10,B,N1V, N4,N7	+	-
A. serratidens Pearson, 1903	+	-	-
Bohadschia argus Jaeger, 1833	1V,3,10V, 16V,18V,B, N1V,N2,N3, N7V,N8,C2	+	+
B. graeffei (Semper, 1868)	6,B,N7,N9V	+	+
B. marmorata Jaeger, 1833	1,3,14V,16V, B,N1,N3,N4V,N7	+	+
Labidodemas semperianum Selenka, 1867	B,N1,N8	+	+
Holothuria (Acanthotrapeza) coluber Semper 1868	3,B,N1,N2,N3	-	-

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H. (Cystipus) inhabilis Selenka, 1867	3,B	-	+
H. (Halodeima) atra Jaeger, 1833	1V,2,3,8,10V, 14V,16V,B,N1, N2,N3,N4V,N7V, N8,N10V,C2	+	+
H. (H.) edulis Lesson, 1830	6,8,B,N1,N2, N5,N7V,N9V	+	+
H. (Lessonothuria) lineata Ludwig, 1875	12,14,16,B,N3	+	+
H. (L.) pardalis Selenka, 1867	B,N1	-	-
H. (Mertensiothuria) leucospilota (Brandt, 1835)	3,B,N1,N3,N4	+	+
H. (M.) fusco-rubra Theel, 1886	N2V,N3	-	-
H. (Metriatyla) scabra Jaeger, 1833	B	-	-
H. (M.) aculeata Semper, 1868	3,N1V,N2,N3	-	-
H. (M.) sp. cf. *albiventer* Semper, 1868	3	-	-
H. (Microthele) fusco-punctata Jaeger, 1833	N7	-	-
H. (M.) nobilis (Selenka, 1867)	N1,N3,N8	-	-
H. (M.) whitmaei Bell, 1887	3,16V,20V,N2V, N3,N8,C2V	+	+
H. (Platyperona) difficilis Semper, 1868	B	+	+
H. (Stauropora) fuscocinerea Jaeger, 1833	N4	-	-
H. (S.) pervicax Selenka, 1867	16,B,N8	+	-
H. (Thymiosycia) arenicola Semper, 1868	3,16,N1	-	-
H. (T.) hilla Lesson, 1830	1V,3V,B,N1,N3 N6,C2	+	+
H. (T.) impatiens (Forskål, 1775)	1,3,16,B,N1, N3,N4,N6,N8,C2	+	+
STICHOPODIDAE			
Stichopus chloronotus Brandt, 1835	3,6,10V,18V,B, N3,N5,N7,N8,C2	+	+
S. horrens Selenka, 1867	16,B	+	+
S. hermanni Semper, 1868	3,14,18,N2,N3, N4,N8,C2	-	-
S. monotuberculatus (Quoy & Gaimard, 1833)	18,B,N3,N8,C2	+	+
S. naso Semper, 1868	N3	+	+
Thelenota ananas (Jaeger, 1833)	9V,B,N1V,N2, N7V,N8	+	+
T. anax H.L. Clark, 1921	18,B,N1,N2, N5,N7	-	+
CUCUMARIIDAE			
Havelockia versicolor (Semper, 1868)	+	-	-
PHYLLOPHORIDAE			
Afrocucumis africana (Semper, 1868)	N3	-	-
SYNAPTIDAE			
Euapta godeffroyi (Semper, 1868)	1,16,B,N1	+	-
Opheodesoma grisea (Semper, 1868)	N2,N3,N4	-	-

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O. lineata Heding, 1928	N3	-	-
Polyplectana kefersteini (Selenka, 1867)	N17	-	-
Synapta maculata (Chamisso and Eysenhardt,1821)	3,B,N1,N2,N3	+	+
Synaptula recta (Semper, 1868)	N3	-	-
CHIRIDOTIDAE.			
Chiridota rigida Semper, 1868	N1,N7	-	-
C. stuhlmanni Lampert, 1896	16	-	-
Trochodota maculata H.L. Clark, 1921	N1	-	-