

Chapter 50

Echinodermata

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INTRODUCTION

Echinoderms are a conspicuous and varied group of marine invertebrates, comprising of feather stars and sea lilies, sea stars, brittle stars, sea urchins and sea cucumbers. Since these are deuterostomes and exhibit closer affinities with Chordata than any other invertebrates (Hyman, 1955; Smith, 2004). They are distributed from the intertidal habitat to greater depths of the ocean while most are recorded from sandy as well as coral reef ecosystems of the world. Possessing a unique endoskeleton and water vascular system, these penta-radially symmetrical organisms form an important group of the marine benthos (Brusca and Brusca 1990). A total 20,550 echinoderm species including 13,000 extinct species and 7,550 extant species are known from the world (Zhang, 2011). Approximately 1000 echinoderm species listed in the Indo-West Pacific region (Guille *et al.*, 1986). Echinoderms are considered as prosperous assets in Indo-West Pacific shallow water (Clark and Rowe, 1971). A total of 741 species were listed from India (Sastry, 2007; Raghunathan *et al.*, 2016; Samuel *et al.*, 2017).

LITERATURE REVIEW

The echinoderm species are known from the Indian waters as early as 1743 when Plancus and Gaultire (1743) studied the echinoderms of the Konkan coast. Echinoderms were reported from the peninsular coasts of India by Bell (1888), Koehler (1897, 1899, 1922, 1927), Koehler and Vaney (1908), Gravelly (1927), James (1966, 1987), Daniel and Halder (1974), Uma (2001), Jayakumari (2004) and Sakthivel *et al.* (2005). The studies from Goa coast was mainly contributed by Plancus and Gaultire (1743), James (1983), and Hegde and Rivonker (2013). In Gujarat coast, Grideon *et al.* (1957) reported few echinoderms. In 1969, Gopalakrishnan reported six species of sea cucumbers from Gujarat. The remarkable role on studies of echinoderms from Maharashtra coast was done by Sanne and Chhapper (1962) with the report

of fifteen species of echinoderms while Parulekar (1981) reported five species. Sastry *et al.* (2012) reported thirty-one echinoderm species including four new distributional records from the Karnataka coast. The studies on echinoderms in Kerala were initiated by Kurian (1953), followed by Deepa and Kumar (2010), who reported six new distributional records from the Malabar Coast.

The studies on echinoderms of Lakshadweep were well studied compared to other areas of the western coastal areas of India. The studies in Lakshadweep were carried by Anderson (1894), Bell (1902), Koehler and Vaney (1908), James (1969), Naghabushanam and Rao (1972), Daniel and Halder (1974), Mukhopadhyay and Samanta (1983), Rao and Misra (1983), James (1989b), Mukhopadhyay (1991), Sastry (1991), Kandan (1994), and Price and Rowe (1996), Nowshad *et al.* (2019) and Sastry *et al.* (2019).

Sastry (2007) provided an annotated list of Echinodermata of India along with the number of species from the coastal states of the west coast of India as follows: Gujarat (37 species); Maharashtra (21 species); Goa (16 species); Karnataka (27 species); Kerala (74 species) and Lakshadweep (140 species). Recently, Parameswaran *et al.* (2017) listed 180 species of echinoderms from the Arabian Sea especially from southeastern areas. The echinoderm fauna of Gulf of Mannar of Tamil Nadu was studied by James (1966, 1967, 1973a&b, 1983, 1986a, b, c &d, 1987a&b, 1988a, 1989, 1991, 1997, 2001), James *et al.* (1988, 1993), James and James (1994), Uma (2001), Sakthivel (2000), Venkataraman *et al.* (2002), Chellaram *et al.* (2003), Sakthivel *et al.* (2005), Karuppaiyan (2007), Balaji *et al.* (2007), James (2008) and Maheswaran *et al.* (2016). From Andhra Pradesh coast, studies were made by Ganapati and Lakshmana Rao (1962a, b), Rao and Rao (1962), Radhakrishna and Ganapati (1968), Rao and Sowbhagyavathi (1972), Vijayakumar *et al.* (1991), and Sastry *et al.* (2012) while Nagabhushanam and Rao (1969)

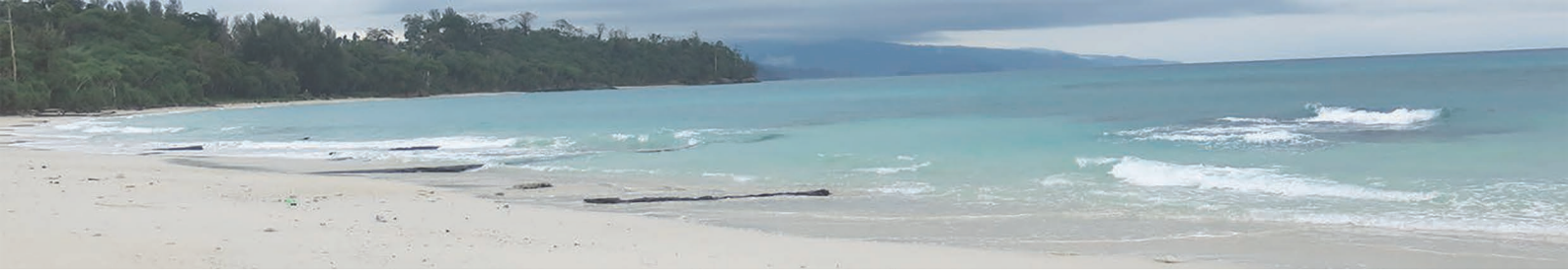
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and Sastry *et al.* (2012) made studies on echinoderms of Odisha coast. Puducherry coast was investigated by Satheeshkumar (2011) for sea urchin diversity.

RESULTS

A total of 440 species of echinoderms under 230 genera, 88 families and 31 orders are reported from the coasts of India (Table 1). The class-wise species occurrence includes-

Class Asteroidea (112 sp.), Class Holothuroidea (109 sp.), Class Ophiuroidea (101 sp.), Class Echinoidea (83 sp.) and Class Crinoidea (36 sp.) (Table 2). A maximum of 232 species of echinoderms are reported from Tamil Nadu coast and minimum numbers of 6 species are reported from Puducherry coast. This checklist is prepared based on available and published literature and the species names were validated from the WoRMS database.

Table 1: Echinoderms of Coasts of India

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Phylum ECHINODERMATA Bruguière, 1791 [ex Klein, 1734] Class CRINOIDEA Miller, 1821 Order COMATULIDA A.H. Clark, 1908 Family COMATULIDAE Fleming, 1828 Genus <i>Capillaster</i> AH Clark, 1909											
1	<i>Capillaster multiradiatus</i> (Linnaeus, 1758)					•						
	Genus <i>Comanthus</i> A.H. Clark, 1908											
2	<i>Comanthus parvicirrus</i> (Müller, 1841)					•						
3	<i>Comanthus wahlbergi</i> (Müller, 1843)						•					
	Genus <i>Comaster</i> L. Agassiz, 1836											
4	<i>Comaster multifidus</i> (Carpenter, 1881)					•						
5	<i>Comaster schlegelii</i> (Carpenter, 1881)											•
	Genus <i>Comatella</i> A.H. Clark, 1908											
6	<i>Comatella nigra</i> (Carpenter, 1876)											•
7	<i>Comatella stelligera</i> (Carpenter, 1888)					•				•		•
	Genus <i>Phanogenia</i> Lovén, 1866											
8	<i>Phanogenia distincta</i> (Carpenter, 1888)											•
9	<i>Phanogenia gracilis</i> (Hartlaub, 1893)					•						
10	<i>Phanogenia multibrachiata</i> (Carpenter, 1888)											•
	Family COLOBOMETRIDAE A.H. Clark, 1909 Genus <i>Cenometra</i> A.H. Clark, 1911											
11	<i>Cenometra bella</i> (Hartlaub, 1890)		•									
12	<i>Cenometra emendatrix</i> (Bell, 1892)					•						
	Genus <i>Oligometra</i> A.H. Clark, 1908											
13	<i>Oligometra serripinna</i> (Carpenter, 1881)		•	•		•				•		
	Family HIMEROMETRIDAE A.H. Clark, 1907 Genus <i>Amphimetra</i> A.H. Clark, 1909											
14	<i>Amphimetra mollerii</i> (A.H. Clark, 1908)					•						
	Genus <i>Heterometra</i> A.H. Clark, 1909											
15	<i>Heterometra compta</i> A.H. Clark, 1909									•		•
16	<i>Heterometra bengalensis</i> (Hartlaub, 1890)		•									
17	<i>Heterometra reynaudi</i> (Müller, 1846)		•	•		•						
18	<i>Heterometra philiberti</i> (Müller, 1849)			•								



Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Genus <i>Himerometra</i> A.H. Clark, 1907											
19	<i>Himerometra robustipinna</i> (Carpenter, 1881)											•
	Family MARIAMETRIDAE A.H. Clark, 1909 Genus <i>Dichrometra</i> A.H. Clark, 1909											
20	<i>Dichrometra ciliata</i> A.H. Clark, 1912		•									
	Genus <i>Lamprometra</i> A.H. Clark, 1913											
21	<i>Lamprometra palmata</i> (Müller, 1841)			•		•	•	•		•	•	
	Genus <i>Stephanometra</i> A.H. Clark, 1909											
22	<i>Stephanometra indica</i> (Smith, 1876)					•	•					
23	<i>Stephanometra tenuipinna</i> (Hartlaub, 1890)											•
	Family ANTEDONIDAE Norman, 1865 Genus <i>Athrypsometra</i> Messing & White, 2001											
24	<i>Athrypsometra mira</i> (A.H. Clark, 1909)										•	
	Genus <i>Euantedon</i> A.H. Clark, 1912											
25	<i>Euantedon</i> sp.						•					
	Genus <i>Fariometra</i> A.H. Clark, 1917											
26	<i>Fariometra obscura</i> (A.H. Clark, 1909)										•	
	Genus <i>Thaumatometra</i> A.H. Clark, 1908											
27	<i>Thaumatometra plana</i> (A.H. Clark, 1912)					•						
	Family CHARITOMETRIDAE A.H. Clark, 1909 Genus <i>Crinometra</i> A.H. Clark, 1909											
28	<i>Crinometra brevipinna</i> (Pourtalès, 1868)					•						
	Genus <i>Glyptometra</i> A.H. Clark, 1909											
29	<i>Glyptometra macilenta</i> (A.H. Clark, 1909)											•
	Family PENTAMETROCRINIDAE A.H. Clark, 1908 Genus <i>Thaumatocrinus</i> Carpenter, 1883											
30	<i>Thaumatocrinus investigatoris</i> (A.H. Clark & A.M. Clark, 1967)											•
31	<i>Thaumatocrinus</i> sp.											•
	Genus <i>Crotalometra</i> A.H. Clark, 1909											
32	<i>Crotalometra rustica</i> A.H. Clark, 1909					•						
33	<i>Crotalometra sentifera</i> A.H. Clark, 1909											•
	Genus <i>Stiremetra</i> A.H. Clark, 1909											
34	<i>Stiremetra carinifera</i> (A.H. Clark, 1912)										•	
	Family TROPIOMETRIDAE A.H. Clark, 1908 Genus <i>Tropiometra</i> A.H. Clark, 1907											
35	<i>Tropiometra carinata</i> (Lamarck, 1816)			•		•					•	
	Order ISOOCRINIDA Sieverts-Doreck, 1952 Family CAINOCRINIDAE Simms, 1988 Genus <i>Teliocrinus</i> Döderlein, 1912											
36	<i>Teliocrinus springeri</i> (A.H. Clark, 1909)								•	•		•

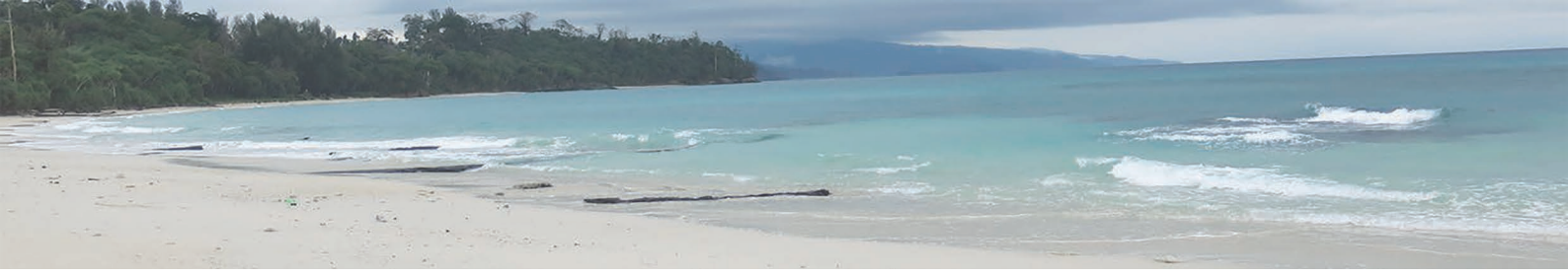


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Class ASTEROIDEA De Blainville, 1830 Order BRISINGIDA Fisher, 1928 Family BRISINGIDAE G.O. Sars, 1875 Genus <i>Brisinga</i> Asbjørnsen, 1856											
37	<i>Brisinga gunni</i> Alcock, 1893									•		
38	<i>Brisinga insularum</i> Wood-Mason and Alcock, 1891										•	
	Order FORCIPULATIDA Perrier, 1884 Family ZOROASTERIDAE Sladen, 1889 Genus <i>Cnemidaster</i> Sladen, 1889											
39	<i>Cnemidaster zea</i> (Alcock, 1893)					•						•
40	<i>Cnemidaster squameus</i> (Alcock, 1893)											•
	Genus <i>Zoroaster</i> Wyville Thomson, 1873											
41	<i>Zoroaster alfredi</i> Alcock, 1893			•		•						
42	<i>Zoroaster angulatus</i> Alcock, 1893					•						•
43	<i>Zoroaster barathri</i> Alcock, 1893			•		•						
44	<i>Zoroaster planus</i> Alcock, 1893											•
	Order PAXILLOSIDA Perrier, 1884 Family LUIDIIDAE Sladen, 1889 Genus <i>Luidia</i> Forbes, 1839											
45	<i>Luidia denudata</i> Koehler, 1910		•	•								
46	<i>Luidia hardwicki</i> (Gray, 1840)	•		•		•		•		•		
47	<i>Luidia maculata</i> Müller & Troschel, 1842		•			•	•					
48	<i>Luidia quinaria</i> von Martens, 1865		•			•				•		
	Family ASTROPECTINIDAE Gray, 1840 Genus <i>Astropecten</i> Gray, 1840											
49	<i>Astropecten bengalensis</i> Döderlein, 1917		•	•		•						
50	<i>Astropecten euryacanthus</i> Lutken, 1871	•		•		•						
51	<i>Astropecten griegi</i> Koehler, 1909										•	•
52	<i>Astropecten hemprichi</i> Müller & Troschel, 1842			•		•				•		
53	<i>Astropecten indicus</i> Döderlein, 1888	•	•	•		•	•				•	
54	<i>Astropecten inutilis</i> Koehler, 1910				•	•				•	•	
55	<i>Astropecten mauritanus</i> Gray, 1840					•						
56	<i>Astropecten monacanthus</i> Sladen, 1883		•	•		•						
57	<i>Astropecten polyacanthus</i> Müller & Troschel, 1842					•						
58	<i>Astropecten tamilicus</i> Döderlein, 1888					•				•		
59	<i>Astropecten vappa</i> Müller & Troschel, 1843		•	•		•	•					
60	<i>Astropecten velitaris</i> von Martens, 1865		•	•								
	Genus <i>Craspidaster</i> Sladen, 1889											
61	<i>Craspidaster hesperus</i> (Müller and Troschel, 1840)		•	•		•						
	Genus <i>Persephonaster</i> Wood-Mason & Alcock, 1891											
62	<i>Persephonaster croceus</i> Wood-Mason & Alcock, 1891					•						



Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
63	<i>Persephonaster rhodopeplus</i> Wood-Mason & Alcock, 1891					•						•
	Genus <i>Psilaster</i> Sladen, 1885											
64	<i>Psilaster agassizi</i> (Koehler, 1909)					•					•	•
	Family PORCELLANASTERIDAE Sladen, 1883 Genus <i>Porcellanaster</i> Wyville Thomson, 1878											
65	<i>Porcellanaster ceruleus</i> Wyville Thomson, 1878											•
	Genus <i>Sidonaster</i> Koehler, 1909											
66	<i>Sidonaster vaneyi</i> Koehler, 1909								•	•		
	Family GONIOPECTINIDAE Verrill, 1889 Genus <i>Goniopecten</i> Perrier, 1881											
67	<i>Goniopecten</i> sp.	•				•						
	Family PSEUDARCHASTERIDAE Sladen, 1889 Genus <i>Pseudarchaster</i> Sladen, 1889											
68	<i>Pseudarchaster jordani</i> Fisher, 1906										•	
69	<i>Pseudarchaster mozaicus</i> Wood-Mason & Alcock, 1891			•		•						
70	<i>Pseudarchaster roseus</i> (Alcock, 1891)											•
	Order SPINULOSIDA Perrier, 1884 Family ECHINASTERIDAE Verrill, 1867 Genus <i>Echinaster</i> Müller & Troschel, 1840											
71	<i>Echinaster luzonicus</i> (Gray, 1840)					•	•					•
72	<i>Echinaster superbus</i> H.L. Clark, 1916					•						
73	<i>Echinaster purpureus</i> (Gray, 1840)		•	•		•	•					
	Genus <i>Metrodira</i> Gray, 1840											
74	<i>Metrodira subulata</i> Gray, 1840		•			•						
	Order NOTOMYOTIDA Ludwig, 1910 Family BENTHOPECTINIDAE Verrill, 1899 Genus <i>Benthopecten</i> Verrill, 1884											
75	<i>Benthopecten huddlestonii</i> (Alcock, 1893)	•										
76	<i>Benthopecten indicus</i> (Koehler, 1909)					•						
77	<i>Benthopecten violaceus</i> (Alcock, 1893)											•
	Genus <i>Cheiraster</i> Studer, 1883											
78	<i>Cheiraster cribellum</i> (Alcock, 1893)											•
79	<i>Cheiraster (Cheiraster) pilosus</i> (Alcock, 1893)					•						•
	Genus <i>Pectinaster</i> Perrier, 1885											
80	<i>Pectinaster mimicus</i> (Sladen, 1889)				•						•	
	Order VELATIDA Perrier, 1884 Family ASTERINIDAE Gray, 1840 Genus <i>Anseropoda</i> Nardo, 1834											
81	<i>Anseropoda ludovici</i> (Koehler, 1909)										•	
82	<i>Anseropoda insignis</i> Fisher, 1906					•						
83	<i>Anseropoda pellucida</i> (Alcock, 1893)					•						

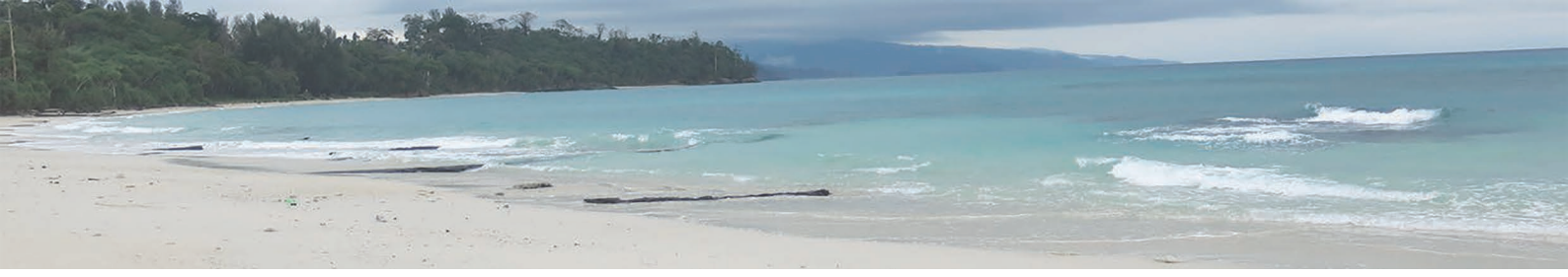


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Genus <i>Aquilonastra</i> O'Loughlin in O'Loughlin & Waters, 2004											
84	<i>Aquilonastra burtoni</i> (Gray, 1840)					•	•					•
85	<i>Aquilonastra cepheus</i> (Müller & Troschel, 1842)					•	•			•		•
86	<i>Aquilonastra coronata</i> (von Martens, 1866)			•		•						
	Genus <i>Asterina</i> Nardo, 1834											
87	<i>Asterina lorioli</i> Koehler, 1910			•		•	•	•				
	Genus <i>Indianastra</i> O'Loughlin in O'Loughlin & Waters, 2004											
88	<i>Indianastra sarasini</i> (deLoriol, 1897)					•						
	Genus <i>Cryptasterina</i> Dartnall, Byrne, Collins & Hart, 2003											
89	<i>Cryptasterina pentagona</i> (Müller & Troschel, 1842)											•
	Genus <i>Disasterina</i> Perrier, 1875											
90	<i>Disasterina ceylanica</i> Döderlein, 1888					•						•
	Genus <i>Tegulaster</i> Livingstone, 1933											
91	<i>Tegulaster leptalacantha</i> (H.L. Clark, 1916)											•
	Family ASTERODISCIDIDAE Rowe, 1977 Genus <i>Asterodiscides</i> A.M. Clark, 1974											
92	<i>Asterodiscides elegans</i> (Gray, 1847)					•						
	Family GONIASTERIDAE Forbes, 1841 Genus <i>Astroceramus</i> Fisher, 1906											
93	<i>Astroceramus fisheri</i> Koehler, 1909										•	
	Genus <i>Ceramaster</i> Verrill, 1899											
94	<i>Ceramaster cuenoti</i> (Koehler, 1909)										•	
	Genus <i>Circeaster</i> Koehler, 1909											
95	<i>Circeaster magdalenae</i> Koehler, 1909							•	•			
96	<i>Circeaster marcelii</i> Koehler, 1909										•	
	Genus <i>Calliaster</i> Gray, 1840											
97	<i>Calliaster childreni</i> Gray, 1840					•						
98	<i>Calliaster mamillifer</i> Alcock, 1893					•						
	Genus <i>Fromia</i> Gray, 1840											
99	<i>Fromia indica</i> (Perrier, 1869)					•						•
100	<i>Fromia milleporella</i> (Lamarck, 1816)					•						•
101	<i>Fromia monilis</i> (Perrier, 1869)											•
102	<i>Fromia nodosa</i> A.M. Clark, 1967											•
103	<i>Fromia pacifica</i> H.L. Clark, 1921											•
	Genus <i>Goniodiscaster</i> H.L. Clark, 1909											
104	<i>Goniodiscaster forficulatus</i> (Perrier, 1875)			•		•						
105	<i>Goniodiscaster scaber</i> (Moebius, 1859)					•						
106	<i>Goniodiscaster vallei</i> (Koehler, 1910)	•	•			•						
	Genus <i>Johannaster</i> Koehler, 1909											
107	<i>Johannaster superbus</i> Koehler, 1909					•			•			

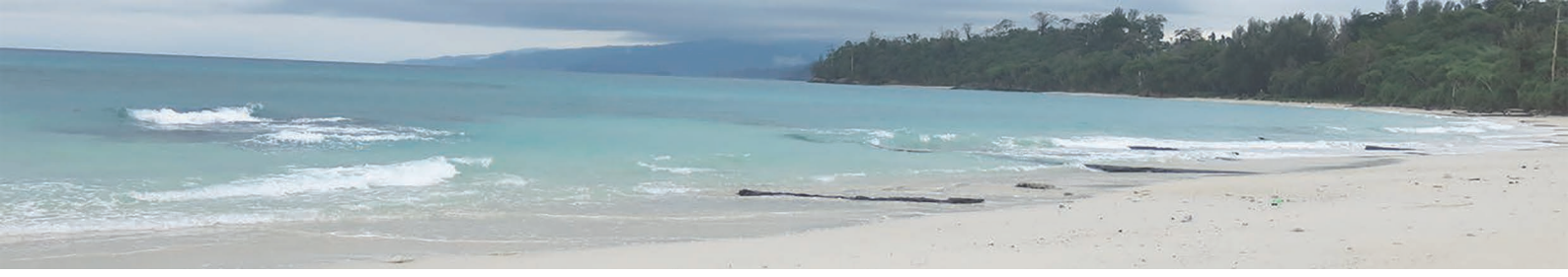


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Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Genus <i>Nymphaster</i> Sladen, 1889											
108	<i>Nymphaster moebii</i> (Studer, 1884)					•						•
	Genus <i>Litonotaster</i> Verrill, 1899											
109	<i>Litonotaster intermedius</i> (Perrier, 1884)											•
	Genus <i>Pseudoceramaster</i> Jangoux, 1981											
110	<i>Pseudoceramaster pulvinus</i> (Alcock 1893)											•
	Genus <i>Pseudarchaster</i> Sladen, 1889											
111	<i>Pseudarchaster roseus</i> (Alcock, 1893)											•
	Genus <i>Pillsburiaster</i> Halpern, 1970											
112	<i>Pillsburiaster döderleini</i> (Koehler, 1910)											•
113	<i>Pillsburiaster investigatoris</i> (Alcock, 1893)			•								
	Genus <i>Paraferdina</i> James, 1973											
114	<i>Paraferdina laccadivensis</i> (James, 1976)											•
	Genus <i>Siraster</i> H.L. Clark, 1915											
115	<i>Siraster tuberculatus</i> H.L. Clark, 1915					•						•
	Genus <i>Stellaster</i> Gray, 1840											
116	<i>Stellaster childreni</i> Gray, 1840		•	•	•							
	Family OREASTERIDAE Fisher, 1908 Genus <i>Anthenea</i> Gray, 1840											
117	<i>Anthenea pentagonula</i> (Lamarck, 1816)		•	•	•	•						
118	<i>Anthenea regalis</i> Koehler, 1910					•						
119	<i>Anthenea tuberculosa</i> Gray, 1847					•						
	Genus <i>Choriaster</i> Lütken, 1869											
120	<i>Choriaster granulatus</i> Lütken, 1869											•
	Genus <i>Culcita</i> Agassiz, 1836											
121	<i>Culcita novaeguineae</i> Müller & Troschel, 1842					•						•
122	<i>Culcita schmideliana</i> (Bruzelius, 1805)					•						•
	Genus <i>Halityle</i> Fisher, 1913											
123	<i>Halityle regularis</i> Fisher, 1913					•						•
	Genus <i>Pentaceraster</i> Döderlein, 1916											
124	<i>Pentaceraster affinis</i> (Müller & Troschel, 1842)			•	•							
125	<i>Pentaceraster gracilis</i> (Lütken, 1871)											
126	<i>Pentaceraster horridus</i> (Gray, 1840)					•						
127	<i>Pentaceraster mammillatus</i> (Audouin, 1826)					•						
128	<i>Pentaceraster multispinus</i> (von Martens, 1866)					•						
129	<i>Pentaceraster regulus</i> (Müller & Troschel, 1842)					•						•
	Genus <i>Poraster</i> Döderlein, 1916											
130	<i>Poraster superbus</i> (Möbius, 1859)					•						
	Genus <i>Protoreaster</i> Döderlein, 1916											
131	<i>Protoreaster lincki</i> (Blainville, 1830)					•						

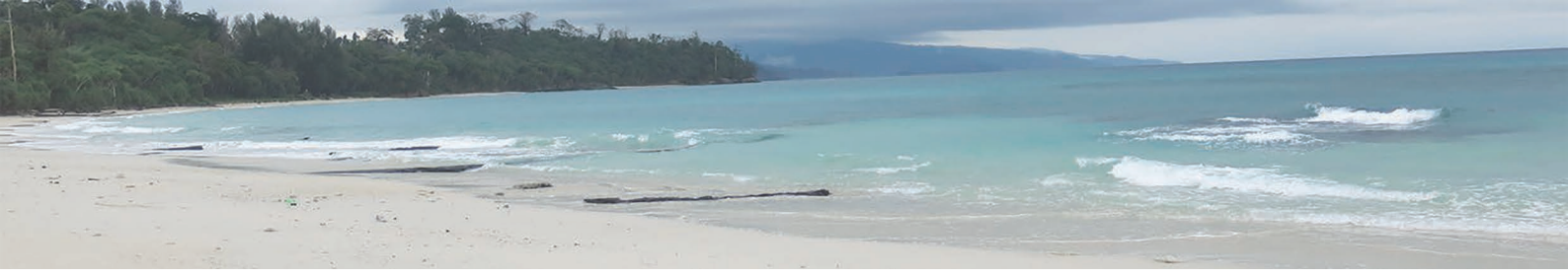


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Family ASTEROPSEIDAE Hotchkiss & Clark, 1976 Genus <i>Asteropsis</i> Müller & Troschel, 1840											
132	<i>Asteropsis carinifera</i> (Lamarck, 1816)											•
	Family ACANTHASTERIDAE Sladen, 1889 Genus <i>Acanthaster</i> Gervais, 1841											
133	<i>Acanthaster planci</i> (Linneaus, 1758)								•			•
	Family OPHIDIASTERIDAE Verrill, 1870 Genus <i>Andora</i> A.M. Clark, 1967											
134	<i>Andora faouzii</i> (Macan, 1938)					•						
	Genus <i>Certonardoa</i> H.L. Clark, 1921											
135	<i>Certonardoa semiregularis</i> (Muller and Troschel, 1842)										•	
	Genus <i>Cistina</i> Gray, 1840											
136	<i>Cistina columbiae</i> (Gray, 1840)											•
	Genus <i>Dactylosaster</i> Gray, 1840											
137	<i>Dactylosaster cylindricus</i> (Lamarck, 1816)					•						•
	Genus <i>Leiaster</i> Peters, 1852											
138	<i>Leiaster leachi</i> (Gray, 1840)											•
	Genus <i>Linckia</i> Nardo, 1834											
139	<i>Linckia guildingi</i> (Gray, 1840)					•						•
140	<i>Linckia laevigata</i> (Linneaus, 1758)					•						•
141	<i>Linckia multifora</i> (Lamarck, 1816)					•						•
	Genus <i>Nardoa</i> Gray, 1840											
142	<i>Nardoa frianti</i> Koehler, 1910					•						•
143	<i>Nardoa galathea</i> (Lütken, 1865)					•						
144	<i>Nardoa novaecaledoniae</i> (Perrier, 1875)					•						•
145	<i>Nardoa variolata</i> (Retzius, 1805)					•						
	Genus <i>Tamaria</i> Gray, 1840											
146	<i>Tamaria dubiosa</i> (Koehler, 1910)					•						
147	<i>Tamaria megaloplax</i> (Bell, 1884)					•						
	Family PTERASTERIDAE Perrier, 1875 Genus <i>Euretaster</i> Fisher, 1940											
148	<i>Euretaster cribrosus</i> (von Martens, 1867)					•						
	Class OPHIUROIDEA Gray, 1840 Order EURYALIDA Lamarck, 1816 Family ASTERONYCHIDAE Ljungman, 1867 Genus <i>Asteronyx</i> Müller & Troschel, 1842											
149	<i>Asteronyx loveni</i> Müller & Troschel, 1842											•
	Family EURYALIDAE Gray, 1840 Genus <i>Asteroschema</i> Örstedt & Lütken in Lütken, 1856											
150	<i>Asteroschema flosculus</i> Alcock, 1893			•								
151	<i>Asteroschema sampadae</i> Parameswaran & Jaleel, 2012										•	



Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
Family GORGONOCEPHALIDAE Ljungman, 1867 Genus <i>Astroboa</i> Döderlein, 1911												
152	<i>Astroboa clavata</i> (Lyman, 1861)					•						
153	<i>Astroba nuda</i> (Lyman, 1874)					•						
Order OPHIURIDA Müller & Troschel, 1840 Genus <i>Ophiomastus</i> Lyman, 1878												
154	<i>Ophiomastus tumidus</i> Koehler, 1897			•								
Genus <i>Ophiotrochus</i> Lyman, 1878												
155	<i>Ophiotrochus panniculus</i> Lyman, 1878											•
Family OPHIOMYXIDAE Ljungman, 1867 Genus <i>Ophiomyxa</i> Müller & Troschel, 1840												
156	<i>Ophiomyxa australis</i> Lütken, 1869		•			•						•
Family OPHIURIDAE Müller & Troschel, 1840 Genus <i>Ophiura</i> Lamarck, 1801												
157	<i>Ophiura aequalis</i> (Lyman, 1878)											•
158	<i>Ophiura kinbergi</i> Ljungman, 1866		•	•							•	
159	<i>Ophiura undulata</i> (Lyman, 1878)									•		
160	<i>Ophiura (Ophiuroglypha) irrorata irrorata</i> (Lyman, 1878)											•
Family OPHIOSPHALMIDAE O'Hara, Stöhr, Hugall, Thuy & Martynov, 2018 Genus <i>Ophiosphalma</i> H.L. Clark, 1941												
161	<i>Ophiosphalma elegans</i> (Koehler, 1897)										•	
162	<i>Ophiosphalma familiare</i> (Koehler, 1897)										•	
163	<i>Ophiosphalma glabrum</i> (Lütken & Mortensen, 1899)			•								
Family OPHIOMUSAIDAE O'Hara, Stöhr, Hugall, Thuy, Martynov, 2018 Genus <i>Ophiomusa</i> Hertz, 1927												
164	<i>Ophiomusa valida</i> (Ljungman, 1872)											•
Family OPHIOPYRGIDAE Perrier, 1893 Genus <i>Amphiophiura</i> Matsumoto, 1915												
165	<i>Amphiophiura paupera</i> (Koehler, 1897)											•
166	<i>Amphiophiura radiata</i> (Lyman, 1878)											•
Genus <i>Ophiopyrgus</i> Lyman, 1878												
167	<i>Ophiopyrgus alcocki</i> Koehler, 1897			•								
Order OPHIOLEUCIDA O'Hara, Hugall, Thuy, Stöhr & Martynov, 2017 Family OPHIERNIDAE O'Hara, Stöhr, Hugall, Thuy & Martynov, 2018 Genus <i>Ophiernus</i> Lyman, 1878												
168	<i>Ophiernus adspersus adspersus</i> Lyman, 1883					•					•	
Order AMPHILEPIDIDA O'Hara, Hugall, Thuy, Stöhr & Martynov, 2017 Family AMPHIURIDAE Ljungman, 1867 Genus <i>Amphioplus</i> Verrill, 1899												
169	<i>Amphioplus cyrtacanthus</i> H.L. Clark, 1915			•			•					
170	<i>Amphioplus dispar</i> (Koehler, 1897)											•
171	<i>Amphioplus gravelyi</i> James, 1970					•						

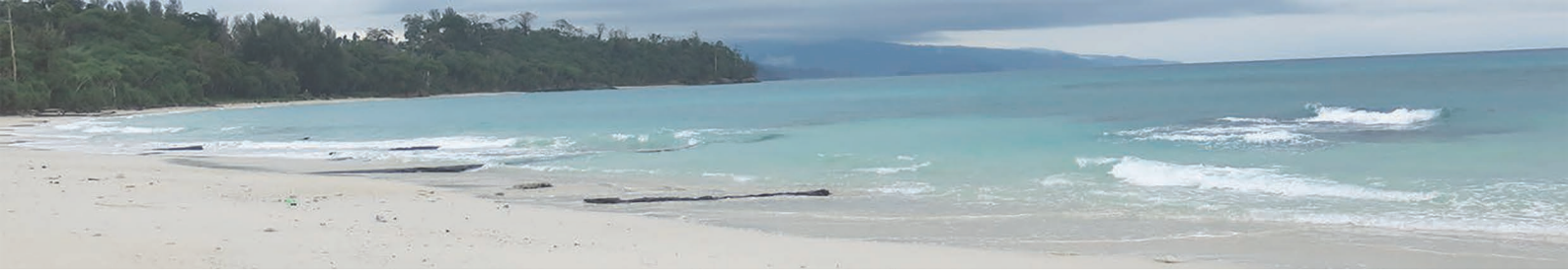


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
172	<i>Amphioplus (Lymanella) andreae</i> (Lütken, 1872)			•								
173	<i>Amphioplus (Lymanella) depressus</i> (Ljungman, 1867)		•	•							•	
174	<i>Amphioplus (Lymanella) hastatus</i> (Ljungman, 1867)	•		•								
175	<i>Amphioplus (Lymanella) laevis</i> (Lyman, 1874)	•					•					
176	<i>Amphioplus (Unioplus) caulleryi</i> (Koehler, 1897)			•								
	Genus Amphipholis Ljungman, 1866											
177	<i>Amphipholis squamata</i> (Delle Chiaje, 1828)					•	•					•
178	<i>Amphioplus gravelyi</i> James, 1970					•						
	Genus Amphiura Forbes, 1843											
179	<i>Amphiura (Amphiura) ambigua</i> (Koehler, 1905)						•					
180	<i>Amphiura (Amphiura) lorioli</i> (Koehler, 1897)										•	•
181	<i>Amphiura (Amphiura) micra</i> H.L. Clark, 1938					•						
182	<i>Amphiura (Ophiopeltis) tenuis</i> (H.L. Clark, 1938)	•										
	Genus Ophiocentrus Ljungman, 1867											
183	<i>Ophiocentrus verticillatus</i> (Döderlein, 1896)			•								
	Genus Dougaloplus A.M. Clark, 1970											
184	<i>Dougaloplus echinatus</i> (Ljungman, 1867)		•			•						
	Family HEMIEURYALIDAE Verrill, 1899 Genus Ophioplocus Lyman, 1861											
185	<i>Ophioplocus imbricatus</i> (Müller and Troschel, 1842)											
	Family OPHIACTIDAE Matsumoto, 1915 Genus Ophiactis Lütken, 1856											
186	<i>Ophiactis brachyura</i> Döderlein, 1898						•					
187	<i>Ophiactis flexuosa</i> Lyman, 1879										•	
188	<i>Ophiactis delagoa</i> J.B. Balinsky, 1957	•										
189	<i>Ophiactis modesta</i> Brock, 1888	•		•		•	•					
190	<i>Ophiactis savignyi</i> (Müller and Troschel, 1842)		•	•		•						•
	Family OPHIONEREIDIDAE Ljungman, 1867 Genus Ophiochiton Lyman, 1878											
191	<i>Ophiochiton ambulator</i> Koehler, 1897		•	•							•	
	Genus Ophionereis Lütken, 1859											
192	<i>Ophionereis dubia dubia</i> (Müller & Troschel, 1842)			•		•	•	•				
193	<i>Ophionereis porrecta</i> Lyman, 1860											•
	Family OPHIOLEPIDIDAE Ljungman, 1867 (restricted) Genus Ophiolepis Müller & Troschel, 1840											
194	<i>Ophiolepis superba</i> H.L. Clark, 1915											•
195	<i>Ophiolepis cincta cincta</i> Müller & Troschel, 1842											•
	Family OPHIOTHAMNIDAE O'Hara, Stöhr, Hugall, Thuy & Martynov, 2018 Genus Histampica A.M. Clark, 1970											
196	<i>Histampica duplicata</i> (Lyman, 1875)											•

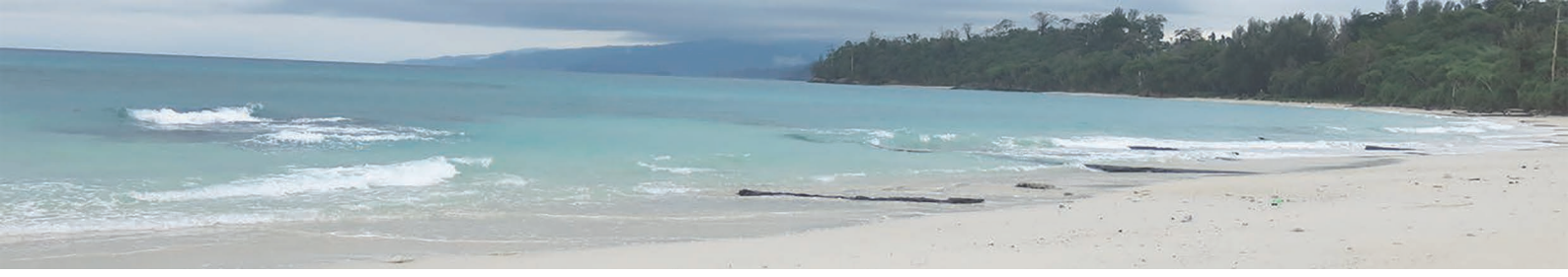


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Family OPHIOTRICHIDAE Ljungman, 1867 Genus Gymnolophus Brock, 1888											
197	<i>Gymnolophus obscura</i> (Ljungman, 1969)					•						
	Genus Macrophiothrix H.L. Clark, 1938											
198	<i>Macrophiothrix aspidota</i> (Müller & Troschel, 1842)			•		•	•	•			•	
199	<i>Macrophiothrix demessa</i> (Lyman, 1861)											•
200	<i>Macrophiothrix hirsuta</i> (Müller and Troschel, 1842)		•			•						
201	<i>Macrophiothrix longipeda</i> (Lamarck, 1816)	•	•	•		•						•
202	<i>Macrophiothrix nereidina</i> (Lamarck, 1816)					•						•
203	<i>Macrophiothrix propinqua</i> (Lyman, 1861)											•
204	<i>Macrophiothrix striolata</i> (Grube, 1868)		•									
205	<i>Macrophiothrix variabilis</i> (Duncan, 1887)					•						
	Genus Ophiothrix Müller & Troschel, 1840											
206	<i>Ophiothrix (Acanthophiothrix) proteus</i> Koehler, 1905					•						
207	<i>Ophiothrix (Acanthophiothrix) purpurea</i> von Martens, 1867											•
208	<i>Ophiothrix (Acanthophiothrix) vigelandi</i> A.M. Clark, 1968											•
209	<i>Ophiothrix (Ophiothrix) trilineata</i> Lütken, 1869											•
210	<i>Ophiothrix (Ophiothrix) accedens</i> Koehler, 1930					•						
211	<i>Ophiothrix (Ophiothrix) aristulata</i> Lyman, 1879			•								
212	<i>Ophiothrix (Ophiothrix) ciliaris</i> (Lamarck, 1816)		•									
213	<i>Ophiothrix (Ophiothrix) exigua</i> Lyman, 1874					•						
214	<i>Ophiothrix (Ophiothrix) foveolata</i> Marktanner-Turneretscher, 1887		•				•					
215	<i>Ophiothrix (Ophiothrix) savignyi</i> (Müller & Troschel, 1842)										•	
216	<i>Ophiothrix (Ophiothrix) vitrea</i> Döderlein, 1896										•	
217	<i>Ophiothrix marginata</i> Koehler, 1905											•
218	<i>Ophiothrix variegata</i> Duncan, 1887					•						
	Genus Ophiocnemis Müller & Troschel, 1842											
219	<i>Ophiocnemis marmorata</i> (Lamarck, 1816)	•		•		•						
	Genus Ophiogymna Ljungman, 1866											
220	<i>Ophiogymna elegans</i> Ljungman, 1866					•						
221	<i>Ophiogymna lineata</i> H.L. Clark, 1938					•						
222	<i>Ophiogymna pellicula</i> (Duncan, 1887)		•	•								
	Genus Ophiomaza Lyman, 1871											
223	<i>Ophiomaza cacaotica</i> Lyman, 1871					•						
	Genus Ophiopsammium Lyman, 1874											
224	<i>Ophiopsammium semperi</i> Lyman, 1874					•						
	Genus Ophiothela Verrill, 1867											
225	<i>Ophiothela danae</i> Verill, 1869		•	•		•		•				
	Order OPHIACANTHIDA O'Hara, Hugall, Thuy, Stöhr & Martynov, 2017 Family OPHIACANTHIDA incertae sedis Genus Ophiodyscrita H.L. Clark, 1938											
226	<i>Ophiodyscrita acosmeta</i> H.L. Clark, 1938						•				•	

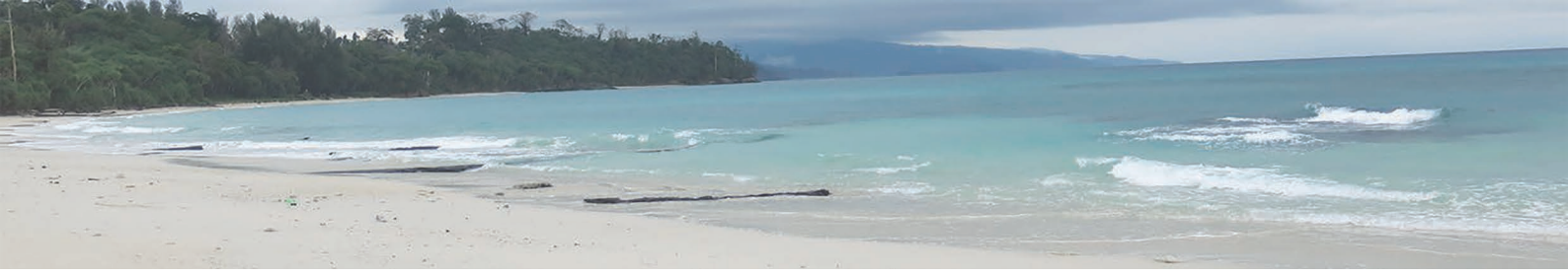


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Family OPHIACANTHIDAE Ljungman, 1867 Genus <i>Ophiacantha</i> Müller & Troschel, 1842											
227	<i>Ophiacantha vagans</i> Koehler, 1898		•									
228	<i>Ophiacantha vorax</i> Koehler, 1897										•	
	Genus <i>Ophiomoeris</i> Koehler, 1904											
229	<i>Ophiomoeris tenera</i> (Koehler, 1897)									•	•	
	Genus <i>Ophioplinthaca</i> Verrill, 1899											
230	<i>Ophioplinthaca rudis</i> (Koehler, 1897)											•
	Family OPHIOTOMIDAE Paterson, 1985 Genus <i>Ophiopristis</i> Verrill, 1899											
231	<i>Ophiopristis vestita</i> (Koehler, 1897)			•								
	Genus <i>Ophiotreta</i> Verrill, 1899											
232	<i>Ophiotreta matura</i> (Koehler, 1904)											•
	Family OPHIOCOMIDAE Ljungman, 1867 Genus <i>Breviturma</i> Stöhr, Boissin & Hoareau, 2013											
233	<i>Breviturma brevipes</i> (Peters, 1851)					•						•
234	<i>Breviturma dentata</i> (Müller & Troschel, 1842)					•						•
235	<i>Breviturma pica</i> (Müller & Troschel, 1842)											•
236	<i>Breviturma longispina</i> (H.L. Clark, 1917)											•
	Genus <i>Ophiocoma</i> L. Agassiz, 1836											
237	<i>Ophiocoma anaglyptica</i> Ely, 1944											•
238	<i>Ophiocoma erinaceus</i> Müller & Troschel, 1842					•						•
239	<i>Ophiocoma scolopendrina</i> (Lamarck, 1816)					•						•
	Genus <i>Ophiocomella</i> A.H. Clark, 1939											
240	<i>Ophiocomella valenciae</i> (Müller & Troschel, 1842)											•
241	<i>Ophiocomella sexradia</i> (Duncan, 1887)					•	•					•
	Genus <i>Ophiomastix</i> Müller & Troschel, 1842											
242	<i>Ophiomastix annulosa</i> (Lamarck, 1816)											•
243	<i>Ophiomastix elegans</i> (Peters, 1851)											•
	Family OPHIODERMATIDAE Ljungman, 1867 Genus <i>Bathypectinura</i> H.L. Clark, 1909											
244	<i>Bathypectinura heros</i> (Lyman, 1879)			•								•
	Genus <i>Indophioderma</i> Sastry, Marimuthu & Rajan, 2019											
245	<i>Indophioderma ganapatii</i> Sastry, Maramuthu & Rajan, 2019											•
	Genus <i>Ophiopeza</i> Peters, 1851											
246	<i>Ophiopeza fallax arbacia</i> (A.M. Clark, 1968)						•					
	Genus <i>Ophiarachnella</i> Ljungman, 1872											
247	<i>Ophiarachnella gorgonia</i> (Müller and Troschel, 1842)					•						
248	<i>Ophiarachnella infernalis</i> (Müller and Troschel, 1842)					•						
249	<i>Ophiarachnella sphenisci</i> (Bell, 1894)					•						



Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Class ECHINOIDEA Leske, 1778 Order CIDAROIDA Claus, 1880 Family CIDARIDAE Gray, 1825 Genus <i>Eucidaris</i> Pomel, 1883											
250	<i>Eucidaris metularia</i> (Lamarck, 1816)										•	•
	Genus <i>Stereocidaris</i> Pomel, 1883											
251	<i>Stereocidaris alcocki</i> (Anderson, 1894)		•							•		•
	Genus <i>Prionocidaris</i> A. Agassiz, 1863											
252	<i>Prionocidaris baculosa</i> (Lamarck, 1816)			•		•						•
	Genus <i>Plococidaris</i> Mortensen, 1909											
253	<i>Plococidaris verticillata</i> (Lamarck, 1816)											•
	Genus <i>Stylocidaris</i> Mortensen, 1909											
254	<i>Stylocidaris tiara</i> (Anderson, 1894)											•
	Family HISTOCIDARIDAE Lambert, 1900 Genus <i>Histocidaris</i> Mortensen, 1903											
255	<i>Histocidaris denticulata</i> Koehler, 1927										•	
	Order ECHINOTHURIOIDA Claus, 1880 Family ECHINOTHURIIDAE Thomson, 1872 Genus <i>Hygrosoma</i> Mortensen, 1903											
256	<i>Hygrosoma luculentum</i> (A. Agassiz, 1879)											•
	Family PHORMOSOMATIDAE Mortensen, 1934 Genus <i>Phormosoma</i> Thomson, 1872											
257	<i>Phormosoma bursarium</i> A. Agassiz, 1881			•		•				•	•	•
258	<i>Phormosoma verticillatum</i> Mortensen, 1904											•
	Order DIADEMATOIDA Duncan, 1889 Family DIADEMATIDAE Gray, 1855 Genus <i>Astropyga</i> Gray, 1825											
259	<i>Astropyga radiata</i> (Leske, 1778)		•			•						•
	Genus <i>Chaetodiadema</i> Mortensen, 1903											
260	<i>Chaetodiadema granulatum</i> Mortensen, 1903	•	•	•								
	Genus <i>Diadema</i> Gray, 1825											
261	<i>Diadema savignyi</i> (Audouin, 1829)											•
262	<i>Diadema setosum</i> (Leske, 1758)											•
	Genus <i>Echinothrix</i> Peters, 1853											
263	<i>Echinothrix calamaris</i> (Pallas, 1774)			•								•
264	<i>Echinothrix diadema</i> (Linnaeus, 1758)					•						•
	Order SELENIOIDA Delage & Hérouard, 1903 Family SALENIIDAE L. Agassiz, 1838 Genus <i>Salenocidaris</i> A. Agassiz, 1869											
265	<i>Salenocidaris miliaris indica</i> Mortensen, 1939											•
	Order CAMARODONTA Jackson, 1912 Family ECHINOMETRIDAE Gray, 1855 Genus <i>Echinometra</i> Gray, 1825											
266	<i>Echinometra mathaei</i> (de Blainvillae, 1825)			•		•						•

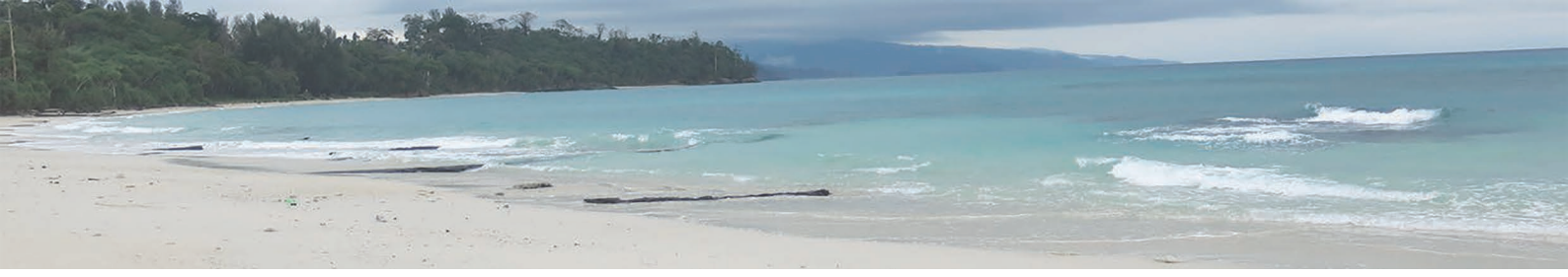


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Genus <i>Echinostrephus</i> A. Agassiz, 1863											
267	<i>Echinostrephus molaris</i> (de Blainvillae, 1825)							•				•
	Genus <i>Heterocentrotus</i> Brandt, 1835											
268	<i>Heterocentrotus mammilatus</i> (Linneaus, 1758)											•
	Family TEMNOPLEURIDAE A. Agassiz, 1872 Genus <i>Mespilia</i> Desor in Agassiz & Desor, 1846											
269	<i>Mespilia globulus</i> (Linneaus, 1758)											•
	Genus <i>Salmacis</i> L. Agassiz, 1841											
270	<i>Salmacis bicolor</i> L. Agassiz in L. Agassiz & Desor, 1846		•	•		•	•			•		•
271	<i>Salmacis virgulata</i> (L. Agassiz in L. Agassiz & Desor, 1846)			•	•	•						•
	Genus <i>Salmaciella</i> Mortensen, 1942											
272	<i>Salmaciella dussumieri</i> (L. Agassiz in L. Agassiz & Desor, 1846)		•	•	•	•						
	Genus <i>Temnopleurus</i> L. Agassiz, 1841											
273	<i>Temnopleurus alexandri</i> (Bell, 1884)					•						
274	<i>Temnopleurus decipiens</i> (de Meijere, 1904)								•			
275	<i>Temnopleurus hardwickii</i> (Gray, 1855)					•						
276	<i>Temnopleurus toreumaticus</i> (Leske, 1778)		•	•		•	•	•	•	•		
	Family TOXOPNEUSTIDAE Troschel, 1872 Genus <i>Gymnechinus</i> Mortensen, 1903											
277	<i>Gymnechinus robillardii</i> (de Loriol, 1883)				•	•						
	Genus <i>Pseudoboletia</i> Troschel, 1869											
278	<i>Pseudoboletia maculata</i> Troschel, 1869					•						•
	Genus <i>Toxopneustes</i> L. Agassiz, 1841											
279	<i>Toxopneustes pileolus</i> (Lamarck, 1816)					•						•
	Genus <i>Tripneustes</i> L. Agassiz, 1841											
280	<i>Tripneustes gratilla</i> (Linneaus, 1758)			•		•						•
	Order STOMOPNEUSTOIDA Kroh & Smith, 2010 Family STOMEPENEUSTIDAE Mortensen, 1903 Genus <i>Stomopneustes</i> L. Agassiz, 1841											
281	<i>Stomopneustes variolaris</i> (Lamarck, 1816)			•		•	•			•		•
	Order SPATANGOIDA L. Agassiz, 1840 Family HEMIASTERIDAE H. L. Clark, 1917 Genus <i>Holanthus</i> Lambert & Thiéry, 1924											
282	<i>Holanthus vanus</i> (Koehler, 1914)			•					•			
	Family BRISSIDAE Gray, 1855 Genus <i>Brissus</i> Gray, 1825											
283	<i>Brissus latecarinatus</i> (Leske, 1778)					•						•
	Genus <i>Brissopsis</i> L. Agassiz, 1840											
284	<i>Brissopsis luzonica</i> (Gray, 1851)		•	•		•					•	
285	<i>Brissopsis oldhami</i> Alcock, 1893			•							•	
	Genus <i>Metalia</i> Gray, 1855											
286	<i>Metalia latissima</i> H.L. Clark, 1925					•						

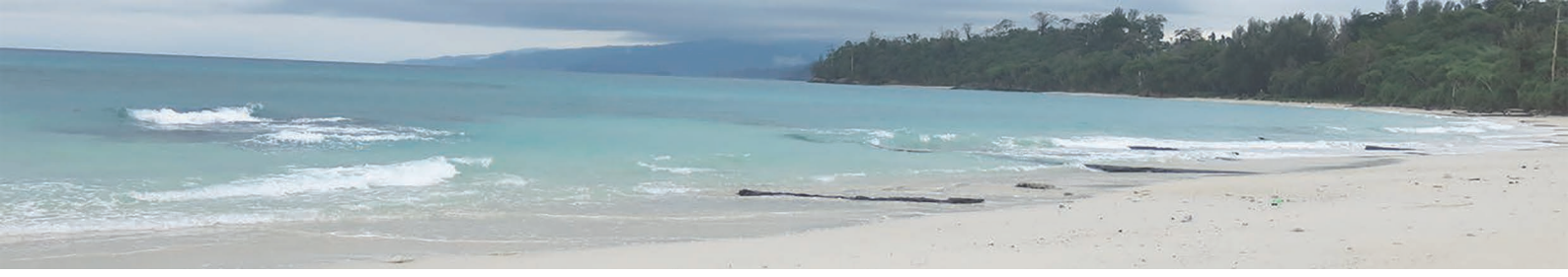


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
287	<i>Metalia spatagus</i> (Linnaeus, 1758)											•
288	<i>Metalia sternalis</i> (Lamarck, 1816)			•		•						
	Genus Rhynobrissus A. Agassiz, 1872											
289	<i>Rhynobrissus pyramidalis</i> A. Agassiz, 1872		•			•						
	Family EURYPATAGIDAE Kroh, 2007 Genus Elipneustes Koehler, 1914											
290	<i>Elipneustes denudatus</i> (Koehler, 1914)					•						
291	<i>Elipneustes rubens</i> (Koehler, 1914)										•	•
	Genus Linopneustes A. Agassiz, 1881											
292	<i>Linopneustes spectabilis</i> (de Meijere, 1902)										•	•
	Family LOVENIIDAE Lambert, 1905 Genus Lovenia Desor in Agassiz & Desor, 1847											
293	<i>Lovenia elongata</i> (Gray, 1845)			•		•						
294	<i>Lovenia subcarinata</i> Gray, 1851		•									
	Family MARETIIDAE Lambert, 1905 Genus Maretia Gray, 1855											
295	<i>Maretia planulata</i> (Lamarck, 1816)					•						
	Genus Nacospatangus A. Agassiz, 1873											
296	<i>Nacospatangus alta</i> (A. Agassiz, 1864)		•	•		•				•		
	Family PALAEOTROPIDAE Lambert, 1896 Genus Paleotrema Koehler, 1914											
297	<i>Paleotrema ovatum</i> (Koehler, 1914)					•						
	Family PALEOPNEUSTINA incertae sedis B Genus Heterobrissus Manzoni & Mazzetti, 1878											
298	<i>Heterobrissus hemingi</i> (Anderson, 1902)										•	
	Family SCHIZASTERIDAE Lambert, 1905 Genus Hypselaster H.L. Clark, 1917											
299	<i>Hypselaster kempii</i> (Koehler, 1914)										•	•
	Genus Schizaster L. Agassiz, 1835											
300	<i>Schizaster angulatus</i> (Koehler, 1914)							•				
301	<i>Schizaster compactus</i> (Koehler, 1914)					•						
302	<i>Schizaster gibberulus</i> L. Agassiz in L. Agassiz & Desor, 1847			•		•						
	Order ECHINONEOIDA H.L. Clark, 1925 Family ECHINONEIDAE L. Agassiz & Desor, 1847 Genus Echinoneus Leske, 1778											
303	<i>Echinoneus cyclostomus</i> Leske, 1778											•
	Order CLYPEASTEROIDA A. Agassiz, 1872 Family CLYPEASTERIDAE L. Agassiz, 1835 Genus Clypeaster Lamarck, 1801											
304	<i>Clypeaster annandalei</i> (Koehler, 1922)			•							•	•
305	<i>Clypeaster eurypetalus</i> H.L. Clark, 1925					•						
306	<i>Clypeaster fervens</i> Koehler, 1922					•						

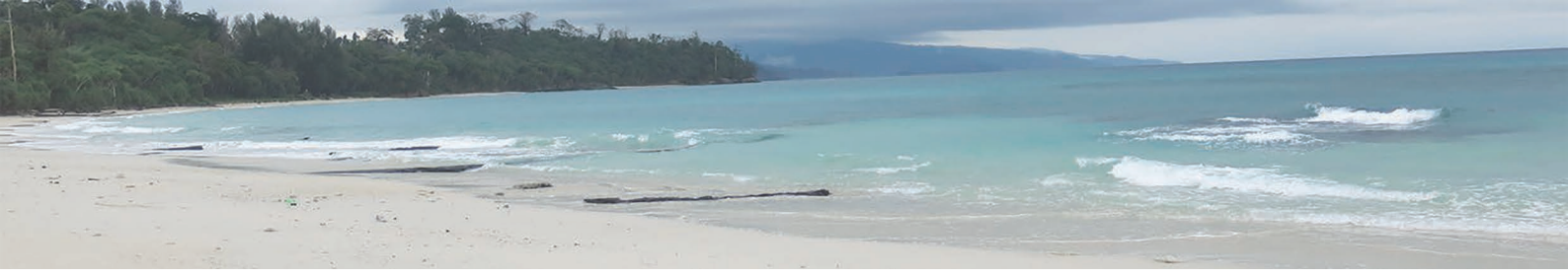


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
307	<i>Clypeaster humilis</i> (Leske, 1778)			•		•	•				•	
308	<i>Clypeaster kieri</i> Pawson & Phelan, 1979					•						
309	<i>Clypeaster pateriformis</i> Mortensen, 1948					•						
310	<i>Clypeaster prostratus</i> Ravenel, 1848					•						
311	<i>Clypeaster rarispinus</i> (de Meijere, 1903)	•	•	•		•	•			•		•
312	<i>Clypeaster reticulatus</i> (Linnaeus, 1758)					•				•		•
313	<i>Clypeaster subdepressus</i> (Gray, 1825)					•						
Family ECHINOCYAMIDAE Lambert & Thiéry, 1914 Genus <i>Echinocyamus</i> van Phelsum, 1774												
314	<i>Echinocyamus crispus</i> Mazzetti, 1893									•		
315	<i>Echinocyamus sollers</i> Koehler, 1922										•	
Family FIBULARIIDAE Gray, 1855 Genus <i>Fibularia</i> Lamarck, 1816												
316	<i>Fibularia cribellum</i> de Meijere, 1903					•						
317	<i>Fibularia volva</i> L. Agassiz in L. Agassiz & Desor, 1847a			•		•						
Family LAGANIDAE Desor, 1858 Genus <i>Jacksonaster</i> Lambert in Lambert & Thiéry, 1914												
318	<i>Jacksonaster depressum</i> (L. Agassiz, 1841)			•		•					•	
Genus <i>Laganum</i> Link, 1807												
319	<i>Laganum decagonale</i> (Blainvillae, 1827)	•	•	•		•						
320	<i>Laganum laganum</i> (Leske, 1778)					•						
Genus <i>Peronella</i> Gray, 1855												
321	<i>Peronella lesueuri</i> (L. Agassiz, 1841)										•	•
322	<i>Peronella oblonga</i> Mortensen, 1948					•	•					
323	<i>Peronella orbicularis</i> (Leske, 1778)					•						
324	<i>Peronella macroproctes</i> Koehler, 1922										•	
325	<i>Peronella rubra</i> Döderlein, 1885					•						
326	<i>Peronella rullandi</i> (Koehler, 1922)											
327	<i>Peronella tuberculata</i> Mortensen, 1918					•						
Family ASTRICLYPEIDAE Stefanini, 1912 Genus <i>Sculpsitechinus</i> Stara & Sanciú, 2014												
328	<i>Sculpsitechinus auritus</i> (Leske, 1778)	•	•	•		•					•	
329	<i>Sculpsitechinus tenuissimus</i> (L. Agassiz & Desor, 1847a)					•						
Genus <i>Echinodiscus</i> Leske, 1778												
330	<i>Echinodiscus bisperforatus</i> Leske, 1778		•	•	•	•						
Order ECHINOLAMPADOIDA Kroh & Smith, 2010 Family ECHINOLAMPADIDAE Gray, 1851 Genus <i>Echinolampas</i> Gray, 1825												
331	<i>Echinolampas alexandri</i> de Loriol, 1876		•			•						•
332	<i>Echinolampas ovata</i> (Leske, 1778)		•	•		•						•

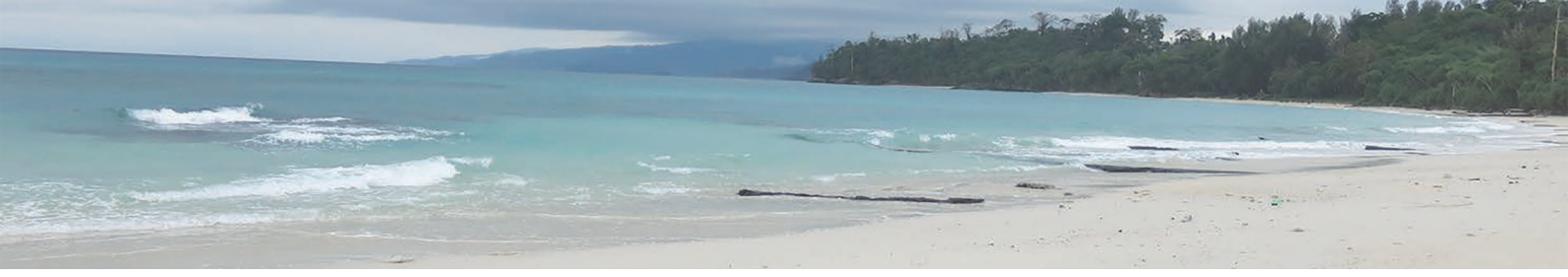


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Class HOLOTHURIDEA deBlainville, 1834 Order APODIDA Brandt, 1835 Family CHIRIDOTIDAE Östergren, 1898 Genus <i>Polycheira</i> Clark, 1908											
333	<i>Polycheira rufescens</i> (Brandt, 1835)					•						•
	Genus <i>Psammothuria</i> Rao, 1968											
334	<i>Psammothuria ganapati</i> Rao, 1968			•								
	Family SYNAPTIDAE Burmeister, 1837 Genus <i>Anapta</i> Semper, 1867											
335	<i>Anapta gracilis</i> Semper, 1867			•				•				
	Genus <i>Euapta</i> Östergren, 1898											
336	<i>Euapta godeffroyi</i> (Semper, 1868)											•
	Genus <i>Labidoplax</i> Östergren, 1898											
337	<i>Labidoplax</i> sp.					•						
	Genus <i>Opheodesoma</i> Fisher, 1907											
338	<i>Opheodesoma grisea</i> (Semper, 1867)											•
	Genus <i>Protankyra</i> Östergren, 1898											
339	<i>Protankyra conferta</i> Koehler & Vaney, 1905			•								
340	<i>Protankyra innominata</i> (Koehler and Vaney, 1905)					•						
341	<i>Protankyra similis</i> (Semper, 1867)			•								
342	<i>Protankyra tristis</i> Koehler & Vaney, 1905			•								
343	<i>Protankyra tuticorensis</i> Jaeger, 1832					•						
344	<i>Protankyra assymetrica</i> (Ludwig, 1875)					•						
345	<i>Protankyra inflexa</i> Koehler & Vaney, 1905			•								
346	<i>Protankyra denticulata</i> Koehler & Vaney, 1905			•								
	Genus <i>Synapta</i> Eschscholtz, 1829											
347	<i>Synapta maculata</i> (Chamisso and Eysenhardt, 1821)					•						•
	Genus <i>Synaptula</i> Örstedt, 1849											
348	<i>Synaptula media</i> Cherbonnier and Feral, 1985						•					
349	<i>Synaptula recta</i> (Semper, 1867)					•						•
350	<i>Synaptula striata</i> (Sluiter, 1887)					•						
	Order DENDROCHIROTIDA Grube, 1840 Family CUCUMARIIDAE Ludwig, 1894 Genus <i>Actinocucumis</i> Ludwig, 1875											
351	<i>Actinocucumis typica</i> Ludwig, 1875			•		•		•				
	Genus <i>Colochirus</i> Troschel, 1846											
352	<i>Colochirus quadrangularis</i> Troschel, 1846					•						
	Genus <i>Leptopentacta</i> Clark, 1938											
353	<i>Leptopentacta imbricata</i> (Semper, 1867)		•	•		•				•	•	•
	Genus <i>Pseudocnus</i> Panning, 1949											
354	<i>Pseudocnus echinatus</i> (von Marenzeller, 1881)		•	•								

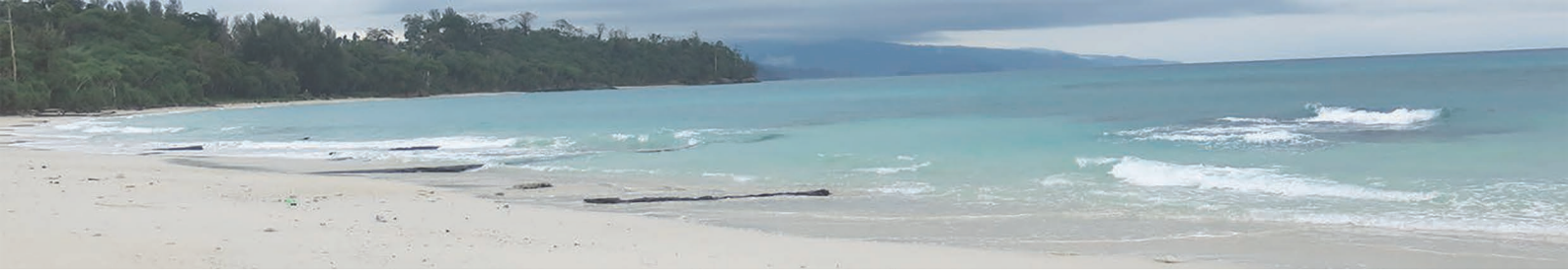


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Genus <i>Pseudocolochirus</i> Pearson, 1910											
355	<i>Pseudocolochirus violaceus</i> (Theel, 1886)		•	•		•	•					
	Genus <i>Roweia</i> Thandar, 1985											
356	<i>Roweia frauenfeldi frauenfeldi</i> (Ludwig, 1882)					•						
	Family PHYLLOPHORIDAE Östergren, 1907 Genus <i>Hemithyone</i> Pawson, 1963											
357	<i>Hemithyone semperi</i> (Bell, 1884)					•						
	Genus <i>Neothyonidium</i> Deichmann, 1938											
358	<i>Neothyonidium intermedium</i> (Koehler & Vaney, 1908)										•	•
	Genus <i>Phyrella</i> Hedding & Panning, 1954											
359	<i>Phyrella fragilis</i> (Mitsukuri & Ohshima in Ohshima, 1912)											•
	Genus <i>Phyllophorus</i> Grube, 1840											
360	<i>Phyllophorus cebuensis</i> (Semper, 1867)					•						
361	<i>Phyllophorus (Urodemella) brocki</i> Ludwig, 1888					•						
	Genus <i>Phyllophorella</i> Hedding & Panning, 1954											
362	<i>Phyllophorella spiculata</i> (Chang, 1935)					•						
	Genus <i>Stolus</i> Selenka, 1867											
363	<i>Stolus buccalis</i> (Stimpson, 1855)			•		•	•					
364	<i>Stolus conjungens</i> (Semper, 1867)					•	•	•				
365	<i>Stolus rapax</i> (Koehler & Vaney, 1908)	•				•						
	Genus <i>Thyone</i> Oken, 1815											
366	<i>Thyone dura</i> Koehler and Vaney, 1908						•	•				
367	<i>Thyone papuensis</i> Theel, 1886					•						
	Family PSOLIDAE Burmeister, 1837 Genus <i>Psolidium</i> Ludwig, 1887											
368	<i>Psolidium complanatum</i> (Semper, 1867)					•						
	Genus <i>Psolus</i> Oken, 1815											
369	<i>Psolus mannarensis</i> James, 1984					•					•	
370	<i>Psolus lavies</i> (Koehler and Vaney, 1905)										•	
	Family SCLERODACTYLIDAE Panning, 1949 Genus <i>Afrocucumis</i> Deichmann, 1944											
371	<i>Afrocucumis africana</i> (Semper, 1867)											•
	Genus <i>Athyone</i> Deichmann, 1941											
372	<i>Athyone</i> sp.							•				
	Genus <i>Havelockia</i> Pearson, 1903											
373	<i>Havelockia ardens</i> (Koehler & Vaney, 1908)		•									
374	<i>Havelockia ariana</i> (Koehler & Vaney, 1908)										•	•
375	<i>Havelockia versicolor</i> (Semper, 1867)			•		•						
	Genus <i>Ohshimella</i> Hedding & Panning, 1954											
376	<i>Ohshimella ehrenbergii</i> (Selenka, 1868)						•					



Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Family VANEYELLIDAE Pawson & Fell, 1965 Genus <i>Mitsukuriella</i> Heding & Panning, 1954											
377	<i>Mitsukuriella inflexa</i> (Koehler & Vaney, 1908)		•									
	Family YPSILOTHURIIDAE Heding, 1942 Genus <i>Ypsilothuria</i> Perrier E., 1886											
378	<i>Ypsilothuria bitentaculata</i> (Ludwing, 1893)											
	Order ELASIPODIDA Théel, 1882 Family LAETMOGONIDAE Ekman, 1926 Genus <i>Benthogone</i> Koehler, 1895											
379	<i>Benthogone fragilis</i> (Koehler & Vaney, 1905)					•			•			
	Genus <i>Laetmogone</i> Théel, 1879											
380	<i>Laetmogone violacea</i> Théel, 1879										•	
	Family PSYCHROPOTIDAE Théel, 1882 Genus <i>Psychropotes</i> Théel, 1882											
381	<i>Psychropotes minuta</i> Koehler & Vaney, 1905											•
	Order HOLOTHURIIDA Miller, Kerr, Paulay, Reich, Wilson, Carvajal & Rouse, 2017 Family HOLOTHURIIDAE Burmeister, 1837 Genus <i>Actinopyga</i> Bronn, 1860											
382	<i>Actinopyga echinites</i> (Jaeger, 1833)											•
383	<i>Actinopyga mauritiana</i> (Quoy & Gaimard, 1834)					•						•
384	<i>Actinopyga miliaris</i> (Quoy & Gaimard, 1834)					•						•
	Genus <i>Bohadschia</i> Jaeger, 1833											
385	<i>Bohadschia argus</i> Jaeger, 1833					•						•
386	<i>Bohadschia marmorata</i> Jaeger, 1833					•						•
387	<i>Bohadschia ocellata</i> Jaeger, 1833						•				•	•
388	<i>Bohadschia tenuissima</i> (Semper, 1868)					•						
	Genus <i>Holothuria</i> Linnaeus, 1767											
389	<i>Holothuria (Halodeima) atra</i> Jaeger, 1833					•				•		•
390	<i>Holothuria (Halodeima) edulis</i> Lesson, 1830					•						
391	<i>Holothuria (Lessonothuria) pardalis</i> Selenka, 1867					•	•					•
392	<i>Holothuria (Mertensiothuria) hilla</i> Lesson, 1830					•						•
393	<i>Holothuria (Mertensiothuria) leucospilota</i> (Brandt, 1835)					•				•		•
394	<i>Holothuria (Metriatyla) scabra</i> Jaeger, 1833					•	•					
395	<i>Holothuria (Microthele) fuscogilva</i> Cherbonnier, 1980					•						
396	<i>Holothuria (Microthele) nobilis</i> (Selenka, 1867)					•						•
397	<i>Holothuria (Platyperona) difficilis</i> Semper, 1868											•
398	<i>Holothuria (Selenkothuria) moebii</i> (Brandt, 1883)					•		•			•	
399	<i>Holothuria (Semperothuria) cinerascens</i> (Brandt, 1835)					•		•			•	•
400	<i>Holothuria (Semperothuria) imitans</i> Ludwig, 1875										•	
401	<i>Holothuria (Stauropora) pervicax</i> Selenka, 1867											•
402	<i>Holothuria (Thelothuria) kurti</i> Ludwig, 1891					•						

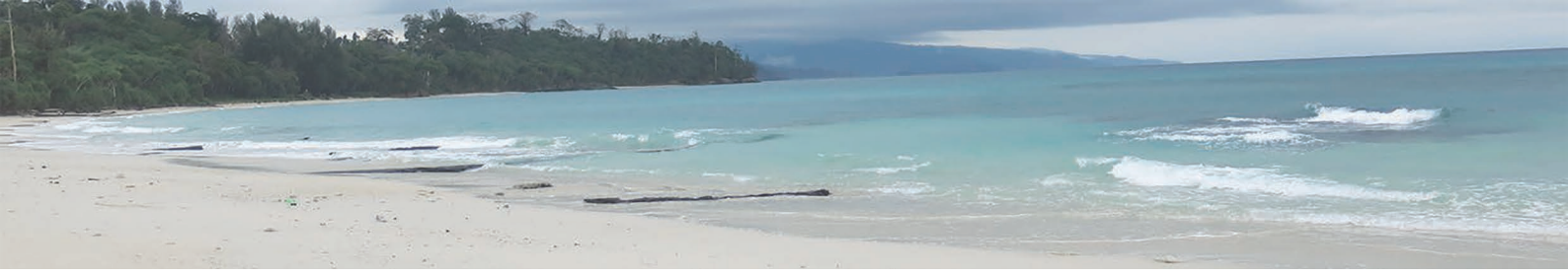


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
403	<i>Holothuria (Theelothuria) spinifera</i> Théel, 1886					•						
404	<i>Holothuria (Thymiosycia) arenicola</i> Semper, 1868					•						•
405	<i>Holothuria (Thymiosycia) impatiens</i> (Forskål, 1775)					•						•
406	<i>Holothuria (Cystipus) rigida</i> (Selenka, 1867)					•						•
407	<i>Holothuria (Vaneyothuria) integra</i> Koehler & Vaney, 1908										•	•
	Genus Labidodemas Selenka, 1867											
408	<i>Labidodemas rugosum</i> (Ludwig, 1875)											•
	Genus Pearsonothuria Levin in Levin, Kalinin & Stonik, 1984											
409	<i>Pearsonothuria graeffei</i> (Semper, 1868)											•
	Family MESOTHURIIDAE Smirnov, 2012 Genus Mesothuria Ludwig, 1894											
410	<i>Mesothuria abbreviata</i> Koehler and Vaney, 1905										•	
411	<i>Mesothuria incerta</i> Koehler and Vaney, 1905										•	
412	<i>Mesothuria multipes</i> (Ludwig, 1894)										•	
413	<i>Mesothuria squamosa</i> Koehler & Vaney, 1905					•						
	Order MOLPADIDA Haeckel, 1896 Family CAUDINIDAE Heding, 1931 Genus Acaudina Clark, 1908											
414	<i>Acaudina leucoprocta</i> (H.L. Clark, 1938)					•					•	
415	<i>Acaudina molpadioides</i> (Semper, 1867)	•	•	•		•	•					
	Genus Hedingia Deichmann, 1938											
416	<i>Hedingia albicans</i> (Théel, 1886) Deichmann, 1938			•							•	
	Genus Paracaudina Heding, 1932											
417	<i>Paracaudina australis</i> (Semper, 1868)					•						
	Family MOLPADIIDAE Müller, 1850 Genus Molpadia Cuvier, 1817											
418	<i>Molpadia concolor</i> (Koehler & Vaney, 1905)			•		•						
419	<i>Molpadia contorta</i> (Koehler & Vaney, 1905)			•								
420	<i>Molpadia ecalcareia</i> (Koehler & Vaney, 1905)					•						
421	<i>Molpadia musculus</i> Risso, 1826			•						•		
422	<i>Molpadia paupera</i> (Koehler & Vaney, 1905)					•						
423	<i>Molpadia polymorpha</i> (Koehler & Vaney, 1905)			•								
	Order PERSICULIDA Miller, Kerr, Paulay, Reich, Wilson, Carvajal & Rouse, 2017 Genus Benthothuria Perrier R., 1898											
424	<i>Benthothuria distorta</i> Koehler & Vaney, 1905								•			
	Order STICHOPODA Haeckel, 1896 Family STICHOPODIDAE Haeckel, 1896 Genus Stichopus Brandt, 1835											
425	<i>Stichopus chloronatus</i> Brandt, 1835					•						•
426	<i>Stichopus hermanni</i> Semper, 1868					•					•	•
427	<i>Stichopus horrens</i> Selenka, 1867					•	•					

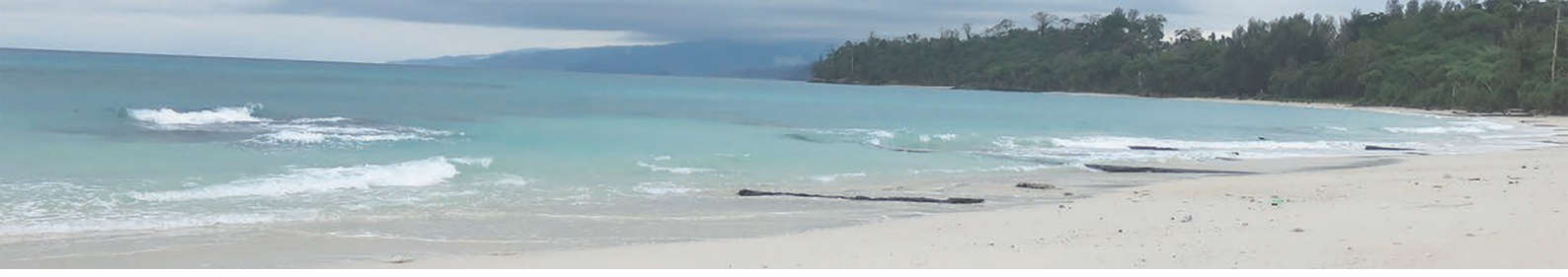


Table 1 contd.

Sl. No.	Species	West Bengal	Odisha	Andhra Pradesh	Puducherry	Tamil Nadu	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Lakshadweep
	Genus <i>Thelenota</i> Brandt, 1835											
428	<i>Thelenota ananas</i> (Jaeger, 1833)											•
	Order SYNALLACTIDA Miller, Kerr, Paulay, Reich, Wilson, Carvajal & Rouse, 2017 Family DEIMATIDAE Théel, 1882 Genus <i>Deima</i> Théel, 1879											
429	<i>Deima validum validum</i> Théel, 1879											•
	Genus <i>Oneirophanta</i> Théel, 1879											
430	<i>Oneirophanta conservata</i> Koehler & Vaney, 1905										•	
	Genus <i>Orphnurgus</i> Théel, 1879											
431	<i>Orphnurgus glaber</i> Walsh, 1891					•						
	Family SYNALLACTIDAE Ludwig, 1894 Genus <i>Bathyplores</i> Östergren, 1896											
432	<i>Bathyplores natans</i> (M. Sars, 1868)										•	
433	<i>Bathyplores pellucidus</i> (Koehler & Vaney, 1905)			•								
	Genus <i>Dendrothuria</i> Koehler & Vaney, 1905											
434	<i>Dendrothuria similis</i> Koehler & Vaney, 1905											
	Genus <i>Paelopatides</i> Théel, 1886											
435	<i>Paelopatides incerta</i> (Koehler & Vaney, 1905)										•	
436	<i>Paelopatides insignis</i> Koehler & Vaney, 1905			•								
437	<i>Paelopatides magna</i> (Koehler & Vaney, 1905)							•				
438	<i>Paelopatides modestus</i> Koehler & Vaney, 1905							•				
	Genus <i>Pseudothuria</i> Koehler & Vaney, 1905											
439	<i>Pseudothuria duplex</i> Koehler & Vaney, 1905								•			
	Genus <i>Scotothuria</i> Hansen, 1978											
440	<i>Scotothuria herringi</i> Hansen, 1978											•
	Total number of species	19	55	97	6	232	42	17	12	29	68	165

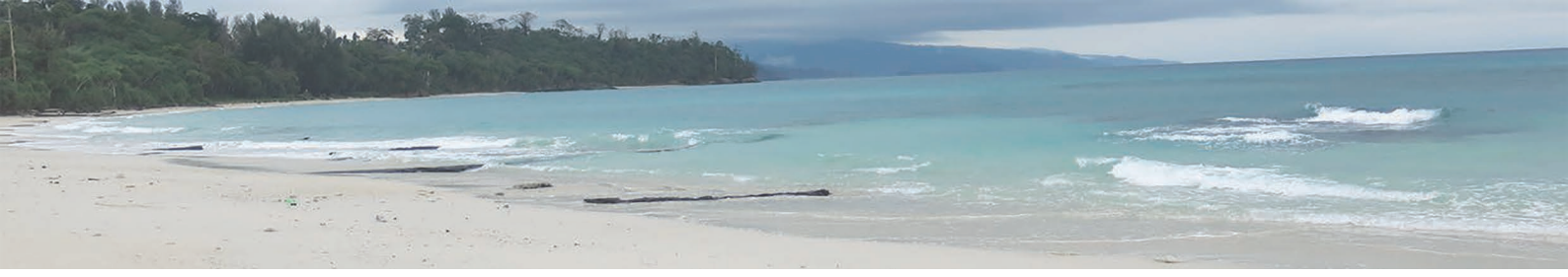
Table 2: Class-wise species occurrence of Echinoderms

Sl. No.	Class	No. of Orders	No. of Families	No. of Genera	No. of Species
1.	Crinoidea	2	9	24	36
2.	Asteroidea	6	17	58	112
3.	Ophiuroidea	5	21	45	101
4.	Echinoidea	10	25	49	83
5.	Holothuridea	8	16	54	100
	Total	31	88	230	440

DISCUSSION

Echinoderms are dispersed worldwide from intertidal zone to the 6000m of the ocean habitats and highly diverse in coral reef ecosystems of shallow water region. Plancus and Gaultire (1743) provided the first report of *Acanthaster planci* from India. James (1983) reported

three echinoderms species from Goa coast. In 1962, Sanne and Chhapparg presented fifteen species from Maharashtra especially from Bombay as a list on the basis of intertidal studies. Gopalakrishnan (1969) listed six sea cucumber species from the Gulf of Kutch. In 1969, James documented forty species from Lakshadweep and reported *Acanthaster planci* from Kadamat Island. In 1973a, James described a new species of sea star *i.e.* *Paraferdina laccadivensis* from the Minicoy Island. In 1974, Daniel and Haldar listed twenty-three sea cucumber species. In 1983, Mukhopadhyay and Samanta stated twelve sea cucumber species from Androth, Kalpeni and Minicoy Islands of Lakshadweep. In 1983, Rao and Misra documented the sea cucumber *Leptosynapta* sp. from Lakshadweep. In 1982, James studied ophiuroids from Chetlat Island of Lakshadweep. James (1989b) studied the zoogeography of Lakshadweep and provided seventy-

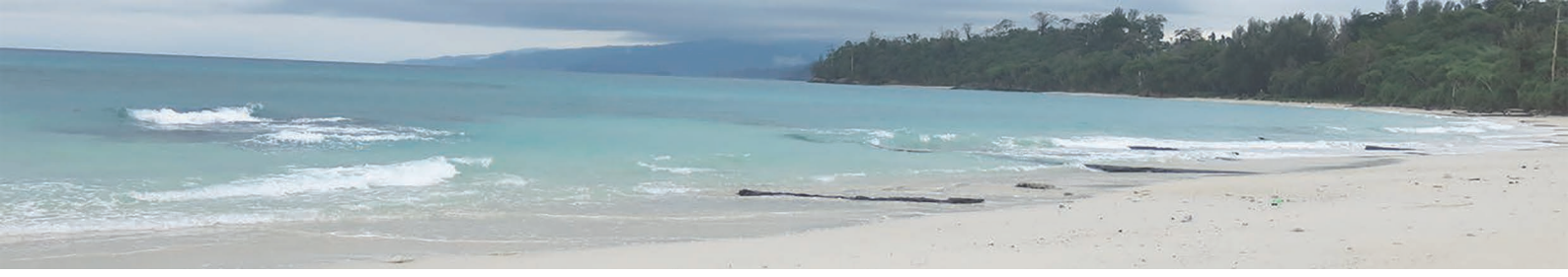


eight species of echinoderms including thirty new distribution records to Lakshadweep. In *Sindbad Voyage Expedition 1980-81*, Price and Rowe (1996) reported eight species of echinoderms from Lakshadweep. Sastry and Satyanarayana (2009) noted two species of feather stars such as *Comatella nigra* and *Comatella stelligera* to Lakshadweep. Currently Parameswaran *et al.* (2017) listed seventy-six species of echinoderms from the Southeastern Arabian Sea. Recently, Sastry *et al.* (2019) described a new genus and species *Indophioderma ganapatii* brittle star and Nowshad *et al.* (2019) also reported a sea star-*Nardoa frianti* from Lakshadweep. In Lakshadweep, the diversity of echinoderm species more than other part of Indian coast, because of its coral reef environment. In 1988, James reported 93 species of echinoderms. Venkataraman *et al.* (2002) documented 103 species of echinoderms from Gulf of Mannar Biosphere Reserve. Sakthivel (2000) reported 15 species of echinoderm species from Mudasalodai and Nagapattinam coastal waters. Karuppaiyan (2007) recorded 33 species of asteroids. Murugesan *et al.* (2013) reported 4 species. Venkataraman and Padmanaban (2013)

reported 37 species of echinoderms. Venkataraman *et al.* (2013) reported 48 species while 19 species were recorded by Maheswaran *et al.* (2016) from the Tamil Nadu coast. Sastry *et al.* (2012) reported 100 species from Andhra Pradesh coast. Sastry *et al.* (2012) recorded 57 species of echinoderm from the Odisha coast and Satheeshkumar (2011) recorded a regular sea urchin from Puducherry coast. In 2007, Sastry compiled an annotated list of echinoderms which included 85 species from the Andhra Pradesh. Presence of sea grass meadows, sandy bottom and healthy coral reef cover is the major attributor for the enriched species diversity in Gulf of Mannar region. The assessment of this phylum is further required and more studies need to be undertaken in the least studies regions namely, Puducherry, Odisha and West Bengal coast of India where the species diversity is poor, in order to evaluate the importance among the marine resources for sustainable conservation. Further exploration of echinoderms in deep sea environment in Indian Exclusive Economic Zone is required to understand the diversity of echinoderms in Indian seas for their effective conservation.

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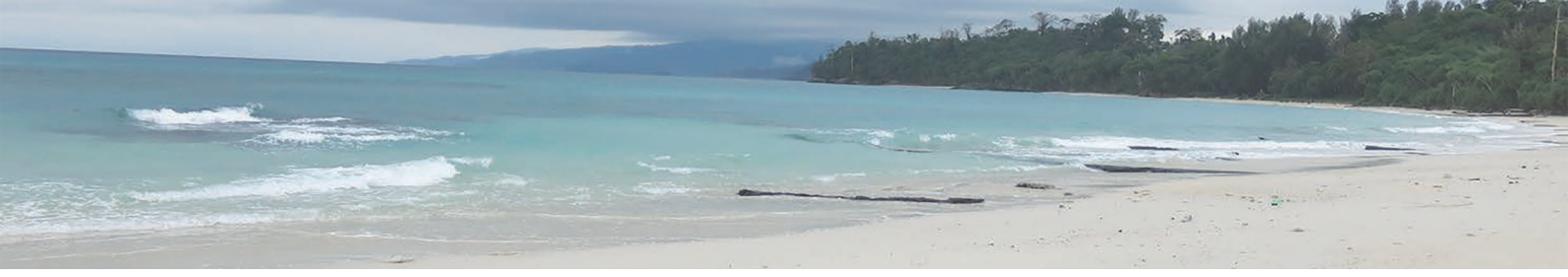
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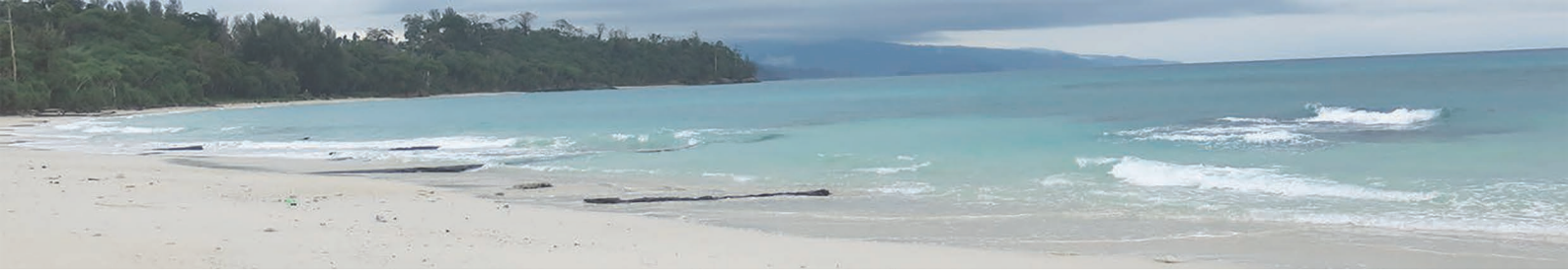
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