



Scleractinian Coral Diversity in Andaman and Nicobar Islands in Comparison with other Indian Reefs

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Introduction

The Andaman and Nicobar Islands are having remarkable marine biodiversity and more than 30 percentage endemism (Savant, 2009). Reef area of Andaman and Nicobar islands, situated in the Bay of Bengal within 6° to 14° N latitudes and 92° to 94° E longitudes, are observed to be the most diverse as well as extensive reef in Indian Ocean. There are about 572 islands in the Andaman and Nicobar group; they include 6 National Parks, and 94 Sanctuaries. The total area of the 6 National Park is 361.79 sq. km. and of which about two third is marine water area. All the National Parks and 91 Sanctuaries are located in the Andaman district, while 3 Sanctuaries in Nicobar district, besides the Great Nicobar Biosphere Reserve, with a total land area of 8293 sq. km., and the estimated coral reef area of 934.26sq Km (MWRD 2000).

In India, the reefs are distributed along the east and west coasts at restricted places. It covers approximately 5,790 km² and is divided into 3 major zones: the

Andaman and Nicobar Islands; the Coral Reefs of the mainland; and the Lakshadweep Islands. All the major reef types are represented in India (Venkataraman, 2003). Studies on the coral reefs in India started in mid 19th century. The earliest coral reef study in the Indian waters was a brief account of the Nicobar Islands by Rink (1847) who pointed out the various adverse effects of siltation in the inshore waters on coral growth and gave an account on deep sea corals of the seas around Andaman. Lt. Col. R.B.S. Sewell was the first person in India to conduct studies on corals of India (Sewell 1922; 1925). Taxonomic studies of Indian corals were restricted to the pioneering works of Pillai (1971a, 1971b, 1972), Scheer and Pillai (1974), Reddiah (1977), Pillai and Patel (1988), Pillai and Jasmine (1989) during the late 20th century. The total number of 199 species of scleractinian corals recorded in the eighties remains unchanged since then; only recently, when extensive collections were made in Andamans, nearly 100 new records were found (Venkataraman *et al.*, 2003). In the past few decades many coral reef surveys have been conducted by the



scientific team of Zoological Survey of India (Reddiah, 1970, 1970a, 1977; Venkataraman and Rajan 1998; Jayabaskaran 1999; Turner *et al.*, 2001; Venkataraman 2003). In spite of many organizations now working on coral reefs in India, non-significant strides in taxonomic investigation of corals have been made since the last compilation by Pillai (1983). Venkataraman *et al.* (2003) were one exception: 42 species were added to the list of coral of the Andaman Nicobar Islands and 13 to the Lakshadweep Islands in the Arabian Sea - though, for the whole of Indian reefs the addition was a meagre 9 nos, since Pillai (1983). Raghuram & Venkataraman (2005) added two more species from Gulf of Mannar and Andaman waters.

Later in 2009, again the coral taxonomic investigation started in Andaman and Nicobar region. Rajkumar *et al.* (2010) reported nine corals from South Andaman region; following this Raghuraman *et al.* (2010) recorded 26 scleractinian species from Pongibalu reef, which is located at Periphery of Mahatma Gandhi Marine National Park. Later in 2010, 55 new hard corals were reported by Madhan *et al.* (2010) and Mondal *et al.* (2010a, b, c, d and e) from Middle and North Andaman reefs. Followed by these reports, Ramakrishna *et al.* (2010) reported 82 species from all over the Andaman and Nicobar reefs. In 2011, Mondal *et al.* (2010a, b, c, d, e, f & g) contribute 44 new records from Rutland, Rani Jhansi Marine National Park, Havelock Island and Neil Islands, these report increased the species number to a notable account.

Material and Methods

Study area and sampling locations are shown in the map (Fig. 1) and Table 1. Corals in the Line Intercept Transect, have been photographed *in-situ* with Sony Cyber shot (DSC T900) and Canon - A 580 camera with underwater housing, and were tried to identify at the first instance. Later, species which required detailed observation of skeletal structures were sampled employing SCUBA, without causing un-due damage to the colony. The specimens were labelled and stored in freshwater for rotting the tissue, with periodically replacing the water. They were then cleaned with a strong water jet to remove any sticking gelatinous tissue.

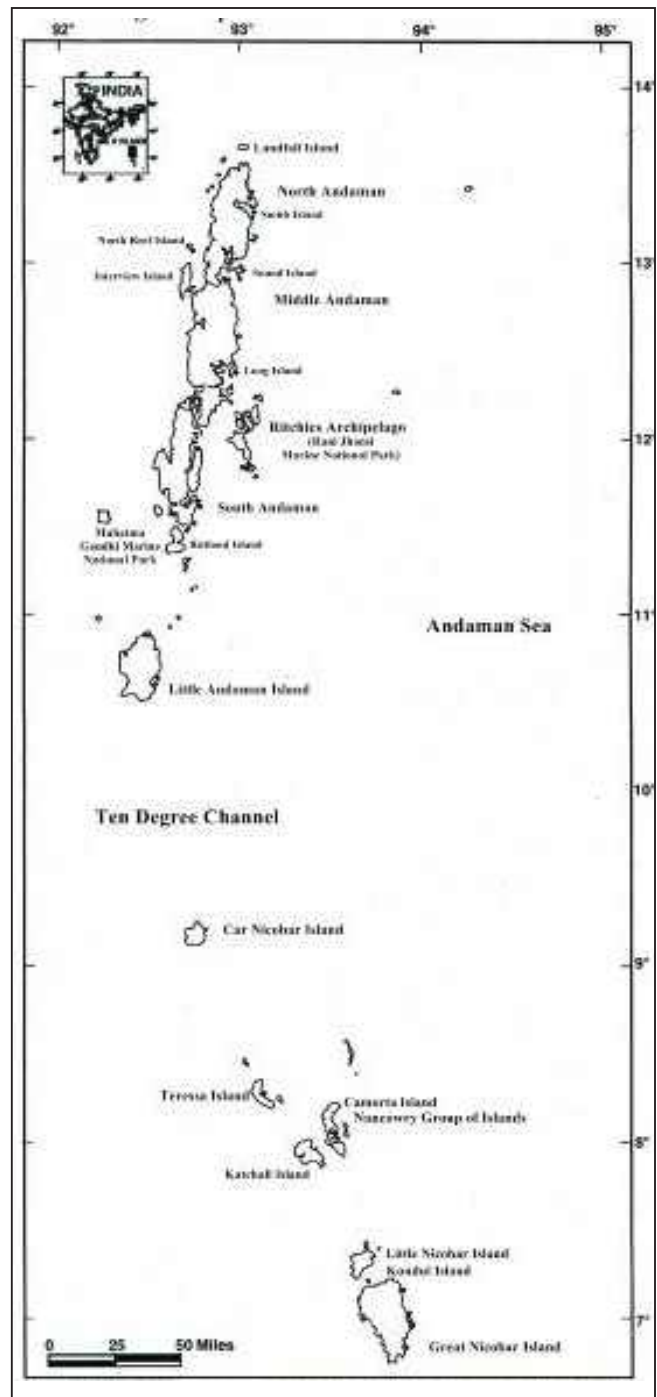


Fig. 1: Map showing the areas surveyed in Andaman and Nicobar Islands.

Detailed skeletal structures were studied under Leica DFC500, Trinocular, Stereoscopic Zoom Microscope, and photographed with the affixed camera. The specimens and images were then analysed for taxonomic identification. Identification manuals by



Table 1: Areas surveyed in the Andaman and Nicobar Islands with their GPS co-ordinates

S. No.	Area surveyed	GPS Co-ordinates	
NORTH ANDAMAN			
1	Landfall Island	Lat.13°39.481'N	Long.93°01.496'E
2	Nariyal Tikri	Lat.13°26.150'N	Long.93°05.416'E
3	Kalipur Beach	Lat.13°13.269'N	Long.93°02.420'E
4	Twins Island	Lat.13°25.687'N	Long. 93°05.971'E
5	Opposite Twins Island	Lat.13°24.865'N	Long. 93°04.105'E
6	Ross Island	Lat. 13°18.167'N	Long. 93°04.261'E
7	Smith Island	Lat. 13°18.406'N	Long. 93°04.207'E
8	Ariel Bay	Lat. 13°16.093'N	Long. 93°02.433'E
9	Lamia Bay	Lat. 13°24.879'N	Long. 93°05.516'E
10	Durgapur	Lat.13°16.260'N	Long.93°02.439'E
MIDDLE ANDAMAN			
11	North Reef Island	Lat. 12° 56. 084'N	Long. 92°57.345'E
12	Interview Island	Lat. 12° 59. 125'N	Long. 92°42.981'E
13	Sound Island	Lat. 12° 56. 084'N	Long. 92°57.345'E
14	Rail Island	Lat. 12° 56. 860'N	Long. 92°54.620'E
15	Karlo Island	Lat. 12° 56. 084'N	Long. 92°53.378'E
16	Guitar Island	Lat. 12°20.323'N	Long. 92°54.529'E
17	Long Island	Lat. 12° 24.412'N	Long. 92°56.837'E
18	North Passage Island	Lat. 12° 18.121'N	Long. 92° 55.718'E
RITCHIE'S ARCHIPELAGO			
19	Inglis Island	Lat. 12°08. 639'N	Long. 93° 06.786'E
20	Henry Lawrence Island	Lat. 12° 05. 000'N	Long. 93°06.312'E
21	John Lawrence Island	Lat. 12°04. 075'N	Long. 93°00.398'E
22	Outram Island	Lat. 12°00. 574'N	Long. 92°56.808'E
23	Sir William Peel Island	Lat. 12°03. 315'N	Long. 92°59.929'E
24	Nicolson Island	Lat. 12°06.739'N	Long. 92°57.235'E
25	South Button Island	Lat. 12°13.467'N	Long. 92°01.334'E
26	North Button Island	Lat. 12°18.974'N	Long. 92°03.826'E
27	Middle Button Island	Lat. 12°16.473'N	Long. 93°01.334'E
28	Wilson Island	Lat. 12°13.061'N	Long. 93°15.207'E
29	Havelock Island	Lat.12°03.313'N	Long. 92°57.730'E
30	Neil Island	Lat. 11°50.826'N	Long. 93°00.554'E
31	Sir Huge Ross Island	Lat. 11°47.063'N	Long. 93°04.616'E

S. No.	Area surveyed	GPS Co-ordinates	
SOUTH ANDAMAN			
32	Off Burmanella	Lat. 11° 33.468'N	Long. 92°43.873'E
33	Off Rangachang	Lat. 11° 34.350'N	Long. 92°44.133'E
34	Chidyatapu	Lat. 11° 29.460'N	Long. 92°42.530'E
35	Pongibalu	Lat. 11° 30.956'N	Long. 92°39.201' E
36	Off Kurmadera	Lat. 11° 39.933'N	Long. 92° 35.903'E
37	North Bay	Lat. 11°42.074'N	Long. 92° 45.143'E
38	Off Collinpur	Lat. 11°41.598'N	Long. 92°37.035'E
39	North Wandoor	Lat. 11° 37.270'N	Long. 92°37.035'E
40	Loha Barrack Croc. Sanctuary	Lat. 11°38.035'N	Long. 92°38.722'E
41	Mahua Dera	Lat.11° 38.765'N	Long. 92° 35.837'E
42	Rutland Island	Lat. 11° 26.506'N	Long. 92° 36.861'E
MAHATMA GANDHI MARINE NATIONAL PARK			
43	Tarmguli Island	Lat.11°34.138'N	Long. 92°33.836'E
44	Belley Island	Lat.11°34.095'N	Long. 92°33.841'E
45	Chester Island	Lat.11°35.194'N	Long. 92°34.708'E
46	Grub Island	Lat.11°35.406'N	Long. 92°35.713'E
47	Red Skin Island	Lat.11°34.318'N	Long. 92°35.705'E
48	Jolly Bouy Island	Lat.11°30.368'N	Long. 92°36.933'E
49	Twins Island	Lat.11°23.330'N	Long. 92°33.003'E
LITTLE ANDAMAN			
50	Little Andaman	Lat. 10° 32.975'N	Long. 92° 32.651'E
51	Sister Island	Lat. 10° 55.830'N	Long. 92° 07.023'E
CAR NICOBAR			
52	Car Nicobar Island	Lat. 09° 10.490'N	Long. 92° 49.714'E
NANCOWRY ISLANDS			
53	Camorta Island	Lat. 12° 51. 322'N	Long. 92° 56.050'E
54	Champin Island	Lat. 08° 01. 670'N	Long. 93° 33.123'E
55	Trinket Island	Lat. 08° 02. 806'N	Long. 93° 34.556'E
56	Munak Island	Lat. 07° 59. 813'N	Long. 93° 30.534'E
57	Katchal Island	Lat. 07° 58.952'N	Long. 93° 24.351'E
58	Teressa Island	Lat. 08° 13.686'N	Long. 93° 10.913'E
KONDUL ISLAND			
59	Kundol Island	Lat. 07° 10. 023'N	Long. 93° 42.949'E
GREAT NICOBAR ISLAND			
60	Great Nicobar Island	Lat. 06° 59. 749'N	Long. 93° 56.718'E

Veron (2000) and Venkataraman (2003) were referred for this purpose. The specimens after identification were submitted at the National Zoological Collection (NZC), Zoological Survey of India (ZSI) Port Blair.

Results and Discussions

Reef structure of Andaman and Nicobar islands

The coral reefs of this archipelago is of fringing type



Table 2 . Showing the Coral diversity of Andaman and Nicobar Reefs

No.	Species	Andaman	Nicobar	No.	Species	Andaman	Nicobar
	ACROPORIDAE Verrill, 1902			39	<i>Acropora chesterfieldensis</i>	*	
	<i>Montipora</i> de Blainville, 1830				(Veron and Wallace, 1984)		
1	<i>Montipora aequituberculata</i>	*	*	40	<i>Acropora clathrata</i> (Brook, 1891)	*	*
	Barnard, 1897			41	<i>Acropora cophodactyla</i> (Brook, 1842)	*	
2	<i>Montipora angulata</i> (Lamarck, 1816)	*	*	42	<i>Acropora copiosa</i> Nemenzo, 1967	*	
3	<i>Montipora calculata</i> (Dana, 1846)	*		43	<i>Acropora cuneata</i> (Dana, 1846)	*	
4	<i>Montipora capitata</i> Dana, 1846	*		44	<i>Acropora cytherea</i> (Dana, 1846)	*	*
5	<i>Montipora cebuensis</i> (Nemenzo, 1976)	*		45	<i>Acropora desalwii</i> (Wallace, 1994)	*	
6	<i>Montipora crassituberculata</i>	*		46	<i>Acropora digitifera</i> (Dana, 1846)	*	*
	Bernard, 1897			47	<i>Acropora divaricata</i> (Dana, 1846)	*	*
7	<i>Montipora danae</i>	*		48	<i>Acropora echinata</i> (Dana, 1846)	*	*
	(Milne Edwards and Haime, 1851)			49	<i>Acropora efflorescens</i> (Dana, 1846)	*	*
8	<i>Montipora delicatula</i> Veron, 2000	*		50	<i>Acropora elizabethensis</i> Veron, 2000	*	
9	<i>Montipora digitata</i> (Dana, 1846)	*	*	51	<i>Acropora fastigata</i> (Nemenzo, 1967)	*	
10	<i>Montipora flabellata</i> Studer, 1901	*		52	<i>Acropora florida</i> (Dana, 1846)	*	*
11	<i>Montipora florida</i> Nemenzo, 1967	*		53	<i>Acropora formosa</i> (Linnaeus, 1758)	*	*
12	<i>Montipora foliosa</i> (Pallas, 1766)	*	*	54	<i>Acropora forskali</i> (Ehrenberg, 1834)	*	
13	<i>Montipora foveolata</i> (Dana, 1846)	*		55	<i>Acropora gemmifera</i> (Brook, 1892)	*	*
14	<i>Montipora grisea</i> Bernard, 1897	*		56	<i>Acropora glauca</i> (Brook, 1893)	*	*
15	<i>Montipora hemispherica</i> Veron, 2000	*		57	<i>Acropora globiceps</i> (Dana, 1846)	*	
16	<i>Montipora hispida</i> (Dana, 1846)	*	*	58	<i>Acropora gomezi</i> Veron, 2000	*	
17	<i>Montipora informis</i> Bernard, 1897	*	*	59	<i>Acropora grandis</i> (Brook, 1892)	*	*
18	<i>Montipora meandrina</i>	*		60	<i>Acropora granulosa</i> (Milne Edwards and Haime, 1860)	*	
	(Ehrenberg, 1834)			61	<i>Acropora haimeii</i>	*	*
19	<i>Montipora peltiformis</i> Benard, 1897	*	*		(Milne Edwards and Haime, 1860)		
20	<i>Montipora porites</i> Veron, 2000	*		62	<i>Acropora hemprichii</i> (Ehrenberg, 1834)	*	*
21	<i>Montipora taiwanensis</i> Veron, 2000	*		63	<i>Acropora horrida</i> (Dana, 1836)	*	
22	<i>Montipora tuberculosa</i> Lamarck, 1816	*		64	<i>Acropora humilis</i> (Dana, 1846)	*	*
23	<i>Montipora turgescens</i> Bernard, 1897	*	*	65	<i>Acropora hyacinthus</i> (Dana, 1846)	*	*
24	<i>Montipora venosa</i> (Ehrenberg, 1834)	*	*	66	<i>Acropora inermis</i> (Brook, 1891)	*	
25	<i>Montipora verrilli</i> Vaughan, 1907	*		67	<i>Acropora insignis</i> (Nemenzo, 1967)	*	
26	<i>Montipora verrucosa</i> (Lamarck, 1816)	*	*	68	<i>Acropora kimbeensis</i> Wallace, 1999	*	
27	<i>Montipora verruculosus</i> Veron, 2000	*		69	<i>Acropora kosurini</i> Wallace, 1994	*	
28	<i>Montipora vietnamensis</i> Veron, 2000	*		70	<i>Acropora latistella</i> (Brook, 1892)	*	*
	<i>Anacropora</i> Ridley, 1884			71	<i>Acropora loisettae</i> Wallace, 1994	*	
29	<i>Anacropora reticulata</i> Veron and Wallace, 1984	*		72	<i>Acropora longicyathus</i>	*	*
	<i>Acropora</i> Oken, 1815				(Milne Edwards and Haime, 1860)		
30	<i>Acropora abrotanoides</i> (Lamarck, 1816)	*		73	<i>Acropora loripes</i> (Brook, 1892)	*	*
31	<i>Acropora anthocercis</i> (Brook, 1893)	*	*	74	<i>Acropora lutkeni</i> Crossland, 1952	*	*
32	<i>Acropora aspera</i> (Dana, 1846)	*	*	75	<i>Acropora massawensis</i>	*	
33	<i>Acropora austera</i> (Dana, 1846)	*	*		(Marenzeller, 1906)		
34	<i>Acropora awi</i> (Wallace and Wolstenholme, 1998)	*		76	<i>Acropora microclados</i>	*	*
					(Ehrenberg, 1834)		
35	<i>Acropora brueggemanni</i> (Brook, 1893)	*	*	77	<i>Acropora microphthalma</i>	*	
36	<i>Acropora carduus</i> (Dana, 1846)	*	*		(Verrill, 1859)		
37	<i>Acropora caroliniana</i> Nemenzo, 1976	*	*	78	<i>Acropora millepora</i> (Ehrenberg, 1834)	*	*
38	<i>Acropora cerealis</i> (Dana, 1846)	*	*	79	<i>Acropora minuta</i> Veron, 2000	*	



No.	Species	Andaman	Nicobar
80	<i>Acropora mirabilis</i> (Quelch,1886)	*	
81	<i>Acropora monticulosa</i> (Bruggemann, 1879)	*	*
82	<i>Acropora multiacuta</i> Nemenzo, 1967	*	*
83	<i>Acropora nana</i> (Studer, 1878)	*	
84	<i>Acropora nasuta</i> (Dana, 1846)	*	*
85	<i>Acropora nobilis</i> (Dana 1846)	*	*
86	<i>Acropora ocellata</i> (Klunzinger, 1879)	*	
87	<i>Acropora palifera</i> (Lamarck, 1816)	*	*
88	<i>Acropora palmerae</i> Wells, 1954	*	*
89	<i>Acropora paniculata</i> Verrill, 1902	*	
90	<i>Acropora papillare</i> Latypov, 1992	*	*
91	<i>Acropora pharaonis</i> (Milne Edwards and Haime, 1860)	*	*
92	<i>Acropora plana</i> (Nemenzo, 1967)	*	
93	<i>Acropora plantaginea</i> (Lamarck,1816)	*	
94	<i>Acropora polystoma</i> (Brook, 1891)	*	*
95	<i>Acropora proximalis</i> Veron, 2002	*	
96	<i>Acropora pulchra</i> (Brook, 1891)	*	*
97	<i>Acropora robusta</i> (Dana, 1846)	*	*
98	<i>Acropora roseni</i> Wallace, 1999	*	
99	<i>Acropora rudis</i> (Rehberg, 1892)	*	
100	<i>Acropora samoensis</i> (Brook, 1891)	*	*
101	<i>Acropora secale</i> (Studer, 1878)	*	*
102	<i>Acropora sekiseiensis</i> Veron, 1990	*	
103	<i>Acropora selago</i> (Studer, 1878)	*	
104	<i>Acropora solitaryensis</i> Veron and Wallace, 1984	*	*
105	<i>Acropora spicifera</i> (Dana, 1846)	*	*
106	<i>Acropora squarrosa</i> (Ehrenberg,1834)	*	*
107	<i>Acropora striata</i> (Verrill, 1866)	*	
108	<i>Acropora subglabra</i> (Brook,1891)	*	*
109	<i>Acropora subulata</i> (Danda, 1846)	*	
110	<i>Acropora tanegashimensis</i> (Veron, 1990)	*	
111	<i>Acropora tenius</i> (Dana, 1846)	*	*
112	<i>Acropora torresiana</i> Veron, 2000	*	
113	<i>Acropora tutuilensis</i> (Hoffmeister, 1925)	*	
114	<i>Acropora valenciennesi</i> (Milne Edwards and Haime, 1860)	*	
115	<i>Acropora valida</i> (Dana, 1846)	*	*
116	<i>Acropora variolosa</i> (Klunzinger, 1879)	*	
117	<i>Acropora vaughani</i> Wells, 1954	*	
118	<i>Acropora verweyi</i> (Veron and Wallace,1984)	*	
	<i>Astreopora</i> de Blainville, 1830		
119	<i>Astreopora cucullata</i> Lamberts, 1980	*	*
120	<i>Astreopora gracilis</i> Bernard, 1896	*	
121	<i>Astreopora incrustans</i> Bernard, 1896	*	

No.	Species	Andaman	Nicobar
122	<i>Astreopora listeri</i> Bernard, 1896	*	*
123	<i>Astreopora myriophthalma</i> (Lamarck,1816)	*	*
124	<i>Astreopora ocellata</i> Bernard, 1896	*	*
125	<i>Astreopora randalli</i> Lamberts, 1980	*	
126	<i>Astreopora suggesta</i> Wells,1954	*	
	ASTROCOENIIDAE Koby, 1890		
	<i>Stylocoeniella</i> Yabe and Sugiyama, 1935		
127	<i>Stylocoeniella armata</i> (Ehrenberg, 1834)	*	*
128	<i>Stylocoeniella guentheri</i> (Bassett and Smith, 1890)	*	*
	<i>Madracis</i> Milne Edwards and Haime, 1849		
129	<i>Madracis kirbyi</i> Veron and Pichon, 1976	*	*
	POCILLOPORIDAE Gray, 1842		
	<i>Pocillopora</i> Lamarck, 1816		
130	<i>Pocillopora ankei</i> Scheer and Pillai, 1974	*	*
131	<i>Pocillopora damicornis</i> Linnaeus, 1758	*	*
132	<i>Pocillopora danae</i> Verrill, 1864	*	*
133	<i>Pocillopora elegans</i> Dana, 1846	*	
134	<i>Pocillopora eydouxi</i> (Milne Edwards and Haime, 1860)	*	*
135	<i>Pocillopora kelleheri</i> Veron, 2002	*	
136	<i>Pocillopora ligulata</i> Dana, 1846	*	*
137	<i>Pocillopora meandrina</i> Dana, 1846	*	*
138	<i>Pocillopora verrucosa</i> (Ellis and Solander, 1786)	*	*
	<i>Seriatopora</i> Lamarck, 1816		
139	<i>Seriatopora aculeate</i> (Quelch,1886)	*	*
140	<i>Seriatopora caliendrum</i> Ehrenberg, 1834	*	
141	<i>Seriatopora crassa</i> Quelch, 1886	*	*
142	<i>Seriatopora hystrix</i> Dana, 1846	*	*
143	<i>Seriatopora stellata</i> Quelch, 1886	*	*
	<i>Stylophora</i> Schweigger, 1819		
144	<i>Stylophora pistillata</i> (Esper,1797)	*	*
	EUPHYLLIDAE Veron, 2000		
	<i>Euphyllia</i> Dana, 1846		
145	<i>Euphyllia ancora</i> Veron and Pichon, 1979	*	*
146	<i>Euphyllia divisa</i> Veron and Pichon, 1979	*	
147	<i>Euphyllia glabrescens</i> (Chamisso and Eysenhardt, 1821)	*	*
148	<i>Euphyllia yaeyamaensis</i> (Sirai, 1980)	*	
	<i>Plerogyra</i> Milne Edwards and Haime, 1848		
149	<i>Plerogyra sinuosa</i> (Dana, 1846)	*	*
150	<i>Plerogyra simplex</i> Rehberg, 1892	*	
	<i>Physogyra</i> Quelch, 1884		



No.	Species	Andaman	Nicobar
151	<i>Physogyra lichtensteini</i> (Milne Edwards and Haime, 1851) OCULINIDAE Grey, 1847 <i>Galaxea</i> Oken, 1815	*	*
152	<i>Galaxea astreata</i> (Lamarck, 1816)	*	*
153	<i>Galaxea cryptoramosa</i> (Fenner and Veron, 2000)	*	
154	<i>Galaxea fascicularis</i> (Linnaeus, 1767) MEANDRINIDAE Gray, 1847 <i>Dichocoenia</i> Milne Edwards and Haime, 1848	*	*
155	<i>Dichocoenia stokesi</i> Milne Edwards and Haime, 1848 SIDERASTREIDAE Vaughan and Wells, 1943 <i>Pseudosiderastrea</i> Yabe and Sugiyama, 1935	*	
156	<i>Pseudosiderastrea tayami</i> Yabe and Sugiyama, 1935 <i>Siderastrea</i> Blainville, 1830	*	*
157	<i>Siderastrea radians</i> (Pallas, 1766)	*	
158	<i>Siderastrea siderea</i> (Ellis and Solander, 1786) <i>Psammocora</i> Dana, 1846	*	
159	<i>Psammocora contigua</i> (Esper, 1797)	*	*
160	<i>Psammocora digitata</i> Milne Edwards and Haime, 1851	*	*
161	<i>Psammocora explanulata</i> van der Horst, 1922	*	*
162	<i>Psammocora haimeana</i> Milne Edwards and Haime, 1851	*	*
163	<i>Psammocora obtusangula</i> (Lamarck, 1816)	*	
164	<i>Psammocora profundacella</i> Gardiner, 1898	*	*
165	<i>Psammocora superficialis</i> Gardiner, 1898 <i>Coscinaraea</i> Milne Edwards and Haime, 1848	*	
166	<i>Coscinaraea columna</i> (Dana, 1846)	*	
167	<i>Coscinaraea crassa</i> Veron and Pichon, 1980)	*	
168	<i>Coscinaraea monile</i> (Forsk. 1775) AGARICIIDAE Grey, 1847 <i>Agaricia</i> Lamarck, 1801	*	*
169	<i>Agaricia fragilis</i> Dana, 1846 <i>Pavona</i> Lamarck, 1801	*	
170	<i>Pavona bipartite</i> Nemenzo, 1980	*	
171	<i>Pavona cactus</i> (Forsk. 1775)	*	*
172	<i>Pavona clavus</i> (Dana, 1846)	*	*
173	<i>Pavona danai</i> Milne Edwards and Haime, 1860	*	
174	<i>Pavona decussata</i> (Dana, 1846)	*	*

No.	Species	Andaman	Nicobar
175	<i>Pavona duerdeni</i> Vaughan, 1907	*	*
176	<i>Pavona explanulata</i> (Lamarck, 1816)	*	*
177	<i>Pavona gigantea</i> Verrill, 1896	*	
178	<i>Pavona maldivensis</i> (Gardiner, 1905)	*	*
179	<i>Pavona minuta</i> Wells, 1954	*	*
180	<i>Pavona varians</i> Verrill, 1846	*	*
181	<i>Pavona venosa</i> (Ehrenberg, 1834) Leptoseris Milne Edwards and Haime, 1849	*	*
182	<i>Leptoseris cuclata</i> (Ellis and Solander, 1786)	*	*
183	<i>Leptoseris explanata</i> (Yabe and Sugiyama, 1941)	*	
184	<i>Leptoseris hawaiiensis</i> (Vaughan, 1907)	*	*
185	<i>Leptoseris incrustans</i> (Quelch, 1886)	*	
186	<i>Leptoseris mycetoseoides</i> Wells, 1954	*	
187	<i>Leptoseris papyracea</i> (Dana, 1846)	*	*
188	<i>Leptoseris scabra</i> Vaughan, 1907	*	*
189	<i>Leptoseris solida</i> (Quelch, 1886)	*	*
190	<i>Leptoseris tublifera</i> Vaughan, 1907	*	
191	<i>Leptoseris yabei</i> (Pillai and Scheer, 1976) Coeloseris Vaughan, 1918	*	
192	<i>Coeloseris mayeri</i> Vaughan, 1918 Gardineroseris Scheer and Pillai, 1974	*	*
193	<i>Gardineroseris planulata</i> (Dana, 1846) Pachyseris Milne Edwards and Haime, 1849	*	*
194	<i>Pachyseris foliosa</i> Veron, 1990	*	
195	<i>Pachyseris gemmae</i> Nemenzo, 1955	*	*
196	<i>Pachyseris rugosa</i> (Lamarck, 1801)	*	*
197	<i>Pachyseris speciosa</i> (Dana, 1846) FUNGIIDAE Dana, 1846 Cycloseris Milne Edwards and Haime, 1849	*	*
198	<i>Cycloseris costulata</i> (Ortmann, 1889)	*	*
199	<i>Cycloseris curvata</i> (Hoeksema, 1989)	*	
200	<i>Cycloseris cyclolites</i> (Lamarck, 1801)	*	*
201	<i>Cycloseris hexagonalis</i> Milne Edwards and Haime, 1848	*	*
202	<i>Cycloseris patelliformis</i> (Boschma, 1923)	*	*
203	<i>Cycloseris sinensis</i> Milne Edwards and Haime 1849	*	*
204	<i>Cycloseris somervillei</i> (Gardiner, 1909)	*	*
205	<i>Cycloseris vaughani</i> (Boschman, 1923) Diaseris Milne Edwards and Haime, 1849	*	
206	<i>Diaseris distorta</i> (Michelin, 1843) Cantharellus Höksema and Best, 1984	*	*



No.	Species	Andaman	Nicobar
207	<i>Cantharellus doederleini</i> (Marenzeller, 1907)	*	
208	<i>Cantharellus jebbi</i> Hoeksema, 1993	*	
209	<i>Cantharellus noumeae</i> Höksema and Best, 1984 <i>Fungia</i> Lamarck, 1801	*	
210	<i>Fungia concinna</i> Verrill, 1864	*	*
211	<i>Fungia corona</i> Doderlein, 1901	*	*
212	<i>Fungia danai</i> Milne Edwards and Haime, 1851	*	*
213	<i>Fungia fralinae</i> Nemenzo, 1955	*	
214	<i>Fungia fungites</i> (Linnaeus, 1758)	*	*
215	<i>Fungia granolosa</i> (Klunzinger, 1879)	*	
216	<i>Fungia horrida</i> Dana, 1846	*	*
217	<i>Fungia klunzingeri</i> Doderlein, 1901	*	
218	<i>Fungia moluccensis</i> (Horst, 1919)	*	*
219	<i>Fungia paumotensis</i> Stutchbury, 1833	*	*
220	<i>Fungia repanda</i> Dana, 1846	*	*
221	<i>Fungia scabra</i> (Doderlein, 1901)	*	
222	<i>Fungia scruposa</i> (Klunzinger, 1879)	*	*
223	<i>Fungia scutaria</i> Lamarck, 1801	*	*
224	<i>Fungia spinifer</i> (Claereboudt and Hoeksema, 1987)	*	
225	<i>Fungia sechellensis</i> Hoeksema, 1993	*	
226	<i>Fungia taiwanensis</i> Hoeksema and Dai, 1991 <i>Ctenactis</i> Verrill, 1864	*	
227	<i>Ctenactis albitentaculata</i> Hoeksema, 1989	*	
228	<i>Ctenactis crassa</i> (Dana, 1846)	*	*
229	<i>Ctenactis echinata</i> (Pallas, 1766) <i>Herpolitha</i> Eschscholtz, 1825	*	*
230	<i>Herpolitha limax</i> (Houttuyn, 1772)	*	*
231	<i>Herpolitha weberi</i> Horst, 1921 <i>Polyphyllia</i> Quoy and Gaimard, 1833	*	
232	<i>Polyphyllia talpina</i> (Lamarck, 1801) <i>Sandalolitha</i> Quelch, 1884	*	*
233	<i>Sandalolitha dentata</i> Quelch, 1884	*	
234	<i>Sandalolitha robusta</i> (Quelch, 1886) <i>Halomitra</i> Dana, 1846	*	*
235	<i>Halomitra pileus</i> (Linnaeus, 1758) <i>Lithophyllon</i> Rehberg, 1892	*	*
236	<i>Lithophyllon lobata</i> (Horst, 1921)	*	*
237	<i>Lithophyllon undulatum</i> Rehberg, 1892 <i>Podabacia</i> Milne Edwards and Haime, 1849	*	
238	<i>Podabacia crustacea</i> (Pallas, 1766)	*	*
239	<i>Podabacia lanakensis</i> Veron, 2000	*	
240	<i>Podabacia sinai</i> (Veron, 2000) PECTINIIDAE Vaughan and Wells, 1943 <i>Echinophyllia</i> Klunzinger, 1879	*	

No.	Species	Andaman	Nicobar
241	<i>Echinophyllia aspera</i> (Ellis and Solander, 1786)	*	*
242	<i>Echinophyllia echinata</i> (Saville-Kent, 1871)	*	
243	<i>Echinophyllia echinoporoides</i> Veron and Pichon, 1979	*	*
244	<i>Echinophyllia orpheensis</i> Veron and Pichon, 1980 <i>Echinomorpha</i> Veron, 2000	*	
245	<i>Echinomorpha nishihirai</i> (Veron, 1990) <i>Oxypora</i> Saville-Kent, 1871	*	
246	<i>Oxypora lacera</i> (Verrill, 1864)	*	*
247	<i>Oxypora crassispinosa</i> Nemenzo, 1979 <i>Mycedium</i> Oken, 1815	*	
248	<i>Mycedium elephantotus</i> (Pallas, 1766)	*	*
249	<i>Mycedium robokaki</i> Moll and Borel-Best, 1984 <i>Pectinia</i> Oken, 1815	*	
250	<i>Pectinia alcornonis</i> (Saville-Kent, 1871)	*	
251	<i>Pectinia lactuca</i> Pallas, 1766	*	*
252	<i>Pectinia paeonia</i> (Dana, 1846)	*	*
253	<i>Pectinia teres</i> Nemenzo, 1981 MERULINIDAE Verrill, 1866 <i>Hydnophora</i> Fischer de Waldheim, 1807	*	*
254	<i>Hydnophora exesa</i> (Pallas, 1766)	*	*
255	<i>Hydnophora grandis</i> Gardiner, 1904	*	
256	<i>Hydnophora microconos</i> (Lamarck, 1816)	*	*
257	<i>Hydnophora pilosa</i> (Veron, 1985)	*	*
258	<i>Hydnophora rigida</i> (Dana, 1846) <i>Merulina</i> Ehrenberg, 1834	*	*
259	<i>Merulina ampliata</i> (Ellis and Solander, 1786)	*	*
260	<i>Merulina scabricula</i> Dana, 1846 <i>Scapophyllia</i> Milne Edwards and Haime, 1848	*	*
261	<i>Scapophyllia cylindrica</i> (Milne Edwards and Haime, 1848) DENDROPHYLLIDAE Grey, 1847 <i>Dendrophyllia</i> Grey, 1847	*	*
262	<i>Dendrophyllia arbuscula</i> v. der Horst	*	*
263	<i>Dendrophyllia miniscula</i> (Bourne, 1905)	*	
264	<i>Dendrophyllia robusta</i> (Bourne, 1905) <i>Tubastrea</i>	*	
265	<i>Tubastrea aurea</i> (Quoy and Gaimars)	*	*
266	<i>Tubastrea coccinea</i> Lesson, 1829	*	*
267	<i>Tubastrea diaphana</i> Dana, 1846	*	
268	<i>Tubastrea fulkneri</i> (Wells, 1982)	*	*
269	<i>Tubastrea micranthus</i> Ehrenberg, 1834 <i>Turbinaria</i> Oken, 1815	*	



No.	Species	Andaman	Nicobar
270	<i>Turbinaria mesenterina</i> (Lamarck, 1816)	*	*
271	<i>Turbinaria peltata</i> (Esper, 1794)	*	*
272	<i>Turbinaria reniformis</i> Bernard, 1896	*	*
273	<i>Turbinaria radicalis</i> Bernerd, 1896	*	*
274	<i>Turbinaria stellulata</i> (Lamarck, 1816)	*	*
	<i>Balanophyllia</i> S.Wood, 1844		
275	<i>Balanophyllia imperialis</i> Kent	*	*
276	<i>Balanophyllia scabra</i> Alock	*	*
	<i>Endopsammia</i> Milne Edwards and Haime, 1848		
277	<i>Endopsammia philippinensis</i> Milne Edwards and Haime	*	*
	<i>Heteropsammia</i> Milne Edwards and Haime, 1848		
278	<i>Heteropsammia michelini</i> Milne Edwards and Haime	*	*
	<i>Enallopsammia</i> Micheloti		
279	<i>Enallopsammia ampheliodes</i> (Alock)	*	*
280	<i>Enallopsammia mearenzelleri</i> (Zibrowiun)	*	*
	CARYOPHYLLIIDAE Gray, 1847		
	<i>Caryophyllia</i> Lamrck, 1801		
281	<i>Caryophyllia clavus</i> Scacchi	*	*
282	<i>Caryophyllia arcuata</i> Milne Edwards and Haime	*	*
283	<i>Caryophyllia grayi</i> Milne Edwards and Haime	*	*
	<i>Deltocyathus</i> Milne Edwards and Haime, 1848		
284	<i>Deltocyathus andamanensis</i> Alock	*	*
	<i>Paracyathus</i> Milne Edwards and Haime		
285	<i>Paracyathus indicus</i> Duncan	*	*
286	<i>Paracyathus stokesi</i> Milne Edwards and Haime	*	*
	<i>Polycyathus</i> Duncan, 1889		
287	<i>Polycyathus verrilli</i> Duncan	*	*
288	<i>Polycyathus andamanensis</i> Alock	*	*
	<i>Heterocyathus</i> Milne Edwards and Haime		
289	<i>Heterocyathus aequicostatus</i> Milne Edwards and Haime	*	*
	FLABELLIDAE Bourne, 1905		
	<i>Placotrochus</i> Milne Edwards and Haime, 1848		
290	<i>Placotrochus laevis</i> Milne Edwards and Haime	*	*
	RHIZANGIIDAE Orbingny, 1851		
	<i>Culicia</i> Dana, 1846		
291	<i>Culicia rubeola</i> (Quoy and Gaimard, 1833)	*	*

No.	Species	Andaman	Nicobar
	MUSSIDAE Ortmann, 1890		
	<i>Acanthastrea</i> Milne Edwards and Haime, 1848		
292	<i>Acanthastrea echinata</i> (Dana, 1846)	*	*
293	<i>Acanthastrea hemprichii</i> (Ehrenberg, 1834)	*	*
294	<i>Acanthastrea maxima</i> Sheppard and Salm, 1988	*	*
295	<i>Acanthastrea regularis</i> Veron, 2000	*	*
	<i>Lobophyllia</i> de Blainville, 1830		
296	<i>Lobophyllia diminuta</i> Veron, 1985	*	*
297	<i>Lobophyllia corymbosa</i> (Forskal, 1775)	*	*
298	<i>Lobophyllia hemprichii</i> (Ehrenberg, 1834)	*	*
299	<i>Lobophyllia robusta</i> Yabe and Sugiyama, 1936	*	*
	<i>Symphyllia</i> Milne Edwards and Haime, 1848		
300	<i>Symphyllia agaricia</i> (Milne Edwards and Haime, 1849)	*	*
301	<i>Symphyllia erythraea</i> (Klunzinger, 1879)	*	*
302	<i>Symphyllia radians</i> Milne Edwards and Haime, 1849	*	*
303	<i>Symphyllia recta</i> (Dana, 1846)	*	*
304	<i>Symphyllia valenciennesii</i> Milne Edwards and Haime, 1849	*	*
305	<i>Symphyllia hassi</i> Pillai and Scheer, 1976	*	*
	<i>Scolymia</i> Haime, 1852		
306	<i>Scolymia australis</i> (Milne Edwards and Haime, 1849)	*	*
307	<i>Scolymia cubensis</i> (Milne Edwards and Hame, 1849)	*	*
308	<i>Scolymia vitiensis</i> Bruggemann, 1877	*	*
	<i>Mycetophyllia</i> Milne Edwards and Haime, 1848		
309	<i>Mycetophyllia danaana</i> (Milne Edwards and Haime, 1849)	*	*
	<i>Australomussa</i> Veron, 1985		
310	<i>Australomussa rowleyensis</i> Veron, 1985	*	*
	<i>Cynarina</i> Bruggemann, 1877		
311	<i>Cynarina lacrymalis</i> (Milne Edwards and Haime, 1848)	*	*
	FAVIIDAE Gregory, 1900		
	<i>Caulastrea</i> Dana, 1846		
312	<i>Caulastrea furcata</i> Dana, 1846	*	*
	<i>Favia</i> Oken, 1815		
313	<i>Favia albidus</i> Veron 2000	*	*
314	<i>Favia danae</i> Verrill, 1872	*	*
315	<i>Favia favius</i> (Forskal, 1775)	*	*



No.	Species	Andaman	Nicobar
316	<i>Favia helianthoides</i> Wells, 1954	*	
317	<i>Favia lacuna</i> (Veron, Turak and DeVantier)	*	
318	<i>Favia laxa</i> (Klunzinger, 1879)	*	
319	<i>Favia lizardensis</i> (Veron and Pichon, 1977)	*	
320	<i>Favia matthaii</i> Vaughan, 1918	*	*
321	<i>Favia maxima</i> Veron, Pichon and Wijsman-Best, 1977	*	*
322	<i>Favia pallida</i> (Dana, 1846)	*	*
323	<i>Favia rotumana</i> (Gardiner, 1899)	*	*
324	<i>Favia speciosa</i> Dana, 1846	*	*
325	<i>Favia stelligera</i> (Dana, 1846)	*	*
326	<i>Favia truncates</i> Veron, 2000	*	*
	Barabattoia Yabe and Sugiyama, 1941		
327	<i>Barabattoia amicorum</i> (Milne Edwards and Haime, 1850)	*	*
328	<i>Barabattoia laddi</i> (Wells, 1954)	*	*
	Favites Link, 1807		
329	<i>Favites abdita</i> (Ellis and Solander, 1786)	*	*
330	<i>Favites acuticollis</i> (Ortmann, 1889)	*	
331	<i>Favites chinensis</i> (Verrill, 1866)	*	
332	<i>Favites complanata</i> (Ehrenberg, 1834)	*	*
333	<i>Favites flexuosa</i> (Dana, 1846)	*	*
334	<i>Favites halicora</i> (Ehrenberg, 1834)	*	*
335	<i>Favites micropentagona</i> Veron, 2002	*	
336	<i>Favites paraflexuosa</i> (Veron, 2002)	*	
337	<i>Favites pentagona</i> (Esper, 1794)	*	*
338	<i>Favites russelli</i> (Wells, 1954)	*	
339	<i>Favites spinosa</i> (Klunzinger, 1879)	*	*
340	<i>Favites vasta</i> (Klunzinger, 1879)	*	
	Goniastrea Milne Edwards and Haime, 1848		
341	<i>Goniastrea aspera</i> Verrill, 1905	*	*
342	<i>Goniastrea australensis</i> (Milne Edwards and Haime, 1857)	*	*
343	<i>Goniastrea edwardsi</i> Chevalier, 1971	*	*
344	<i>Goniastrea minuta</i> Veron, 2002	*	
345	<i>Goniastrea pectinata</i> (Ehrenberg, 1834)	*	*
346	<i>Goniastrea persi</i> (Faure and Pichon, 1978)	*	
347	<i>Goniastrea retiformes</i> (Lamarck, 1816)	*	*
	Platygyra Ehrenberg, 1834		
348	<i>Platygyra acuta</i> Veron, 2000	*	
349	<i>Platygyra carnosus</i> Veron, 2000	*	
350	<i>Platygyra crosslandi</i> Matthai, 1928	*	
351	<i>Platygyra daedalea</i> (Ellis and Solander, 1786)	*	*
352	<i>Platygyra lamellina</i> (Ehrenberg, 1834)	*	*
353	<i>Platygyra pini</i> Chevalier, 1975	*	*
354	<i>Platygyra ryukyuensis</i> (Yabe and Sugiyama, 1936)	*	

No.	Species	Andaman	Nicobar
355	<i>Platygyra sinensis</i> (Milne Edwards and Haime, 1849)	*	*
356	<i>Platygyra verweyi</i> Wijsman-Best, 1976	*	
	Oulophyllia Milne Edwards and Haime, 1848		
357	<i>Oulophyllia bennettiae</i> (Veron and Pichon, 1099)	*	
358	<i>Oulophyllia crispa</i> (Lamarck, 1816)	*	*
359	<i>Oulophyllia levis</i> (Nememzo, 1959)	*	
	Leptoria Milne Edwards and Haime, 1848		
360	<i>Leptoria irregularis</i> Veron, 1990	*	*
361	<i>Leptoria phrygia</i> (Ellis and Solander, 1786)	*	*
	Diploria Milne Edwards and Haime, 1848		
362	<i>Diploria strigosa</i> (Dana, 1848)	*	
	Montastrea de Blainville, 1830		
363	<i>Montastrea annuligera</i> (Milne Edwards and Haime, 1849)	*	*
364	<i>Montastrea cavernosa</i> (Linnaeus, 1766)	*	
365	<i>Montastrea colemani</i> (Veron, 2000)	*	
366	<i>Montastrea curta</i> (Dana, 1846)	*	
367	<i>Montastrea salebrosa</i> (Nememzo, 1959)	*	
368	<i>Montastrea valenciennesi</i> (Milne Edwards and Haime, 1848)	*	*
	Plesiastrea Milne Edwards and Haime, 1848		
369	<i>Plesiastrea versipora</i> (Lamarck, 1816)	*	*
	Oulastrea Milne Edwards and Haime, 1848		
370	<i>Oulastrea crispata</i> (Lamarck, 1816)	*	*
	Diplostrea Matthai, 1914		
371	<i>Diplostrea heliopora</i> (Lamarck, 1816)	*	*
	Colpophyllia Milne Edwards and Haime, 1848		
372	<i>Colopophyllia natans</i> (Houttuyn, 1772)	*	
	Leptastrea Milne Edwards and Haime, 1848		
373	<i>Leptastrea aequalis</i> Veron, 2000	*	*
374	<i>Leptastrea bottae</i> Milne Edwards and Haime, 1849	*	*
375	<i>Leptastrea purpurea</i> (Dana, 1846)	*	*
376	<i>Leptastrea transversa</i> Klunzinger, 1879	*	*
	Cyphastrea Milne Edwards and Haime, 1848		
377	<i>Cyphastrea japonica</i> Yana and Sugiyama, 1932	*	*



No.	Species	Andaman	Nicobar
378	<i>Cyphastera microphthalmia</i> (Lamarck, 1816)	*	*
379	<i>Cyphastera ocellina</i> (Dana, 1864)	*	
	<i>Solenastrea</i> Milne Edwards and Haime, 1848		
380	<i>Solenastrea bournoni</i> (Milne Edwards and Haime, 1849)	*	
	<i>Echinopora</i> Lamarck, 1816		
381	<i>Echinopora forkaliana</i> (Milne Edwards and Haime, 1850)	*	
382	<i>Echinopora fruticulosa</i> (Ehrenberg, 1834)	*	
383	<i>Echinopora gemmacea</i> Lamarck, 1816	*	*
384	<i>Echinopora hirsutissima</i> Milne Edwards and Haime, 1849	*	
385	<i>Echinopora horrida</i> Dana, 1846	*	*
386	<i>Echinopora lamellosa</i> (Esper, 1795)	*	*
387	<i>Echinopora pacificus</i> Veron, 1990	*	
	TRACHYPHYLLIIDAE		
	Milne Edwards and Haime, 1848		
	Trachyphyllia Milen Edwards and Haime, 1848		
388	<i>Trachyphyllia geoffroyi</i> (Audouin, 1826)	*	*
	PORITIDAE Grey, 1842		
	<i>Porites</i> Link, 1807		
389	<i>Porites annae</i> Crossland, 1952	*	
390	<i>Porites arnaudi</i> Reyes-Bonilla and Carricart-Ganivet, 2000	*	
391	<i>Porites compressa</i> Dana, 1846	*	*
392	<i>Porites cylindrica</i> Dana, 1846	*	*
393	<i>Porites densa</i> Vaughan, 1918	*	
394	<i>Porites eridani</i> Umbgrove, 1940	*	
395	<i>Porites evermanni</i> Vaughan, 1907	*	
396	<i>Porites harrisoni</i> Veron, 2000	*	
397	<i>Porites latistella</i> Quelch, 1886	*	
398	<i>Porites lichen</i> Dana, 1846	*	*

No.	Species	Andaman	Nicobar
399	<i>Porites lobata</i> Dana, 1846	*	*
400	<i>Porites lutea</i> Milne Edwards and Haime, 1860	*	*
401	<i>Porites monticulosa</i> Dana, 1846	*	
402	<i>Porites murrayensis</i> Vaughan, 1918	*	*
403	<i>Porites myrmidoensis</i> Veron, 1985	*	
404	<i>Porites nigrescens</i> Dana, 1846	*	*
405	<i>Porites porites</i> (Pallas, 1766)	*	
406	<i>Porites rus</i> (Forskal, 1775)	*	*
407	<i>Porites solida</i> (Forskal, 1775)	*	*
408	<i>Porites stephensoni</i> Crossland, 1952	*	
409	<i>Porites vaughani</i> (Crossland, 1952)	*	
	<i>Goniopora</i> de Blainville, 1830		
410	<i>Goniopora columna</i> Dana, 1846	*	*
411	<i>Goniopora eclipsensis</i> Veron and Pichon, 1982	*	
412	<i>Goniopora fruticosa</i> Saville-Kent, 1893	*	
413	<i>Goniopora lobata</i> Milne Edwards and Haime, 1860	*	*
414	<i>Goniopora minor</i> Crossland, 1952	*	*
415	<i>Goniopora norfolkensis</i> Veron and Pichon, 1982	*	
416	<i>Goniopora pandoraensis</i> Veron and Pichon, 1982	*	
417	<i>Goniopora pearsoni</i> Veron, 2000	*	
418	<i>Goniopora planulata</i> (Ehrenberg, 1834)	*	*
419	<i>Goniopora savignyi</i> Danan, 1846	*	
420	<i>Goniopora stokesi</i> Milne Edwards and Haime, 1851	*	*
421	<i>Goniopora tenuidens</i> (Quelch, 1886)	*	*
	<i>Alveopora</i> de Blainville, 1830		
422	<i>Alveopora catalai</i> Wells, 1968	*	
423	<i>Alveopora marionensis</i> (Veron and Pichon, 1982)	*	
424	<i>Alveopora verrilliana</i> Dana, 1846	*	*
	Total number of species	424	242
	Total number of genus	86	74
	Total number of family	19	18

and a barrier reef to the west has also been reported with a lagoon up to 40m deep on the western side, but its precise coordinates are yet unknown. So, the reefs of the area still largely remain unstudied. A deep oceanic ridge along 10° N separates the Andaman group and Nicobar group of Islands. Coral reefs of Andaman and Nicobar Islands can be classified into grouped five major zones as follows: North Andaman, Middle Andaman, South Andaman, Little Andaman and Nicobar reefs.

The Northern most part of the Andaman Archipelago comprises of pristine mangroves and serene beaches. Diglipur in North Andaman is endowed with dense mangroves and splendid shallow coral reefs. Though the reefs are not very dense, they are richly diversified. *Porites* dominates in few regions in an insignificant level. In the Islands of Ross and Smith, which are on the eastern side of Diglipur, the reefs are in thick patches, characterized by *Acropora* and *Porites* in



greater density. Exposure of vast reef area can be witnessed during low tides in most of the islands of this area.

Middle Andaman with a total area of 1,536 km² composed more of lush growth of mangroves in the shoreline and with a muddy bottomed nearby sea in most fractions. The coral reefs are mainly concentrated around the smaller islands adjacent to Middle Andaman such as Long Island group in the east. The reefs along the eastern side of all the scattered islands surrounding Middle Andaman are shallow due to the land uplift caused by destructive seismic waves. The reefs are mainly dominated by *Acropora* followed by *Porites* in few islands. The islands in the western side of Mayabunder are also represented by shallow reefs but have lesser reef flat than the islands in the eastern side. Comparing to other region middle Andaman doesn't have a noteworthy coral diversity, because of mangrove lushes, loose bottom and high sedimentation restrict the coral growth only up to 10m depth except few Islands like Sound, Interview and Reef Islands, but these are Sea ward Islands.

South Andaman is the highly diversified and species richness zone of Andaman and Nicobar Islands. The coral reefs of South Andaman differ in wide proportions from one another. All the reefs in South Andaman have small reef flat and gradual reef slope, that extend up to 40m with good luminosity. Most of the reef bottoms covered with dead corals, rubbles and live rock, hence, these reefs offer high coral recruitment, good coral live cover and reef associated fauna, in comparison with other sandy and muddy bottom reefs of North and Middle Andaman. South Andaman boasts two marine national parks namely, Mahatma Gandhi Marine National Park and Rani Jhansi Marine National Park. These two parks cover some of the major reefs of this region. These protected zones possess excellent species diversity and have good live coral cover, when compared to other areas in South Andaman. South Andaman reefs are mainly dominated by *Acropora*, *Favia*, *Fungia*, *Pocillopora*, and few Mussid genera. Some of the Coral reef areas such as North Bay, where tourism has been promoted to extreme degrees have degraded over the years due to the constant encounter with anthropogenic activity.

Little Andaman is the southernmost island of the Andaman Archipelago. The island does not possess many shallow reefs like in the northern parts. The reefs are far away from shore and colonize in depths at an average of 15m. Destructive tsunami engulfed the reefs of little Andaman to a large extent and it is evident along the eastern side. Recruited corals are more prevalent in shallower regions due to high algal cover and hard bottom, revealing a good sign of recovery. Deep water corals are healthy and are affected to very lesser degree. Unfortunately, there is no exact reef crest and reef slope. Thus, these reefs have less diversity but have good live cover. Some seaward reefs are covered with sandy bottom between the patchy reefs, they causes high degree of siltation and so hosts mainly boulder and encrusting corals. *Acroporids* and *Porites* are dominant over here.

Nicobar group of Islands are flat, fertile islands with unspoilt seas all around. Deep water corals dominate the reefs of Car Nicobar. *Acropora* is abundant here. Long stretch of reef slope offers the good live cover and diversity. Higher wave and strong current controls the species diversity. Newly recruited Acroporids are seen in most of the reefs in these islands.

Reef structure in the major reefs of India

All three major reef types occur in India (Atoll, Fringing and Barrier). Within these habitats are some of the most diverse, extensive and least disturbed reefs in the Indian Ocean. The mainland coast of India has two widely separated areas containing reefs: the Gulf of Kachchh in the northwest, which has some of the most northerly reefs in the world, and Palk bay and Gulf of Mannar in the Southeast. Other than Andaman and Nicobar Islands, India has one more offshore Islands; Lakshadweep in the Arabian Sea which also have extensive reef diversity.

Gulf of Kachchh has fringing reefs like Andaman, but due to the high tidal amplitude and sedimentation rate, which controls the coral settlement, coral growth and gamete release these reefs restricted with shallow water corals. In Palk bay there is one barrier reef, less than 200m wide and maximum depth of 6m. The lagoon is shallow and can be waded through at lowest tides. Thus, this reef prevail encrusting and boulder corals.



Different types of reef forms such as shore platforms, patch, and fringing type are also observed in the Gulf of Mannar regions. Those islands have fringing reefs and patch reefs around them. Narrow fringing reefs are located mostly at a distance of 50 to 100 m from the Islands. On the other hand patchy reefs rise from depths of 2 to 9m and extend to 1 to 2 km in length. Reef flat is extensive in almost all the reefs in the Gulf of Mannar. Reef vegetation is richly distributed on these reefs. But unusual monsoon, coral mining and high sedimentation load affects the visibility, and mostly restricted to large corallites possessing corals like Faviidae.

Lakshadweep Islands consist, chain of coral atolls and reef on a continuous submarine banks like Andaman western invisible coral banks, covering a distance of over 2000 km. The Islands are flat and scarcely rise more than 2m. They are made up of coral sand and boulders that have been compacted into sandstone. Coral reefs of the Islands are mainly atolls except one platform at Androt. Lakshadweep also has good light intensity like Andaman, and they have good coral diversity too. Acropora, Pocillopora, Psammocora and some encrusting faviids dominate the Lakshadweep reefs.

Coral diversity

A check list of scleractinian corals recorded so far from Andaman and Nicobar Islands is presented in the Table 2. Most of the species mentioned herein from Andaman have been examined by the authors. Information on the occurrence of the various species is based on previous works (Sudarshan *et al.*, 1967, Pillai 1967a&b, Sheppard 1987 and Venkataraman 2003). The taxonomical hierarchy followed here is that of Veron, 2000 and Venkataraman *et al.*, 2003.

Among India's four major reefs, Andaman and Nicobar Islands are showing maximum diversity (Pillai, 1967a, Venkataraman *et al.*, 2003) (Table 3). There was no significant compilation on coral diversity after Venkataraman *et al.*, (2003). The present work compiles all the recent works done in Andaman and Nicobar Islands as well as other parts of India. This study resulted with a total of 424 zooxanthellate and azooxanthellate coral species distributed all over the Andaman and Nicobar Islands, where India has a total of 478 species,

which contributes 60% of global coral diversity. Andaman Islands alone have 424 species (89% of India's coral diversity) and 242 species (all these species recorded in Andaman also) distributed in Nicobar groups of Islands which contributes 51% coral diversity of India. Andaman and Nicobar Islands have two endemic species namely *Deltocyathus andamanensis* Alock and *Polycyathus andamanensis* Alock; which are azooxanthellate in nature (Venkataraman, 2003).

Table 3: Comparison of the scleractinian corals in the major reefs of India

	Gulf of Kachchh*	Lakshadweep**	Palk Bay and*** Gulf of Mannar	A&N Islands	Total
Families	10	13	14	19	19
Genera	27	37	40	86	89
Species	49	104	117	424	478

*- Satyanarayana, 2010; **-Planning Commission, Govt. of India, 2008; ***-Patterson, 2007

Among the four major reef areas of India, Andaman and Nicobar Islands are found to be very rich and Gulf of Kachchh the poorest in species diversity. Lakshadweep Islands have more number of species than the Gulf of Mannar. About 97% of Indian genera has been recorded from Andaman and Nicobar Island. where as other reefs constitute merely 40%. This indicates the high degree of coral diversity in Andaman and Nicobar Islands. Interestingly Andaman and Nicobar Islands has all the families (100%) which are recorded from other major reefs of India.

Major coral families in A and N Islands in comparison with Indian corals

Andaman and Nicobar reefs are mainly dominated by family Acroporidae, Faviidae, Poritidae, Fungidae and Agariciidae. Acroporidae alone contributes 30% of the total coral biodiversity of Andaman and Nicobar with 126 species which is about 83% of the Indian acroporids (Table 4). High wave action areas like, Little Andaman, Car Nicobar and some open sea islands of Andaman confine the high diversity of Acroporid with good live cover. Gradual reef slope of Andaman and Nicobar



Table 4: Coral families recorded from A and N Islands in comparison with Indian corals.

No.	Family	India		A & N Islands	
		Genus	Species	Genus	Species
1	ACROPORIDAE Verrill, 1902	4	143	4	126
2	ASTROCOENIIDAE Koby, 1890	2	4	2	3
3	POCILLOPORIDAE Gray, 1842	3	15	3	15
4	EUPHYLLIDAE Veron, 2000	3	7	3	7
5	OCULINIDAE Grey, 1847	1	4	1	3
6	MEANDRINIDAE Gray, 1847	1	1	1	1
7	SIDERASTREIDAE Vaughan and Wells, 1943	4	14	4	13
8	AGARICIIDAE Grey, 1847	6	32	6	29
9	FUNGIIDAE Dana, 1846	11	48	11	43
10	PECTINIIDAE Vaughan and Wells, 1943	5	13	5	13
11	MERULINIDAE Verrill, 1866	3	8	3	8
12	DENDROPHYLLIDAE Grey, 1847	7	26	7	19
13	CARYOPHYLLIIDAE Gray, 1847	6	11	5	9
14	FLABELLIDAE Bourne, 1905	2	2	1	1
15	RHIZANGIIDAE Orbingny, 1851	2	2	1	1
16	MUSSIDAE Ortmann, 1890	7	23	7	20
17	FAVIIDAE Gregory, 1900	18	81	18	76
18	TRACHYPHYLLIIDAE Milne Edwards and Haime, 1848	1	1	1	1
19	PORITIDAE Grey, 1842	3	43	3	36
	Total	89	478	86	424

Fig. 2: Major threats of Andaman and Nicobar coral reefs



Effect Tsunami



Effect of recent Bleaching



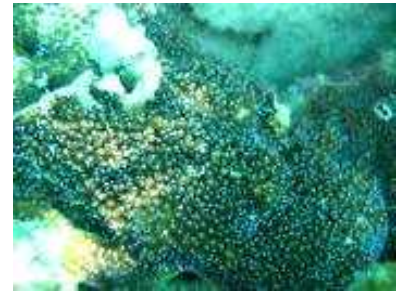
Siltation



Acropora humilis (Dana, 1846)



Astreopora listeri Bernard, 1896



Montipora peltiformis Benard, 1897



Favia speciosa Dana, 1846



Platygyra daedalea (Ellis and Solander, 1786)



Leptoria phrygia (Ellis and Solander, 1786)



Funqia klunzingeri Doderlein, 1901



Herpolitha limax (Houttuyn, 1772)



Ctenactis echinata (Pallas, 1766)



Porites cylindrica Dana, 1846



Porites rus (Forskal, 1775)



Goniopora tenuidens (Quelch, 1886)



Leptoseris solida (Quelch, 1886)



Pavona explanulata (Lamarck, 1816)



Pachyseris rugosa (Lamarck, 1801)

Fig. 3: Coral diversity of Andaman and Nicobar Islands.



Islands host, variety of Acroporid forms such as table, digitate, encrusting and sub-massive. Large reef flat areas like in North Andaman reefs offer many boulder corals (26%) such as Faviidae, Poritidae.

Following Faviidae, the family Fungiidae contributes notable amount of species to the Andaman and Nicobar reef diversity with 43 species belonging to 11 genera. Though Fungiidae recorded high number of species, they do not contribute in reef formation expect few encrusting species. Encrusting family like Agariciidae also show high rate of diversity than few massive corals (Mussidae). North and Middle Andaman show high diversity of encrusting and solitary corals.

Among the 424 species belonging to 19 families Meandrinidae and Trachyphylliidae represents only one species each, but the latter is a monospecific family. Musiidae is also one of the major reef building corals which does not have rich species diversity (20 species). Andaman & Nicobar Islands are unique in possessing all the species of Pectiniidae family that are recorded from mainland India so far. Other than zooxanthellate; azooxanthellate coral families like Dendrophyllidae and Caryophyllidae also have good diversity (19 and 9 species respectively).

Andaman and Nicobar Islands corals and its affinities

Andaman and Nicobar Islands connects the Bay of Bengal and Pacific Ocean through Andaman Sea, so they have affinities on both east coast of India and west coast of Thailand, Burma, Sumatra and Java. The most diverse region of the world for coral reefs is centred on the Philippines, Indonesia, Malaysia and Papua New Guinea, with between 500 and 600 species of coral in each of these countries. Andaman and Nicobar Islands has major affinities with eastern side of the Islands than western (Sheppard, 1987, Venkataraman *et al.* 2003). When compared to the Gulf of Mannar and Sri Lanka which has recorded only 117 (Patterson, 2007) and 289 (Veron, 2009) species respectively, this archipelago shows very similarity to eastern eco-regions such as Sumatra (386 species) and Thailand (404 species) (Veron, 2009). Hence, Andaman and Nicobar Archipelago have much affinity with Indo-West Pacific

reefs than peninsular Indian reefs. The major reason of this affinity is that these regions (Sumatra and Thailand) are very close to Andaman Islands.

Nicobar coral reefs and its importance

Entire Nicobar group of Islands are falling under Sundaland Biodiversity hotspot. The Sundaland biodiversity hotspot covers about 17,000 Islands, but this has been mainly considered for terrestrial floral and faunal diversity. Sumatra and Java Islands also coming under Sundaland Biodiversity hotspot, and Nicobar Islands has much coral biodiversity affinities with these groups of Islands (Veron, 2009). Sundaland Islands (Nicobar, Sumatra and Java) are augmented with rich marine biodiversity. Thus, these Islands may be declared as marine biodiversity hotspot for the better research and management.

In addition, Andaman and Nicobar Islands are closely located to 'Coral Triangle' (CT) (~2800 km away), which is almost the same distance between the Lakshadweep Islands and Andaman and Nicobar Islands. In CT, minimum number of species reported in North Arafura Islands (503 species) (Veron, 2009) are also almost similar in number of coral species (424 species) recorded from this archipelago. Extensive survey of remote Islands like Nicobar could increase the number of species (Rajkumar *et al.*, 2010). In future, the CT can be demarcated up to Andaman and Nicobar Islands owing to the rich marine biodiversity of this region. Coral species reported from Andaman and Nicobar Islands remained a dismal 177 species (Venkataraman *et al.*, 2003); but the work by Turner *et al.* (2001) hints that coral diversity in these Islands could accrue to 80% of the global maximum. The recent works by the Zoological Survey of India enhanced up the coral species records from this archipelago making this a total of 326 species. The compilation of the recent works has increased to 424 species of corals in Andaman and Nicobar Islands.

Major threats to the reefs of Andaman and Nicobar islands

The mean SST analysis in Andaman Sea over a decade shows that the reef area has warmed from 28.40°C in 1985 to 28.78°C in 2005 *i.e.* at the rate of



0.19°C per decade. The annual average maximum SST increased from 30.08°C to 30.54°C, *i.e.* at a rate of 0.23°C per decade. The minimum SST increased at a faster rate of 0.35°C per decade (from 27.1° to 27.8°C). Coral bleaching occurred when the summer SST maxima exceeded 31°C and remained high for more than 30 days. During July 1998, 90% of the massive corals and 75% of the branching corals were bleached. The 1998 bleaching event had little impact in the Andaman and Nicobar, and an average of 65% live coral cover was estimated at that time. The mortality due to bleaching in this area during 1998 was relatively local, however subsequent surveys showed no sign of mass mortality. Tsunami cum earthquake that struck on 26th December 2004 caused damage to the extent of 30% loss in several reef areas in North Andaman. The SST in Andaman Sea during May 2005 was between 31 °C and 32 °C which resulted in the localized massive beaching. Similarly in 2010, SST of Andaman Sea increased to 31.7°C against average of 30.08 °C resulted massive bleaching of corals. Extent of bleaching during April-May 2010 ranged from 65% to 81% in various sites. The estimated left over live coral cover in June 2010 was 1.09 to 9.7 %. Presently the live coral status has been improved to an average of 25.38 % during November 2011.

Siltation and smothering of coral reefs is a major issue in Andaman and Nicobar Islands, because of Islands receives approximately 300 cm rainfall annually. This heavy precipitation leads to freshwater influx, then the runoff stressed upon many fauna and flora in semi-enclosed bays and lagoons by lowering salinity and depositing large amounts of sediments and nutrients. Some of the reefs near Port Blair area itself are under threat due to siltation which causes mortality of corals. In Andaman and Nicobar Islands population sheltered at coastal areas only, hence the sewage directly discharging on the reefs. Sewage discharge and runoff may also introduce pathogens into coral reef ecosystems. For example, *Aspergillus sydowii* has been associated with a disease in sea fans, and *Serratia marcescens*, has been linked to white pox, another coral disease.

Conclusion

This work clearly indicates that Andaman and Nicobar Islands have much coral diversity (contributing

60% of global coral biodiversity) when compared to other mainland Indian reefs and also nearby eco-regions. These Islands have greater affinities with ecological impact regions in terms of coral species diversity, such as Sundaland and Coral Triangle. A concentrated work on the coral diversity can yield many more species from this archipelago. Surveying the remote Islands is a big problem in developing country like India. Some of the territorial Islands are being maintained by defence, Coast guard for security purpose, in this scenario research permission and accessibility itself is a big issue. Second issue is the tracking of islands; the fishermen-the only accessible way to coral reefs in most of the regions- know only local names of the Island. Therefore conveying the exact location to the fishermen with a detailed map also makes dilemma. Most of the Islands are named by foreign sailors; local people might not know the name which is being used nationally. Andaman and Nicobar Islands consist of six aboriginal tribes; so, some of the Islands in Nicobar regions are restricted to the general civilian without prior permission. Another important setback is the adverse weather conditions, as these chains of Islands are located in the open ocean between two seas (Bay of Bengal and Andaman Sea) which cause these Islands weather change dramatically continuously throughout the year.

Apart from the above mentioned issues; locating some of the open sea reefs such as barrier reef in the western side, invisible coral banks, open sea ledges and patch reefs are also another key issue. Most of the surveys had been done on the eastern side (Andaman Sea) of the Islands, may be the reason for, Andaman reef's less affinities with Bay of Bengal reef (Gulf of Mannar and Palk Bay). These kinds of struggle restrict the researchers to survey only confined and easily accessible Islands. When the said issues are rectified, coral diversity of these Islands could accrue to more than 500 species.

In recent years, the world coral reefs are affecting adversely by climatic change and other anthropogenic pollution. Hence, these pristine reefs should be protected by the Government by declaring this archipelago as a marine biodiversity hotspot. Also adding these islands to coral triangle after more



extensive surveys in these regions, which can attract international attention for conservation and authorities,

should promote the continuous monitoring with the help of government and general public.

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