Global Journal of Science Frontier Research
Agriculture & Biology
Volume 12 Issue 4 Version 1.0 April 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Scleractinian Diversity of Ritchie's Archipelago, Andaman & Nicobar Islands

By Tamal Mondal, C. Raghunathan & K. Venkataraman

Zoological Survey of India

Abstract - Ritchie's Archipelago, being the part of South Andaman, shows a variety of marine biodiversity in each of its thirteen islands. These islands show a great deal of scleractinian life on its continental shelf in a fringing pattern. The study will help up to get a summarized data of scleractinian diversity of this archipelago. The will be to take conservatory measure for the proper sustainable development of coral reef of the islands. A Total of 168 species of scleractinian corals were recorded during the study period from the study areas. Shannon –Weaver Diversity index (H^{-}) of Scleractinian corals ofthe islands was recorded between 4.718 and 6.556, indicating very high coral diversity of those places. Similarity index (S) was also ranges from 29.41% to 73.89%, suggeststhe existence of species strong links between islands. Ritchie's Archipelago is a group of islands which shows a variety of scleractinian corals. high level of species co-existence which harbours with the other associated faunal communities for their survival. The diversity of scleractinian corals in the Ritchie's Archipelago is discussed in detail in this paper.

Keywords : Scleractinian Coral, Diversity, Ritchie's Archipelago, Andaman, Shannon –Weaver Diversity index, Similarity index.

GJSFR-D Classification : FOR Code: 050202, 960802

SCLERACTINIAN DIVERSITY OF RITCHIES ARCHIPELAGO, ANDAMAN NICOBAR ISLANDS

Strictly as per the compliance and regulations of :

© 2012 . Tamal Mondal, C. Raghunathan & K. Venkataraman.This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Scleractinian Diversity of Ritchie's Archipelago, Andaman & Nicobar Islands

Tamal Mondal [α], C. Raghunathan [α] & K. Venkataraman [σ]

Abstract - Ritchie's Archipelago, being the part of South Andaman, shows a variety of marine biodiversity in each of its thirteen islands. These islands show a great deal of scleractinian life on its continental shelf in a fringing pattern. The study will help up to get a summarized data of scleractinian diversity of this archipelago. The will be to take conservatory measure for the proper sustainable development of coral reef of the islands. A Total of 168 species of scleractinian corals were recorded during the study period from the study areas. Shannon –Weaver Diversity index (H^{-}) of Scleractinian corals of the islands was recorded between 4.718 and 6.556, indicating very high coral diversity of those places. Similarity index (S) was also ranges from 29.41% to 73.89%, suggests the existence of species strong links between islands. Ritchie's Archipelago is a group of islands which shows a variety of scleractinian corals. high level of species co-existence which harbours with the other associated faunal communities for their survival. The diversity of scleractinian corals in the Ritchie's Archipelago is discussed in detail in this paper.

Keywords : Scleractinian Coral, Diversity, Ritchie's Archipelago, Andaman, Shannon –Weaver Diversity index, Similarity index.

I. Introduction

The Andaman & Nicobar Islands are a low mountain chain of islands, which rise from a submerged north-south trending ridge separating the sea from Bay of Bengal between 6°-14° N and 92°-94° E. There are 572 islands in the chain, some of which are volcanic. The islands occupy an area of 8293 sq km. with a coastline of 1962 km and account for 30% of the Indian Exclusive Zone [1]. Ritchie's archipelago is one of the most diverse areas with various marine biodiversity. This archipelago is the combined form of thirteen islands such as, Sir William Peel Island, Nicolson Island, Wilson Island, Henry Lawrence Island, Havelock Island, Outram Island, Inglis Island, South Button Island, North Button Island, Middle Button Island, Sir Hugh Rose Island, John Lawrence Island and Neil Island. This archipelago is situated in the Eastern most region of Andaman Islands group.

Author α : Zoological Survey of India, Andaman & Nicobar Regional Centre, National Coral Reef Research Institute,Haddo, Port Blair-744102, India. E-mail : t_genetics@yahoo.com

Author σ : Zoological Survey of India, Prani Vigyan Bhawan, M- Block, New Alipore, Kolkata-700 053, India.

In India, coral reefs are distributed in Andaman and Nicobar Islands, Lakshadweep Islands, Gulf of Mannar and Gulf of Kachchh, and in patches off Malwan on west and Gopalpur on east coast. Indian coral reefs together with shelves, lagoon and submerged banks have a fishery potential of 0.2 billion tones per year or about 10% of the total production [2]. The reef of corals of the Andaman Islands belongs to Indo-west Pacific faunal province. The Andaman are just northwest of the central area of greatest marine biodiversity, referred to as the 'Coral Triangle', an area enclosing the Philippines, central and eastern Indonesia, and northern and eastern Papua New Guinea [3]. Coral reef ecosystems are the most diverse and complex aquatic communities. Although they are diverse as a whole this diversity is not evenly distributed among habitat types within the reef. For a keystone species, the corals, diversity was found to be greatest on reef slopes, mid-level on crests and lowest on reef flats in a study in the region [4]. Coral reefs are among the most valuable yet most threatened of the world's ecosystems. Reefs provide subsistence food for a number of native populations, and also serve as major tourist draws [5]. However, this precious resource is in decline around the world as a result of a number of anthropogenic related factors such as global warming, overfishing, pollution, and even tourism [6]. The most important environmental factors determining the dominant morphologies of coral are light and wave energy, with sedimentation, temperature, plankton availability, and the frequency of mortality caused by a number of factors such as grazing, storms, and tidal exposure also playing a part [7]. It is now widely appreciated that ecosystem functioning is dictated to a large degree by biodiversity and the community structure that result from factors such as the richness and evenness of the diversity. Diversity at all levels, including infra-specific or genetic diversity that characterize populations of a species, species diversity that characterize communities, and in turn community diversity that characterize an ecosystem, all play a major role in this. The present study was undertaken to inventories the scleractinian corals in Ritchie's Archipelago.

II. Materials and Methods

Eleven Islands out of Thirteen Islands of Ritchie's Archipelago were surveyed during August, 2009 to November, 2011 (Table-1 & Fig-1).

© 2012 Global Journals Inc. (US)

Table 1 : Coordinates of Suryed Areas

Sl. No.	Name of the Islands	Latitude	Longitude
1.	Sir William Peel	N-12°03.865'	E-93°07.239'
2.	Nicolson	N-12°06.231'	E-92°57.267'
3.	Wilson	N-12°06.539'	E-92°59.267'
4.	Henry Lawrence	N-12°12.598'	E-93°03.883'
5.	Havelock	N-11°53.274'	E-93°01.439
6.	Outram	N-12°12.346'	E-93°06.475'
7.	Inglis	N-12°08.586'	E-93°06.651'
8.	South Button	N-12°13.243'	E-93°01.200'
9.	Sir Hugh Rose	N-11°46.924'	E-93°04.599'
10.	John Lawrence	N-12°00.112'	E-93°00.608'
11.	Neil	N-11°50.165'	E-93°01.846'

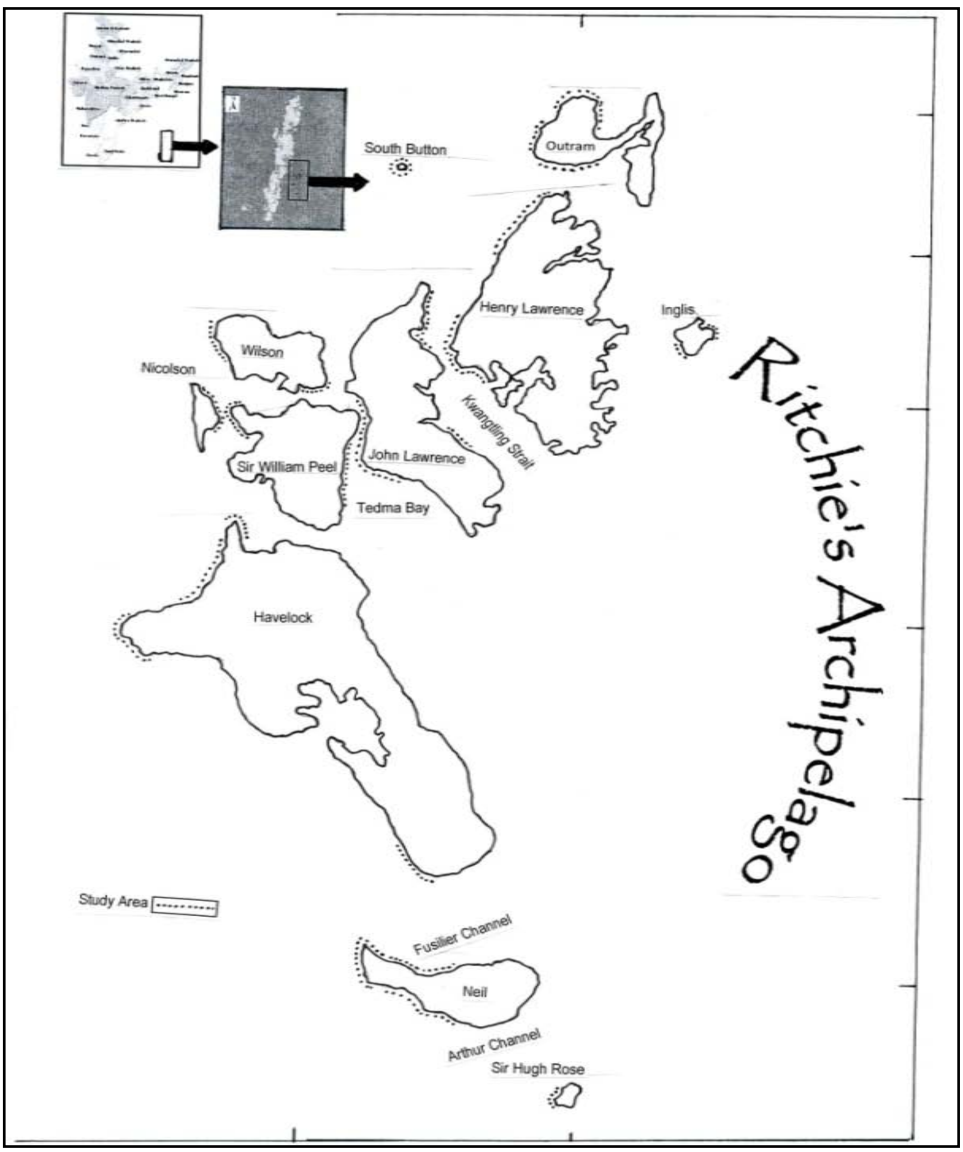

Fig 1 : Map showing the location of 11 Islands of Ritchie's Archipelago.

© 2012 Global Journals Inc. (US)

Each island was surveyed primarily using "Manta tow" study method [8, 9] followed by Line Intercept Transect Method [10] and Quadrate methods [11] to investigate the diversity of the scleractinian corals. For the purpose of this study each location and depth combination was considered an individual "site".

Data were collected by Self Contained Underwater Breathing Apparatus (SCUBA) diving and snorkeling during the above said study period. Belt transect method was applied to get the data of the diverse scleractinian corals. Each quadrate was photographed with a housed digital camera (Sony - Cyber shot, Model-T900, marine pack, 12.1 megapixels) oriented toward the start of transect. When possible, the entire quadrate was photographed in a single image. Occurrence of coral species in each quadrate was recorded. Individual photo quadrates were identified in conjunction with Veron [12] Wallace [13] and labeled according to the Islands.

Species diversity was calculated following Shannon- Weaver diversity index formula described below [14].

$$H^{-} = -\sum p_i \log_e p_i$$

Where, pi = Proportion of number of individual of a particular species and total number of individual of all the species, H^{-} = diversity of a theoretically infinite population.

Similarity Index is the simple measure of the extent to which two habitats species in common. It has been formulated below [15].

$$S = (2C/a + b) \times 100$$

Where 'C' = Number of species common at any two stations, 'a' = number of species of one station and 'b' = number of species at the other station.

III. Results

On the basis of this extensive study in Ritchie's Archipelago, one hundred and sixty eight scleractinian corals (Table-2) were identified from the eleven islands in different frequency.

Table 2 : Diversity and distribution of Scleractinian Corals along surveyed areas of Ritchie's Archipelago

SL. NO.	Family	Species	Name of Islands of Ritchie's Archipelago										
			PL	NCN	WN	HNL	HL	OM	IN	SB	SHR	JNL	NL
1.	Acroporidae	*Acropora aspera* (Dana, 1846)	-	-	+	+	+	+	+	+	+	+	+
2.		*Acropora microphthlma* (Verrill, 1859)	-	+	-	+	+	+	-	+	+	-	+
3.		*Acropora robusta* (Dana, 1846)	+	+	+	+	+	+	+	+	+	-	+
4.		*Acropora humilis* (Dana, 1846)	-	+	-	+	+	+	+	+	+	+	+
5.		*Acropora natalensis* (Riegl, 1995)	-	-	-	-	+	-	-	-	-	-	-
6.		*Acropora chesterfieldensis* (Veron & Wallace, 1984)	-	-	+	-	+	+	-	+	-	-	-
7.		*Acropora schmitti*(Wells, 1950)	-	-	-	-	+	-	-	+	-	-	-
8.		*Acropora cerealis* (Dana, 1846)	+	-	-	-	+	-	-	+	-	+	-
9.		*Acropora ocellata* (Klunzinger, 1879)	-	-	-	-	-	+	-	-	+	-	+
10.		*Acropora microclados* (Ehrenberg, 1834)	-	-	-	-	+	-	+	+	-	-	-
11.		*Acropora subglabra* (Brook, 1891)	+	-	-	-	+	-	+	+	-	-	-
12.		*Acropora nasuta* (Dana, 1846)	-	-	-	+	+	-	-	+	-	-	+
13.		*Acropora papillare* (Latypov, 1992)	-	-	-	-	-	+	-	+	-	-	-
14.		*Acropora clathrata* (Brook, 1892)	-	-	-	-	+	-	-	-	-	-	+
15.		*Acropora pulchra* (Brook, 1891)	-	+	+	-	+	+	-	+	-	-	-

© 2012 Global Journals Inc. (US)

16.	1846)	+	+	-	+	+	+	+	+	+	+	+
17.	*Acropora loripes* (Brook, 1892)	-	-	+	-	-	-	-	-	-	-	-
18.	*Acropora monticulosa* (Bruggemann,1879)	+	+	+	+	+	+	+	+	+	+	+
19.	*Acropora rudis* (Rehberg, 1892)	+	-	-	-	+	-	-	-	-	-	+
20.	*Acropora nobilis* (Dana, 1846)	+	-	-	+	+	-	+	+	-	+	+
21.	*Acropora forskali* (Ehrenberg, 1834)	-	-	-	-	+	-	-	-	-	-	+
22.	*Acropora plantaginea* (Lamarck, 1816)	-	+	-	-	+	-	-	-	-	-	-
23.	*Acropora abrotanoides* (Lamarck, 1816)	-	-	-	-	+	+	-	+	-	-	+
24.	*Acropora cythera* (Dana, 1846)	+	-	+	-	+	+	+	+	+	+	+
25.	*Acropora valida* (Dana,1846)	+	-	+	-	+	+	-	+	-	-	+
26.	*Acropora hyacinthus* (Dana, 1846)	+	-	+	+	+		+	+	-	+	+
27.	*Acropora gemmifera* (Brook, 1892)	+	-	-	+	+	+	+	+	-	+	+
28.	*Acropora bruggamnni* (Brook, 1893)	-	-	-	-	-	-	-	+	-	-	-
29.	*Acropora spicifera* (Dana, 1846)	-	-	-	-	+	+	-	-	-	-	+
30.	*Acropora dendrum* (Bassett-Smith, 1890)	-	-	-	+	-	-	-	-	-	-	-
31.	*Acropora bifurcata* (Nemanzo, 1967)	-	-	+	-	+	+	-	-	-	-	+
32.	*Acropora vaughani* (Wells, 1954)	-	+	-	-	-	-	-	+	-	-	+
33.	*Acropora grandis* (Brook, 1892)	+	-	+	-	+	+	-	+	+	-	+
34.	*Acropora inermis* (Brook, 1891)	-	-	-	-	-	-	-	-	-	+	-
35.	*Acropora austera* (Dana, 1846)	-	-	-	-	+	-	+	-	-	-	+
36.	*Acropora tanegasshimensis* (Veron, 1990)	-	-	-	-	-	-	-	-	-	-	+
37.	*Acropora palmerae* (Wells, 1954)	-	+	-	-	+	-	-	+	-	-	+
38.	*Acropora florida* (Dana, 1846)	-	-	-	-	-	+	+	+	+	-	+
39.	*Acropora polystoma* (Brook, 1891)	-	-	-	-	-	-	-	-	-	-	+
40.	*Acropora subulata* (Dana, 1846)	-	-	-	-	+	-	-	-	-	-	+
41.	*Acropora sekiseiensis* (Veron, 1990)	-	-	-	-	-	-	-	-	-	-	+
42.	*Acropora kimbeensis*(Wallace, 1999)	-	-	-	-	-	-	-	-	-	-	+
43.	*Acropora millepora* (Ehrenberg, 1834)	+	+	-	-	+	+	+	+	-	-	-
44.	*Acropora selago* (Studer, 1878)	-	-	-	-	-	-	-	+	-	-	-
45.	*Acropora divaricata* (Dana, 1846)	-	-	-	-	+	-	+	-	-	+	-

© 2012 Global Journals Inc. (US)

46.		*Acropora wallaceae* (Veron, 1990)	-	-	-	-	+	-	-	-	-	-	+
47.		*Acropora samoensis* (Brook, 1891*)*	-	-	-	-	-	-	-	-	-	+	+
48.		*Acropora efflorescens* (Dana, 1846)	-	+	-	-	-	-	-	-	-	-	-
49.		*Acropora digitifera* (Dana, 1846)	-	-	-	-	+	-	-	-	-	-	+
50.		*Acropora palifera* (Lamarck, 1816)	-	-	-	+	+	+	+	+	+	-	+
51.		*Montipora hemispherica* (Veron, 2000)	-	-	-	-	-	-	-	-	-	+	-
52.		*Montipora capitata* (Dana, 1846)	-	+	-	-	+	-	-	-	-	-	-
53.		*Montipora hispida* (Dana, 1846)	+	-	-	-	-	+	-	+	-	-	+
54.		*Montipora digita* (Dana, 1846)		+	-	-	+	+	-	-	-	-	+
55.		*Montipora peltiformis*(Bernard, 1897)	+	-	+	+	+	-	+	-	+	+	+
56.		*Montipora grisea* (Bernard, 1897)	-	-	-	-	-	-	-	-	-	-	+
57.		*Montipora meandrina* (Ehrenberg, 1834)	-	-	-	-	-	+	-	-	-	-	-
58.		*Montipora tuberculosa* (Lamarck, 1816)	-	+	-	-	+	-	+	-	-	-	-
59.		*Montipora varrucosa* (Lamarck, 1816)	-	-	-	-	+	+	-	-	-	-	-
60.		*Montipora mollis*(Bernard, 1897)	-	-	-	-	+	-	-	-	-	-	-
61.		*Montipora informis* (Bernard, 1897)	-	-	-	-	+	-	+	+	+	+	+
62.		*Montipora monasteriata* (Forskal, 1775)	-	-	-	-	-	-	-	-	-	-	+
63.		*Montipora undata* (Bernard, 1897)	-	-	-	-	-	-	+	-	-	-	-
64.		*Montipora aequituberculata*(Bernard, 1897)	+	+	+	+	+	+	-	+	+	+	+
65.		*Montipora danae* (Milne Edwards and haime, 1851)	-	-	-	-	-	-	-	-	-	-	+
66.		*Astreopora myriophthalma* (Lamarck, 1816)	-	-	-	+	+	+	-	+	+	-	+
67.		*Astreopora ocellata* (Bernard, 1896)	-	-	-	-	-	-	-	-	-	-	-
68.	Pocilloporidae	*Pocillopora damicornis* (Linnaeus,1758)	+	+	+	+	+	+	+	+	+	+	+
69.		*Pocillopora varrucosa* (Ellis & Solander, 1786)	+	+	+	+	+	-	+	+	+	+	+
70.		*Pocillora meandrina* (Dana, 1846)	-	-	-	-	-	-	-	-	-	-	+
71.		*Pocillopora ligualata* (Dana, 1846)	-	-	-	-	-	-	-	-	-	-	+
72.		*Seriatopora hystrix* (Dana, 1846)	+	+	+	+	+	+	-	+	+	+	+
73.		*Seriatopora stellata* (Quelch, 1886)	-	+	-	-	+	-	-	-	-	-	+
74.		*Stylophora pistillata* (Esper,1797)	-	-	+	+	+	-	-	-	-	-	+

© 2012 Global Journals Inc. (US)

75.	Oculinidae	*Galaxea astreata* (Lamarck,1816)	-	+	+	-	+	-	-	-	-	-	+
76.		*Galaxea cryptoramosa* (Veron, 2002)	-	-	-	-	-	-	-	-	-	-	+
77.		*Galaxea fascicularis* (Linnaeus,1767)	+	+	+	+	+	+	+	+	+	-	+
78.	Siderastrea	*Pseudosiderastrea tayami* (Yaba & Sugiyama,1935)	-	-	-	-	+	-	-	+	+	-	+
79.		*Psammocora digita* (Milne Edwards & Haime, 1851)	-	-	-	-	+	-	-	-	-	-	-
80.		*Psammocora contigua* (Esper, 1797)	+	-	+	-	+	-	+	+	-	+	+
81.	Agariciidae	*Pachyseris gemmae* (Nemenzo,1955)	+	+	-	+	+	+	-	+	-	-	+
82.		*Pachyseris speciosa* (Dana,1846)	+	+	-	-	+	-	-	+	+	+	+
83.		*Pachyseris rugosa* (Lamarck, 1801)	+	-	-	-	+	+	-	-	-	-	+
84.		*Pavona duerdeni* (Vaughan, 1907)	+	-	-	-	+	-	-	+	+	-	-
85.		*Pavona minuta* (Wells, 1954)	+	-	-	-	+	-	-	+	-	-	+
86.		*Pavona danai* (Milne Edwards & Haime, 1860)	-	-	-	-	-	-	-	-	-	+	-
87.	Fungiidae	*Ctenactis echinata* (Pallas,1766)	+	+	+	+	+	+	+	+	+	+	+
88.		*Ctenactis crassa* (Dana, 1846)	+	-	+	-	+	-	-	+	-	+	-
89.		*Diaseris distorta* (Michelin, 1843)	+	-	-	+	+	-	-	-	-	-	-
90.		*Cycloseris tenuis* (Dana, 1846)	-	-	-	-	+	-	-	-	-	-	-
91.		*Fungia danai* (Milne Edwards & Haime, 1851)	-	-	+	-	+	+	-	+	-	+	+
92.		*Fungia fungites* (Linnaeus, 1758)	-	-	-	+	+	+	+	+	-	+	+
93.		*Fungia paumotensis* (Stutchbury,1833)	-	+	-	+	+	-	-	+	+	+	+
94.		*Fungia concinna* (Verrill, 1864)	+	-	+	-	+	+	-	+	-	-	-
95.		*Fungia corona* (Doderlein, 1901)	+	-	-	+	+	-	-	+	-	-	-
96.		*Fungia scabra* (Doderlein, 1901)	-	+	-	+	+	-	+	-	+	-	-
97.		*Fungia spinosa*(Klunzinger, 1879)	+	-	-	-	-	+	-	-	-	-	-
98.		*Fungia granolusa* (Klunzinger, 1879)	-	-	+	+	+	-	-	-	-	-	-
99.		*Fungia klunzingeri* (Doderlein, 1901)	+	-	-	+	+	+	-	-	-	-	-
100.		*Fungia horrida* (Dana, 1846)	+	+	-	-	+	-	+	+	-	+	+
101.		*Fungia moluccensis* (Stutchbury, 1833)	-	-	-	-	+	-	-	-	-	-	-
102.		*Fungia repanda* (Dana, 1846)	-	-	+	-	-	+	+	-	-	+	-
103.		*Herpolitha limax* (Houttuyn, 1772)	-	-	+	+	+	-	-	+	-	-	+
104.		*Herpolitha weberi* (Horst, 1921)	-	-	-	-	+	-	-	-	-	-	-
105.		*Lithophyllon lobata* (Horst, 1921)	-	-	-	-	+	+	-	-	-	-	+

© 2012 Global Journals Inc. (US)

106.		*Lithophyllon undulatum* (Rehberg,1892)	-	-	-	-	+	+	-	+	-	-	+
107.		*Hydnophora microconos* (Lamarck,1816)	+	+	+	+	+	-	+	+	+	+	+
108.	Merulinidae	*Hydnophora grandis* (Gardiner, 1904)	+	-	-	-	+	+	-	+	-	+	+
109.		*Hydnophora exesa* (Pallas, 1766)	+	+	+	-	+	+	-	-	-	-	-
110.		*Hydnophora rigida* (Dana, 1816)	+	-	-	-	+	-	-	-	-	+	+
111.		*Merulina scabricula* (Dana, 1846)	-	-	-	+	+	+	-	+	-	-	+
112.		*Merulina ampliata* (Ellis & Solander, 1786)	+	-	+	+	+	+	-	+	+	-	+
113.	Mussidae	*Symphyllia radians* (Milne Edwards & Haime, 1849)	+	-	+	'	+	+	'	+	'	'	+
114.		*Symphyllia hassi* (Pillai and Scheer, 1776)	-	-	-	+	+	-	-	-	-	-	-
115.		*Symphyllia agaricia* (Milne Edwards and Haime, 1849)	-	-	-	-	+	+	-	-	-	+	+
116.		*Symphyllia valenciennsis* (Milne Edwards & Haime, 1849)	-	-	-	-	+	-	-	-	-	-	-
117.		*Symphyllia recta* (Dana, 1846)	+	+	+	+	+	+	+	+	+	+	+
118.		*Lobophyllia pachysepta* (Chevalier, 1975)	-	-	-	-	-	-	-	-	-	+	-
119.		*Lobophyllia hemprichi* (Ehrenberg, 1834)	-	-	+	+	+	+	+	+	+	+	+
120.		*Favia pallida* (Dana,1846)	+	+	+	+	+	+	+	+	+	-	+
121.	Faviidae	*Favia favus* (Forskal, 1775)	-	-	+	-	+	-	-	-	-	-	+
122.		*Favia maxima* (Veron and Pichon, 1977)	+	+	-	-	+	+	-	-	-	+	-
123.		*Favia lizardensis* (Veron and Pichon, 1977)	-	-	-	-	-	-	-	-	-	+	+
124.		*Favia matthaii* (Vaughan, 1918)	+	+	+	+	+	+	+	+	+	+	+
125.		*Leptastrea transversa* (Klunzinger, 1879)	-	-	-	-	-	-	-	-	-	-	+
126.		*Leptastrea purpurea* (Dana, 1846)	+	-	-	-	-	+	+	-	-	-	-
127.		*Favites abdita* (Ellis and Solander, 1786)	+	-	+	-	+	+	+	+	+	+	+
128.		*Favites pentagona* (Esper,1794)	-	-	+	-	+	+	-	+	+	+	+
129.		*Favites complanata* (Ehrenberg, 1834)	+	+	-	+	+	+	+	+	+	+	+
130.		*Favites halicora* (Ehrenberg, 1834)	+	+	+	+	+	+	+	+	+	+	+
131.		*Favites flexuosa* (Dana, 1846)	-	-	-	+	-	-	-	-	-	-	-
132.		*Barabattoi amicorum* (Milne Edwards and Haime, 1850)	-	-	-	-	-	-	-	-	-	-	+
133.		*Barabattoi laddi (Wells, 1954)*	-	-	-	-	-	+	-	-	-	-	-
134.		*Leptoria phrygia* (Ellis and Solander, 1786)	-	+	-	-	+	-	+	+	-	-	+
135.		*Leptoria irregularis* (Veron, 1990)	-	+	-	+	-	+	+	+	+	+	+

© 2012 Global Journals Inc. (US)

136.		*Platygyra pini* (Chevalier, 1975)	+	-	+	-	+	+	+	+	-	+	+
137.		*Platygyra verweyi* (Wijsmann-Best, 1976)	-	-	-	-	+	+	-	-	-	+	-
138.		*Platygyra daedaea* (Ellis and Solander, 1786)	-	-	-	-	-	-	-	-	-	-	+
139.		*Platygyra sinensis* (Milne Edwards and Haime, 1849)	-	-	-	-	+	+	-	+	-	-	+
140.		*Platygyra lamellina* (Ehrenberg, 1834)	+	+	+	+	+	+	+	+	-	+	+
141.		*Oulophyllia crispa* (Lamarck, 1816)	-	-	-	-	-	-	-	-	-	+	-
142.		*Diploastrea heliopora* (Lamarck, 1816)	-	-	-	-	+	+	-	+	+	+	-
143.		*Echinophora fruticulosa* (Ehrenberg, 1834)	-	-	-	-	-	+	-	+	-	+	-
144.		*Echinophora gemmacea* (Lamarck, 1816)	-	-	-	-	-	-	-	-	-	-	+
145.		*Echinophora lamellosa* (Esper, 1795)	+	-	+	-	+	-	-	-	-	-	+
146.		*Goniastrea australensis* (Milne Edwards and Haime, 1857)	-	-	-	-	-	+	-	-	-	-	+
147.		*Goniastrea retiformis* (Lamarck, 1816)	+	+	+	+	+	-	+	+	+	+	+
148.		*Goniastrea minuta* (Veron, 2000)	+	-	+	+	+	+	-	-	-	+	+
149.		*Goniastrea pectinata* (Ehrenberg, 1834)	-	-	-	-	+	-	-	-	-	-	-
150.		*Goniastrea edwardsi* (Chevalier,1971)	+	-	+	+	+	+	+	+	+	+	+
151.	Pectiniidae	*Pectinia laetuca* (Pallas, 1766)	+	-	-	-	+	-	-	+	-	-	+
152.		*Pectinia paeonia* (Dana, 1846)	+	-	-	+	-	-	-	-	-	+	+
153.		*Echinophyllia aspera* (Ellis and Solander, 1788)	-	-	-	-	-	+	-	-	-	+	+
154.		*Oxypora crassispinosa* (Nemenzo, 1979)	+	+	-	-	+	+	+	+	-	+	+
155.	Poritidae	*Porites solida* (Forskal, 1775)	+	+	+	+	-	+	+	+	+	+	+
156.		*Porites lobata* (Dana, 1846)	+	+	+	+	+	+	+	+	-	+	+
157.		*Porites lutea* (Milne Edwards & Haime, 1860)	+	-	-	-	+	-	+	-	-	-	+
158.		*Porites cylindrica* (Dana, 1846)	+	+	+	+	+	+	-	+	-	+	+
159.		*Porites annae* (Crossland, 1952)	-	-	-	+	+	-	+	+	-	-	-
160.		*Porites ankeli* (Scheer and Pillai, 1974)	-	-	-	-	+	-	-	-	-	-	-
161.		*Porites murrayensis* (Vaughan, 1918)	-	-	-	-	+	-	-	-	-	-	-
162.		*Porites rus* (Forskal, 1775)	+	+	+	-	-	+	-	+	-	+	+
163.		*Goniopora tenuidens* (Quelch, 1886)	-	-	-	-	+	+	-	-	-	-	+
164.		*Goniopora columna* (Dana, 1846)	-	-		-	+	+	-	-	-	-	-

© 2012 Global Journals Inc. (US)

165.	Euphyllidae	*Euphyllia glabrescens* (Chamisso & Eysenhardt, 1821)	+	-	+	-	+	+	-	+	-	-	+
166.		*Physogyra lichtensteini* (Milne Edwards & Haime, 1857)	+	-	-	-	-	-	-	-	-	-	-
167.	Dendrophylliidae	*Turbinaria stellulata* (Lamarck, 1816)	-	-	-	-	+	-	-	-	-	-	-
168.		*Tubastrea micranthus* (Ehrenberg, 1834)	-	-	-	-	+	-	-	-	-	-	-
Total Number of Individual Colony of Species			65	44	49	50	121	78	48	82	38	61	108
Shannon –Weaver Index (H¯) of each Island			5.585	5.115	5.173	5.243	6.556	5.758	6.013	6.059	4.718	5.366	6.169

*Since Pi is the proportion of a given category, its maximum value is 1 and its minimum approaches 0. For any base, the log of 1 is 0 and the log of any value between 0 and 1 is a negative number. By reversing the sign, the index becomes positive and is easier to understand.

[PL-Sir William Peel, NCN- Nicolson, WN- Wilson, HNL- Henry Lawrence, HL- Havelock, OM-Outram, IN- Inglis, SB-South Button, SHR- Sir Hugh Rose, JNL- John Lawrence, NL- Neil]

Among them corals in Sir William Peel-65 species, Nicolson-44 species, Wilson-49 species, Henry Lawrence-50 species, Havelock-121 species, Outram-78 species, Inglis-48 species, South Button-82 species, Sir Hugh Rose- 38 species, John Lawrence- 61 species and, Neil- 108 species were noticed (Table-2). From the graphical presentation (Fig-2), it can be said that the highest number of species was observed in Havelock Island whereas Sir Hugh Rose Island reported less number of species.

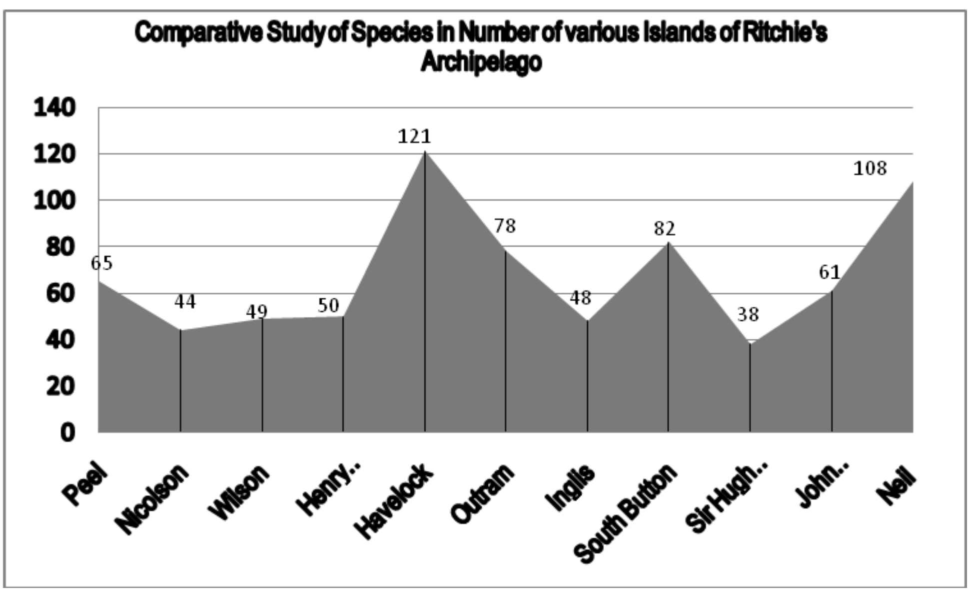

Fig 2 : Number of Species in Each Island

The species diversity (H') ranged from 4.178 to 6.556 in Sir Hugh Rose Island and Havelock Island respectively (Table-2). However moderately high values of species diversity was recorded in Sir William Peel-5.585, Nicholson- 5.115, Wilson- 5.173, Henry Lawrence- 5.243, Outram- 5.758, Inglis-6.013, South Button- 6.059, John Lawrence- 5.366 and Neil- 6.169 Islands (Fig-3).

Global Journal of Science Frontier Research (D) Volume XII Issue IV Version I April 2012

© 2012 Global Journals Inc. (US)

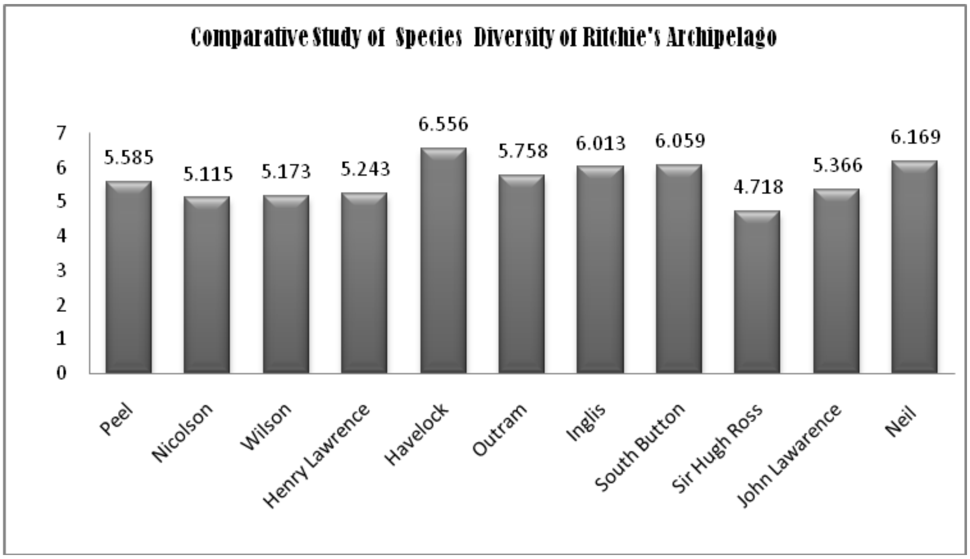

Fig 3 : Graphical Presentation of Species Diversity

Similarity Index (S) has been calculated between the islands and the values are depicted in Table-3. The maximum similarity index value (73.89%) was observed for between Havelock and South Button Island, and the lowest similarity index value (29.41%) was observed for significantly wide range of distribution of scleractinian corals between Havelock Island and Wilson Island (Fig-4). Most of the islands, the similarity index of scleractinian corals varied between 40 and 60%. Very few values are observed in between the range of 20-40% while moderately high similarity index values were observed with the range of 60-80%.

Table 3 : Species similarity index percentage between islands.

Name of Islands→ ↓	Nicolson	Wilson	Henry Lawrence	Havelock	Outram	Inglis	South Button	Sir Hugh Ross	John Lawrence	Neil
Peel	49.54	63.15	53.91	61.29	55.94	51.32	62.58	40.77	55.55	57.8
Nicolson		45.16	55.31	47.27	45.9	54.34	52.38	51.21	45.71	46.05
Wilson			54.54	29.41	50.39	47.42	56.48	48.27	52.72	52.22
Henry Lawrence				52.63	48.43	57.14	56.06	61.36	52.25	51.89
Havelock					62.31	49.7	73.89	41.5	50.54	35.8
Outram						56.03	67.5	44.82	57.36	62.36
Inglis							60	58.13	56.88	47.43
South Button								53.33	61.53	68.42
Sir Hugh Ross									52.52	47.94
John Lawrence										55.62

© 2012 Global Journals Inc. (US)

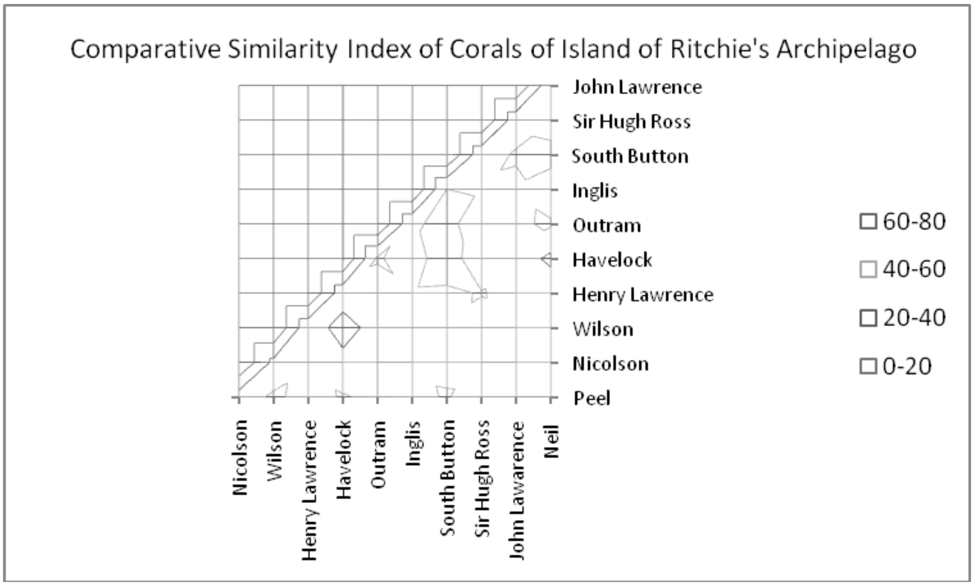

Figure 4 : Comparative Similarity Index of Scleractinian Corals according to Islands

IV. Discussion

The most species-rich marine communities probably occur on coral reefs, a habitat in which many groups of organisms reach their greatest diversity. The diversity of scleractinian corals with their comparative distribution are presented in this paper. Within the continuum of spatial scale three levels are often discussed to taxonomic diversity: within habitat (alpha), between habitat (beta), and regional (gamma) diversity [16, 17, 18]. Differences in taxonomic composition and diversity among regions can be explained in part by present day condition. Thus, habitat area clearly plays a role with about 85% of the world area of reefs lying in the Indo-Pacific, compared with only 15% in the Atlantic [19]. Beta diversity indicates the degree of difference in species composition between sites [16]. In this paper the degree of scleractinian coral diversity was made among the eleven islands of Ritchie's Archipelago to draw a quantitative analysis. Species may be poor competitors because of inherent traits such as small polyps, small size, and short life span, or because of local environmental constraints [20]. Previously no such documentation was made regarding this archipelago to state the scleractinian corals diversity. Only Rao & Sastry [21] showed a number of 50 scleractinian coral from three Button Island, i.e. North Button, Middle Button and South Button. However, the present study included only South Button Island among those three. Through the result of extensive survey it can be said that the Islands of Ritchie's Archipelago have diverse number of scleractinian corals species in its all the islands. This diverse coral species for any given ecosystem, a biodiversity inventory per se is important. Equally, if not more important, is to understand their role in ecosystem processes. Though the islands have various species diversity index value, the scleractinian diversity of those islands is very optimum or great in status. The maximum species diversity value is 6.556 and minimum value is 4.718. Each of the surveyed islands of Ritchie's Archipelago is the representative of saturated marine biodiversity areas with good scleractinian coral composition. Though the total number of individual species of scleractinian corals of Inglis Island is less than Peel, Wilson, Henry Lawrence, John Lawrence and Outram Islands, inspite of that the species diversity of corals is much more than the those islands [Inglis (6.013) > Peel (5.585), Wilson (5.173), Henry Lawrence (5.243), John Lawrence (5.366), Outram (5.758)]. The islands also have great deal of similarity in their species composition which can be seen through the result of similarity index. These islands are interlinked with each other in respect of scleractinian corals diversity from 29.41% to 73.89%. This similarity of scleractinian coral diversity is high in Havelock and South Button Islands, whereas lowest similarity of coral diversity was observed between Havelock and Wilson Islands. The environment characteristics of each study site account for some of the differences between sites in species composition. The characteristics of physical environment overshadow the influence of differences in biodiversity of the functioning of the coral reefs, as long as the representatives of each of the performers of key ecological roles are present. In order to conserve the coral reefs of Ritchie's Archipelago, an adequate awareness among societies are required which helps to protect marine biodiversity.

Global Journal of Science Frontier Research (D) Volume XII Issue IV Version I April 2012

© 2012 Global Journals Inc. (US)

V. Acknowledgement

Authors are grateful to the Ministry of Environment and Forests, Government of India for providing financial assistance to undertake the study through the projects of National Coral Reef Research Institute, Zoological Survey of India, Port Blair.

References Références Referencias

1. Jeyabaskaran, R. 1999. Report on Rapid Assessment of coral reefs of Andaman & Nicobar Islands. GOI/UNDP/GEF Project on Management of Coral Reef Ecosystem of Andaman & Nicobar Islands. Published by Zoological Survey of India, Port Blair, 110p.
2. Wafar, W.V.M. 1990. Coral reef-Specialized Ecosystem. Current trends in coastal Marine Science: A special collection of papers to falicitate Prof. R. Natarajan on his 60th birth day:156-162.
3. Hoeksema, B. and C-F. Dai, 1992. Scleractinian of Taiwan. II. Family Fungiidae (including a new species). Bulletin of the Zoology Academia Sinica, 30: 201-226.
4. Karlson, R. H., Cornell, H. V. and T. P. Hughes, 2004. Coral communities are regionally enriched along an oceanic biodiversity gradient, Nature, 429:867-870.
5. West, J. and R. Salm, 003. Environmental determinants of resistance and resilience to coral bleaching: implications for marine protected area management. Conservation Biology, 17: 956-967.
6. Hughes, T. P. 2003. Climate change, human impacts, and the resilience of coral reefs. Science, 301: 929-933.
7. Huston, M.A. 1985. Pattern of species diversity on coral reefs. Ann. Rev. Ecol. Syst. 16: 149-177.
8. Done, T.J., Kenchinton, R.A. and L.D. Zell, 1982. Rapid, large area, reef resource surveys using a manta board. Proceedings of the Fourth International Coral Reef Symposium, Manila, 2: 597-600.
9. Kenchinton, R.A. 1984. Large area surveys of coral reefs. UNESCO Reports in Marine Science, 21: 92-103.
10. Bradbury, R. H., Reichelt, R. E., Meyer, D. L and R. A. Birtles, 1886. Patterns in the distribution of the crinoid community at Davies Reef on the central Great Barrier Reef, Coral Reefs, 5: 189-196.
11. Endean, R. and W.Stablum, 1973. A study of some aspects of the crown of thorns starfish *(A. planci)* infestations of reefs of Australia's Great Barrier Reef. Atoll Res. Bull. 167:1-60
12. Veron, J. E. N. 2000. Corals of the World. Australian Institute of Marine Science. 1-3 volumes.
13. Wallace, C. C. 1999. Staghorn Corals of the world. CSIRO Publications, Melbourne. pp 421.
14. Weaver, W., and C.E. Shannon, 1949. The Mathematical Theory of Communication. Urbana, Illinois: University of Illinois
15. Raghunathan, C., Mehmuna, B., Sivaperuman, C. and R. Kirubagaran, 2009. Diversity of Oceanic Zooplankton in Andaman Sea. Nature Environment and Pollution Technology. 8(4):635-644.
16. Whittaker, R. H. 1967. Gradient analysis of vegetation. Biological Reviews, 42:207-264.
17. Brown, B.E. and R.P. Dunne, 1988. The impact of coral mining on coral reefs in the Maldives. Env. Conserv. 22: 1-63.
18. Clark. A. 1992. Is the real latitudinal diversity in the sea? Trends Ecol. Evol 7: 286-287.
19. Smith, S.V. 1978. Coral reef area and the contribution of reefs to processes and resources of the world oceans. Nature, 273 : 225-226.
20. Romano, S. L. 1990. Long-term effects of interspecific aggressionon growth of the reef-building corals *Cyphastrea ocellina (Dana) and Pocillopora damicornis (Linnaeus)*. J. Exp. Mar. Biol. Ecol, 140:135–146.
21. Rao, D.V. and D.R.K. Sastry, 2007. Fauna of Button Island National Parks, South Andaman, Bay of Bengal. Rec. zool.Surv. India, Occ. Paper No.-270: 1-54.

© 2012 Global Journals Inc. (US)