



## NEW RECORD OF SIX SCLERACTINIAN CORALS TO INDIAN WATER FROM RANI JHANSI MARINE NATIONAL PARK & ADJOINING ISLANDS, ANDAMAN & NICOBAR ARCHIPELAGO

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### ABSTRACT

Rani Jhansi Marine National Park is the part of south Andaman Archipelago. It has great ecological attributes for sustainable development of various representatives of biological world. The islands under the marine national park are the optimum environment providing areas where various scleractinian corals are recorded in the recent past. Corals are the naturally generated organisms of underwater marine life throughout the world. Recruitment or finding of new corals with the existing corals is the progressive parameter of enrichment of biodiversity and related niche concept of the studied sites. Six species of scleractinian corals such as *Acropora ocellata* (Klunzinger, 1879), *Favia helianthoides* Wells, 1954, *Montastrea curta* (Dana, 1846), *Platygyra carnosus* Veron, 2000, *Cantharellus jebbi* Hoeksema, 1993, *Symphyllia erythraea* (Klunzinger, 1879) belong to four families viz. Acroporidae, Faviidae, Fungiidae and Mussidae are identified as new record to Indian Water from the Rani Jhansi Marine National Park and its adjoining islands of Ritchie's Archipelago, Andaman & Nicobar Archipelago. The present paper deals with the taxonomical description of newly identified six scleractinian corals on the basis of their photographic morphological characters.

**KEYWORDS:** Scleractinian Corals, New records, Ritchie's Archipelago and Taxonomy.

### INTRODUCTION

Coral reefs are important to coastal ecosystems for several reasons. These massive, calcareous structures are often called "underwater rainforests"; the most biologically diverse marine ecosystems in the world. They provide shelter to mobile aquatic animal species and have unusually high gross primary production which is recycled within the reefs. The principal producer organisms are microscopic algae called zooxanthellae that live within the coral tissues. This symbiotic relationship enhances the biological activity of the community in terms of the abundance and the diversity of plants and animals found on the reefs. The coral and zooxanthellae exist in a symbiotic relationship. The coral provides shelter for the zooxanthellae and, in return, the zooxanthellae provide energy through photosynthesis (Humann, 1993; NOAA, 2008)<sup>[1],[2]</sup>. This relationship is very crucial to the coral's survival. If there is even the slightest change in water quality, the zooxanthellae could leave the coral to die; which is known as coral bleaching. Therefore, corals must be located in a region with adequate water quality in order to thrive (Richmond, 1993; Turner, 2008)<sup>[3],[4]</sup>. Reefs are also important as natural breakwaters to storm surges and large wave forces. The Andaman & Nicobar group of Islands is located in the SE of Bay of Bengal, between 6°-14° N latitude and 91°-94° E longitude. They are the part of the mountain chain and lie on a ridge that extends southward from Irrawaddy delta of Burma, containing the trend of the Arakan Yoma range (Venkataraman, 2003)<sup>[5]</sup>. There are 106 protected areas in these islands, 96 designated as wildlife sanctuaries, 9 national parks and one biosphere reserve. Among 9 national parks, 2 are marine national parks which have not yet inventoried

thoroughly. The coral reefs of Andaman and Nicobar Islands are the biodiversity hot spot of India (Jeyabaskaran, 1999)<sup>[6]</sup>. The two marine national parks are Mahatma Gandhi Marine National Park and Rani Jhansi Marine National Park. The Rani Jhansi Marine National Park is the combined result of three islands viz. John Lawrence, Henry Lawrence and Outram Island. Another ten islands such as Havelock, Neil, Sir Hugh Ross, Nicholson, Wilson, Sir William Peel, Inglis, South Button, Middle Button and North Button Islands are situated in the same Archipelago, which is called as Ritchie's Archipelago, is an important area of Andaman & Nicobar Archipelago. The structure of a reef provides homes and food for many types of plants, fish and invertebrates. Coral and rocky reefs constitute one of the most important ecosystems in our planet, being their astonishing diversity, productivity, abundance and beauty some of their main characteristics (Goldman & Talbot, 1976)<sup>[7]</sup>. According to recent studies, coral reefs constitute one of the country's main marine assets (Schleyer *et al.*, 1999; Rodrigues *et al.*, 1999)<sup>[8],[9]</sup>. This paper deals with the morphologic as well as the taxonomic characters of six newly recorded species from Rani Jhansi Marine National Park as well as the other islands of, Ritchie's Archipelago, South Andaman.

### MATERIAL AND METHODS

The surveys were made during the last year September, 2009 to January, 2010 at different sites of Rani Jhansi Marine National Park and adjoining islands of Ritchie's Archipelago, such as Havelock Island (Lat.-12° 00. 005'N & Long. -92° 56.808'E), Inglis Island (Lat.-12° 08. 639'N & Long.- 93° 06.786'E), Henry Lawrence Island (Lat.-12°

05. 000°N & Long.- 93° 06.312'E), John Lawrence Island (Lat.-12° 04. 075'N & Long.- 93° 00.398'E), Outram Island (Lat.-12° 00. 574'N & Long.- 92° 56.808'E), Sir William Peel Island (Lat.-12° 03. 315'N & Long.-92° 59.929'E), South Button Island (Lat.-12° 13. 467'N & Long. 92° 01.334'E), North Button Island (Lat.-12° 18. 974'N & Long.-92° 03.826'E), Middle Button Island (Lat.- 12° 16. 473'N & Long.-93° 01.334'E), Lakshmanpur Beach-1(Lat.-11°50.826'N & Long.-93°00.554'E), Howrah Bridge-2 (Lat.-11°49.727'N & Long. - 93°00818'E), Middle point (Lat.-11°53.274'N & Long.- 93°01.140'E), Ramnagar Beach-3 (Lat. -11°48.400'N & Long.-93°01.440'E), Sunset point (Lat.-11°51.941'N & Long.-93°00.667'E) and Beach-2 (Lat.-11°50.766'N & Long.-93°00795'E) by employing Self –Contained Underwater Breathing Apparatus (SCUBA) diving and snorkeling. Line Intercept Transect (Bradbury and Reichelt *et.al.*,1986)<sup>[10]</sup> and Quadrant methods (Edean and Stablum, 1973)<sup>[11]</sup> were applied to investigate the diversity and distribution of the corals. During SCUBA diving, species recording was made by underwater digital photography (Sony - Cyber shot, Model-T900, marine pack, 12 megapixels) for detailed identification. Identification was done depending on the photographs in conjunction with Veron (2000)<sup>[12]</sup>, Wallace (1999)<sup>[13]</sup> and (Sheppard, 1987)<sup>[14]</sup>.

## RESULTS

Six scleractinian coral were identified and recorded as new findings to Indian water. During the study period physical parameters of the water sample also noted to get the ecological attributes of the underwater environment. The pH value of water samples was 8.1 to 8.5 and the salinity was 32 ppt. to 37 ppt. during the period of study. The surveys were made upto the depth of 19 metres on that selected sites. The taxonomic description of the identified scleractinian corals are as follows.

1. ***Acropora ocellata* (Klunzinger, 1879)**, Fig-1  
Family- Acroporidae Verrill, 1902  
Genus- *Acropora* Oken, 1815

### Synonym

- *Madrepora ocellata* Klunzinger, 1879

### Taxonomic references:

- Klunzinger, C. B. (1879). Die Korallthiere des Rothen Meeres. 2: Die Steinkorallen. 1. Die Madreporaceen und Oculinaceen. Gutmann. - Berlin
- Cairns, S. D., Hoeksema, B. W. and van der Land, J. (1999). List of extant stony corals. *Appendix (pp. 13-46) in S. D. Cairns, Species richness of Recent Scleractinia. Atoll Research Bulletin* (459) 46 pp.
- Veron, J. E. N. (2000). Corals of the World. 3 vols. Australian Institute of Marine Science and CRR Qld Pty Ltd.

### Key Characters:

Axial corallites on branch ends .....Genus *Acropora*  
Colony with axial corallites, colony digitate, colony forms clumps, branches cylindrical, Axial corallites small .....*Acropora ocellata*

**Description:** Colonies are digitate. Branches are thick, tapering to a small axial corallite. Small branchlets or incipient axial corallites usually occur at the base of main

branches. Radial corallites are of two sizes, the smaller are immersed, the larger are round and irregular.

**Colour:** Pale brown with white branch tips.

**Similar species:** *Acropora arabensis*. The colony shape is like *Acropora humilis*, axial corallites are like *Acropora monticulosa* and incipient axial corallites are like *Acropora gemmifera*.

**Occurrence:** Rare.

**Place of Record in Andaman:** Havelock Island and South Button Island.

**Distribution:** American Samoa, Australia, Cocos (Keeling) Islands, Egypt, Guam, Indonesia, Madagascar, Mozambique, Sri Lanka, Taiwan and Province of China.

**IUCN Red List Category and Criteria:** Data deficient

### 2. ***Favia helianthoides* Wells, 1954**, Fig-2

Family- Faviidae Gregory, 1900

Genus- *Favia* Oken, 1815

### Synonym

- *Plesiastrea salebrosa* Nemenzo, 1959

### Taxonomic references:

- Wells, J. W. (1954). Recent corals of the Marshall Islands. *Professional Paper, United States Geological Survey* (2601) 385-486.
- Cairns, S. D. (1991). Catalogue of the type specimens of stony corals (Milleporidae, Styliasteridae, Scleractinia) in the National
- Museum of Natural History, Smithsonian Institution. *Smithsonian Contributions to Zoology* (514) 59 00.
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- Veron, J. E. N. (2000). Corals of the world. 3 vols. Australian Institute of Marine Science and CRR Qld Pty Ltd.

### Key Character:

Colonies massive or derived from massive, budding intratentacular or meandroid, colonies plocoid, corallites not exsert.....Genus *Favia*.  
Corallites middle sized (8-12 mm diameter), septa not irregular, corallites conical .....*Favia helianthoides*.

**Description:** Colonies are sub-massive. Corallites are conical and mostly uniform in shape. They show both extra- and intratentacular budding. Paliform lobes are well developed. Septa are neatly arranged and are thickened over the wall. Costae are also neat and those of adjacent corallites adjoin.

**Colour:** Brown, tan or blue-grey with cream oral discs.

**Similar species:** *Favia laxa*, which has smaller, more widely spaced corallites, and *F. speciosa* which has less conical corallites. *Favia favus*, which has much larger corallites and *Diploastrea heliophora*, which has a similar colour but also larger corallites with much thicker septo-costae.

**Occurrence:** Sometimes common.

**Place of Record in Andaman:** Wilson Island, John Lawrence Island and Havelock Island.

**Distribution:** American Samoa, Australia, Egypt, Indonesia, Japan, Madagascar, Marshall Islands, Papua New Guinea, Philippines, Saudi Arabia, Seychelles, Solomon Islands, Sudan, Taiwan, Province of China,

Thailand, Tonga, United Republic of Tanzania, Vanuatu and Viet Nam.

**IUCN Red List Category and Criteria:** Near Threatened

3. *Montastrea curta* (Dana, 1846), Fig-3  
Family- Faviidae Gregory, 1900  
Genus- *Montastrea* Blainville, 1830



Figure 1 *Acropora ocellata* (Klunzinger, 1879)

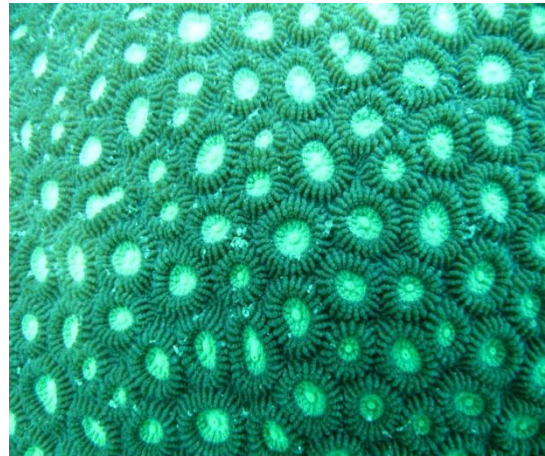


Figure 2 *Favia helianthoides* Wells, 1954



Figure 3 *Montastrea curta* (Dana, 1846)



Figure 4 *Platygyra carnosus* Veron, 2000



Figure 5 *Cantharellus jebbi* Hoeksema, 1993



Figure 6 *Symphyllia erythraea* (Klunzinger, 1879)

**Synonyms:**

- *Galaxea laperousiana* (Milne Edwards & Haime, 1850)
- *Montastraea coronata* (Dana, 1846)
- *Astrea solidior* Milne Edwards & Haime, 1850
- *Astrea laperousiana* Milne Edwards & Haime, 1850
- *Astrea quadrangularis* Milne Edwards & Haime, 1850
- *Astrea coronata* Dana, 1846, *Astrea curta* Dana, 1846
- *Heliastrea solidior* (Milne Edwards & Haime, 1850)
- *Orbicella funafutensis* Gardiner, 1899
- *Orbicella rotumana* Gardiner, 1899
- *Orbicella wakayama* Gardiner, 1899
- *Orbicella curta* (Dana, 1846)
- *Orbicella coronata* (Dana, 1846)
- *Orbicella solidior* (Milne Edwards & Haime, 1850)
- *Sarcinula laperousiana* Milne Edwards & Haime, 1848
- *Favia wakayama* Gardiner, 1914

**Taxonomic references:**

- Dana, J. D. (1846). Zoophytes. United States Exploring Expedition during the years 1831-1842 under the command of Charles Wilkes 8: 1-740. Lea and Blanchard. -Philadelphia
- Cairns, S. D. (1991). Catalogue of the type specimens of stony corals (Milleporidae, Stylasteridae, Scleractinia) in the National Museum of Natural History, Smithsonian Institution. *Smithsonian Contributions to Zoology* (514) 59 00.
- Cairns, S. D., Hoeksema, B. W. and van der Land, J. (1999). List of extant stony corals. *Appendix (pp. 13-46) in S. D. Cairns, Species richness of Recent Scleractinia. Atoll Research Bulletin* (459) 46 pp.
- Veron, J. E. N. (2000). Corals of the world. 3 vols. Australian Institute of Marine Science and CRR Qld Pty Ltd.

**Key Characters:**

Colonies massive or derived from massive, budding extratentacular, corallites middle sized, corallites plocoid, colonies submassive, septa do not alternate .....

.....Genus *Montastrea*  
Corallites small (<5 mm diameter), corallites not conical .....

.....*Montastrea curta*  
**Description:** Colonies are spherical, columnar or flattened. Corallites are circular and widely spaced or closely compacted. The width of calices varies greatly, this variation mostly occurring between, rather than within, colonies. Long and short septa alternate. Small paliform lobes are usually developed.

**Colour:** Cream or orange on reef flats, often with colours concentric to the oral discs. Usually dark brown when in shaded habitats.

**Similar species:** *Montastrea salebrosa*, which has smaller more exsert corallites. *Favia stelligera*.

**Occurrence:** Common.

**Place of Record in Andaman:** Havelock Island, Outram Island and South Button Island.

**Distribution:** American Samoa, Australia, Bangladesh, British Indian Ocean Territory, China, Cocos (Keeling) Islands, Cook Islands, Djibouti, Egypt, Fiji, French Polynesia, Guam, Hong Kong, Indonesia, Japan, Kiribati, Madagascar, Malaysia, Maldives, Marshall Islands,

Mauritius, Micronesia (Federated States of), Mozambique, New Caledonia, New Zealand, Norfolk Island, Northern Mariana Islands, Palau, Papua New Guinea, Philippines, Pitcairn, Réunion, Samoa, Saudi Arabia, Singapore, Solomon Islands, Taiwan, Province of China, Thailand, Tonga, Tuvalu, United States Minor Outlying Islands and Vanuatu and Viet Nam.

**IUCN Red List Category and Criteria:** Least Concern.

4. *Platygyra carnosus* Veron, 2000, Fig-4  
Family- Faviidae Gregory, 1900  
Genus- *Platygyra* Ehrenberg, 1834

**Taxonomic references:**

- Veron, J. E. N. (2000). Corals of the world. 3 vols. Australian Institute of Marine Science and CRR Qld Pty Ltd.

**Key Characters:**

Colonies massive or derived from massive Budding intratentacular or meandroid Colonies ceroid to secondary meandroid Paliform lobes absent or weakly developed Paliform lobes spongy Ambulacral groove absent.....**Genus** *Platygyra*. Colonies monocentric or have short valleys Walls not thick, rounded Valleys mostly monocentric Columellae well developed .....

.....*Platygyra carnosus*.  
**Description:** Colonies are massive and cerioid to submeandroid with thin, acute walls. Valleys are irregular in length in the same colony. Septa are thin and highly granulated. They converge and may fuse except where valleys are straight. Columellae are well developed. Polyps are fleshy.

**Colour:** Uniform brown or red, with pale tops to walls.

**Similar species:** No other *Platygyra* has such fleshy polyps. Skeletal structures are similar to those of *Platygyra verweyi* and are somewhat *Goniastrea*-like.

**Occurrence:** Uncommon.

**Place of Record in Andaman:** Wilson Island, Henry Lawrence Island and South Button Island.

**Distribution:** Egypt; Madagascar, Sri Lanka and Viet Nam.

**IUCN Red List Category and Criteria:** Near Threatened

5. *Cantharellus jebbi* Hoeksema, 1993, Fig-5

Family- Fungiidae Dana, 1846  
Genus- *Cantharellus* Höksema and Best, 1984

**Taxonomic references:**

- Hoeksema, B. W. (1993). Mushroom corals (Scleractinia: Fungiidae) of Madang Lagoon, northern Papua New Guinea: An annotated checklist with the description of *Cantharellus jebbi* spec. nov. *Zoologische Mededelingen* 67: 1-19.
- Cairns, S. D., Hoeksema, B. W. and van der Land, J. (1999). List of extant stony corals. *Appendix (pp. 13-46) in S. D. Cairns, Species richness of Recent Scleractinia. Atoll Research Bulletin* (459) 46 pp.
- Veron, J. E. N. (2000). Corals of the world. 3 vols. Australian Institute of Marine Science and CRR Qld Pty Ltd.

**Key Characters:**

Not colonial Attached to substrate.....**Genus** *Cantharellus*. Septa thick Disc irregular, encrusting...*Cantharellus jebbi*

**Description:** Solitary or colonial. Solitary polyps are small (up to 70 mm diameter) and tightly encrust the

substrate. Colonies are uncommon but are relatively conspicuous, up to 0.2 metres across. Septa are thick and wavy.

**Colour:** Light brown.

**Similar species:** Like *Lithophyllon mokai* but usually has only one centre. Septa are like *Cantharellus doederleini* but the latter is not completely encrusting.

**Occurrence:** Uncommon.

**Place of Record in Andaman:** Outram Island, Henry Lawrence Island and South Button Island.

**Distribution:** Fiji, Guam, Indonesia, Japan, Papua New Guinea and Solomon Islands.

**IUCN Red List Category and Criteria:** Least Concern

**6. *Symphyllia erythraea* (Klunzinger, 1879)**, Fig-6

Family- Mussidae Ortmann, 1890

Genus- *Symphyllia* Milne Edwards and Haime, 1848

**Synonyms:**

- *Isophyllia erythraea* Klunzinger, 1879,
- *Acanthastrea erythraea* (Klunzinger, 1879)

**Taxonomic references:**

- Milne Edwards, H. and Haime, J. (1849). Recherches sur les Polypiers. Mémoire 4, Monographie des Astreides (1). *Annales des Sciences Naturelles, Zoologie* (3)11: 233-312.
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- Veron, J. E. N. (2000). *Corals of the world*. 3 vols. Australian Institute of Marine Science and CRR Qld Pty Ltd.

**Key Characters:**

Colonial Corallites >12 mm. diameter Colony meandroid Septal teeth very prominent.....**Genus** *Symphyllia* Peripheral and central valleys similar Valleys short, submeandroid..... *Symphyllia erythraea*.

**Description:** Colonies are massive, becoming hemispherical. Valleys are short, usually with less than three centres. Septa are in two orders, with tall teeth. Columellae are well formed.

**Colour:** Mottles or uniform brown, grey, green or cream.

**Similar species:** *Acanthastrea hilae* also has a tendency to form valleys with multiple centre.

**Occurrence:** Uncommon.

**Place of Record:** Wilson Island and Henry Lawrence Island.

**Distribution:** Egypt, Madagascar, Myanmar, Saudi Arabia, Sudan, United Republic of Tanzania.

**IUCN Red List Category and Criteria:** Least Concern.

## DISCUSSION

Coral reefs are dynamic systems, producing lime stones at the rate of 400-2000 tones per hectare per year. Coral reefs influence the chemical balance of world's oceans (Smith, 1978)<sup>[15]</sup>. The ability of coral reef ecosystems to exist in balanced harmony with other naturally occurring competing/limiting physico-chemical and biological agents has been severely challenged in the last several

decades by the dramatically increased negative and synergistic impacts from poorly managed anthropogenic activities (Maragos *et al.*, 1996)<sup>[16]</sup>. The Government of India and UNDP GEF field mission (2001 diving studies) reported a total 198 species of scleractinian coral from Andaman groups of island of which 111 are supposed to be new records to India (on verification with other studies only 94 species are found to be new records and this also include some non-scleractinian corals) (Turner, *et al.* 2009)<sup>[17]</sup>. 50 scleractinian corals were recorded from South Button Island and Middle Button Island (Rao & Sastry, 2007)<sup>[18]</sup>. Present findings of six new record of species from Rani Jhansi Marine National Park and adjoining islands of Ritchie's Archipelago, Andaman & Nicobar group islands is the addition of total biodiversity index of this Marine National Park records as well as the total diversity index of Andaman & Nicobar Islands. Several intensive studies are required in future to get adequate data on scleractinian corals. The findings of newly recorded six species will be helpful to search out several coral associated marine organisms and that related marine ecological niche.

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- [12]. Veron, J. E. N. (2000). *Corals of the World.* Australian Institute of Marine Science,**1-3** volumes.
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