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NEW RECORDS OF CORALS FROM LAKSHADWEEP ISLANDS

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INTRODUCTION

The Lakshadweep (Laccadive Islands) is situated in the Arabian Sea (71°–74°E Longitudes and 8°–12°N Latitudes) about 225-450 km from the southwest coast of India. There are 27 islands in Lakshadweep covering a total land area of 28.54 km^2 of which, 11 islands are inhabited and have a land area of 26.89 km^2, while the 16 uninhabited islets are 1.65 km^2 (Attakoya, 2000). Most of the islands are located within the 12 atolls. The height of the land above sea level in the islands is generally 1-2 m and the terrain is mostly flat. Lakshadweep is lying along a north-south axis (except Androth Island, the length of which is in East-West direction) with lagoon on the west and open sea on the east. Estimated total coral reef area in these islands is 276 km^2 including the reef flat area of 136.5 km^2 (Bahuguna and Nayak, 1998).

Taxonomic studies of Indian corals are almost totally restricted to the pioneering works of Pillai (1971a, 1971b, 1972), Scheer and Pillai (1974), Reddiah (1977), Pillai and Patel (1988), Pillai and Jasmine (1989) in the 70s and 80s. Logistic constraints, notably lack of SCUBA facilities, had limited the collections in all these surveys from no more than a few meters depth. The total number of 199 species of scleractinian corals (155 hermatypes under 50 genera and 44 ahermatypes under 21 genera) recorded in the eighties stands unaltered since then; only recently, when extensive collections were made in Andamans, nearly 100 species not reported previously were found (Venkataraman *et al.*, 2003).

A compilation by Pillai and Jasmine (1989) showed 104 coral species under 37 genera in these atolls (9°–12°N; 72°–74°E), mainly from the southern ones. Extensive surveys were made from the year 2001 to 2003 at 5–20 m depth in Lakshadweep Islands revealed, the 20 coral species not reported so far from these islands were recorded for the first time. The systematic details of each

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species are given below. Among these, *Montipora foveolata*, *Cycloseris tenuis*, *Fungia seychellensis*, *Lobophyllia serratus* and *Oulophyllia bennettae* are being recorded for the first time from any of the Indian reefs. Lakshadweep Islands are located in the Laccadive-Maldive-Chagos ridge and its coral species composition, therefore, can be expected to reflect those of Chagos or Maldives. So far, 220 species under 58 genera, and 248 species under 57 genera, have been reported respectively from Chagos (Sheppard, 2000) and Maldives (Pichon and Benzoni, 2007). Compared with these, it is safe to presume that the diversity of corals in Lakshadweep is likely to be twice higher than what is known now.

MATERIALS AND METHODS

Scleractinian corals of India are protected under Schedule I of Wild Life Protection Act of India, 1972. Collection of coral specimens are strictly prohibited under this act. Hence, coral identification was made based on the field observation during SCUBA diving and underwater photographs. Regular field trips to Lakshadweep Islands had been organized by the author from the year 2001 to 2003, using SCUBA diving vessels made available by the Lakshadweep Coral Reef Monitoring Network (LCRMN). Under water photography was done by using Nikonos V camera with close-up-outfit and Nikonos 105 strobe illumination. The identification of all the coral species were made following the taxonomic monographs of Veron and Pichon (1976), Veron *et al.*, (1977), Veron and Pichon (1980 & 1982), Veron and Wallace (1984), Veron (1986), Hoeksema (1989), Veron (2000).

SPECIES NEWLY RECORDED FROM LAKSHADWEEP ISLANDS

1. *Montipora foveolata* (Dana, 1846)*
2. *Acropora valida* (Dana, 1846)
3. *Physogyra lichtensteini* (Edwards and Haime, 1851)
4. *Pavona explanulata* (Lamarck, 1816)
5. *Pavona duerdeni* Vaughan, 1907
6. *Pachyseris rugosa* (Lamarck, 1801)
7. *Cycloseris cyclolites* (Lamarck, 1801)
8. *Cycloseris costulata* (Ortmann, 1889)
9. *Cycloseris tenuis* (Dana, 1846)*
10. *Fungia granulosa* Klunzinger, 1879
11. *Fungia seychellensis* Hoeksema, 1993*
12. *Herpolitha limax* (Esper, 1797)

13. *Pectinia lactuca* (Pallas, 1766)
14. *Hydnophora exesa* (Pallas, 1766)
15. *Lobophyllia serratus* Veron, 2000*
16. *Symphyllia recta* (Dana, 1846)
17. *Platygyra pini* Chevalier, 1975
18. *Oulophyllia bennettae* (Veron and Pichon, 1977)*
19. *Porites murrayensis* Vaughan, 1918
20. *Porites vaughani* Crossland, 1952

*New to India

SYSTEMATIC ACCOUNT

Phylum CNIDARIA Hatschek, 1888

Class ANTHOZOA Ehrenberg, 1834

Order SCLERACTINIA Bourne, 1900

Family ACROPORIDAE Verrill, 1902

Genus ***Montipora*** de Blainvillae, 1830

Montipora foveolata (Dana, 1846) Velvet coral

(Fig. 1)

1846. *Montipora foveolata* Dana, *Zoophytes,* **7** : 1-740, pl. 1-61.

1954. *Montipora socialis* Wells, *Prof. Pap. U.S. Geol. Surv*, **260**-I : 385-486, pl. 94-187.

2000. *Montipora foveolata* Veron, *Corals of the World*, **1** : 131.

Materials examined : Kavaratti island 5 colonies, Amini island 2 colonies, Androth island 3 colonies, Chetlat island 1 colony, Kiltan island 1 colony, Bitra island 7 colonies.

Distribution : New record to India.

Elsewhere : Southeast Asia and Australia.

Genus ***Acropora*** Oken, 1815

Acropora valida (Dana, 1846) Table coral

(Fig. 2)

1846. *Madrepora valida* Dana, *Zoophytes*, **7** : 1-740, pl. 1-61.

1976. *Acropora variabilis* Pillai and Scheer, *Zoologica* (Stuttgart), **43**(126) : 1-83, pl. 1-32.

1984. *Acropora (Acropora) valida* Veron & Wallace, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **6** : 346-350

2000. *Acropora valida* Veron, *Corals of the World*, Vol. **1** : 404-405.

Materials examined : Kavaratti island 3 colonies.

Distribution : India-Gulf of Mannar and Andaman & Nicobar Islands.

Elsewhere : Red Sea to Central America and Australia.

Family EUPHYLLIDAE Veron, 2000

Genus ***Physogyra*** Quelch, 1884

Physogyra lichtensteini (Edwards and Haime, 1851) Small bubble coral
(Fig. 3)

1851. *Plerogyra lichtensteini* Edwards & Haime, *Arch. Mus. Natl. Hist. Nat,* (Paris), **5** : 1-505, pl. 1-20.

1928. *Physogyra lichensteini* Matthai, *Bri. Mus (Nat. His.),* **7** : 288, pl. 1-72.

2000. *Physogyra lichensteini* Veron, *Corals of the World*, Vol. **2** : 92-93.

Materials examined : Kavaratti island 9 colonies, Chetlat island 2 colonies, Kiltan island 1 colony, Androth island 2 colonies, Bitra island 3 colonies, Suheli island 8 colonies.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Madagascar east to Marshall Islands and Australia.

Family AGARICIIDAE Gray, 1847

Genus ***Pavona*** Lamarck, 1801

Pavona explanulata (Lamarck, 1816) Star column coral
(Fig. 4)

1816. *Agaricia explanulata* Lamarck, *Historie des animaux sans vertebres. Verdière,* Paris. **2** : 1-568.

1976. *Pavona explanulata* Pillai & Scheer, *Zoologica* (Stuttgart), **43**(126) : 1-83, pl. 1-32.

2000. *Pavona explanulata* Veron, *Corals of the World*, Vol. **2** : 184-185.

Materials examined : Kavaratti island 3 colonies, Amini island 2 colonies, Agatti island 4 colonies, Suheli island 3 colonies, Minicoy island 5 colonies.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Madagascar east to Philippines and Eastern Australia.

Pavona duerdeni Vaughan, 1907 Star coral
(Fig. 5)

1907. *Pavona duerdeni* Vaughan, *U.S. Natl. Mus. Bull.*, **59**(9) : 1-427, pl. 1-96.

1974. *Pavona duerdeni* Scheer & Pillai, *Zoologica* (Stuttgart), **42**(122) : 1-75, pl. 1-33.

2000. *Pavona duerdeni* Veron, *Corals of the World*, Vol. **2** : 200-201.

Materials examined : Kavaratti island 3 colonies, Androth island 5 colonies, Kiltan island 2 colonies, Chetlat island 2 colonies, Kadmat island 1 colony.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Maldives, Red Sea to Central America and Australia.

Genus ***Pachyseris*** Milne Edwards and Haime, 1849

Pachyseris rugosa (Lamarck, 1801) Elephant skin coral
(Fig. 6)

1816. *Agaricia rugosa* Lamarck, *Historie des animaux sans vertebres. Verdière,* Paris. **2** : 568 pp.

1974. *Pachyseris rugosa* Scheer and Pillai, *Zoologica* (Stuttgart), **42**(122) : 1-75, pl. 1-33.

2000. *Pachyseris rugosa* Veron, *Corals of the World*, Vol. **2** : 226-227.

Materials examined : Kavaratti island 3 colonies, Kiltan island 3 colonies, Chetlat island 1 colony, Bitra island 1 colony, Amini island 1 colony, Androth island 4 colonies.

Distribution : India-Gulf of Mannar, Andaman & Nicobar Islands.

Elsewhere : Red Sea east to Marshall Islands, Micronesia, Samoa and Australia.

Family FUNGIIDAE Dana, 1846

Genus ***Cycloseris*** Milne Edwards and Haime, 1849

Cycloseris cyclolites (Lamarck, 1801) Mushroom coral
(Fig. 7)

1801. *Fungia cyclolites* Lamarck, *Historie des animaux sans vertebres. Verdière*, Paris. **1** : 1-432.

1974. *Cycloseris cyclolites* Scheer and Pillai, *Zoologica* (Stuttgart), **42**(122) : 1-75, pl. 1-33.

1989. *Fungia (Cycloseris) cyclolites* Hoeksema, *Zool. Verhandelingen,* **254** : 41-46.

2000. *Cycloseris cyclolites* Veron, *Corals of the World*, Vol. **2** : 236-237.

Materials examined : Kavaratti island 4 colonies, Chetlat island 2 colonies, Bitra island 7 colonies.

Distribution : India-Gulf of Mannar, Andaman & Nicobar Islands.

Elsewhere : Red Sea east to Japan and Australia.

Cycloseris costulata (Ortmann, 1889) Mushroom coral
(Figs. 8a & 8b)

1889. *Fungia costulata* Ortmann, *Zool. Jahrb. Abt. Syst. Geor. Biol. Tiere,* **4** : 493-590, pl. 11-18.

1976. *Cycloseris costulata* Pillai & Scheer, *Zoologica* (Stuttgart), **43**(126) : 1-83, pl. 1-32.

1989. *Fungia (Cycloseris) costulata* Hoeksema, *Zool Verhandelingen,* **254** : 64-69.

2000. *Cycloseris costulata* Veron, *Corals of the World*, Vol. **2** : 245.

Materials examined : Kavaratti island 3 colonies, Chetlat island 1 colony, Bitra island 11 colonies.

Distibution : India-Andaman & Nicobar Islands.

Elsewhere : Maldive islands east to Bismark Archipelago and Australia.

Cycloseris tenuis (Dana, 1846) Mushroom coral
(Figs. 9a & 9b)

1846. *Fungia tenuis* Dana, *Zoophytes* **7** : 1-740, pl. 1-61.

1972. *Cycloseris cooperi* Pillai, *Symp. Mar. Biol. Assoc. India*, **5** : 191-216.

1989. *Fungia (Cycloseris) tenuis* Hoeksema, *Zool Verhandelingen*, **254** : 70-74.

2000. *Cycloseris tenuis* Veron, *Corals of the World*, Vol. **2** : 244.

Materials examined : Chetlat island 1 colony, Bitra island 2 colonies.

Distibution : New record to India.

Elsewhere : Maldives, Philippines to Micronesia and Australia.

Genus ***Fungia*** Lamarck, 1801

Fungia granulosa Klunzinger, 1879 Mushroom coral
(Fig. 10)

1879. *Fungia granulose* Klunzinger, *Die Korallenthiere des Rothen Meeres* **3** : 1-100, pls. 1-10.

1980. *Fungia (Verrillofungia) granulosa* Veron & Pichon, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **4** : 156-159.

1989. *Fungia (Wellsofungia) granulosa* Hoeksema, *Zool Verhandelingen*, **254** : 125-129.

2000. *Fungia granulosa* Veron, *Corals of the World*, Vol. **2** : 276.

Materials examined : Kavaratti island 1 colony, Bitra island 2 colonies.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Red Sea east to Philippines and Australia.

Fungia seychellensis Hoeksema, 1993 Mushroom coral
(Figs. 11a, 11b & 11c)

1993. *Fungia (Pleuractis) seychellensis* Hoeksema, *Zool Mededelingen*, **67** : 639-654.

2000. *Fungia seychellensis* Veron, *Corals of the World*, Vol. **2** : 279.

Materials examined : Bitra island 1 colony.

Distribution : New record to India.

Elsewhere : Seychelles and Chagos Archipelago.

Genus ***Herpolitha*** Eschscholtz, 1825

Herpolitha limax (Esper, 1797) Tongue coral
(Fig. 12)

1797. *Madrepora limax* Esper, *Fortsetzungen,* **1** : 1-230.

1976. *Herpolitha limax* Pillai & Scheer, *Zoologica* (Stuttgart), **43**(126) : 1-83, pl. 1-32.

1980. *Herpolitha limax* Veron & Pichon, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **4** : 178-180.

1989. *Herpolitha limax* Hoeksema, *Zool Verhandelingen,* **254** : 168-175.

2000. *Herpolitha limax* Veron, *Corals of the World,* Vol. **2** : 292-293.

Materials examined : Bitra island 2 colonies.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Red Sea east to Tuamoto Archipelago and Australia.

Family PECTINIIDAE Vaughan & Wells, 1943

Genus ***Pectinia*** Oken, 1815

Pectinia lactuca (Pallas, 1766) Hibiscus coral
(Figs. 13a & 13b)

1766. *Madrepora lactuca* Pallus, *Elenchus Zoophytorum.* Den Haag. 1-451.

1980. *Pectinia lactuca* Veron &Pichon, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **4** : 330-331.

2000. *Pectinia lactuca* Veron, *Corals of the World,* Vol. **2** : 350-351.

Materials examined : Kavaratti island 3 colonies, Chetlat island 1 colony, Bitra island 1 colony, Suheli island 5 colonies.

Disribution : India-Andaman & Nicobar Islands.

Elsewhere : From Madagascar east to Fiji and Australia.

Family MERULINIDAE Verrill, 1846

Genus ***Hydnophora*** Fischer de Waldheim, 1807

Hydnophora exesa (Pallas, 1766) Horn coral
(Fig. 14)

1766. *Madrepora exesa* Pallas, *Elenchus Zoophytorum.* Den Haag. 1-451.

1904. *Hydnophora maldivensis* Gardiner, *Fauna and Geography of the Maldives and Luccadives Archipelagoes'* Cambridge, **2** : 756-90, pl. 59-64.

1977. *Hydnophora exesa* Veron, Pichon & Wijsman-Best, *Australian. Inst. Mar. Sci. Monogr. Ser.* Vol. **3** : 129-134.

2000. *Hydnophora exesa* Veron, *Corals of the World,* Vol. **2** : 370-371.

Materials examined : Kavaratti island 3 colonies, Kadmat island 2 colonies, Androth island 3 colonies, Minicoy island 1 colony.

Distribution : India-Gulf of Kachchh, Gulf of Mannar, Andaman & Nicobar Islands.

Elsewhere : Maldives, Red Sea east to Tuvalu and Australia.

Family MUSSIDAE Ortmann, 1890

Genus ***Lobophyllia*** de Blainville, 1830

Lobophyllia serratus Veron, 2000 Tooth coral

(Fig. 15)

2000. *Lobophyllia serratus* Veron, *Corals of the World*, Vol. **3** : 41.

Materials examined : Kavaratti island 1 colony.

Distribution : New record to India.

Elsewhere : Philippines and Indonesia.

Genus ***Symphyllia*** Milne Edwards and Haime, 1848

Symphyllia recta (Dana, 1846) Brain coral

(Fig. 16)

1846. *Mussa recta* Dana, *Zoophytes,* **7** : 1-740, pl. 1-61.

1924. *Symphyllia sinuosa* Matthai, *Bri. Mus. (Nat. His.)* **7** : 288, pl. 1-72.

1980. *Symphyllia recta* Veron & Pichon, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **4** : 282-289.

2000. *Symphyllia recta* Veron, *Corals of the World*, Vol. **3** : 56-57.

Materials examined : Suheli island 1 colony, Amini island 2 colonies, Kiltan island 1 colony, Chetlat island 2 colonies, Androth island 3 colonies, Minicoy island 2 colonies.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Maldive Islands east to the Marshall Islands and Australia.

Family FAVIIDAE Gregory, 1900

Genus ***Platygyra*** Ehrenberg, 1834

Platygyra pini Chevalier, 1975 Maze coral

(Fig. 17)

1975. *Platygyra pini* Chevalier, *2éme Partie. Expéd. Récifs Corallins Nouvelle-Calédonie,* **7** : 5-407, pl. 1-42.

1977. *Platygyra pini* Veron, Pichon & Wijsman-Best, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **3** : 108-110.

2000. *Platygyra pini* Veron, *Corals of the World*, Vol. **3** : 178-179.

Materials examined : Kavaratti island 2 colonies, Kadmat island 1 colony, Androth island 2 colonies, Suheli island 2 colonies, Minicoy island 1 colony.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Western Pacific Ocean and Australia.

Genus ***Oulophyllia*** Milne Edwards & Haime, 1848

Oulophyllia bennettae (Veron and Pichon, 1977) Labyrinth coral

(Fig. 18)

1977. *Favites bennettae* Veron, Pichon & Wijsman-Best, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **3** : 73-78.

1986. *Oulophyllia bennettae* Veron, *Corals of Australia and the Indo-Pacific*. 500-501.

2000. *Oulophyllia bennettae* Veron, Corals *of the World*, Vol. **3** : 200-203.

Materials examined : Kavaratti island 2 colonies, Androth island 5 colonies.

Distribution : New record to India.

Elsewhere : South East Asia and Australia.

Family PORITIDAE Gray, 1842

Genus ***Porites*** Link, 1807

Porites murrayensis Vaughan, 1918 Mustard coral

(Fig. 19)

1918. *Porites murrayensis* Vaughan, *Geol. Rijksmus. Leiden* **2**(2) : 1-91.

1976. *Porites murrayensis* Pillai & Scheer, *Zoologica* (Stuttgart) **43**(126) : 1-83, pl. 1-32.

1982. *Porites* (*Porites*) *murrayensis* Veron & Pichon, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **5** : 18-20.

2000. *Porites murrayensis* Veron, Corals *of the World*, Vol. **3** : 292.

Materials examined : Kavaratti island 6 colonies, Chetlat island 5 colonies, Bitra island 2 colonies, Suheli island 7 colonies.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : Maldives to Samoa and Australia.

Porites vaughani Crossland, 1952 Pore coral

(Fig. 20)

1952. *Porites* (*Synaraea*) *vaughani* Crossland, *Br. Mus. (Nat. Hist.)*, **6**(3) : 85-257, pl. 1-56.

1976. *Porites seminularis* Nemenzo, *Nat Appl Sci Bull Univ Philippines* **28** : 229-276, pl. 1-9.

1982. *Porites (Nanopora) vaughani* Veron & Pichon, *Australian Inst. Mar. Sci. Monogr. Ser.* Vol. **5** : 53-57.
2000. *Porites vaughani* Veron, Corals *of the World*, Vol. **3** : 308-309.

Materials examined : Kavaratti island 9 colonies, Bitra island 5 colonies, Androth island 2 colonies.

Distribution : India-Andaman & Nicobar Islands.

Elsewhere : South China Sea and Australia.

SUMMARY

Underwater survey of the coral reefs at 10 of 27 islands of Lakshadweep *i.e.*, Agatti, Androth, Amini, Bitra, Chetlat, Kadmat, Kavaratti, Kiltan, Minicoy and Suheli islands revealed 20 species to be new record to the fauna of Lakshadweep. Among these, 5 species namely *Montipora foveolata, Cycloseris tenuis, Fungia seychellensis, Lobophyllia serratus* and *Oulophyllia bennettae* are new record to the Indian coral reefs. Systematic account of the 20 species with distribution is given.

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