New report of *Melithaea delicata* Hickson, 1905 (subclass: octocorallia) from Little Andaman Island, India

J. S. Yogesh Kumar¹*, S. Geetha², C. Raghunathan³, & R. Sornaraj²

¹Marine Aquarium and Regional Centre, Zoological Survey of India (MoEFCC), Government of India, Digha, West Bengal, India.
²Research Department of Zoology, Kamaraj College (Manonmaniam Sundaranar University), Thoothukudi, Tamil Nadu, India.
³Zoological Survey of India (MoEFCC), Government of India, New Alipore, Kolkata, West Bengal, India.

*E-mail: coralyogesh@yahoo.co.in*

Received 04 December 2017; 25 April 2018

*Melithaea* octocoral (Family Melithaeidae) are represented by 15 species in Indian waters and 13 species were reported from Andaman and Nicobar Island. *Melithaea delicata* is reported herein as a new distributional record in Indian waters, from Little Andaman Island. This species is identified by morphological and sclerite structures and characterised by club-shaped sclerites of the calyx, pointed needle shape sclerites of the collaret; spindles shaped in the calyx and coenenchyme. Updated distribution details of all 15 *Melithaea* species in Indian waters are provided.

**Keywords:** Octocorals; Soft corals; Melithaeidae; *Melithaea delicata*; Little Andaman; Andaman and Nicobar Island; India

**Introduction**

The subclass Octocorallia belongs to class Anthozoa, phylum Cnidaria and is commonly known as soft corals and seafans (Alcyonacea), blue corals (Helioporidae), sea pens, and sea pencils (Pennatulacea). Octocorallia is classified into 3 orders, 8 suborders, 55 families and about 3200 species. The genus *Melithaea* belongs to the order Alcyonacea, suborder Sleraxonia, family Melithaeidae and subfamily Melithaeinae. The family Melithaeidae is one of the 49 presently recognized families of octocorals. The genus *Melithaea* is one of the 49 presently recognized families of octocorals. The genus *Melithaea* is distributed in the marine environment and is very common in warm and tropical waters from shallow to deep sea. A total of 121 species of *Melithaea* have been reported by different researchers from different parts of the world (East Africa and Red Sea by Grasshoff; Indian Ocean by Thomson, Ofwegen, and Williams; Indo-West Pacific by Ofwegen, Grasshoff, Ofwegen, Hoeksema and Ofwegen, Matsumoto and Ofwegen). The genus name *Melithaea* was placed on the official list of generic names and the node and internodes play a major role for morphological identification of the species. The axis of Melithaeidae having short and long internodes, is short, smooth, rod-shaped. Recently the family Melithaeidae was recognized by Reijnen et al., based on investigation of the DNA molecular phylogenetic relationship and synonymised several genera, namely, Acabaria, Clathraria, Melithaea, Mopsella, Wrightella coming under this family.

In India, an aggregate of 461 species of octocorals belong to 92 genera, 30 families, 8 suborders, and 3 orders. Of which, 301 species are from the east coast, 98 species from the west coast, 277 species from the Andaman and Nicobar Islands, 203 species from the Tamil Nadu, 40 species from the Lakshadweep Islands, 31 species from the Kerala coast, 29 species each from Andhra Pradesh and Orissa, 27 species from Pondicherry, 18 species from Gujarat, 15 species from Mumbai coast, 8 species from West Bengal, and 4 species from Karnataka. Among them, 14 species are reported under the genus of *Melithaea*, while four species (*M. variabilis, M. philippinensis, M. ornate, M. pulchella*) are reported from Andaman sea, three species (*M. andamanensis, M. biserialis, M. squamata*) from south-east coast of India, one species (*M. variabilis*) from Muttom Kerala coast, and one species (*M. variabilis*) from Minicoy Atoll, Lakshadweep Islands. Recently, 7 species (*M. braueri, M. caledonica, M. cinquemiglia,*
M. ochracea, M. ouvea, M. rubeola, M. variabilis) are reported under this genus from Andaman and Nicobar Islands. In this study, we present detailed description of the newly recorded species of Melithaea delicata from Little Andaman Island and updated list of species reported under the genus of Melithaea from Indian coast.

Materials and Methods
The samples were collected during the survey period from June 2013 to May 2016 by SCUBA diving in South Bay, Little Andaman and preserved in 70% ethanol. The specimens were identified based on the structural characteristics of the colony and sclerites structure. Sclerites were extracted by 5% sodium hypochlorite and probed under the compound and stereo microscope (Labovision AXR 20; Leica–DFC 500) and underwater pictures were taken with the help of Canon G15 camera. The identified samples were deposited in the National Zoological Collection of ZSI, Port Blair.

Results
In India, a total of 15 species belonging to the genus Melithaea, family Melithaeidae, 13 species of Melithaea were reported from Andaman and Nicobar Islands. Among them, one species Melithaea delicata was identified as the new distribution record to Indian waters from the Little Andaman Island on the basis of taxonomical attributes. The taxonomical identification was made based on the morphological variations, sclerites characters and size. The detailed morphological feature of Melithaea delicata is described below with all other reported 14 species under this genus from Indian coast.

Phylum: Cnidaria Verrill, 1865
Class: Anthozoa Ehrenberg, 1834
Subclass: Octocorallia Haeckel, 1866
Order: Alcyonacea Lamouroux, 1812
Suborder: Scleraxonia Studer, 1887
Family: Melithaeidae Gray, 1870
Subfamily: Melithaeinae, Alderslade, 2006
Genus: Melithaea Milne Edwards, 1857
1857 Mopsella Gray
1859 Acabaria Gray
1859 Clathraria Gray
1870 Wrightella Gray
1902 Pleurocoralloides Moroff

1. Melithaea delicata (Hickson, 1940) (Figs. 1 & 2)
1940 Acabaria delicata Hickson,
1940 Acabaria gracillima Stiasny
1996 Acabaria delicata Weinberg
1966 Acabaria biserialis Tixier-Durivault
1976 Acabaria biserialis Grasshoff
1987 Acabaria aff. delicata Ofwegen

Material examined: The specimen deposited in ZSI/ANRC-13682. Live colony and polyps are greenish yellow in colour and internodes are red in colour, the preserved sample was pale yellow with pink colour on internodes; 23 mm length and 30 mm width. The sample was collected from 18 m depth at South Bay, Little Andaman (Lat. 10°30.605 N; Long. 092°29.143 E), on 18 November 2015.

Description: The sample is small, uneven branches and 1.0 mm cylindrical stem. The branches are free, anastomoses and dichotomous forms. Polyps are scattered on the branches and calyces are less than 1.0 mm diameter. The calyx wall is projected above the coenenchyme and pale yellow colour sclerites are noted on the coenenchyme and the calyx. The red colour sclerites are presented in the nodes and internodes (2.0 mm). The coenenchyme have spindle, simple irregular tuberculation sclerites and club shape sclerites presented in the calyx. The nodes and internodes have a rod- and cigar-shaped sclerites.

Sclerites: These are exceedingly varied in shape. The average surface of calyx is 0.10 mm to 1.04 mm clubs and spindles sclerites; the coenenchyme surface have 0.10 mm to 0.175 mm spindles sclerites and 0.05 mm to 0.08 mm clubs and rods sclerites on the nodes surface and subsurface. In collaret, long pointed and small spindle-shaped sclerites are present (0.10 mm – 0.20 mm).

Colour: The living colony is greenish yellow in colour; the tentacles of polyp also in same colour and nodes are red in colour. The coenenchymal sclerites are pale yellow in colour and coenenchymal on nodes are red in colour, nodes surface are red in colour and subsurface of internodes are pale yellow or colourless sclerites.

Distribution: Indonesian; Red Sea; Ghardaqa; Madagascar; Eilat; Kenya; India, Little Andaman, Andaman and Nicobar.
References: Hickson
Remarks: New distribution record from Indian water.
2. *Melithaea andamanensis* (van Ofwegen, 1987)

1909 *Melithaea variabilis* Thomson and Simpson

1905 *Melithaea variabilis* Hickson

1987 *Acabaria andamannensis* van ofwegen

**Distribution:** Central Indo–Pacific; India, Mandapam, Gulf of Mannar, Cuddalore, Southeast coast of India, South Andaman.

**References:** Fernando2018.
3. *Melithaea biserialis* (Kukenthal, 1908)
   1908 *Acabaria biserialis* Kukenthal
   1976 *Acabaria biserialis* Grasshoff
   1987 *Acabaria biserialis* Ofwegen
   2014 *Melithaea biserialis* Reijnen
   **Distribution:** Red Sea; India, Mandapam, Gulf of Mannar, Cuddalore, Southeast coast of India, South Andaman.
   **References:** Kukenthal29,20,28.

4. *Melithaea braueri* (Kukenthal, 1919)
   1919 *Wrightella braueri* Kukenthal,
   **Distribution:** Karthip, Nancowry in Andaman and Nicobar Islands.
   **References:** Kukenthal30,23,28.

5. *Melithaea caledonica* Grasshoff, 1999
   1970 *Melithaea stormii* Tixier-Durivault
   **Distribution:** Western South Pacific; India, Pongibalu, Munak Gate, Nancowry in Andaman and Nicobar Islands.
   **References:** Grasshoff14, 23,28.

   1999 *Acabaria cinquemiglia* Grasshoff
2014 Melithaea cinquemiglia Reijnen  
*Distribution:* Gulf of Mannar, Southeast coast of India, Pongibalu, Andaman and Nicobar Islands. 
*References:* Grasshoff 34,20,23,28.

7. *Melithaea hicksoni* (Nutting 1911)  
1911 Acabaria hicksoni Nutting 
Scirpearia hicksoni Nutting  
*Distribution:* Andaman and Nicobar Islands. 
*References:* Nutting 31.

1987 Clathraria maldivensis van Ofwegen,  
*Distribution:* Indian Ocean; India, Lakshadweep. 
*References:* Ofwegen and Vennam 32.

9. *Melithaea ochracea* (Linnaeus, 1785)  
1758 Isis ochracea Linnaeus  
1767 Isis ochracea Linnaeus  
1924 Melitodes ochracea Kukenthal  
1970 Melithaea ochracea Tixier – Durivault  
1970 Melithaea rubeola Tixier – Durivault  
1977 Melithaea ochracea Muzik and Wainwright  
1984 Melithaea ochracea Zou and Chen  
1987 Melithaea ochracea van ofwegen  
1996 Melithaea ochracea Goh and Chou  
*Distribution:* Havelock, Andaman and Nicobar Islands. 
*References:* Kumar et al., 23,28.

*Distribution:* Andaman and Nicobar Islands. 
*References:* Thomson and Simpson 19

11. *Melithaea ouvea* (Grasshoff, 1999)  
1999 Acabaria ouvea Grasshoff  
2014 Melithaea ouvea Reijnen  
*Distribution:* South Pacific Ocean; India, Gulf of Mannar, Guitar Island, Andaman and Nicobar Islands. 
*References:* Grasshoff 34,20,23,28.

12. *Melithaea philippinensis* (Wright and Studer, 1889)  
1889 Acabaria philippinensis (Wright & Studer)  
*Distribution:* Andaman and Nicobar Islands. 
*References:* Wright and Studer 33.

13. *Melithaea rubeola* (Wright & Studer, 1889)  
1889 Acabaria rubeola Wright & Studer  
1889 Mopsella rubeola Wright & Studer  
1937 Mopsella rubeola Hickson  
1996 Mopsella rubeola Goh and Chou  
2000 Mopsella rubeola Van Ofwegen  
2014 Melithaea rubeola Reijnen  
*Distribution:* Yerwadi, Gulf of Mannar, John Lawrence, Andaman and Nicobar Islands. 
*References:* Wright and studer 33,20,23,28.

14. *Melithaea squamata* (Nutting, 1911)  
1911 Melitodes squamata Nutting  
1924 Melitodes squamata Kukenthal  
1956 Melitodes squamata Utinomi  
1984 Melitodes squamata Ofwegen  
1987 Melitodes squamata Ofwegen  
*Distribution:* Red Sea; India, Uvari, Kanyakumari, Tuticorin in Gulf of Mannar, Cuddalore, South-east coast of India. 
*References:* Nutting 31,23,28.

15. *Melithaea variabilis* (Hickson, 1905)  
1905 Acabaria variabilis (Hickson)  
1905 Melitodes variabilis Hickson  
*Distribution:* Landfall Island in Andaman and Nicobar Islands and Laccadive Islands. 
*References:* Hickson 34,24.

**Discussion**

The diversity and distribution of octocorals were explored during the study period from June 2013 to May 2016 in Andaman and Nicobar Islands. Based on these studies, as one new distribution reports, the species *Melithaea delicata* was identified based on the morphological variations between the other species and the sample observed at 18 m depth from Little Andaman Island. The genus *Melithaea* was synonymised from the following genera Acabaria, Clathraria, Melithaea, Mopsella, Wrightella and the species *M. delicata* was misidentified and synonymised in the name of *Acabaria delicata, Acabaria gracillima, Acabaria delicata, Acabaria biserialis, Acabaria biserialis, and Acabaria aff. delicata* 9,17.

In India, total 15 species (*Melithaea andamanensis, M. biserialis, M. braueri, M. caledonica, M. cinquemiglia, M. delicata, M. hicksoni, M. maldivensis, M. ochracea, M. ornata, M. ouvea, M. philippinensis, M. rubeola, M. squamata, M. variabilis*) were reported under this genus 18–24, among them *M. delicata* was reported first time from Indian water. *M. delicata* nodes are red in colour, branching and
colour of the sample is very similar to *Melithaea variabilis*. The species growth form and sclerites size varied between the other reported species (121 sp.) under this genus from elsewhere’s 5,6,7,9,16,35. The present study indicates the addition to the diversity index of octocoral fauna in Indian coast.

**Conclusion**

The octocorals of India have not been sufficiently studied; it can be anticipated that the *Melithaea* diversity is also quite high. Regrettably, there is also a scarcity of information on *Melithaea* diversity of Indian reef regions, such as those of Gulf of Mannar, Gulf of Kuchchh, Lakshadweep, and Andaman and Nicobar Islands. At this stage, therefore, it can be cautiously concluded that the number of *Melithaea* species on the Indian reef is rather moderate. It is anticipated that several extensive surveys and taxonomical studies are required to inventory the octocoral fauna to enhance the database of Andaman and Nicobar Islands as well as mainland reef ecosystem of India.

**Acknowledgement**

The authors are thankful to our honourable Director, Zoological Survey of India, Kolkata, Ministry of Environment of Forest and Climate Change (MoEFCC) for the permission granted to survey the Islands. Also thanks to the Department of Science and Technology (DST) and Science and Engineering Research Board (SERB) for financial support under Young Scientist program.

**References**


