New Records and Range Extensions of Some Marine Sponges (Porifera: Demospongiae and Homoscleromorpha) from the Andaman Islands, India; Part of the Indo-Burma Biodiversity Hotspot

Vibha V. Ubare* and P.M. Mohan
Department of Ocean Studies and Marine Biology, Pondicherry University, Brookshabad, Port Blair - 744 112, Andaman and Nicobar Islands, India. E-mail: pmmtu@yahoo.com

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Vibha V. Ubare and P. M. Mohan (2018) The present study reports seven new records of marine sponges from the Andaman Islands, India. Among them, six species are from the Class Demospongiae and one is from the Class Homoscleromorpha. These seven species were earlier recorded from Australian and South-east Asian regions and islands in the Indian Ocean. The current study documents the range extension of these sponges and highlights the importance of filling the gaps in distributional patterns (Wallacean shortfall). Out of the seven species, four species are reported here, from the Indian waters, for the first time.

Key words: Spheciospongia globularis, Clithosoa aurivillii, Biemna fortis, Siphonodictyon mucosum, Oceanapia fistulosa, Axinyssa mertoni, Plakortis communis.

BACKGROUND

The Andaman and Nicobar Islands of India extend between 06°N to 14°N latitudes and 90°E to 94°E longitudes. These islands are situated between the Andaman Sea in the east and the Bay of Bengal in the west. These two water masses enhance the biodiversity of these islands through a coral reef ecosystem. Geologically, these islands are a continuation of the mountain ranges of the Naga and Lushai Hills and Arakan Yoma of Burma that extend through Cape Negrais to the Andaman and Nicobar Islands and the Achin Head (South-east of Sumatra). The Andaman and Nicobar Islands form two distinct groups of islands divided by the Ten-degree channel (Tikader and Das 1985; Pattanayak 1998).

Different kinds of organisms in the coral reef community facilitate reef system formation, and sponges play an integral role in this system. They are evolutionary primordial organisms belonging to the Phylum Porifera. They play a major role in the marine ecosystem by acting as biogeochemical fluxes that respire organic matter, helping the utilization and release of nutrients and recycling organic carbon through the shedding of cellular material (Webster and Thomas 2016). However, taxonomic studies of these ecologically important taxa are limited in this region due to the difficulty in identifying species and scarcity of relevant literature.

The available literature suggests that numerous species of sponges have been recorded from the Indo-West Pacific region and show affinity to the sponges of other regions. For example, East African sponges show more similarities to
Indonesian species rather than those of closer regions like India, Red Sea, South or West Africa (van Soest 1994; Barnes and Bell 2002).

There are remarkable studies on the distribution sponges of Andaman and Nicobar Islands, but they have not been continuous. Researchers like Schulze (1902), Annandale (1915), Dendy and Burton (1926), Burton (1928), Burton and Rao (1932), Thomas (1977 1979), Tikadar et al. (1986), van Soest and Hooper (1993) and Pattanayak (1998 2006) provide significant insight on aspects of sponge species descriptions and distributions in Andaman and Nicobar waters. There has been very little taxonomic work documented from these islands since these studies. However, since 2011 there has been a steady rate of contributions in the taxonomic work of sponges from this region by Immanuel and Raghunathan (2011), Krishnan et al. (2012), Vinod et al. (2012), Ramkumar et al. (2013), Raghunathan et al. (2014), Raghunathan (2015), Immanuel et al. (2015a b), Kiruba-Sankar et al. (2016), Ubare and Mohan (2016), Mohan et al. (2016) and Pereira et al. (2016).

During our survey, we also found some species of sponges that were not recorded earlier in this region and suggest a range extension for some Australian and African species. The results of these surveys are given here with the intention of updating some of the Andaman Islands’ sponge fauna.

MATERIALS AND METHODS

Study area

Specimens were collected during the project work of INDOBIS (2012-2017) from Chidiyatappu (Lat. 11°29'11.71"N; Long. 092°42'43.68"E), Badabalu (Lat. 11°30'37.04"N; Long. 092°41'09.28"E), Burmanallah (Lat. 11°38'43.11"N; Long. 092°45'29.75"E), Carbyns Cove (Lat. 11°38'43.56"N; Long. 092°45'27.85"E), Mayabunder (Lat. 12°54'34.44"N; Long. 092°55'14.61"E) and Diglipur (Lat. 13°13'19.94"N; Long. 093°03'5.83"E) on the Andaman Islands (Fig. 1). Chidiyatappu has a rocky bottom with sandy sediments together with boulders and pebbles. Badabalu has a hard coralline outcrop covered with mud and fine sand. Burmanallah has a rocky outcrop with a thin veneer of sand on the surface. Carbyns Cove also exhibits a rocky outcrop but lacks a sand deposit. Mayabunder is covered with exposed dead corals and contains medium to fine sand and rocky outcrops. Diglipur also has large amount of exposed dead corals.

It has been shown that sponge fauna of the Indian Seas is closely related to that of the Australian region, Red Sea and Pacific Ocean (Thomas 1983). Thomas (1977 1979), described four species from the Andaman Sea; which had earlier been identified as being from Australia and its adjacent areas. The presence of these species in mainland India and the Andaman Islands suggests a distributional extension of these species within Indian waters.
Collection of samples

The samples were handpicked with forceps from depths of one to five meters. The photographic documentation was done using an underwater Nikon Coolpix AW110 camera. The collected specimens were fixed in 70% ethanol and deposited in the Department of Ocean Studies and Marine Biology (DOSMB), Pondicherry University, Port Blair.

Morphometry, microscopy and sample analysis

Spicule slides were prepared by dissociating small fragments of the sponge in boiling nitric acid. Thick hand cut sections were made using a surgical blade for the skeleton and were observed under a Carl Zeiss AXIO Vert.A1 light microscope with inbuilt camera. Thirty spicules of each kind were measured per individual. Spicule measurements were expressed as “length/width” in μm. Species’ systematics and distribution were verified by the World Porifera Database (van Soest et al. 2017) and original descriptions.

Geographic co-ordinates for localities were retrieved using Google-Earth and maps of the localities were prepared using QGIS version 2.16.1.

RESULTS

SYSTEMATICS

Phylum Porifera Grant, 1836
Class Demospongiae Sollas, 1885
Subclass Heteroscleromorpha Cárdenas, Pérez & Boury-Esnault, 2012
Order Clionaida Morrow & Cárdenas, 2015
Family Clionaidae d’Orbigny, 1851

Genus Spheciospongia Marshall, 1892
Spheciospongia globularis Dendy, 1922
(Figs. 2 and 3)

Synonyms: Spirastrella globularis Dendy, 1922 (genus transfer)


Description: Globular head attached to short, slender stalk (Figs. 2A-B). The head measures 20.2-49.9 mm in size while the stalk is 20.2 mm in length and 13.4 mm in width. The coloration of live specimens is dull yellow, which turns to pale yellow after preservation in ethanol. The surface is granular and uneven. The oscules are very minute in shape and range from 0.5-2.4 mm in diameter. The texture of sponge is firm, incompressible and compact.

Spicules: Megascleres- Tylostyles are present in the variable size ranges. The larger tylostyle (Fig. 2C1) is somewhat curved with globular head measuring 450.0-547.0/6.0-24.0 μm, the medium sized tylostyle (Fig. 2C2) is straight and measures 296.0-360.0/11.0-19.0 μm, the smaller sized...
tylostyles (Fig. 2C3) are similar to the medium sized tylostyle and ranges 187.0-215.0/9.0-11.0 \(\mu\)m. Microscleres- Slender spinispir (Fig. 2C4), bended two to three times, some are thick and thin in width. The size ranges from 11.0-23.0/1.5-2.0 \(\mu\)m.

**Skeleton:** Shows irregular reticulation of stout, loose spicular tracts; spongin is very rarely present. Spicules are scattered irregularly in the ectsosomal and choanosomal region. In the stalk, the skeleton is almost entirely composed of longitudinal bundles and it is closely packed (Figs. 2D-F).

**Habitat:** This species prefers rocky and sandy environments. The base of this species is buried inside the sandy substratum and the globular head with the stalk is present outside the substratum. This species was mostly observed with the sponge *Neopetrosia chaliniformis* and algae *Halimeda* spp.

**Distribution:** India-North Andaman - Diglipur and Middle Andaman-Mayabunder; Elsewhere - Chagos (Dendy 1922), Seychelles (Dendy 1922), Indian Ocean (Schleyer et al. 2006) (Fig. 3).

**Remarks:** This is the first record of this species in Indian waters; it is a second species of genus *Spheciospongia* recorded from the Andaman Islands.

**Genus Cliothosa Topsent, 1905**  
*Cliothosa aurivillii* (Lindgren, 1897)  
(Figs. 4 and 5)

**Synonyms:** *Spirastrella aurivillii* Lindgren, 1897  
*Spirastrella aurivillii* excavans Lindgren, 1897


**Description:** This sponge is present in the alpha stage only (Fig. 4A). The sponge specimen fills the cavity 8 × 4.5 × 2.5 cm, inside the coral substrate (Figs. 4B-C). It has numerous papillae outside the coral substrate. These papillae are connected internally to the chamber. The papillae are 7.4 × 5.1 mm. In the living specimen, the colour of papillae and internal mass of specimen is orange and, after preservation, the colour of papillae changes to white and internal mass becomes dull orange. The internal mass of the sponge is very soft and rubbery; the papillary region is compact and brittle.

**Spicules:** Megascleres- Two types of tylostyles are present, one is thick, and the other is thin. The thick tylostyles (Fig. 4D1) are large, smooth, stout and slightly curved with a circular head, usually subterminal, and measures 479.0-632.0/31.0-31.5 \(\mu\)m. The thin tylostyles (Fig. 4D2) are straight and smooth with circular and oval heads and measures 336.0-476.0/7.0-12.0 \(\mu\)m.

Microscleres- The large sized amphiasters (Fig. 4D3) have branches and bifurcated tips; they measure 26.0-59.0/3.2-3.3 \(\mu\)m.

**Skeleton:** The amphiasters are present only in the internal mass of the sponge; they were not observed in the papillary region. In the papillary region, the tylostyles are arranged in a vertical manner (Figs. 4E-F) and showing irregular arrangement in the internal mass of the sponge.

**Habitat:** This sponge is present in a boring form with live or dead coral. The host coral

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**Fig. 3.** Geographical extension of *Spheciospongia globularis* (Dendy, 1922).
occurs with sea grass *Thalassia hemprichii*, algae *Halimeda* spp., *Padina* spp., sea cucumber and foraminiferan *Sorites* spp.

**Distribution:** India: Gulf of Mannar and Palk Bay (Thomas 1979); in the present study, it was observed at North Andaman: Diglipur; Elsewhere: Palau (Bergquist 1965), Sunda Shelf/Java Sea (Lindgren 1898), West Caroline Islands (Bergquist 1965) and Indonesia (Hooper and van Soest 2002) (Fig. 5).

**Remarks:** This species has been reported from the Andaman Islands for the first time in this study. Pattanayak (1999 2006) mentioned a *Cliothosa hancocki* (Topsent, 1888) from Port Blair, South Andaman region. The differences between these two species are that the *C. hancocki* consists of a single type of tylostyle (320.0-480.0/15.0-22.0 μm), nodular amphiaster (10.0-12.0/3.0-4.0 μm) and slender amphiaster (18.0-30.0 μm) whereas *C. aurivillii* comprises two types of tylostyles - thick (479.0-632.0/31.0-31.5 μm) and thin (336.0-476.0/7.0-12.0 μm) - large sized amphiaster with branches and bifurcate tips (26.0-59.0/3.2-3.3 μm).

**Order Biemnida Morrow, 2013**  
**Family Biemnidae Hentschel, 1923**  
**Genus Biemna Gray, 1867**  
**Biemna fortis** (Topsent, 1897)  
(Figs. 6 and 7)

**Synonyms:** *Desmacella fortis* Topsent, 1897 (genus transfer)

**Material examined:** 2 ex., DOSMB 00129-DOSMB 00130, India: Andaman and...
Description: This sponge is massive-flanged and finger shaped (Fig. 6A). It is mostly present in the sandy substratum and always covered by sand. It measures 17.9-42.6 mm. The live colour of the specimen is whitish and does not change much after preservation. Oscular chimneys are present. Sometimes only one or many oscular chimneys.
have been observed from a single specimen; it is oval to circular in shape and ranges 1.7-7.5 mm in diameter. The consistency is compact, brittle, and compressible. The surface of the specimen is uneven and rough to touch.

**Spicules**: The spicules of the specimen are very pointed and sharp. Megascleres- The styles (Fig. 6B1) are slightly curved, the head region is round and the base is sharply pointed. The size ranges 923.0-1330.0/25.0-27.0 µm. Microscleres-Rhaphides are present in bundles known as Trichodragmas (Fig. 6B2) 24.0-178.0/9.0-16.0 µm. Three categories of sigmas are present. Large sized sigma (Fig. 6C1) - C shaped 76.0-108.0/4.0-7.0 µm; Medium sized sigma (Fig. 6C2) - 21.0-37.0/1.0-3.0 µm and Smaller sized sigma (Fig. 6C3) - 15.0-19.0/1.0-1.5 µm.

**Skeleton**: The ectosomal skeleton is arranged vaguely. The choanosomal skeleton is arranged in an indefinite manner, in the plumose and plumoreticulate forms.

**Habitat**: This species prefers the sandy substratum and is fully covered by the thick layer of sand. Only the oscules are visible from the outside. It is always surrounded by the algae *Halimeda* spp. and *Padina* spp. Similarly, polychaetes, nudibranchs, amphipods, and foraminifera (*Sorites* spp.) were observed inside the oscular chambers of this species. Brittle stars were always present with species of this genus.

**Distribution**: India - East of Puri coast (Burton and Rao 1932), Minicoy Islands from Lakshadweep (Thomas 1980) and Gulf of Mannar (Thomas 1985) - It has been newly recorded in the Andaman Islands. The present study observed this species in North Andaman - Diglipur; Middle Andaman - Mayabunder and South Andaman - Badabalu, Burmanallah, Carbys Cove, Chidiyatappu and Pongibalu; Elsewhere - Banda Sea (Hooper and van Soest 2002), East African Coral Coast (Pulitzer-Finali 1993), Malacca Strait (Lim et al. 2008), Seychelles (Thomas 1981), Singapore (Lim et al. 2008), Vietnam (Lévi 1961), Western and Northern Madagascar (Barnes and Bell 2002) and Kenya (Pulitzer-Finali 1993) (Fig. 7).

**Remarks**: This species was recorded by Sollas (1902) as *Desmacella fortis* and the specimen colour was mentioned as violet and pink but other authors report the specimen colour as whitish and mostly overlaid with sand.

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**Order Haplosclerida Topsent, 1928**  
**Family Phloeodictyidae Carter, 1882**  

**Genus Siphonodictyon Bergquist, 1965**  
*Siphonodictyon mucosum* (Bergquist, 1965)  
(Figs. 8 and 9)

**Synonyms**: *Aka mucosa* (Bergquist, 1965) (Junior synonymy with insect genus *Aka* White, 1879. Reverting to the original name.)

*Siphonodictyon mucosa* Bergquist, 1965 (agreement in gender)

**Material examined**: 1 ex., DOSMB 00178  

**Description**: Here this species is described on the basis of fistulae alone (Fig. 8A). The sponge is mainly boring, only the fistular portion is externally visible. The remaining sponge body is present inside the rocky substratum. The fistular portion is very short, some are bifurcated. The length of the fistula ranges from 16.1-32.3 mm and diameter ranges are 5.6-9.9 mm. The colour of the specimen is blackish brown in live condition and grayish internally, no change occurs after preservation. The consistency is firm, brittle, and compressible. It oozes out. The surface is hispid, oscules may be present but not visible.

**Spicules**: Megascleres- Only oxeas (Fig. 8B) are present, it is straight, smooth and measures 185.0-216.0/10.0-10.2 µm. Microscleres is absent.

**Skeleton**: The ectosomal skeleton shows oxeas arranged in the reticulate pattern. Oxea are attached to each other with the spongin present at the tip portion. In the choanosomal region the oxeas are running parallel to the wall of the sponge. It is arranged in a multispiracular reticulation pattern (Figs. 8C-F).

**Habitat**: Boring sponge, only fistulae are visible from the outside and present on the sandy substratum.

**Distribution**: India: Not reported anywhere in India. The present study reported it in Diglipur; Elsewhere - West Caroline Islands (Bergquist 1965) and Western Sumatra (Rützler 1971) (Fig. 9).

**Remarks**: This species has been reported for the first time from India. There are two species from this genus that were earlier reported from the Indian region viz. *Siphonodictyon diagonoxeum* (Thomas, 1968) and *Siphonodictyon minutum* (Thomas, 1972). The new record, *Siphonodictyon mucosum* oozes more mucus than these two species and its oxea size is also larger (185.0-216.0/10.0-10.2 µm) than *S. diagonoxeum* (109.0-
130.0/7.0-8.0 μm) and S. minutum (85.0-141.0/1.0-7.0 μm).

**Genus Oceanapia Norman, 1869**

*Oceanapia fistulosa* (Bowerbank, 1873)

(Figs. 10 and 11)

**Synonyms:** Desmacidon fistulosa Bowerbank, 1873 (genus transfer)

Phloeodictyon fistulosum (Bowerbank, 1873) (genus transfer)

Rhizochalina fistulosa (Bowerbank, 1873) (genus transfer)

Rhizochalina fistulosa var. infradensata Ridley, 1884 (junior synonym)


**Description:** The shape of the sponge is globular with 7–8 fistules (Fig. 10A) apically. The specimen is buried in the sandy substratum. The fistulae are 1.1-3.3 cm long and 0.2-0.4 cm in diameter. It is somewhat sturdy. The size of the full specimen is 3.6-4.6 cm. The colour of the sponge is milky white but externally it is fully covered with dark pinkish purple coloured soft coral. Colour remains unchanged after preservation. The fistula shows a circular opening but it is not clear if it has oscules; mostly closed from the upper side. The body of the sponge is porous. The consistency of sponge is hard, incompressible and uneven.

**Spicules:** Megascleres- It has oxea of two types, one is thick and the other is thin. Thick oxea (Fig. 10B1) is smooth, robust, slightly curved in the center part of the spicule with a blunt end. It measures 195.0-263.0/4.0-15.0 μm. The thin oxea (Fig. 10B2) is smooth with pointed ends 87.0-255.0/3.0-9.0 μm. Microscleres is absent.

**Skeleton:** The ectosomal skeleton is multilayered and tangentially arranged. The

Fig. 8. *Siphonodictyon mucosum* Bergquist, 1965. (A) Specimen after preservation. (B) Oxea. (C) Longitudinal section. (D) Longitudinal section. (E) Transverse section. (F) Transverse section.

![Geographical extension of Siphonodictyon mucosum](image)
choanosomal skeleton shows multispicular tracts which are arranged in irregular meshes. The section also shows sclerites structure, which from the soft coral (Figs. 10C-F).

**Habitat:** It is attached to rocks. The area is covered by dead corals with several types of algae. The specimen is associated with the soft coral and foraminifera, *Elphidium* spp.

**Distribution:** India: Gulf of Mannar (Carter 1880; Rao 1941; Thomas 1985); the present study observed them in the location at North Andaman - Diglipur; Elsewhere: Aegean Sea (Kefalas et al. 2003), Banda Sea (Topsement 1897), Leeuwin (Bowerbank 1873), Mediterranean Sea - Eastern Basin (Koukouras 2010), North Atlantic Ocean (van Soest 2001), Northern Monsoon Current Coast (Pulitzer-Finali 1993), Western Arabian Sea (Burton 1959), Western and Northern Madagascar (Vacelet et al. 1976) Brazil (Muricy et al. 2011), Eastern Brazil (Ridley and Dendy 1886), Greater Antilles (Pulitzer-Finali 1986; van Soest 1980), Indian Ocean (Thomas 1981), Kenya (Pulitzer-Finali 1993) and Seychelles (Thomas 1981) (Fig. 11).

**Remarks:** Dendy (1905) documented this species from the west coast of Ceylon (Now Sri Lanka); Burton, 1934 and 1959 mentioned this species in the Great Barrier Reef and South Arabian Coast, respectively. Rao (1941) described this species in the Pamban, Gulf of Mannar region. The other species, *Oceanapia ascidia* (Schmidt, 1870) from the Caribbean region, has also been called *Oceanapia fistulosa* (Bowerbank, 1873), however the spicule size varies (larger oxeas 219-271 × 8.5-14 μm, and smaller oxeas 77-
129 × 3-7 μm) and the habitat consists of soft bottom sediments (van Soest 2017). Further, van Soest (2017) suggested that the use of the name *Oceanapia fistulosa* (Bowerbank, 1873) should be restricted to the Indo-West Pacific region specimens.

**Order Suberitida Chombard & Boury-Esnault, 1999**  
**Family Halichondriidae Gray, 1867**

**Genus Axinyssa Lendenfeld, 1897**  
*Axinyssa mertoni* (Hentschel, 1912)  
(Figs. 12 and 13)

**Synonyms:**  
- Amorphinopsis mertoni (Hentschel, 1912) (genus transfer)  
- Axinyssa pitys (de Laubenfels, 1954) (junior synonym)  
- Ciocalypta mertoni Hentschel, 1912 (genus transfer)  
- Pseudaxinyssa pitys de Laubenfels, 1954 (genus transfer and junior synonym)

**Material examined:** 1 ex., DOSMB 00204, India: Andaman and Nicobar Islands: Middle Andaman: Mayabunder, Coll. Vibha Ubare, 29.vii.2014.

**Description:** It has a massive-flanged shape with fistulae arising from the basal buried portion of the sponge (Figs. 12A-B). The fistulae are 1.7-1.9 cm long and 0.7-0.9 mm thick with serrated margin. The basal portion is fully buried in the sand and it measures 9 × 5 × 4 cm. It is very soft and whitish in colour, but changes to light gray after preservation. The oscules are inconspicuous. The surface is soft, compressible, fragile and somewhat tough to remove.

**Spicules:** Megascleres-only oxea (Fig. 12C) is present. It is smooth, hastate, and long; measures 289.0-719.0 × 6.5-7.0 μm. Microscleres is absent.

**Skeleton:** The ecosomal skeleton is absent.

**Fig. 12.** *Axinyssa mertoni* (Hentschel, 1912). (A) Specimen after preservation. (B) Close view of fistular structure. (C) Oxea. (D) Longitudinal section. (E) Longitudinal section. (F) Transverse section. (G) Transverse section.

**Fig. 13.** Geographical extension of *Axinyssa mertoni* (Hentschel, 1912).  
★ Palau Islands (Type Locality)  
Records from WPD  
△ Mayabunder, Andaman, India (This study)
The choanosomal skeleton shows plumose to halichondroid arrangement with multispicular tracts running longitudinally and close to each other. It comes out from the surface as plumose brushes (Alverez and Hooper 2011) (Figs. 12D-G).

**Habitat:** Present in the sandy substratum.

**Distribution:** India: Middle Andaman: Mayabunder (Present study). Elsewhere - Arafura Sea (Hentschel 1912), Indian Ocean (Alvarez and Hooper 2011), Indonesia (Hentschel 1912), Palau (Hooper and van Soest 2002) and West Caroline Islands (Laubenfels 1954, Bergquist 1965) (Fig. 13).

**Remarks:** This species has been reported from the Indian region through this study.

**Class Homoscleromorpha Bergquist, 1978**
**Order Homosclerophorida Dendy, 1905**
**Family Plakinidae Schulze, 1880**

**Genus Plakortis Schulze, 1880**

*Plakortis communis* (Muricy, 2011)
(Figs. 14 and 15)


**Description:** It is massive-globose or cushion-shaped (Fig. 14A), the size ranges around 2.9 cm in length and 0.8 cm in thickness. The live colour of the specimen is greenish brown externally and light brown internally, which changes to a lighter brown after preservation. The surface is even, smooth with soft, friable consistency and compressible. Oscules are oval in shape, contracted after preservation and present in dorsal region of the sponge; sizes 0.09-0.17 cm.

**Spicules:** Diods (Fig. 14B1) - It is smooth, abundant, slightly curved. Some show protuberance with acerate ends in the middle portion. It measures between 91.0-118.0/4.0-4.5 µm. Triods (Fig. 14B2) - Irregular in shape, blunt ended and available in significant quantity. It measures 12.0-64.0/4.0-5.0 µm.

**Skeleton:** Ectosomal skeleton shows tangential reticulation, multispicular tracts that form elliptical meshes. The ectosome is well differentiated from the choanosome region. Subectosomal lacunae are present. Choanosomal skeleton is confused with irregular meshes (Figs. 14C-F).

**Habitat:** Specimens were collected from attached rocks; the species prefers sandy and dead coral habitats.

**Distribution:** India: South Andaman: Chidiyatappu (present study) Elsewhere - Central and Southern Great Barrier Reef (Muricy 2011), Eastern Philippines (Muricy 2011), Fiji Islands (Muricy 2011) and Houtman Abrolhos Islands (Muricy 2011) (Fig. 15).

**Remarks:** This is the third species of this genus recorded from these islands and reported for the first time from India, specifically from the Andaman Islands. Earlier *Plakortis simplex* was listed by Krishnan et al. (2012), but he did not give *P. simplex* a species description. A new species, *Plakortis badabaluensis*, was discovered later by Ubare and Mohan (2016). The main difference between *P. badabaluensis* and *P. communis* is that the *P. badabaluensis* has two types of diods.
microstrongyloid microhabds and colour pigments, all of which are absent in the *P. communis*.

**DISCUSSION**

Due to the lack of proper documentation of the distribution patterns of marine sponges in Indian waters, studies were unable to record the exact number of species present in the region. In the current study we have recorded seven species of sponges from the Andaman region. Of these seven species, *Clothoia aurivillii* (Lindgren, 1897); *Biemna fortis* (Topsent, 1897) and *Oceanapia fistulosa* (Bowerbank, 1873) have previously been recorded in the Indian region; the other four have not been documented in this region.

*Biemna fortis* (Topsent, 1897) is the most commonly observed species among these seven and *Plakortis communis* Muricy, 2011 is the least studied from the Andaman Islands. To date, only three species in this genus were studied in Indian waters. *Axinyssa mertoni* (Hentschel, 1912), *Spheciospongia globularis* (Dendy, 1922) and *Siphondictyon mucosum* Bergquist, 1965 were described in present study for the first time.

This study supports the idea that knowledge on species distribution relates to species’ temporal and spatial distribution (Hortal et al. 2015). The Andaman and Nicobar Islands belong to the Burma plate, which is actually a part of the Eurasian plate. The type localities of the studied species are from the Arabian, African, Indo-Australian and Eurasian plates, which was earlier part of Gondwanaland. Furthermore, all the existing distributional areas present in the archipelagic region exist in the Western Indo-Pacific region. Geographical separation of Andaman and Nicobar Islands from the major landmasses of South and Southeast Asia resulted in distinct diversity and endemism (Bandopadhyay and Carter 2017). According to the ’Plate Tectonic Theory,’ it is believed that these islands were isolated from the major continental land masses during the Continental Drift, possibly during the Early Tertiary or Late Cretaceous period (Renvoize 1979; Mathew et al. 2015).

Similarly, Burton (1930 1932) demonstrated that there is relationship between distribution pattern and affinity to water current. He further mentions that the Indian seas, bound on the north and east sides by continents, have impassible cold-water currents from the Indian Ocean. The water flowing east to west moves the faunal distribution from the Pacific and Australian regions to the Andaman and Nicobar Islands’ environments. The species introduced in this area further migrated due to equatorial and monsoon currents, and this allowed the species to survive along the continental shelves of different areas. In the Southern Ocean too, the Antarctic Circumpolar Current and the past continent connectivity were responsible for sponges’ biogeographic and species distribution patterns (Downey et al. 2012).

The present work seems to support the above concept of species distribution, but further studies and observations from these islands are required to delineate the causality of sponge distribution. The uniqueness of this region makes proper

![Geographical extension of Plakortis communis Muricy, 2011.](image)
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Authors’ contributions: VVU and PMM designed the study and performed the field work; VVU identified the specimens and made the scientific illustrations. Both authors contributed to drafting and revising the manuscript. Both authors read and approved the final manuscript.

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