# Morphological Notes on Marine Sponges of the Class Demospongiae and one Calcarea from Lakshadweep

**Abstract:**

This study expands knowledge on Lakshadweep's sponge diversity, documenting a new species *Scalarispongia androthensis* n.sp. and four new regional records. These findings enhance understanding of coral reef ecosystems and support future conservation and biodiversity research.

**Keywords**: Arabian sea, Diversity. India, Island, New record.

**Introduction:**

Lakshadweep islands located between 08°00'N and 12°30'N latitudes and 71.00'E and 74°C0'E longitudes at a distance ranging from 200 Kms (111 nautical miles) to 400 Kms (222 nautical miles) from mainland. It is the largest atoll system in the world (Jones 1986). It consists of 12 atolls, 27 islands, 3 reefs and 5 submerged banks and a total area of 32 sq.km coastline of 132 m and lagoon area. 10 are inhabited and the rest of the islands are uninhabited. Studies on marine resources of this island system include Corals, fish, mainly tuna, sharks, food fishes, bait fishes and ornamental fishes. Other than fishes there was numerous diversities in crustaceans like crabs, shrimp and sponges. Sponge are most primitive among multicellular animals that existed for 700- 800 million years. It is worldwide in their distribution, which are mostly marine and very abundant in all seas, ranging from intertidal

rock to very great depths. Most species encrust hard rocky substrate, but many are embedded in sandy muddy sediments with a root-like structure.It is usually dominates cryptofauna in coral reefs.They constitute an abundant and functionally important component of coral reef systems that perform many important functional roles. Sponges also provide microhabitats for various invertebrate species as well as some fishes enhancing biodiversity and harbors microbial symbionts that can contribute to reef productivity' so far scientific publications have identified about 9000 poriferans species, of which about 400 are glass sponges about 500 are calcareous and the rest of the species are demosponges. The composition size and shape of spicules are one of the largest determining factors in taxonomic identification of sponges. Demospongiae is the largest and most diverse class of the Porifera. The calcarea and demospongiae are strictly shallow water forms, while the hexactinellida are typically deep-water inhabitants. A total of 275 species of sponges have been identified in India (Thomas, 1998). In the Gulf of Mannar and Palk Bay, a maximum of 219 species of sponges recorded followed by Andaman and Nicobar Islands (95 species), Lakshadweep (91 species) and Gulf of Kachchh (25 species) (Venkataraman and Wafar, 2005b). The distribution of sponges in other area is in the Gulf of Kutch – 25 species; and the Orissa coast – 54 species (Thomas, 1998).

**Materials and methods:**

Underwater surveys were conducted by SCUBA diving in five different locations where patchy coral growths are presentin various islands viz., Kavaratti, Agatti Androth, Kadamath and Kalpeni, Bangaram, Amini & Kadmat were carried out from 15.10.2019 to 8.11.2019 and 14.2.2020 to 25.2.2020vdepth ranging from 10 to 30 m. The samples were placed in polythene bags in dry condition and preserved in 90 % ethanol for identification. The specimens were maintained in wet conditions and were identified based on the morphological characters of spicules and skeletal structures following Hooper and Van Soest (2002). Thick sections of specimens were made by cutting 0.1 cm surface blocks and dehydrating them in xylene, finally mounted on micro-slides in DPX for observation of skeletal network structure. Morphometries and photography were taken in scale bars approximate. To obtain preparations of clean, free diagnostic spicules, small pieces of sponge were dissolved in nitric acid. For each spicule type, the length and width of 25 spicules were considered, and measurements were expressed in mm or µm. The spicules were analyzed by light microscopy under a 50i Nikon Eclipse compound microscope. The identified specimen was deposited in the National Zoological Collections of Marine Biology Regional Centre, Zoological Survey of India (MBRC/ZSI), Chennai.

**Review of Literature:**

India has a rich history of detailed sponge studies from the Gulf of Mannar, Andaman and Nicobar Islands, and Lakshadweep. The first scientific documentation of sponge fauna of Lakshadweep was made by Gardiner during 1903–1906, followed by Thomas (1979–1986), who particularly materialized the special interest of Dr. Jones in documenting the sponge fauna of Lakshadweep, culminating in several publications (Thomas, 1973; 1979; 1989; 1989). There has been a complete paucity of comparable data on the Indian Ocean atolls. Little knowledge has been added about the Laccadives' atolls since GARDINER (1903–1906) published the definitive work on the Maldive and Laccadive Archipelagoes.

More than 90 sponges were reported from his exploratory surveys at various locations in Lakshadweep. In addition, he reported a total of 41 Demospongiae distributed among 23 families and 32 genera from Minicoy Island, and 18 species of boring sponges from various atolls. After a long research gap, Gopi and Ajith Kumar (2012) reported 21 species from Agatti of which 19 were new records. Prabhakaran *et al*. (2013) reported 22 species from Minicoy Island seagrass meadows followed by Das *et al*. (2019), who reported a new record from Bangaram and Thinnakara island. Few reports during the past years included knowledge about the sponge diversity of Lakshadweep (Venkataraman *et al*., 2004; George et al., 2020). More recently, studies on secondary metabolites and bacteria associated with the sponges of Lakshadweep were also carried out.Species checklists of type collections were made in ZSI, Kolkata by Pattanayak during 1999–2009. Substantial contributions on the sponge fauna of the west coast were made by Dendy 1916–1922, while Burton (1930; 1937) and Thomas (1979; 1980; 1986; 1989) contributed significantly to the sponges of the east coast. Thomas (1986) published a sponge species inventory from the Gulf of Mannar and Palk Bay, wherein brief taxonomic descriptions of 275 sponges were provided.Out of the 555 sponges reported from India, the World Porifera Database could reflect only a total of 138 species as valid taxa (George *et al*., 2020). The present study is intended to provide an outline of the sponge species composition of Lakshadweep islands based on literature review and exploratory su

**Results:**

A total of 44 species of sponges belonging to 9 orders, 12 families and 32 genera from class Demospongiae were recorded. Out of which one new species *Scalarispongia androthensis* n.sp. recorded and three new records such as *Axinella minor*, *Haliclona cymaeformis*, *Callyspongia subarmigera*, *Luffariella* sp, were recorded from Lakshadweep region List as below

**1. *Stylissa carteri* (Dendy 1889)**

1889. *Acanthella carteri* Dendy. Annals and Magazine of Natural History. (6) 3: 73-99, pls III-V.page(s): 93-94.

**Material Examined**:3exs. Reg.No. Sta: Agatti: Reg.No.S.420, Kadmat; Reg.No. S.339.; Bangaram,Reg.No S.359, Pitty island; Date: 3.11.2019, 20.2.2020, 3.11.2019, 6.2.2022. Coll: Marimuthu & Party.

**Description:** Section showing the choanosomal skeleton with plumose tracts running up the sponge. Ectosomal skeletons show protruding spicule tracts making the surface velvety.

Spicules- Styles are in two forms.A.Short stout gradually sharp pointed styles. b. long slender curved styles. 0.4-0.021mm.

**Distribution**: India. Continental shelf of southwestern Bay of Bengal (Ansari *et al*., 2012 **Elsewhere:** India, Indonesia, Kenya, Madagascar, Mozambique channel

**2. *Axinella donnani* (Bowerbank, 1873)**

1873. *Axinella* (*Stylissa*) *donnani* Bowerbank. *Proceedings of the Zoological Society of London.* 1873: 25-32, pls V-VII. 28-29.

**Material Examined:**3 exs, S.453. Kalpeni, 29.10.2019

**Description:** Sponge lamellate, branched, or cup-shaped. Surfaceminutely hispid and with longitudinal ridges Color yellow or orange when alive and with tough texture. Oscules are arranged in groups.Axial condensation is quite dense. and extra axial fibers arise from the axial part at different angles. Fibers arc cored and echinated with styles. The extra-axial fibers are interconnected by scattered spicules or fibers in a scalariform pattern Spicules: (I) Styles. Size: 0.1 X 0.004

mm. (2) Oxeas. Size: 0.25 x 0.008 mm.

**Distribution:** India Gulf of Mannar Thomas, 1986

**Elsewhere:** Atlantic Ocean, Red Sea

### 3. ***Axinella manus*** **Dendy, 1905**

**Material Examined:**2 exs, S.347. Kalpeni, 29.10.2019

**Description:** Sponge erect and palmately branched: stalk cylindrical and branches flattened in outline. Color: light gray in spirit; Texture compressible, and resilient. Oscules are small. Skeleton without distinct axial and extra-axial specialization, Spicules are plumosely arranged. Spicules: (I) Styles. Size: 0.2 x 0.016 mm. (2) Oxeas. Size as in the above.

**Distribution:** India Gulf of Mannar Thomas, 1986

**Elsewhere:** East African Coral Coast and South India

**4. *Phakellia palmata* Row,1911**

1911. *Phakellia palmata* Row. *Journal of the Linnean Society.* 31 (208): pls 35-41. page(s): 357-359.

**Material Examined:** 1ex, Reg.No.342.Androth, 2.11.2019.

**Description:** Sponges consist of palms -like lamellae growing on a cylindrical stalk. The base of the sponge is a flat, circular area. Stalk height is 10 mm & 6 mm in diameter. The main body of the spnge is a flat lamella 50 mm wide, 40 mm high, and 3 mm thick. There is a small conical process that emerges from the lamella edge.The sponge had no osculum .The surface of the sponge is coarse. Pores are difficult to see. Color is dark brown. Texture is hard and resilient. It is extremely difficult to cut or bend the sponge.The main skeleton consists of many spicules. At the surface, sponges occur in bundles of spicules arranged at intervals of 0.2 mm.Spicules: length of styles —0.2 mm x dia 0.004 mm

**Distribution:**Lakshadweep.

**Elsewhere**: Red sea.



**5. *Dragma cidondurissimum* (Dendy 1905)**

1905. Dragmacidon durissima. Dendy. Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar. 3 (Supplement 18). (Royal Society: London). Pp. 57-246, pls I-XVI. 187-188.

**Material Examined**: 2exs, S.373, Sta: Kalpeni, Date: 28.10.2019.

**Description:** Sponge massive, tuberous. Colour orange texture compact. Oscules numerous, compound. Pores minute. Main skeleton composed of plumose colums of megascelres . Spicules: Oxeas: 0.297x0. 01mm.Styles: 0.0217x0.01mm.

**Distribution:** India: Gulf of Mannar Thomas, 1986

**Elsewhere:** Banda Sea, Gulf of Thailand, Seychelles, South India, Sri Lanka, Southern Red Sea & West Arabian Sea.

**6. *Phakellia.sp*.**

2009. *Phakellia* Alvarez and Hooper. *The Beagle, Records of the Museums and Art Galleries of the Northern Territory*. 25: 17-42. page(s): 29

**Material Examined:**1ex.342, Sta: Kadmat, Date: 20.2. 2020.Coll: Marimuthu & Party.

**Description:** Surface cartilaginous Orange in colour while in alive. Styles straight slightly curved, 422.51 – 524.93 – 650.41 × 8.82 – 14.87 – 18.71 μm

**Distribution:** India.

**Elsewhere:** Red Sea.

**7. *Tethya robusta* (Bowerbank, 1873)**

1873. *Tethya robusta* Bowerbank. Part IV. *Proceedings of the Zoological Society of London.* 1873: 3-25, pls I-IV.pp: 10-11

**Material Examined:** 1ex, Reg.No.S.338, Sta: Kalpeni, Date: 27.10.2019; Reg.No. S.344, Kadmat, Date: 20.2.2020.

**Description:**Sponge sphaerical surface tuberculated. Yellowish brown in colour.Consistency fleshy. Oscules slit like.Pores minute. Skeleton in radial pattern Strongylaxeas: 0.217-1.2x0.002mm Sphaerasters: 0.031, Oxyasters: 0.025-0.03mm, Chiasters: 0.012mm.

**Distribution:** India:Gulf of Mannar and Palk Bay Thomas, 1986..

**Elsewhere**: South india, Sri Lanka, South eastern Brazil, South Caribbean. Western & Northern Madgascar & Fiji Islands

**8**. ***Stelletta clavosa*** **Ridley, 1884**

1884. *Myriaster clavosa* Ridley. (*British Museum (Natural History): London).* 366-482, pls 39-43; 582-630, pls 53-54. page(s): 474-476.

**Material Examined:**1ex, S.352, Sta: Kalpeni, Date: 27.10.2019.

**Description:** Sponge spherical in shape.ht grey in colour. Consistency hard.surface hispid due to the presence of spicules. Spicules: Dichotriaenes: 0.074mm, Protriaenes: 0.02mm, Anatriaenes: 0.1mm, Asters: 0.012mm

**Distribution:** India: Andaman & Nicobar Islands, Pattanayak, 2006.

**Elsewhere:** Andaman & Nicobar Islands, Banda Sea, Malacca Strait, South India, Sri Lanka& North great Barrier reef.

### 9. A*gelas dispar*Duchassasing & Michelotti, 1864

1883. *Agelas clavaeformis* Carter. *Natuurkundige verhandelingen van de Hollandsche maatschappij der wetenschappen te Haarlem.* 21(2): 1-124, pls I-XXV.
page(s): 76-77; pl XV fig 1

**Material Examined:** 1ex.Reg. No.334; Androth; 362, Androth: Date: 22.10.2019
**Description:** Sponge globular with cavernous interior. Dark brown in clour. Consistency fibrous and resilient. Skeleton with spined acanthostyles . Acanthostyles: 0.13- 0.001mm
**Distribution:** India: Gulf of Mannar, Thomas, 1986.
**Elsewhere**: Maldives, Marshall Islands, South India, Sri Lanka Madgascar & Seychelles

### 10. *Agelas mauritiana* (Carter, 1883)

1883. *Ectyon ma*uritiana Carter. *Annals and Magazine of Natural History.* (5) 12 (71): 308-329, pls XI-XIV. page(s): 310-311; pl XII fig 3a-b.
**Material examined:** 2exs. Reg.No.S.401. Kavaratti, 2.11.2019.

**Description:** Sponge tubular with cavernous interior. Colour dark brown. Consistency fibrous and resilient. skeleton reticulated with acanthostyles. Acanthostyles 0.134x 0.012mm.
**Distribution:** India, Gulf of MannarThomas,
1986 **Elsewhere:** Red Sea to West pacific.

### 11.*Cliona orientalis Thiele, 1900*

1900 *Anthosigmella orientalis* Thiele. *Frankfurt.* 25: 19-80.

**Material Examined:**3 exs, Reg.No.S.335, Sta: Kalpeni; Date: 28.10.2019

**Description:** This species common on corals. Oscules scattered. Surface minutely hispid. Tylostyles: 0.127- 0.0012mm.
**Distribution:** India: Andaman & Nicobar Islands, Pattanayak, 2006 & Gulf of Mannar Thomas, 1986
**Elsewhere:** South India Sri Lanka Southern Red Sea

### 12.*Clathria (Thalysias) procera* (Ridley, 1884)

1884. *Clathria ( Thalysias) procera* Ridley. *(British Museum (Natural History): London).* 366- 482, pls 39-43; 582-630, pls 53-54. page(s): 451-452.

**Material Examined:**3exs, S.504, Sta: Pitty Island, Date:6.2.2022.

**Description:** Sponge a clathrous mass. Textre compressible. Surface uneven, Oscules scattered, slit like. Skeleton is an irreugular reticulation of fibres cored by subtylostyles. Subtylostyles; 0.21-0.331X0.005.
Isochelas: 0.015mm

**Distribution:** South India Gulf of Mannar (Thomas, 1886) & Sri Lanka.

**Elsewhere:**Hawaii, India, Natal, Seychelles, South India and Sri Lanka, Southe Red Sea, Torres Strait Northern Great Barrier Reef, Western India

**13. *Callyspongia fistularis* (Topsent, 1892)**

1892. *Sclerochalina fistularis* Topsent. *Mémoires de la Société Zoologique de France.* 5: 21-29, pl. page(s): 25-26
**Material Examined:**3 exs.S.463. Sta: Androth, Date 22.10.2019.

**Description:** Sponge surface spinous or tuberculated. Oscules terminal.Skeleton composed of multispicular fibres, primaries & connectives.
Oxeas: 0.06-0.07mm

**Distribution:** South India (Gulf of Mannar) by Thomas, 1986 & Sri Lanka
**Elsewhere:** Marshall Islands, Red Sea

**14. *Callyspongia (Cladochalina) diffusa* (Ridley, 1884)**

1884. Cladochalina diffusa Ridley *Annals and Magazine of Natural History.* (5) 14(81): 183-187.page(s): 183-184.

**Material Examined:** 1ex, 341; Bangaram, 23.2.2020.

**Description:** Sponge flabellate.Oscules scattered. Pore min ute. Surface reticulated and hispid. Main fibers are coarse.Oxeas: 0.031x 0.001mm.

**Distribution:** South India (Gulf of Mannar) by Thomas, 1986 &Srilanka.

**Elsewhere:** Great Barrier reef, East African Coast, Eastern India, Hawaii, India, Maldives, New Zealand, Singapore, Archipelago

**15. *Callyspongia (Cladochalina ) fibrosa* (Ridley & Dendy, 1886)**

1886. *Dasychalina fibrosa* Ridley & Dendy. *Annals and Magazine of Natural History.* 18: 325-351, 470-493. page(s): 330.

**Material Examined:** 2exs.Reg. No.S.502.Sta: Pitty island; Date 7.2.2022

**Description:** Sponge composed of finger shaped branches. Surface with strong conules. Oscules distributed terminal. Dermal skeleton reticulate meshes triangular. Primaries of 0.12mm and connectives 0.03mm in diameter. Oxeas: slightly curved tips pointed. ).056-0.11x 0.002mm.

**Distribution:** South india (Gulf of Mannar) by Thomas, 1986 & Sri Lanka

**Elsewhere:** Brazil, Great Barrier Reef, Eastern Phillipines, Malacca strait, Northern Bay of Bengal, Seychelles, Vietnam & Western Arabian Sea.

### 16.*Haliclona (Gellius) cymaeformis* (Esper, 1806)

1806.*Spongia cymaeformis* Esper.ZweyterTheil. (Raspe: Nürnberg): 25-48, pls LXV-LXX page(s): 43, plate LXIX figs 1-2.

**Material Examined:** 2exs.Reg. No.S.399. Kavaratti, 2.10.2019

**Description:** Sponge irreugular cluster of tubes in different diameter. Colour pale yellow when dry. Texture hard. Oscules in linear series. Pores minute. Surface minutely hispid. Skeleton compoised of triangular meshes.Spicule: Oxeas: .102-0.142x 0.002mm.

**Distribution:** India.

**Elsewhere:** Madagascar, Singapore and Indian Ocean.

### 17. *Haliclona (Haliclona) oculata* (Linnaeus, 1759)

1759. *Axinella occulata* Linnaeus**.** *Hagae.* pp. 451. *available online at* https://doi.org/10.5962/bhl.title.6595. pp: 390-391

**Material Examined:**3exs, S.438. Sta: Kavaratti Island, Date: 19.10.2019.

**Description:** Sponge consists of several tubes. Texture soft and compressible. Surface hispid oscules terminal. Skeleton consist of cored fibres and connectives. Spicules: Oxeas: 0.047- 0.12x 0.002mm.

**Distribution:** India: (Gulf of Mannar) by Thomas, 1986

**Elsewhere:** Kara Sea, North Atlatic Ocean, White Sea & Belgium.

### 18. *Gelliodes pumila* (Lendenfeld, 1887)

1887. *Adocia pumila* Lendenfeld.*Zoologische Jahrbücher, Jena.* 2: 723-828, pls XVIII-XXVII. page(s): 806.

**Material Examined:**2 exs, S.346; Sta: Agatti, Date: 4.11.2019.

**Description:** Sponge tubular. Conules at the tip. Short oxeas with less frequent sigmas pointed by arrows. Skeleton reticulated with oxeas in isodityal pattern. Oxeas: 0.10-0.22x 0.001mm.

**Distribution:** India: (Gulf of Mannar) by Thomas,
1986 **Elsewhere:** Red Sea.

**19.*Halichondria (Halichondria) panicea* (Pallas, 1766)**

*Alcyonium panicium* Pallas. *Fransiscum Varrentrapp, Hagae.* pp. 451., *available online at* https://doi.org/10.5962/bhl.title.6595. page(s): 388.

**Material Examined**:1ex, S.462, Sta: Androth, Date: 24.10.2019.

**Description:** Sponge is tubular cushion shaped. Skeleton composed of halichondroid pattern. Microscleres absent.
Oxeas: 0.66x0.021mm.

**Distribution:** India (Gulf of Mannar) by Thomas, 1986

**Elsewhere:** Adriatic Sea, Baltic Sea, Black Sea, North Atlantic Ocean, North Sea, Western Mediterranean, White Sea, Belgium

**20. *Plakinastrella schulzi* Dendy, 1905**

1905. *Penares schulze*Dendy. *Zeitschrift für wissenschaftliche Zoologie.* 34(2): 407-451.

page(s): 13.

**Material Examined:** 1ex.Reg. No.S.380, Sta: Kalpeni: Date: 27.10.2019.

**Description:** The specimen is petaloid branches.Pores are scattered. Skeleton contains numerous short shafted triaenes. Spicules- Short shafted triaenes arys are pointed. Diamter-0.4mm thick.

**Distribution:** India (Gulf of Mannar) by Thomas, 1986

**Elsewhere:** Adriatic Sea, Aegean Sea, Celtic Seas, Great Barrier Reef, Eastern Brazil, Eastern Carribean, Eastern Phillipines, Maldives, New Caledonia, North Atlantic Ocean, Red Sea, Madagascar, belgium

**21. *Cliona celata* Grant, 1826**

1826. *Halichondria celata* Grant. Edinburgh New Philosophical Journal. 1: 78-81., available online at https://www.biodiversitylibrary.org/page/2471191, page(s): 81

**Material Examined:** 1ex, Reg. No.S.481, Sta: Kalpeni, Date28.10.2019.

**Description:** This is boring sponge. Massive and cushion shaped. Pores scattered. Spicules: Tylostyles: 0.150-0.33x0.002mm.

**Distribution:** India (Gulf of Mannar) by Thomas, 1986

**Elsewhere:** Argentina, Namibia, North Atlantic Ocea, Red Sea, Belgium Canada & Netherlands

### 22. *Dysidea granulosa* Bergquist, 1962

1814. *Dysidea granulosa*Montagu. The Palau Archipelago. *Pacific Science*. 19 (2): 123-204. page(s): 144

**Material examined:** 3exs, Reg.No. 352, Sta: Agatti, Date: 4.11.2019.

**Description:** Section showing conulose surface that is heavily charged with sand. - Choanosomal skeletal fibres forming a regular reticulating that is heavily cored by debris and sand

**Distribution:** India (Gulf of Mannar) by Thomas, 1986

**Elsewhere:** Adriatic Sea, Aegean Sea, Bermuda, Black Sea, Carribean Sea, Eastern brazil, Chatham Island, Japan Sea, New Zealand, North Atlantic Ocean, North Sea.

### 23. *Fasciospongia cavernosa* (Schmidt, 1862)

1862. *Cacospongia cavernosa* Schmidt. Leipzig): i-viii, 1-88, pls 1-7. page(s): 28 **Material Examined:** 4 exs, Reg.No.S.416. Sta: Androth, 22.10.2019.

**Description:** Sponge thickly fistular. Oscules scattered. Texture hard and incompressible.Surface conulose. Primary fibres 0.12mmthick nd cored.connectives are 0.012mm thick.

**Distribution:** South India, (Gulf of Mannar) by Thomas, 1986 &Sri Lanka

**Elsewhere:** Adriatic Sea, Aegean Sea, North Atlantic Ocean, Red Sea,

Remarks:

### 24. *Leucetta chagosensis* Dendy, 1913

1931. *Leucetta expansa* Row and Hozawa. *Science Reports of the Tôhoku Imperial University*. (4) 6(1): 727-809, pls XIX-XXI. page(s): 749-751

**Material Examined**:2exs. Reg.No.355, Sta, Kadmat, Date: 20.02.2020

**Description**: The skeleton is composed mainly of small triactines, which are present everywhere, while colossal triactines are present only on the cortex and very rare small tetractines can be found only in the atrium.

Large triactines with conical equiradiate actines measuring 427.27 – 516.47 – 635.63 × 32.48 - 42.38 50.01 μm. Small, extremely rare equiangular actines measuring 34.17 – 44.75 - 56.03 × 5.79 - 5.45 – 7.06 μm.

**Distribution**: India: Lakshadweep (Anita mary, 2020)

**Elsewhere**: Banda, Great Barrier Reef, Phillipnes, Fiji Isl;and, Indonesia, Maldives, New Caledonia, Saudi Arabia Papua new guinea, Madagascar, Northern Red Sea, Japan (Okinawa), Indonesia, Australia (Queensland and Fremantle), New Caledonia and French Polynesia (Dendy, 1913; Wörheide & Hooper, 1999; 2008; Borojevic & Klautau, 2000).

**25.*Hyattella* sp.**

1766. *Spongia sinuosa* Pallas. Fransiscum Varrentrapp, Hagae., *available online at* https://www.biodiversitylibrary.org/page/6019361. pp. 451, page(s): 394;

**Material Examined**: 1ex. Reg.No.S. S.456., Androth, 4.11.2019.

**Description:** Choanosomal skeleton with anastomosed fibers.Primary fibers are thic and secondary fibers are very thinner.

**Distribution**: India Lakshadweep

**Elsewhere**: Banda Sea, Seychelles, Sri Lanka.

**26.*Spongia* ( *Spongia) ceylonensis* ( Dendy, 1905)**

1905. *Euspongia officinalis var ceylonenensis* Dendy. *(Royal Society: London).* Pp. 57-246, pls I-XVI.page(s): 211-213

**Material Examined:** 6exs. Reg.No.S. 7262, Kadmat, 20.02.2020

**Description:** Sponge sub-globularbearing oscules. Surface minutely conulose.Colour yellow when dry. Main fibers running vertically towards surface. It is connected with secondaries.

Distribution: India

**Elsewhere**: Central New Zealand

**27.*Dragmacidon agariciforme* (Dendy, 905)**

1905. *Axinella agariciformis* Dendy. *(Royal Society: London).* Pp. 57-246, pls I-XVI. page(s): 186-187.

**Material Examined:** 1ex.S.358. Sta: Bangaram. Date 6.11.2019.

**Description:** Section showing the choanosomal skeleton with thick plurispicular columns running parallel to each other approaching the surface to form the characteristic conules. The primary tracts contain single spicules protruding making the surface velvety

Distribution: India, South India, Lakshadweep (Anita Mary, 2020) Srilanka

**Elsewhere**: Delagoa, Maldives, Western Arabian Sea, Western India

**Remarks**: This species was recorded in Lakshadweep (Anita mary), 2020.

**28.*Hyrtios erectus* (Keller, 1889)**

1889. *Heteronema erecta* Keller. *Z. wiss. Zool.* 48: 311-405, pls XX-XXV. page(s): 340-341/

**Material Examined**: 4exs. Reg.No.S.425, Androth, Date: 22.10.2019

**Description**: Anastomosing choanosomal skeletal fibres heavily cored by sand and debris

**Distribution**: Indian Ocean. (Thomas, 1986)

**Elsewhere:** Eastern Phillipines, Gulf of Thailand, New Caledonia, North Atlantic Ocean,

**29. *Mycale (Mycale) crassissima* (Dendy, 1905)**

1905. *Esprella crassissima* Dendy. *(Royal Society: London).* Pp. 57-246, pls I-XVI. page(s): 160-161

**Material Examined:** Reg.No. 6 exs, S.505. Pitty island. Date: 12.2.2022.

**Description**: Sponge finger shaped branches. Consistency hard but compressible.Surface reticulated..Oscules 3mm in diameter.Spicules: Subtylostyles: 0.25x0.02mm. Sigmas: 0.026mm.

**Distribution**: South India Gulf of Mannar, Thomas, 1986.Srilanka

**Elsewhere**: Brazil, east African Coral Coast, Floridian, Gulf of Aden, Malacca strait, Papua, Archipelago, Madagascar, Kenya, Mozanbique

**30. *Suberites carnosus* (Johnston, 1842)**

1842) *Halichondria carnosa* Johnston. A History of British Sponges and Lithophytes. *(W.H. Lizars:Edinburgh).* i-xii,1-264, plsI-XXV

**Material Examined**: 2exs, S.506, Pitty island, 6.2.2022.

**Description**: Sponge ramose & club shaped. Consistency flaeshy. Oscules terminal. Skeleton composed of tylostyles.Tylostyles: 0.2-0.46x 0.003mm.

**Distribution**: South India, Gulf of Mannar, Thomas, 1986.Sri Lanka

**Elsewhere:** Adriatic Sea, Aegean Sea, Black Sea, Maldives, Mozambique, NewZealand, North Atlantic Ocean, North Sea, Red Sea, Seychelles,

**31. *Stylissa massa* (Carter, 1887)**

1887. *Axinella virgultosa var massa* Carter. *Journal of the Linnean Society, Zoology*. 21(127-128): 61-84, pls 5-7. page(s): 68

**Material Examined**: 1ex, Reg.No.373. Kalpeni, 29.10.2019

**Discussion**: Sponge lobate. Consistency firm. Brown in colour. Skeleton plumose and spicules are oxeas.

**Distribution**: India

**Elsewhere:** Maldives, Western India

**32. *Aplysinopsis elegans* Lendenfeld, 1888**

1888. *Aplysinopsis elegans* Lendenfeld. (Taylor & Francis: London). i-xiv, 1-260, pls 1-12. page(s): 149-150.

**Material Examined**: 1ex, Reg.No.378, Kavaratti, 2.11.2019.

**Description**: The sponge consists cylindrical. The oscules are downside.; the skeleton is light chestnut-brown, stiff, but compressible. The main fibres of the skeleton are 0-18 millim. thick, and cored. The connecting-fibres are slightly ramified, The mess are rectangular.

**Distribution**: India

**Elsewhere:** Madagasgar, Rad Sea.

**33. *Semitaspongia* sp.**Cook and Bergquist, 2000 2000. *Semitaspongia bactriana* Cook and bergquist

**Material Examined**: 1 ex. Reg.No.S.510. Kavaratti, 2.11.2019.

**Description**: A The sponge is soft and massive species, forming fibre network. The surface has numerous, fine to coarse conules, with long dendritic emergent terminal fibres. Colour is brown. The primary fibers are cored. The secondary fibers are uncored.

**Dsitribution**: India. Not reported so far. **Elsewhere**: Polynesia, Archipelago.

**34.*Callyspongia subarmigera* ( Duchassaing & Michelotti, 1864)** 1864.

Tuba armigera Duchassaing & Michelotti. *Natuurkundige verhandelingen van de Hollandsche maatschappij der wetenschappen te Haarlem.* 21(2): 1-124, pls I-XXV.
page(s): 48-49; pl VIII fig 3

**Material examined**: 1ex, Reg.No.S.439, Sta: Agatti, Date: 4.11.2019.

**Description:** Sponge surface conules. Oscules distributed terminal. Dermal skeleton reticulate meshes triangular. Ectosomal skeleton large. Primaries of 0.12mm and connectives 0.03mm in diameter. Oxeas: slightly curved tips pointed. 43-n69-70 mm x 0.153mm in diameter.

**Distribution**: First time reported in Lakshadweep. **Elsewhere**: West Indies, Florida, jamaika.

**35.*Hyattella intestinalis* (Lamarck, 1814)**

1814. *Spongia intestinalis* Lamarck. *Annales du Museum national d'Histoire naturelle.* 20: 294-312; 370-386; 432-458.

**Materials Examined**: 4exs. Banagaram, 23.2.2020.

**Description**: Surface minutely conulose. Oscules terminal, Pores numerous. Texture hard with poor resiliency. Skeletons consist of amber coloured spongin fibers. Primaries are cored by objects 0.14mm thickness. The secondaries are much slender 0.006 mm thickness. The mesges are polygonal.

**Distribution**: India: Gulf of Mannar (Thomas, 1986) Sri Lanka.

**Elsewhere:** Atlantic Ocean, Mediterranean Sea.

**36.** *Hyattella sp*

**Material Examined:** 1 ex, Reg.No.456, Bangaram, 23.2.2020

**Description**: Sponge body is soft. Oscules are numerous. Minutely conulose. Skeleton is reticulated primaries and connectives. Primaries are cored and secondaries are uncored. **Distribution**: India and Sri Lanka.

**Elsewhere**: Mediterranean Sea.

**37. *Scalarispongia androthensis* n. sp. Sivaleela *et al* 2025**.

Zoo Bank Id: urn: lsid: zoobank.org:pub:6EAD4E82-D4B7-4E6E-A003-9FF8EB0E8F8C.

**Material Examined**: 1ex, Holotype; Paratype 01ex. 397, Sta: Androth, Date:22.11.2019.

**Diagnostic character:** Cook and Bergquist (2000, 2002a) separated *Cacospongia scalaris* Schmidt, 1862 from the genus *Cacospongia* and established the genus *Scalarispongia*. They defined *Scalarispongia* to be unarmored Thorectinae, with a regular, rectangular fibre skeleton, simple primary fibres, and moderate collagen

**Description:** Sponge lobose, surface conulose, and oscules are rare. Color is yellow. *Scalarispongia* genus is characterized by the skeletal structure with a spongin fibre reticulum of concentrically laminated primary and secondary fibres, arranged in a regular, ladder-like pattern (Cook and Bergquist, 2000). The meshes in skeletal reticulum are often tough, precisely rectangular, with secondary fibres forming almost perfect right-angles to primary fibres. The primaries are cored and inseparable from the 0.12 mm diameter connectives. The arrangement and size of the pore fields in *Scalarispongia androthensis* n.sp. are notably different from those in other species, contributing to its unique classification within the genus. All species differ considerably from *S. androthensis* in terms of their skeletal architecture.

**Distribution**: India.

**Elsewhere:** Mediterranean Sea, East Atlantic, Kora & Brazil..

**38. *Acarnus sp* Ridley, 1884.**

1884. *(British Museum (Natural History): London).* 366-482, pls 39-43; 582-630, pls 53-54.

page(s): 453 & 615.

**Material Examined**: S.443, Androth, Date: 22.11.2019.

**Description:** Sponge finger shaped colour pale yellow. Surface hispid. Skeleton well developed reticutaion of spongin fibers cored by styles and tylotes. Main fibers are not demarcated with connctives. Spicules styles: 0.31- 0.42mm, Tylotes: 0.204x0.002mmToxas: long one is 0.155x 0.003 mm and small one is 0.062-0.21mm, Isochelas: 0.003-0.01mm.

**Distribution**: India; Gulf of Mannar, Thomas, 1986.

**Elsewhere:** Red Sea, Australina region.

**39.*Axinella minor* Thomas, 1981**.

1981. *Axinella minor* Thomas. s, 1973, p. 43, pl. II, fig. 17

**Material Examined**: 5 exs, Reg.No.340, Androth, 22.10.19

**Description:** Body finger shapped, tips blunt, Colour:Orange when alive brown after dry.. Consistency: Compressible with good resiliency.Skeleon consist of primaries and connectives.

Spicules: Styles. Slightly curved and sharply pointed; head conspicuous in younger forms. Size, 0.183 - 0.245 mm x 0.002 - mm.

**Distribution:** Indian Ocean.Thomas,1981. (Mahe island). First time reported from Lakshadweep.

**Elsewhere**: Indian Ocean.

**40. *Phakettia ridleyi* (Dendy, 1887)**

1887. *Phakellia ridleyi* Dendy. *Annals and Magazine of Natural History.* (5) 20(117):153-165, pls IX-XII.page(s): 159-160.

**Material Examined**: 4exs, Reg.No.S.447, Kavaratti, 22.11.2019.

**Description**: Body lamellar and ridged. Colour blood red when alive yellow in dry condition. Texture rough and cartilaginous. Oscules and pores not traceable.Skeleton axial and extra axial spicules in plumosed manner. Styles: 0.213-0.267x 0.003mm.

**Distribution:** India; Andaman, gulf of Mannar (Thomas, 1986)

**Elsewhere**: Cosmopolitan.

**41. *Callysponga spinosissima* (Dendy, 1887)**

1887. *Pachychalina spinosissima* Dendy. Proceedings of the Zoological Society, London,35: 524-526.

**Material Examined**: 2exs, Reg.No.2 exs, S.463. Androth, 22.11.2019.

**Desription**: Sponge repent cylindrical branches. Colour yellow. Oscules scattered, pore sminute. The main skeleton is coarse and composed of primaries and connectives.

Oxeas: 0.21-0.2x 00.3-0.01mm.

**Distribution**: India; Gulf of Mannar Thomas, 1986.

**Elsewhere:** Indian Ocean.

**42.*Spheciospongia inconstans margaritifera* Dendy, 1887**

1887. Suberites inconstans Dendy.*Annals and Magazine of Natural History.* (5) 20(117):153-165, pls IX-XII. page(s): 154

**Material Examined:** 1ex, Reg.No.S.511. Kavaratti, 2.11.2019.

**Description:**This is boring sponge in oyster.Cavities formed inside the shell. Tylostyles: 0.21- 0.002mm, Spirasters:0.0012mm.

**Distribution**: India. Tamilnadu, Thomas, 1986.

**43. *Ectyodorys lissostyla* Thomas, 1970**.

1970. Lissodendoryx (Ectyodoryx) lissostyla (Thomas 1970). *Journal of the Marine Biological Association of India.* 12(1): 202-209.page(s): 203.

**Material Examined**:s. 1ex, Reg.No.512.Androth, 2.11.2019.

**Description**: Sponge encrusting. Colour pale yellow. Consistency hard. Surface conulose. Oscules small. Dermal skeletons consist of styles. Styles: 0.318-0.003mm, Sigmas: ).023- 0.01mm.

**Distribution**: India. Gul of Mannar

**Elsewhere**: Cosmopolitan.

**44.*Chondrilla australiensis* Carter, 1873**

1873. *Chondrilla australiensis* Carter. *Annals and Magazine of Natural History.* (4)12(67): 17-30, pl. I. page(s): 23-24; pl I fig 10-14 & 16.

**Material Examined**: 1ex. Reg.No.513, Kavaratti, 2.11.2019.

**Description:** Sponge lobose. Colour brown with dark specks. Consisitency tough and cartilaginous. Surface smooth. Cortex well developed. Spherasters and oxyasters in the cortex. Sphaerasters. 0.016-0.23mm, Oxyasters: 0.0012-0.020mm.

**Distribution:** Gulf of mannar.

**Elsewhere**: Indo Pacific.

**Discussion and conclusion:** A total of 44 species of sponges belonging to 9 orders, 12 families and 32 genera from class Demospongiae were recorded. Out of which one new species *Scalarispongia androthensis* n.sp recorded and three new records to Lakshadweep such as *Axinella minor, Haliclona cymaeformis, Callyspongia subarmigera*and one rare calcareous sponges were recorded from Lakshadweep region. *Axinella* minor species was not described from these before. 24 species of sponges were found to be most common and abundant in Agatti, Kadmat & Pitti silands. They are *Clathria procera, Stylissa carteri, Agelas dispar, Dysidea granulosa,* etc. *Cliona celata, Cliona orientalis, Cliona margarifera*

are the boring sponges from Lakshadweep. Earlier, Thomas (1989) published a checklist of 91species of sponges from Lakshadweep. George *et al* (2020) listed 21 new records from Lakshadweep. Nine species of *Scalarispongia* were reported worldwide (Schmidt, 1862; Baar, 1904; Thiele, 1905; (Samaai & Kelly, 2002). While *Scalarispongia scalaris* has been examined more extensively owing to its historical significance and presence in well-documented marine locations, *Scalarispongia androthensis* emphasizes the need for continued research into sponge biodiversity in less-explored areas like Lakshadweep. *Scalarispongia* genus species of sponges distributed in Kora and brazil earlier. Now it is recorded new species from Lakshadweep. This report will be helpful for the protection and conservation of the diversity of Lakshadweep. Seven species have been reported in *Scalarispongia* worldwide (Soest, 2005).

DNA barcoding of one calcarean species of *Leucetta chagosensis* was submitted in NCBI as a part of the study of molecular taxonomy. Species voucher number GenBank (ITS): *Leucetta chagosensis* QMG313774 AM850505.

**Disclaimer (Artificial intelligence)**:

The author hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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**Plates**

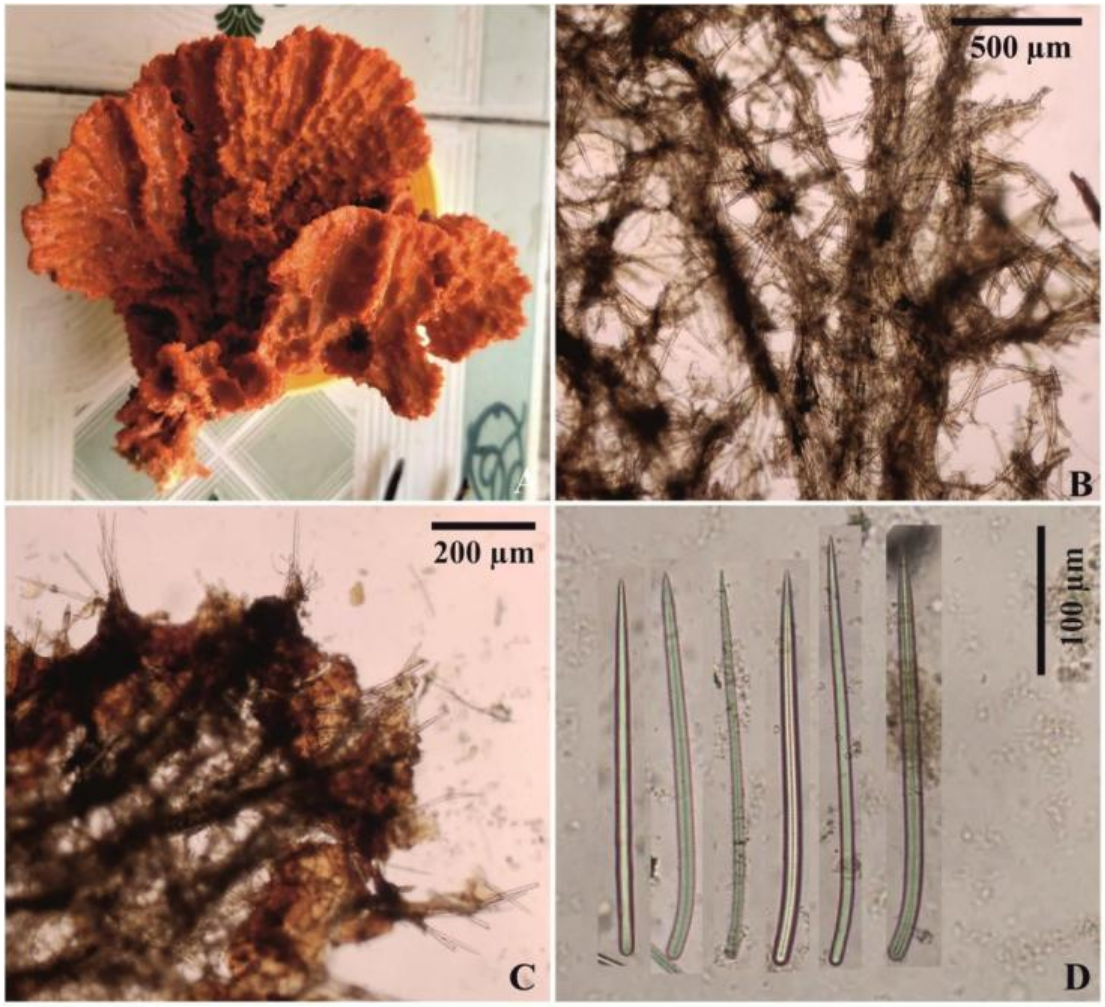


Plate 1: *Stylissa carteri* (Dendy, 1889). A-Freshly collected specimen; B- Section showing the choanosomal skeleton with plumose tracts running up the sponge (scale= 500 µm); C- Ectosomal skeleton showing protruding spicule tracts making the surface velvety (scale= 200 µm); D- Styles (scale= 100 µm).

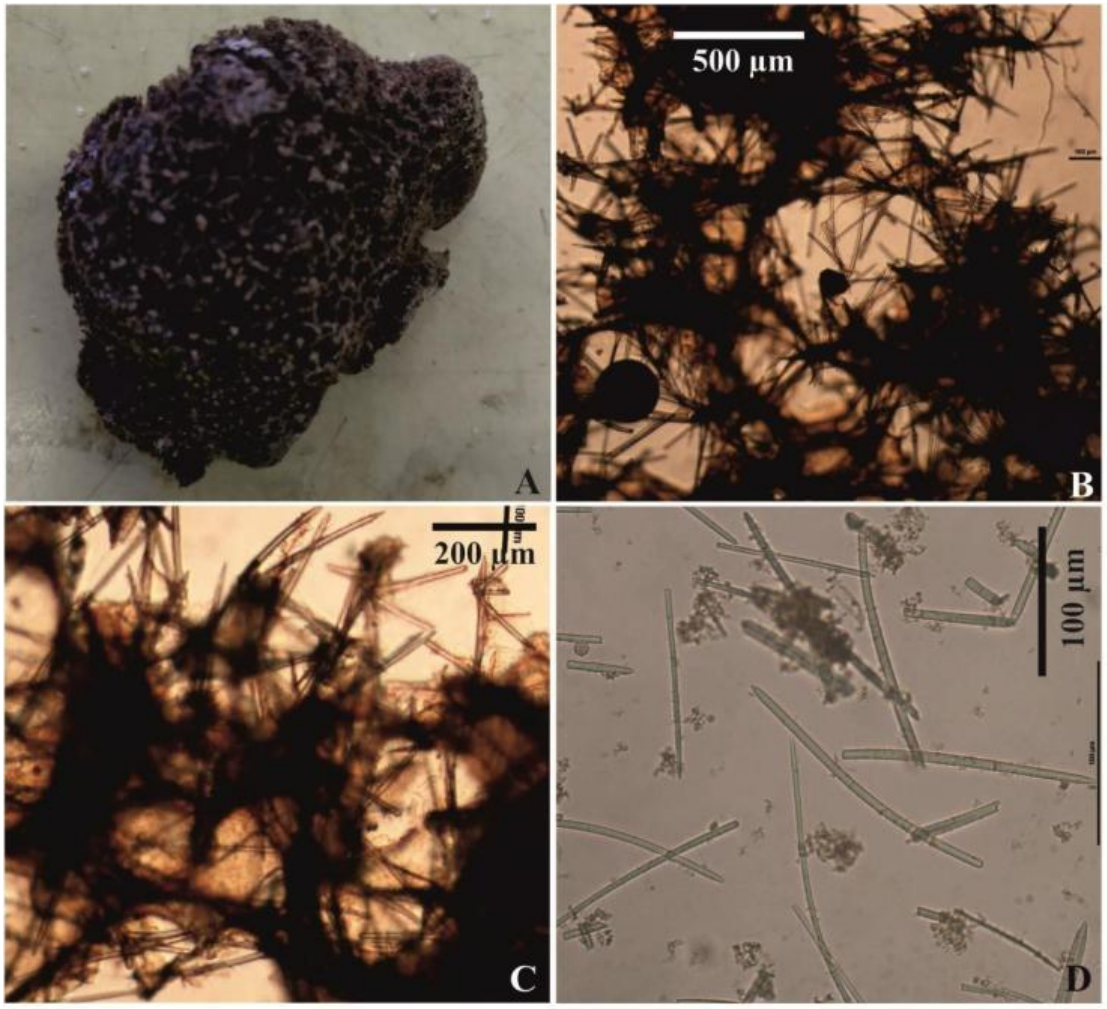


Plate 2: *Axinella donnani* (Bowerbank, 1873) A- Preserved specimen (Dry preservation); B- Section showing overall skeletal architecture with paucispicular primary fibres running toward the surface; C- Close-up of the choanosomal tracts (scale= 200 µm); D- Styles (scale= 100 µm).

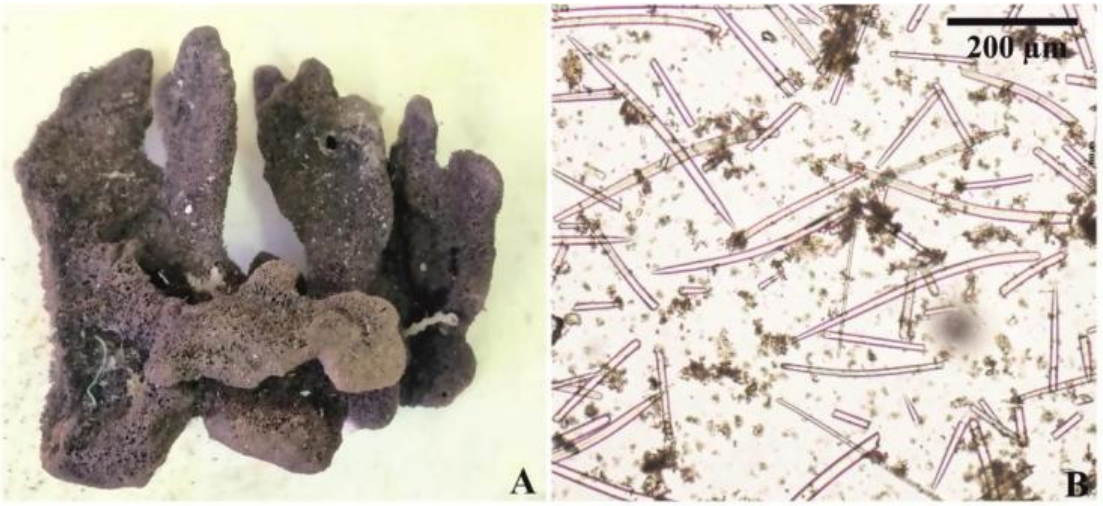


Plate 3: *Axinella manus* (Lendenfeld,1887) . A- Preserved specimen (Dry preservation); B- Oxeas and styles of a varying size range (scale= 200 µm).

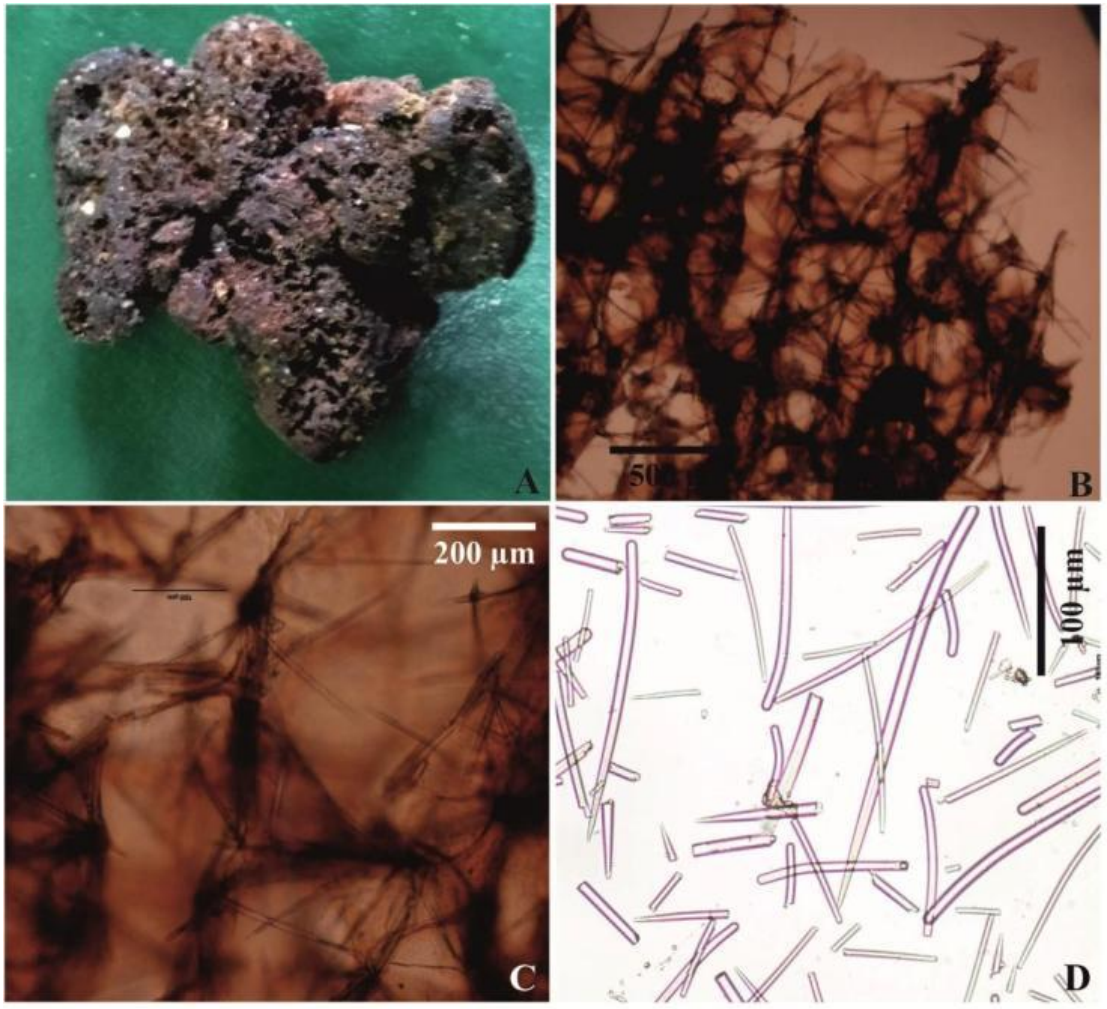


Plate 4: *Dragmacidon durissimum* (Dendy, 1905) A- Preserved specimen (Dry preservation); B- Section showing the thick paucispicular tracts rising to the surface forming conules (scale= 500 µm); C- Close-up of choanocyte chambers (scale= 200 µm); D-Styles (scale= 100 µm).

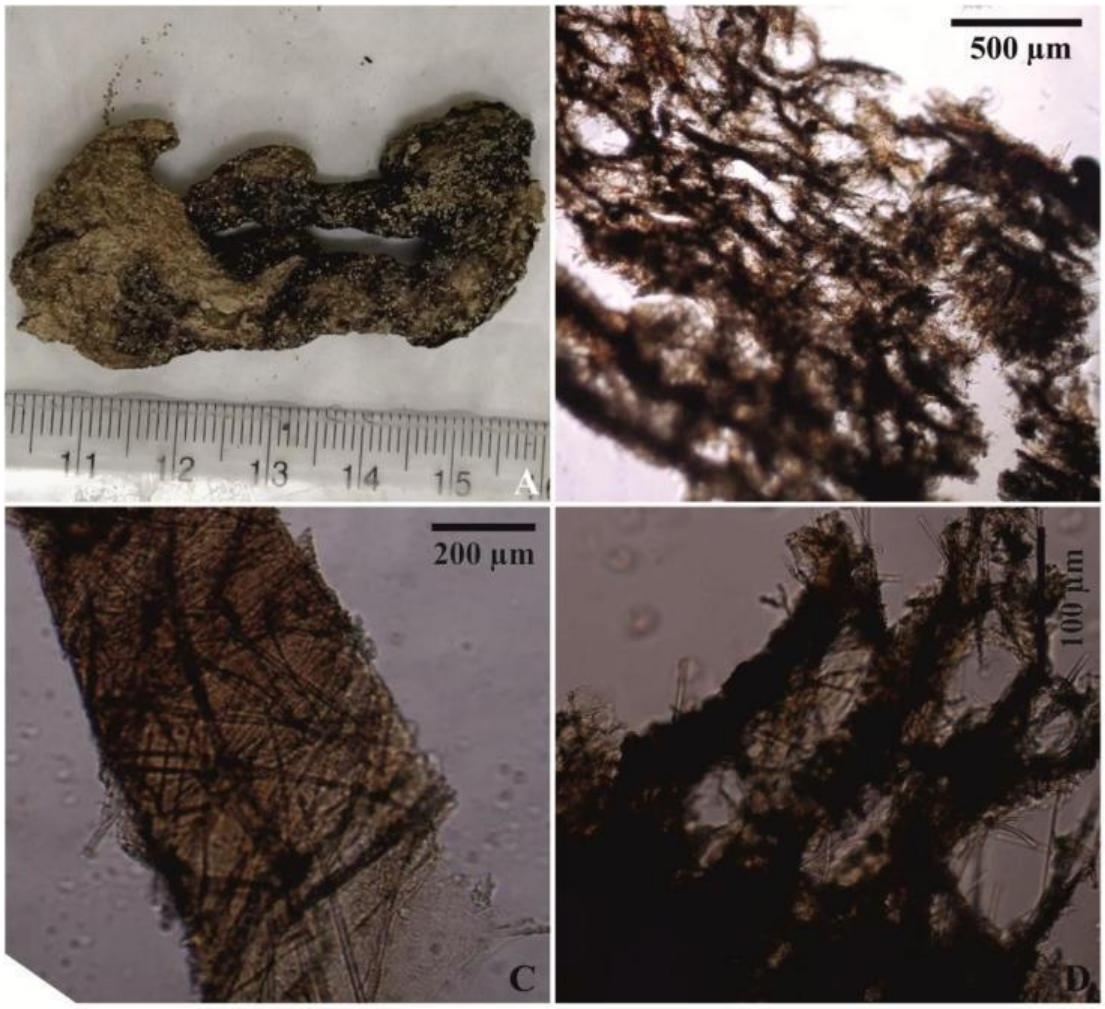


Plate 5: *Phakellia sp*. A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with plumose tracts running up the sponge (scale= 500 µm); C- Tangential surface skeleton (scale= 200 µm); D- Close-up of choanosomal tracts (scale= 100 µm).

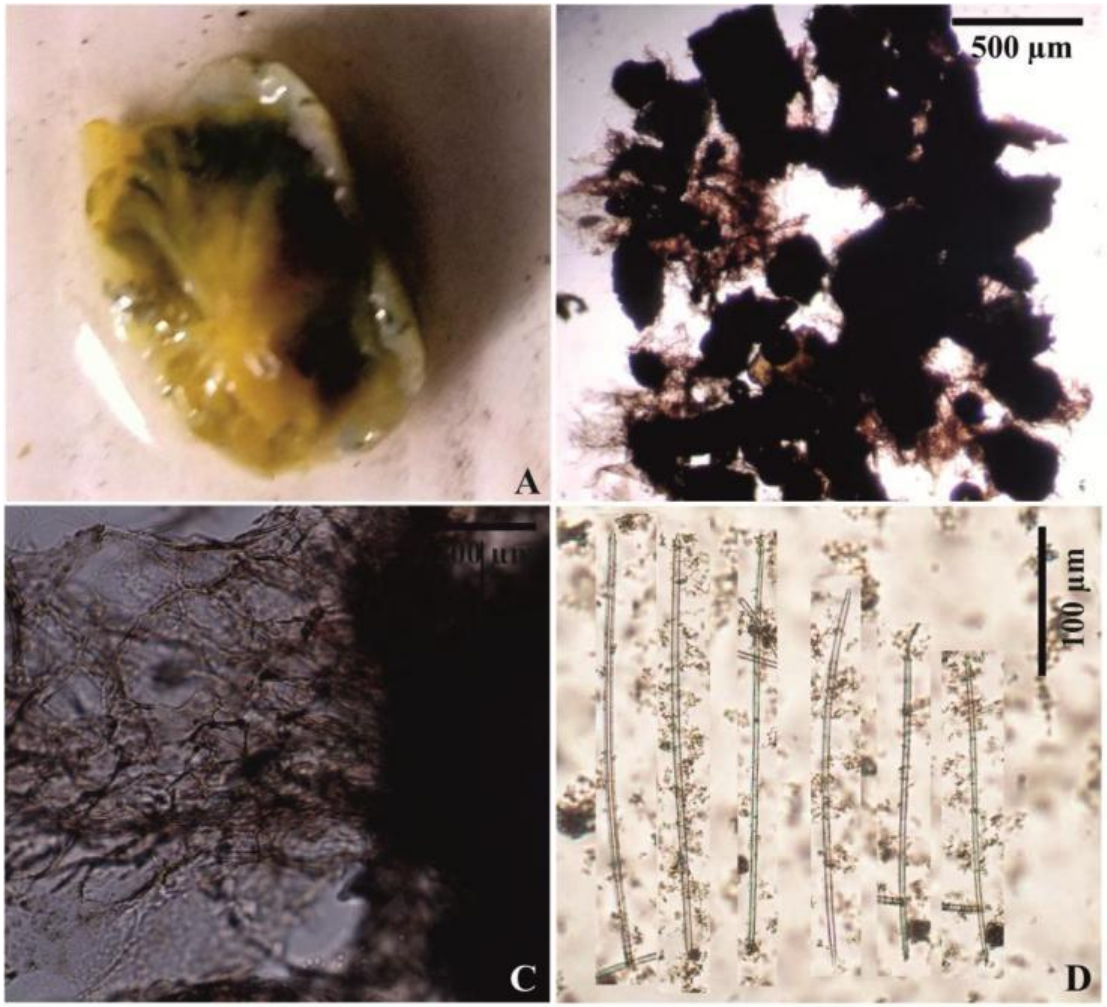


Plate 6: *Tethya robusta* (Bowerbank,1873). A-Freshly collected specimen; B- Section showing the choanosomal skeleton with thick plurispicular columns running parallel to each other approaching the surface to form the characteristic conules (scale= 500 µm); C- The primary tracts contain single spicules protruding making the surface velvety (scale= 200 µm); D- Strongyloxeas (scale= 100 µm).

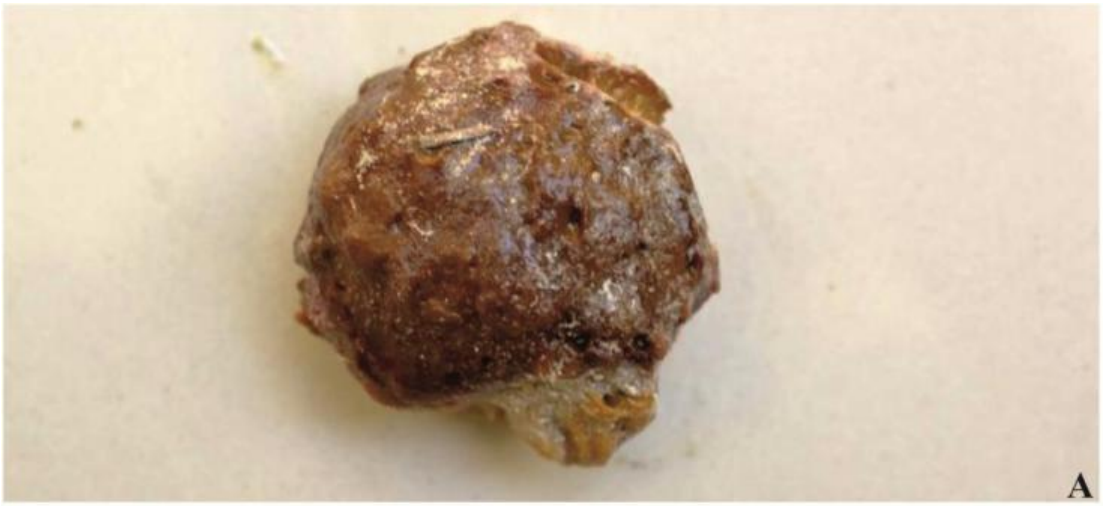


Plate 7: *Stelletta clavosa* Ridley, 1884. A- Freshly colleceted specimen; B- Section showing the radiating spicutes that protrude through the surface (scale= 500 μm).


Plate 8: *Agelas dispar* Duchassaing & Michelotti, 1864. A- Preserved specimen (Dry preservation); B- Section showing overall skeletal architecture with choanosomal fibres forming adense reticultion of rounded meshes; C- Close-up of the choanasomal reticulation(scale= 200 µm); D- Close-up showing echinating verticillate spined styles on fibres (scale= 100 µm).

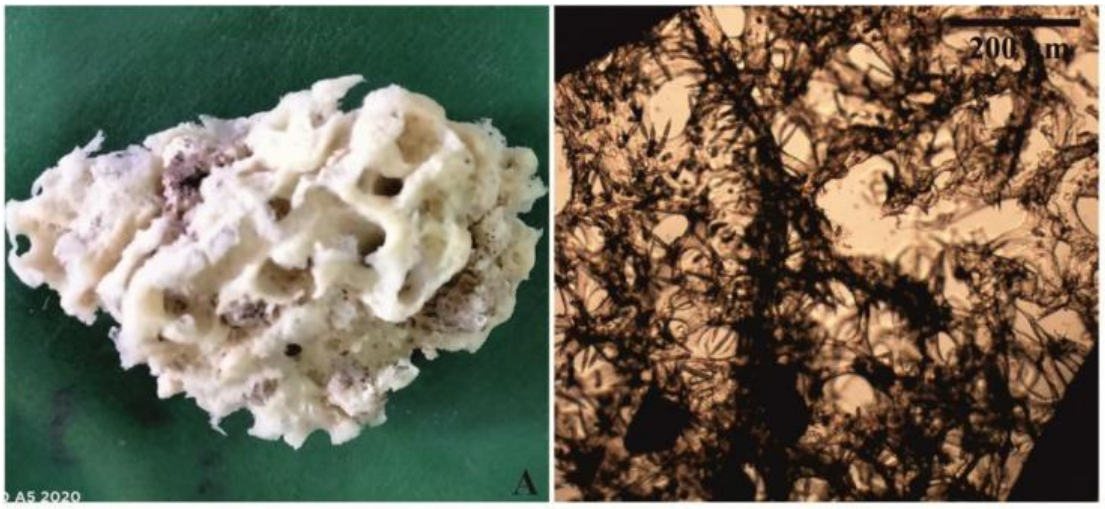


Plate 9: *Agelas mauritiana* (Lendenfeld,1887) . A- Preserved specimen (Dry preservation); B- Thick fibres that are echinated by verticillate spined styles (scale= 200 µm).

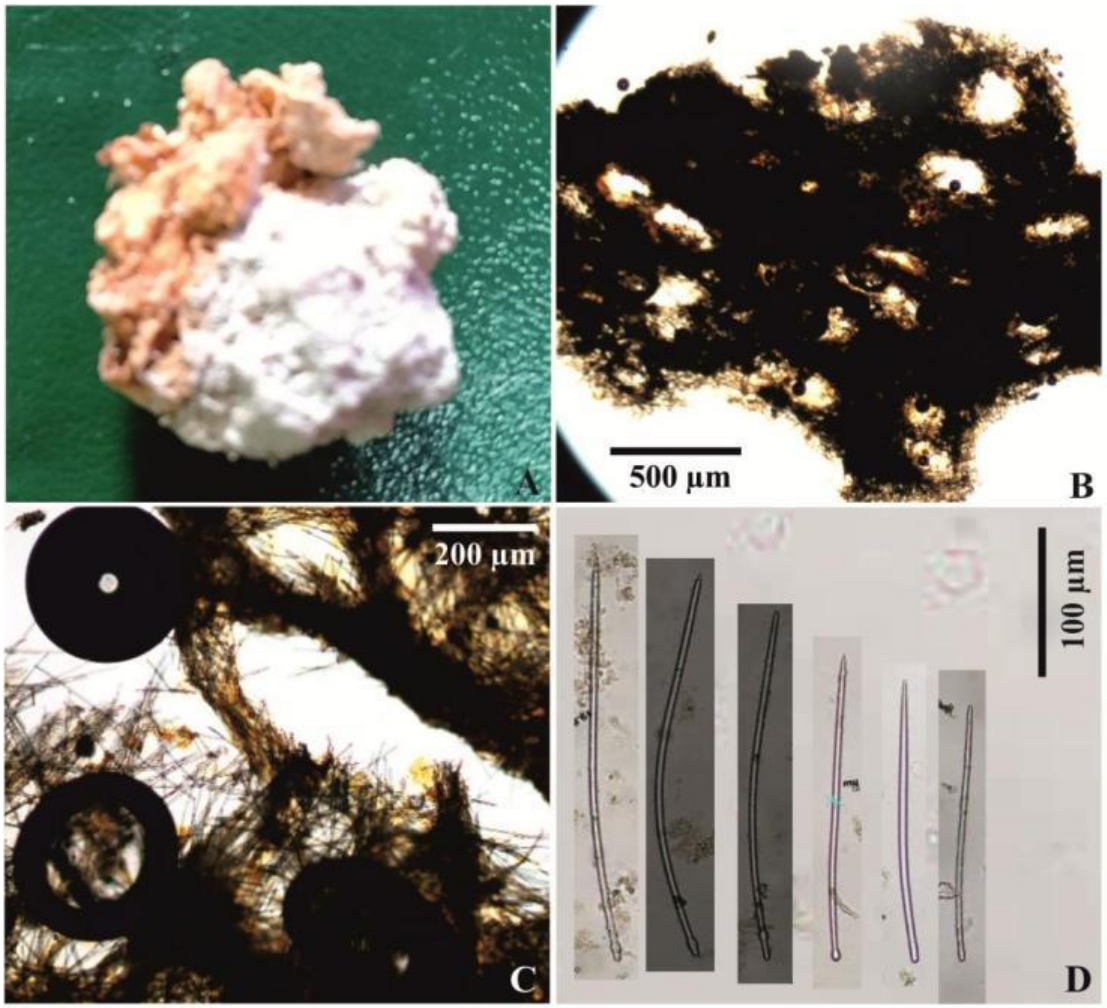


Plate 10: *Cliona orientalis* Thiele, 1900. A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with free spicules arranged in a confused irregular manner (scale= 500 µm); C- Close-up of spicules arranged around choanocyte chambers (scale= 200 µm); D- Tylostyles (scale= 100 µm).

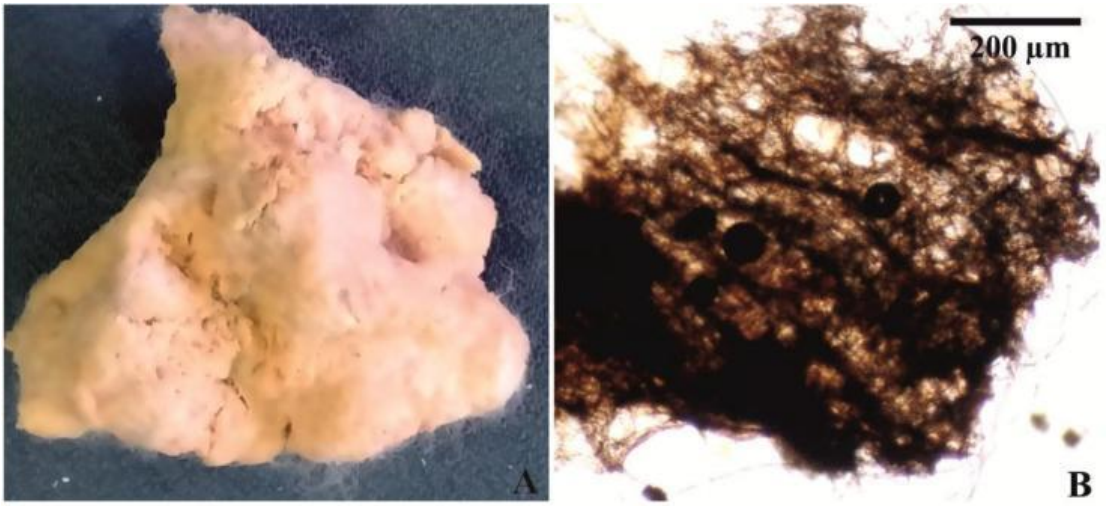


Plate 11: *Clathria (Thalysias) procera* (Ridley, 1884) . A- Preserved specimen (Dry preservation); B- Thick fibres that are echinated by acanthostyles and cored by structural smooth styles (scale= 200 µm).

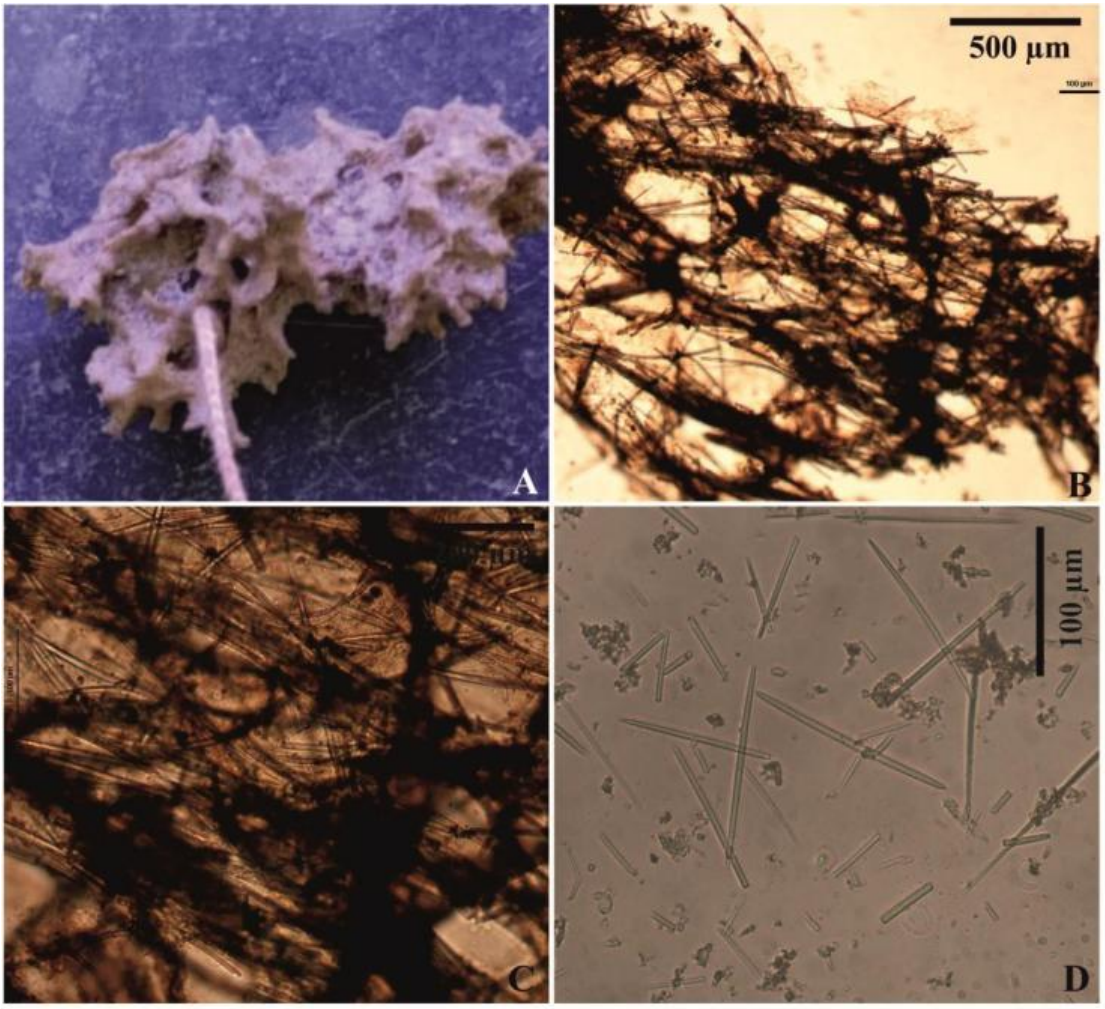


Plate 12: *Callyspongia fistularis* (Topsent, 1892). A- Preserved specimen (Dry preservation); B- Section showing plumose multispicular tracts running toward the surface (scale= 500 µm); C- Close up of the choanosomal skeleton showing the multispicular primary tracts connected by loosly formed connecting tracts; D- Small thin oxeas (scale= 100 µm).

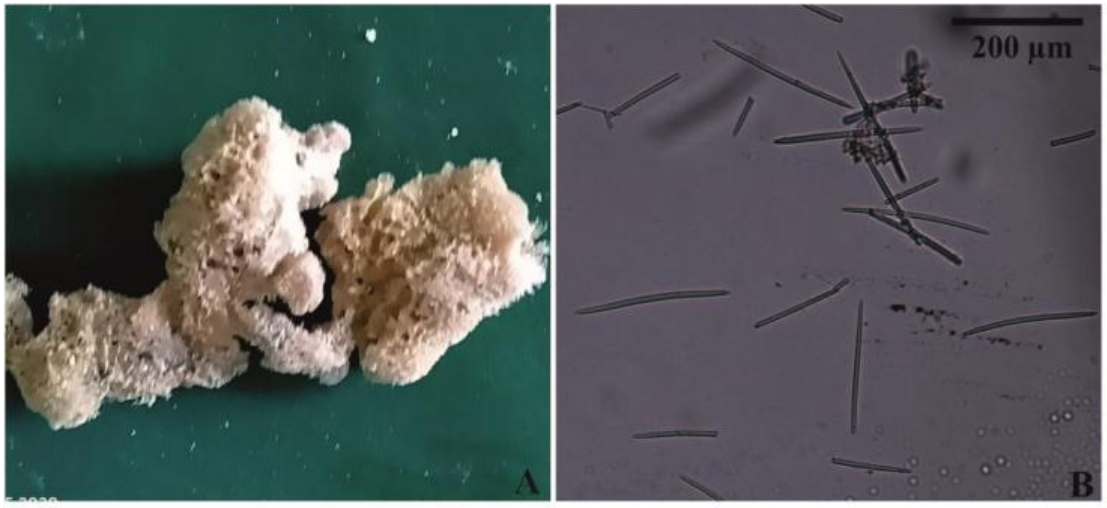


Plate 13: *Callyspongia (Cladochalina) diffusa* (Ridley, 1884) . A- Preserved specimen (Dry preservation); B- Oxeas of a single size class (scale= 200 µm).


Plate 14: *Callyspongia (Cladochalina) fibrosa* (Ridley & Dendy, 1886). A- Preserved specimen (Dry preservation); B- Oxeas of a single size class (scale= 200 µm).

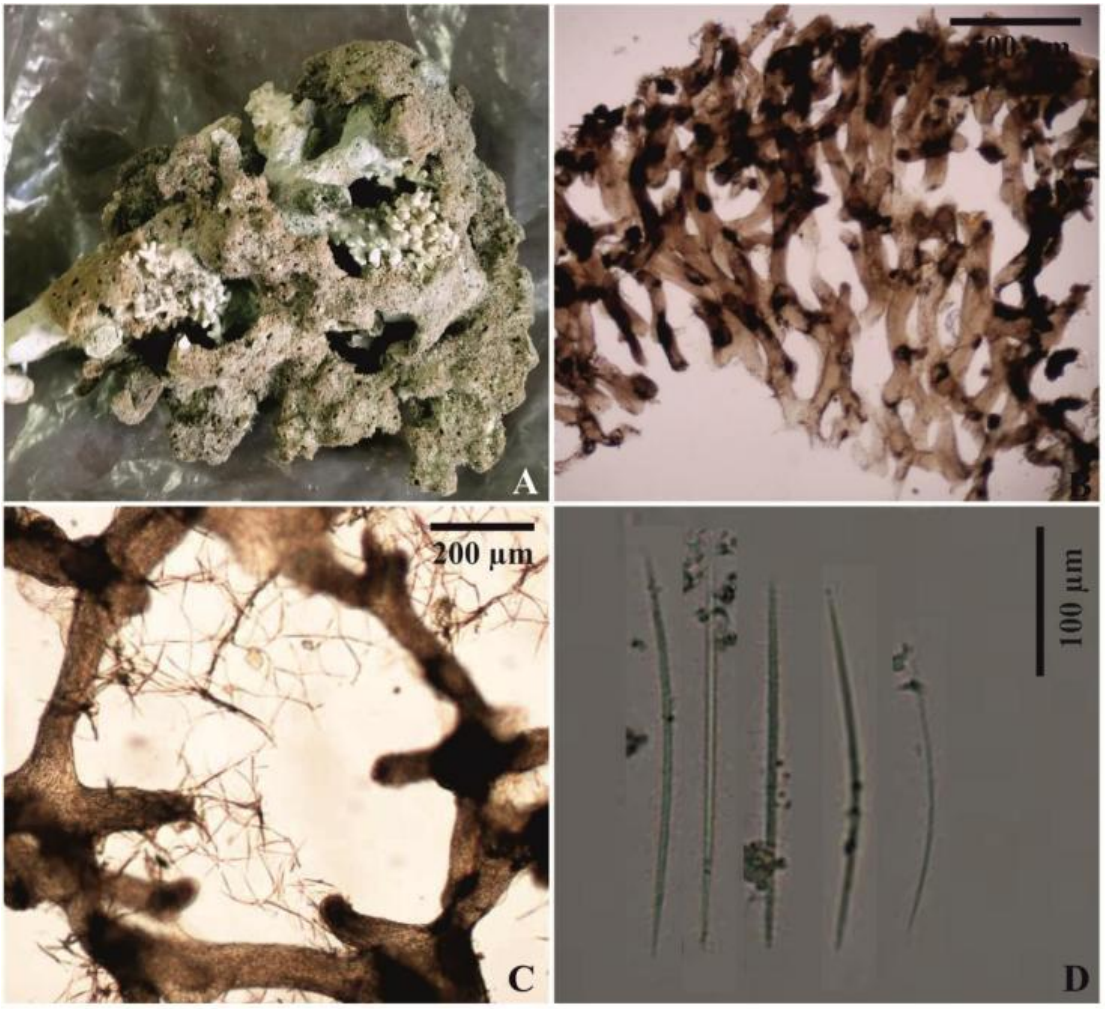


Plate 15: *Haliclona (Gellius) cymaeformis* (Esper, 1794) . A- Preserved specimen (Dry preservation); B- Section showing the general arrangement of the sponge and the symbiotic algae (scale= 500 µm); C- Close up of the choanosomal skeleton showing the isodictyal reticulation of the sponge skeleton in between the algal fibre network; Small thin oxeas (scale= 100 µm).

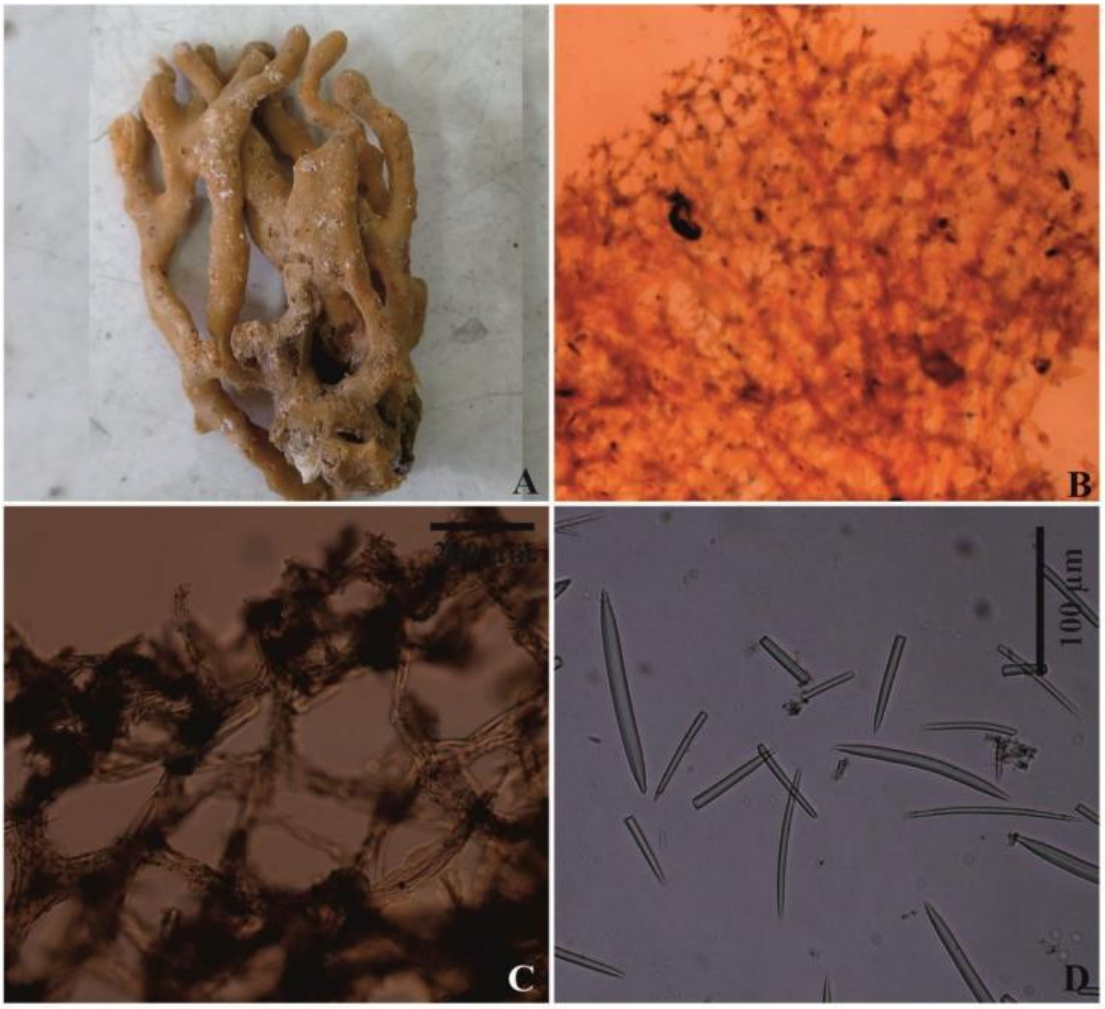


Plate 16: *Haliclona cf. oculata* (Linnaeus, 1759). A- Preserved specimen (Dry preservation); B- Choanosomal skeleton showing irregular reticulation of paucispicular cores fibres, primaries and connectives distinct; C- Close-up of the rectangular meshes formed in the choanosomal region (scale= 200 µm); D- Oxeas (scale= 100 µm).

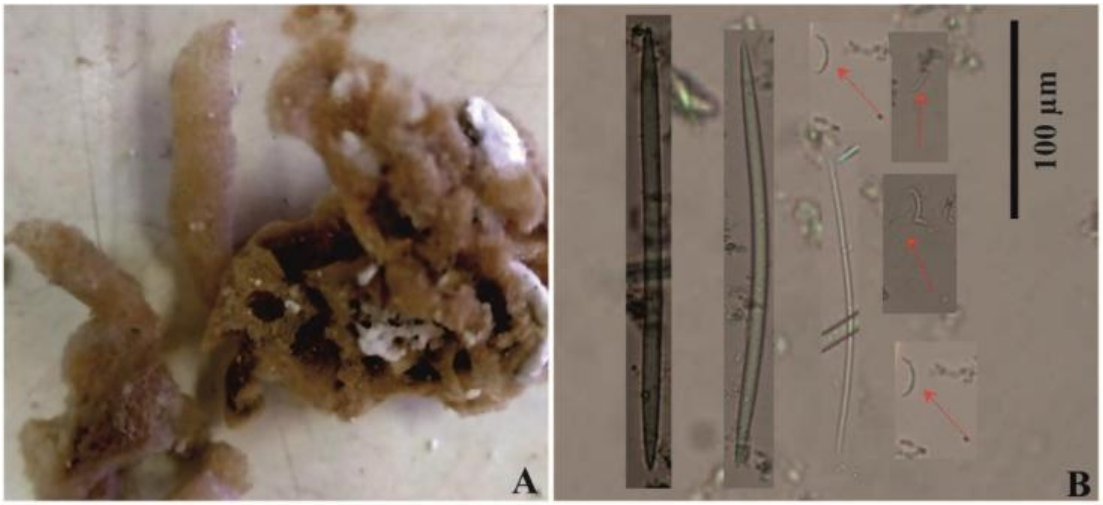


Plate 17: *Gelliodes pumila* (Lendenfeld,1887). A- Preserved specimen (Dry preservation); B- Short oxeas with less frequent sigmas pointed by arrows (scale= 100 µm).


Plate 18: *Halichondria (Halichondria) panicea* (Pallas, 1766). A- Preserved specimen (Dry preservation); B- Section showing the halichondroid arrangement of the choanosomal skeleton (scale= 500 μm).

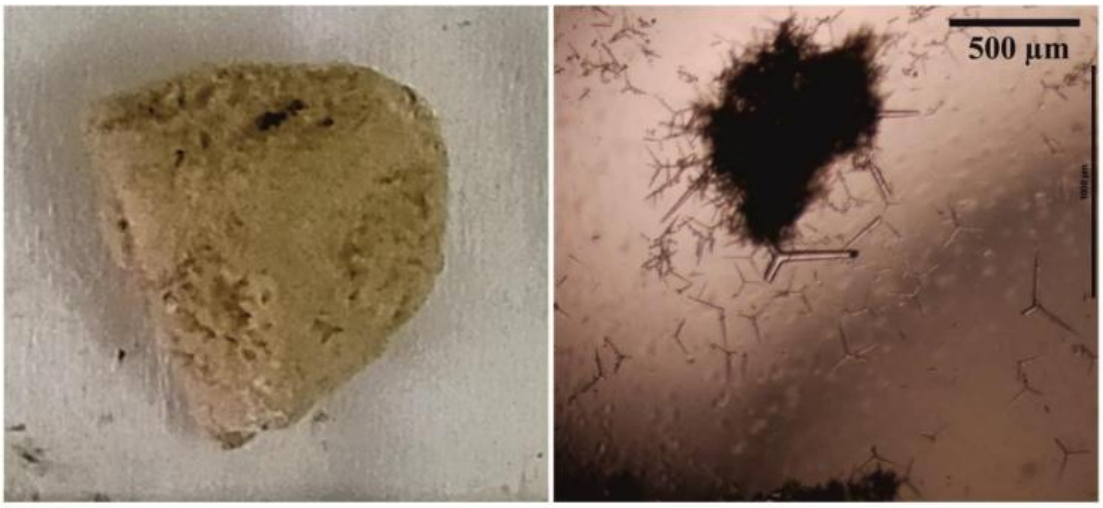


Plate 19: *Plakinastrella schulzi* Dendy, 1905. A- Preserved specimen (Dry preservation); B- Short shafted triaenes (scale= 500 µm).

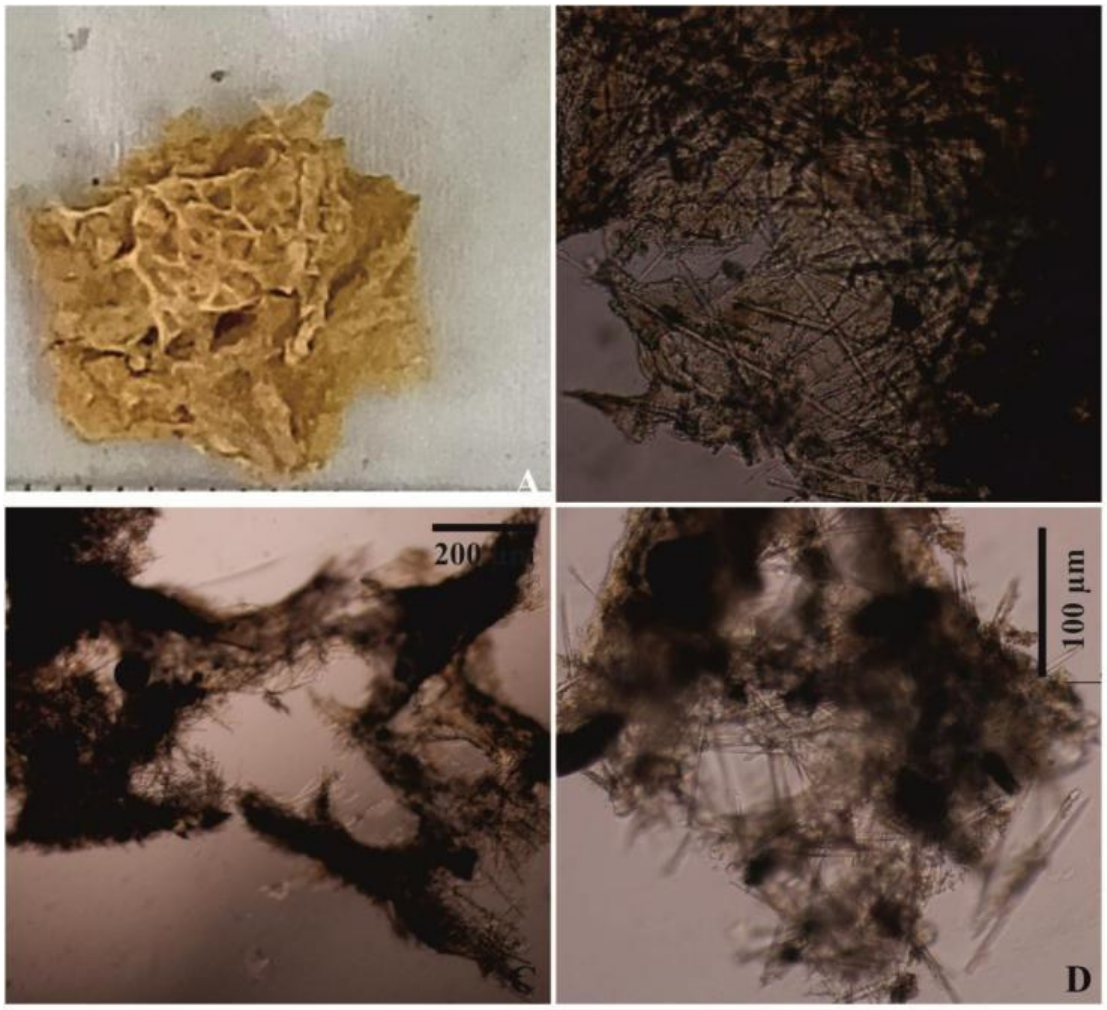


Plate 20: *Cliona cf. celata* Grant, 1826. A- Preserved specimen (Dry preservation); B-D Sections showing the irregular confused manner in which the free spicules are arranged around the choanocye chambers in the choanosomal region.

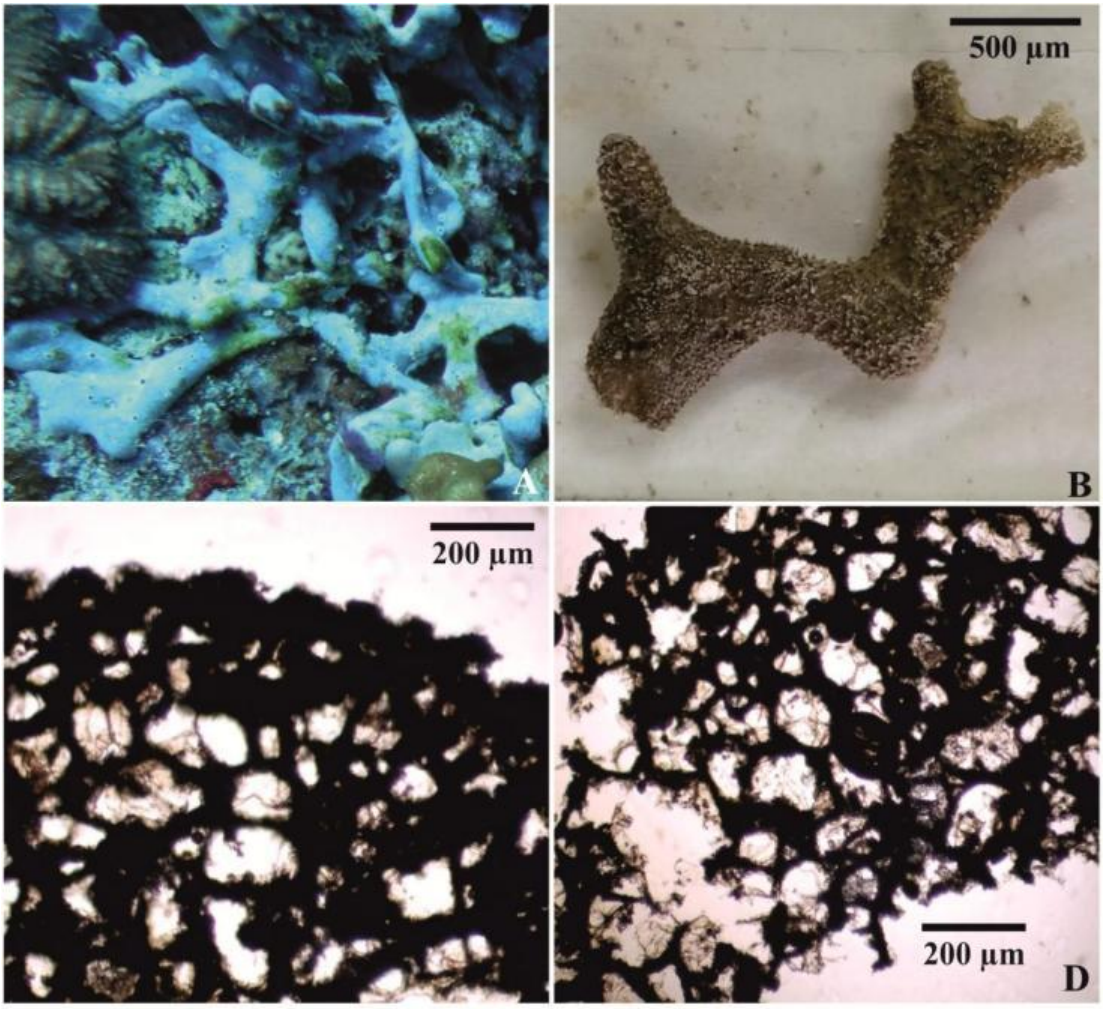


Plate 21: *Dysidea granulosa* Bergquist, 1965. A- In-situ; B- Preserved specimen (Dry preservation); C- Section showing conulose surface that is heavily charged with sand (scale= 200 µm); D- Choanosomal skeletal fibres forming a regular reticulating that is heavily cored by debris and sand (scale= 200 µm).

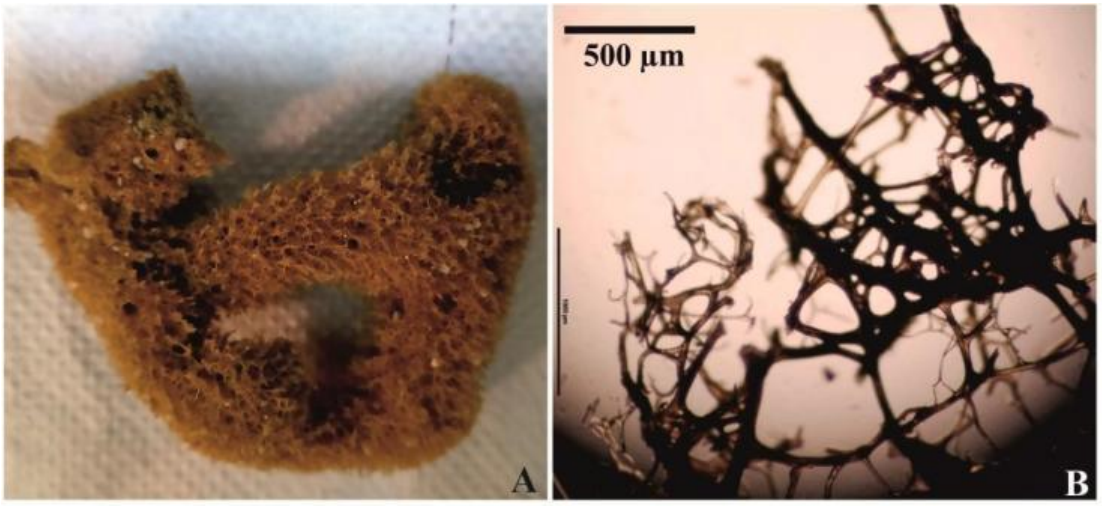


Plate 22: *Fasciospongia cavernosa* (Schmidt, 1862). A- Preserved specimen (Dry preservation); B- Primary fibres centrally cored (scale= 500 µm).


Plate 23: *Leucetta chagosensis* Dendy, 1913. A- Preserved specimen (Dry preservation); B- Oxeas of a single size class (scale= 200 µm).

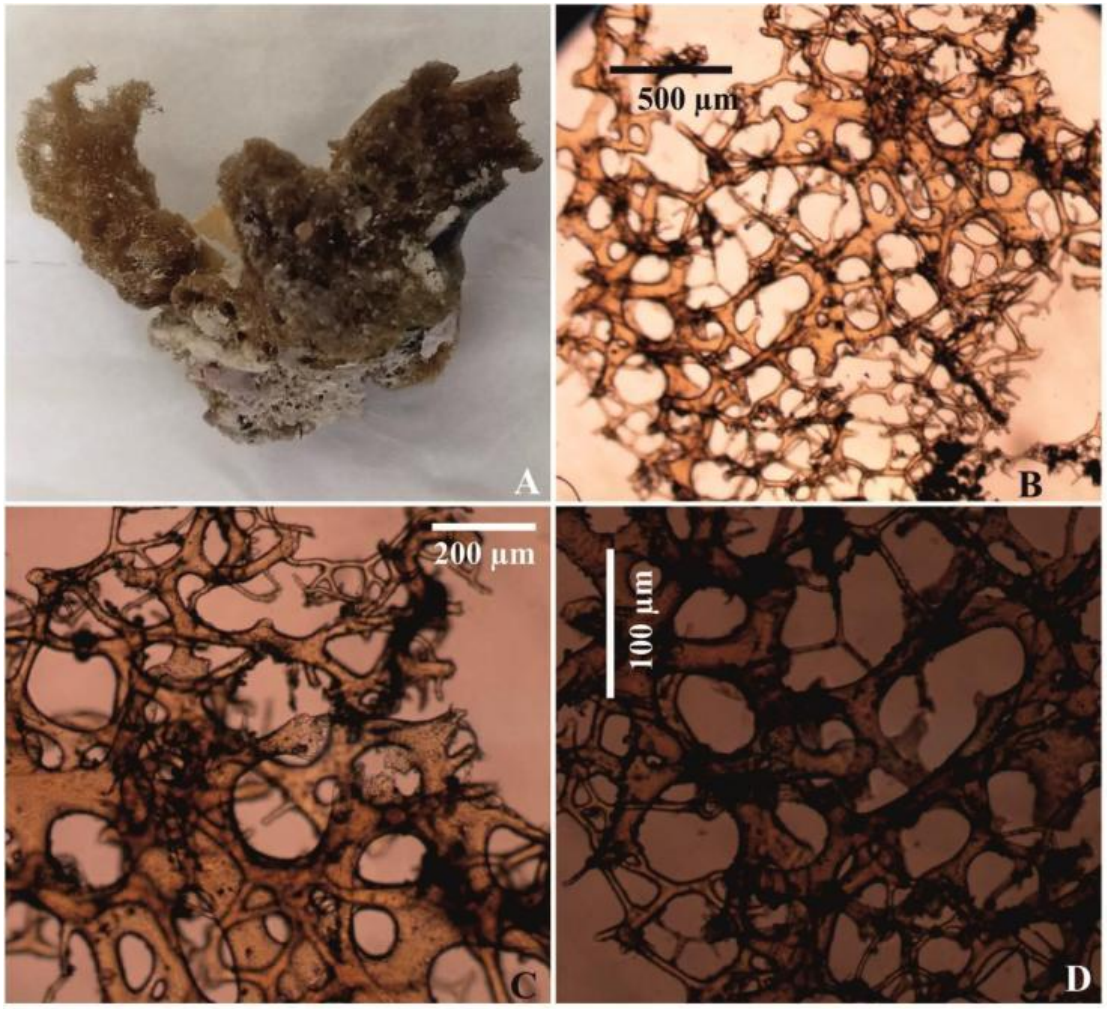


Plate 24: *Hyatella* sp. . A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with anastomosed tracts (scale= 500 µm); C & D- Close-up of thick primary fibres and thinner secondary fibres (100 µm).

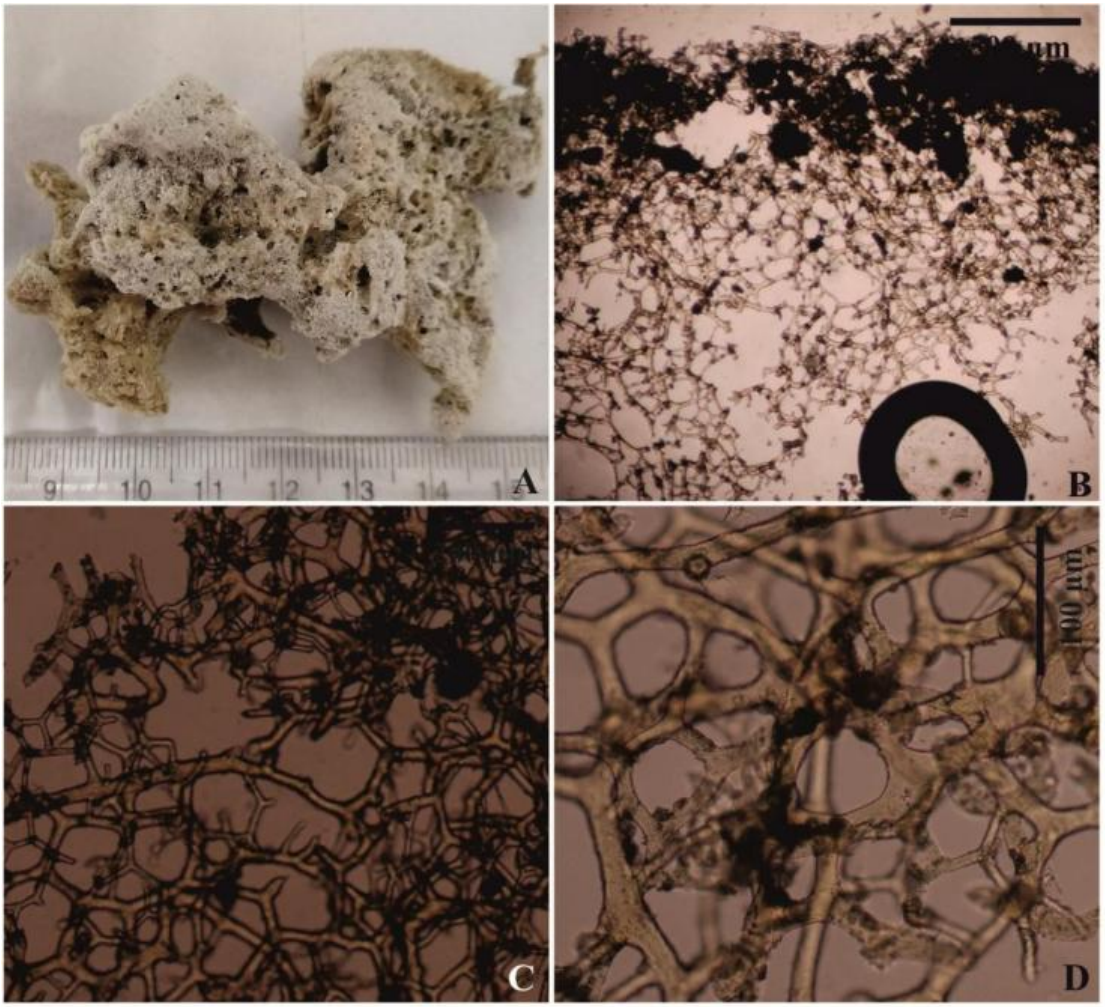


Plate 25: *Spongia (Spongia) ceylonensis* (Dendy, 1905).. A- Preserved specimen (Dry preservation); B- Section showing the dermal region heavily charged with sand partices (scale= 500 µm); C- Choanosomal skeleton showing a regular reticulation of polygonal meshes (scale= 200 µm); D- Close-up of polygonal meshes of the choanosomal region (scale= 100 µm).


Plate 26: *Dragmacidon agariciforme* (Dendy, 1905). A-Freshly collected specimen; B-Section showing the choanosomal skeleton with thick plurispicular columns running parallel to each other approaching the surface to form the characteristic conules (scale= 500 µm); C-The primary tracts contain single spicules protruding making the surface velvety (scale= 200 µm); D- Oxeas and styles in 2 size classes (scale= 100 µm).

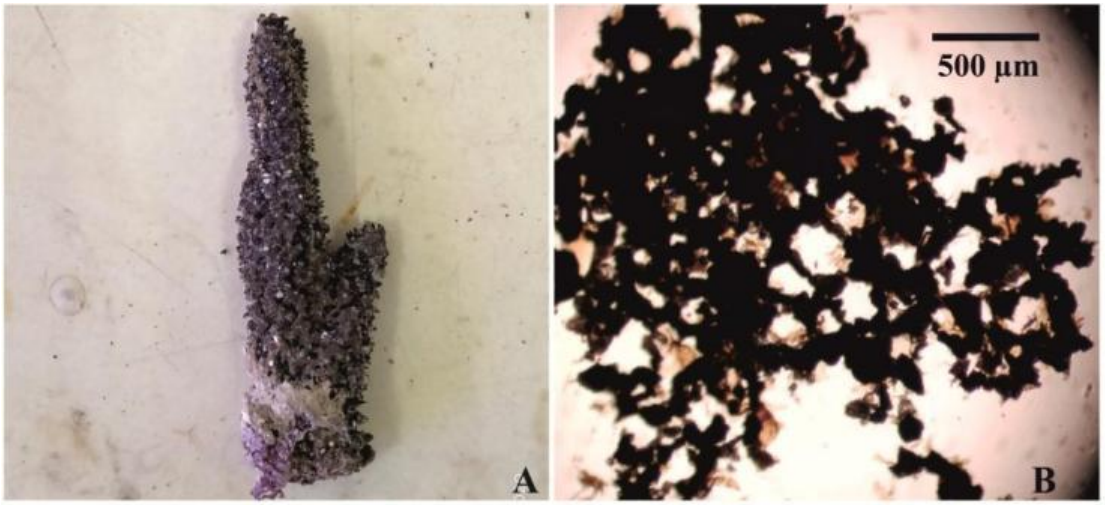


Plate 27: *Hyrtios erectus (*Lendenfeld,1887) . A- Preserved specimen (Dry preservation); B- Anastomosing choanosomal skeletal fibres heavily cored by sand and debris (scale= 500 µm).

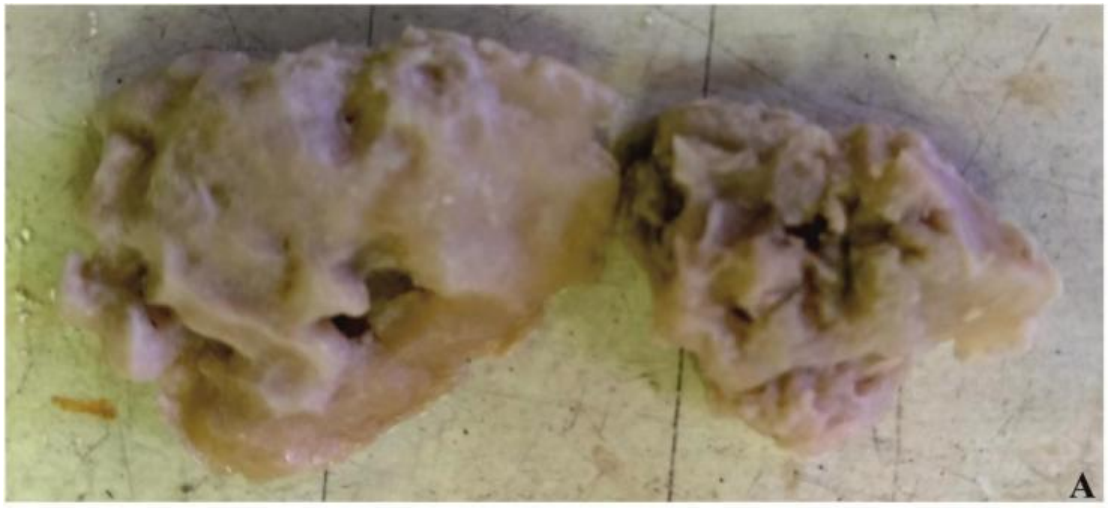


Plate 28: *Mycale (Aegogropila) crassissima* (Dendy, 1905). A- Preserved specimen (Dry preservation).

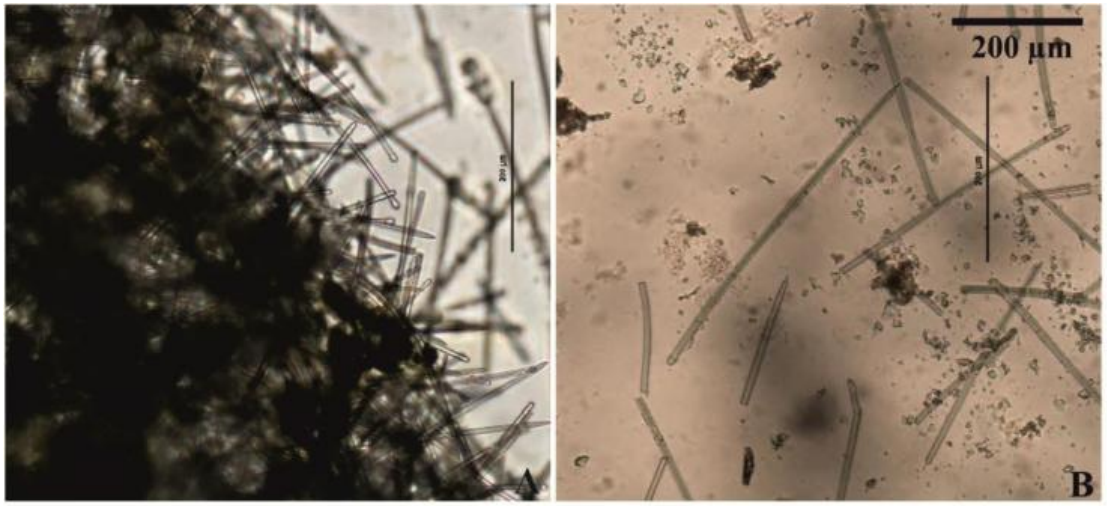


Plate 29: *Suberites carnosus* (Johnston, 1842). A- Confused arrangement of long slender; B- Tylostyles (scale= 200 µm).

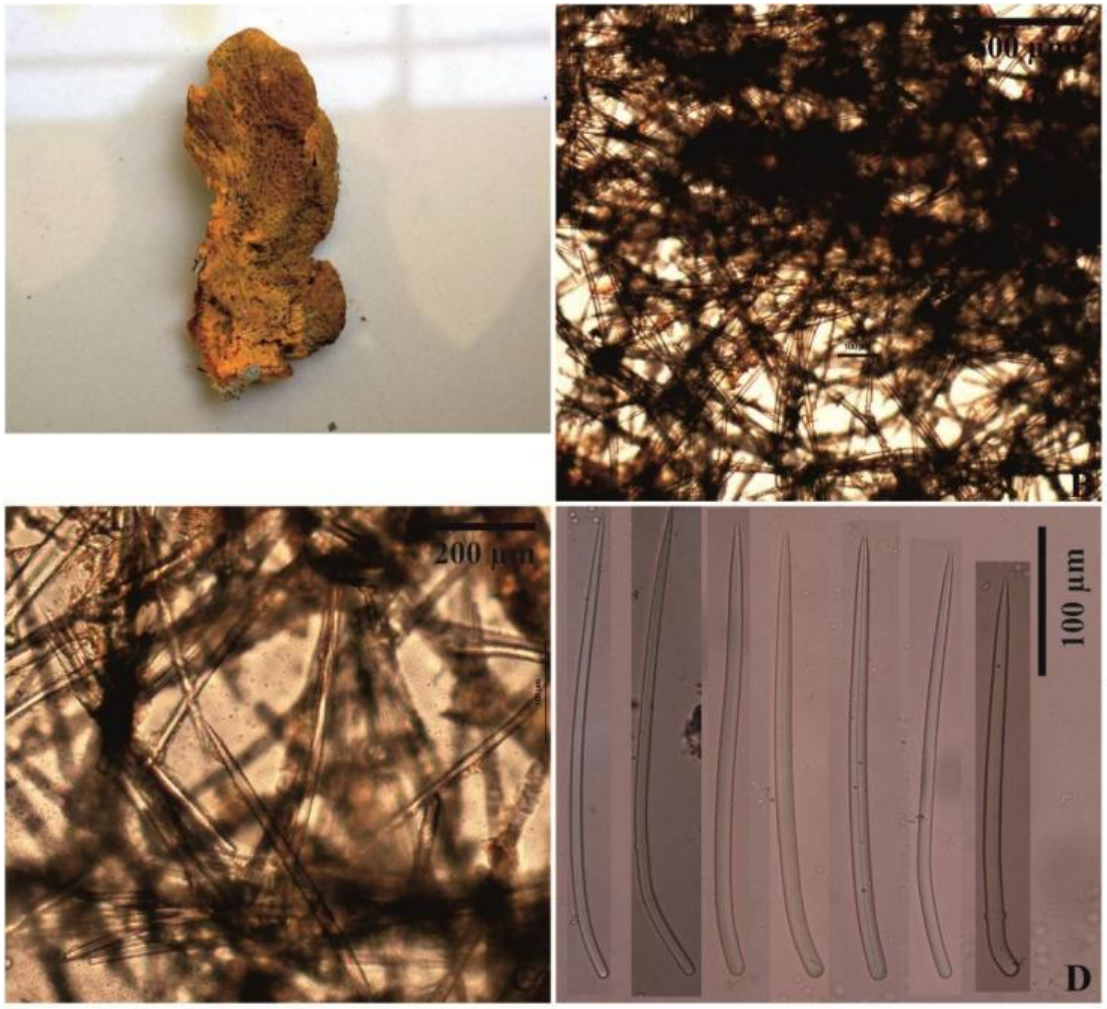


Plate 30: *Stylissa massa* (Carter, 1887). A-Freshly collected specimen; B- Section showing the choanosomal skeleton with confused halichondroid skeletal networks (scale= 500 µm); C- Close-up of choanosomal skeleton (scale= 200 µm); D- Styles of a single size class (scale= 100 µm).

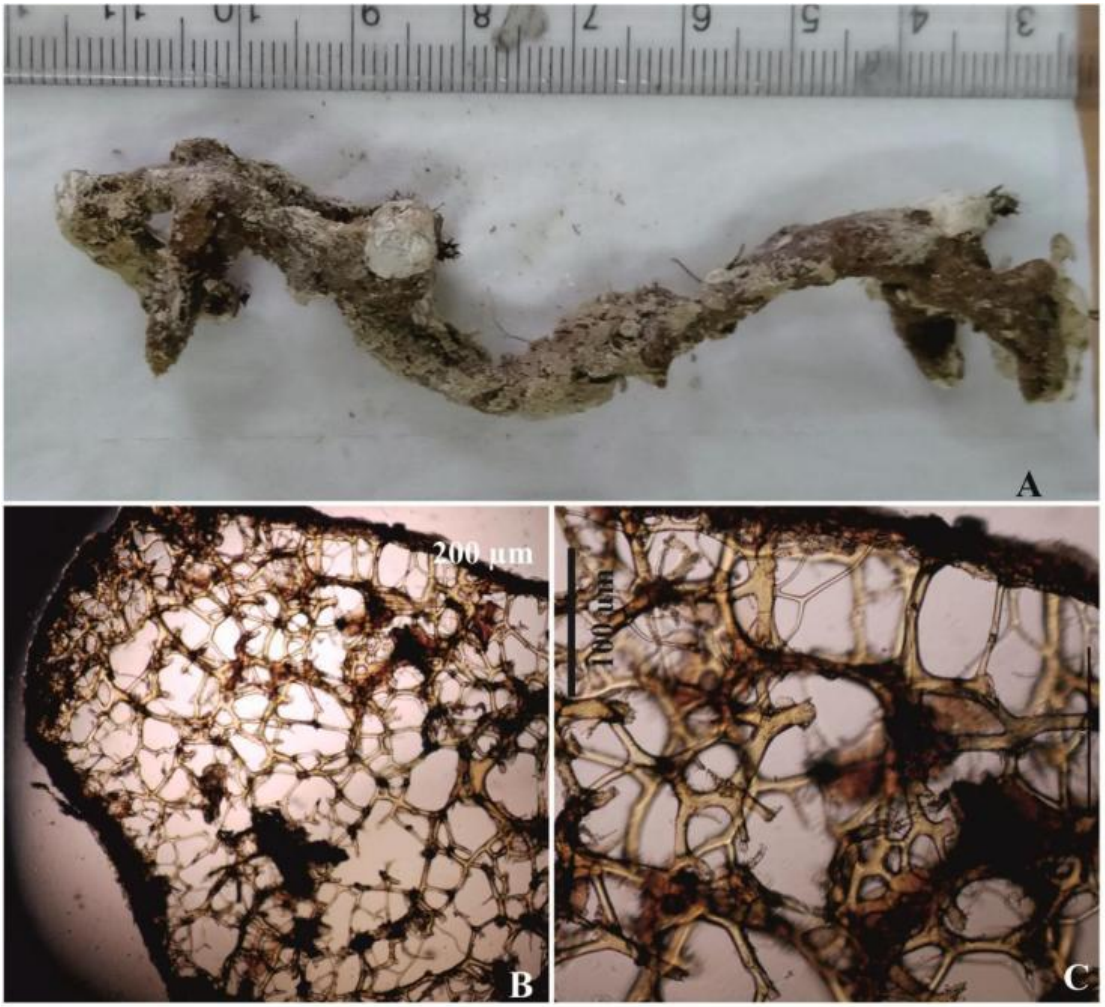


Plate 31: *Aplysinopsis elegans* Lendenfeld, 1888 A- Preserved specimen (Dry preservation); B- Section showing the over all skeletal arrangement (scale= 500 µm); C- Close-up of ectosomal skeleton (100 µm)

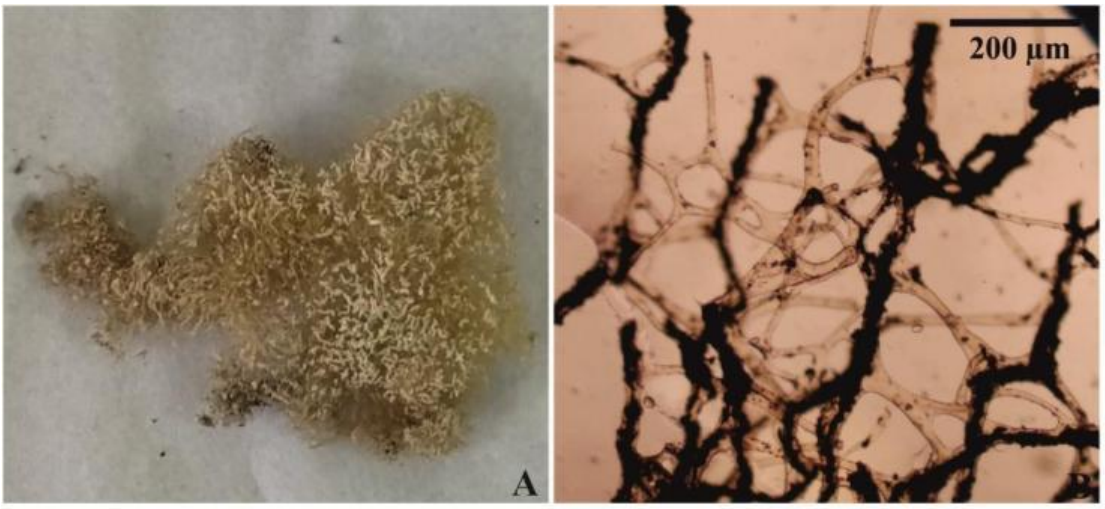


Plate 32: *Semitaspongia* sp. A- Preserved specimen (Dry preservation); B- Primary fibres are cored with debris and the secondary fibres are clear (scale= 200 µm).

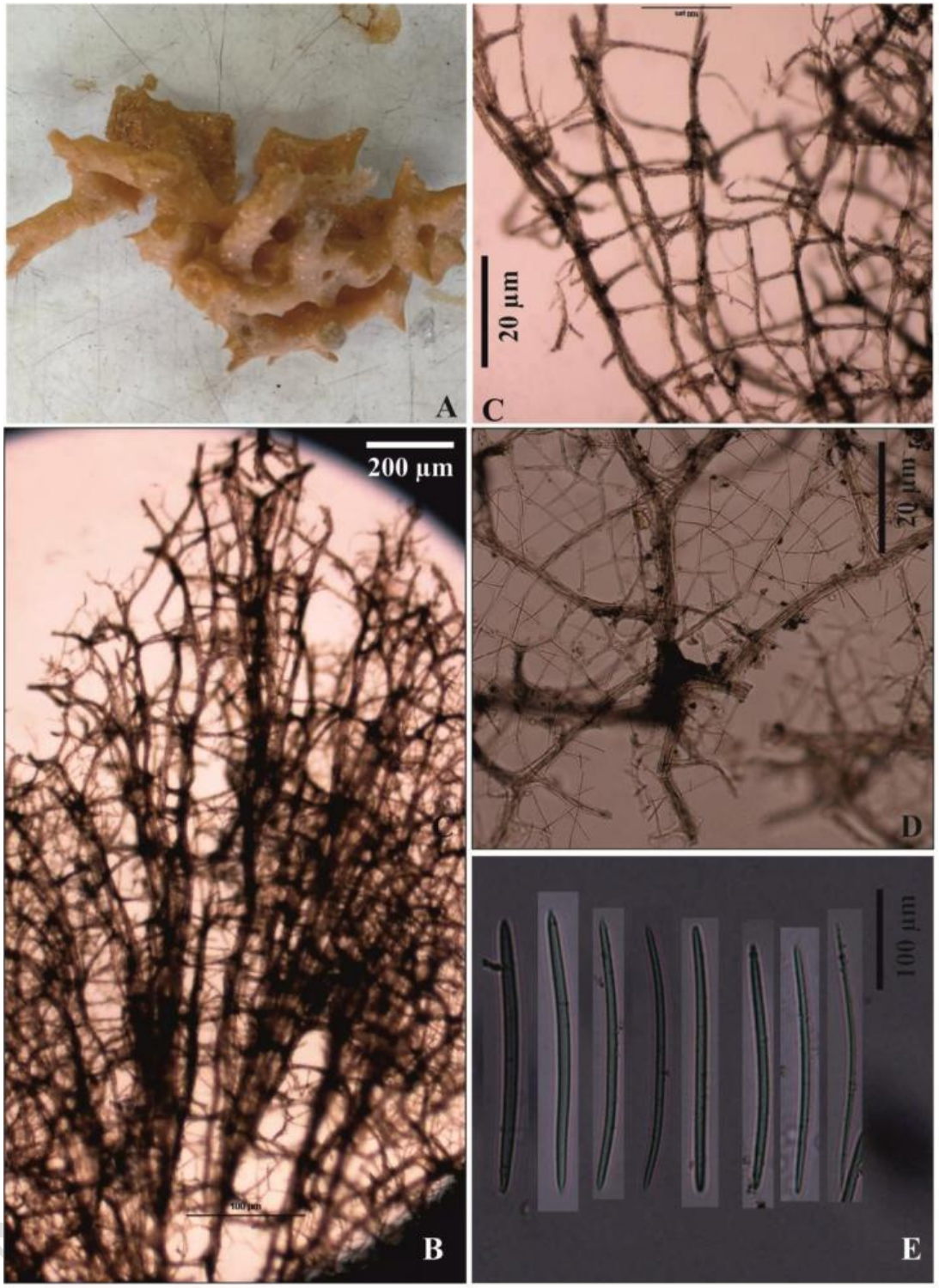


Plate 33: *Callyspongia (Cladochalina) subarmigera* (Ridley, 1884) . A-Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with plumose tracts running up the sponge (scale= 500 µm); C- Close-up of ladder like choanosomal tracts; D- Tangential ectosomal skeleton (scale= 200 µm); E- Small slender oxeas (scale= 100 µm).

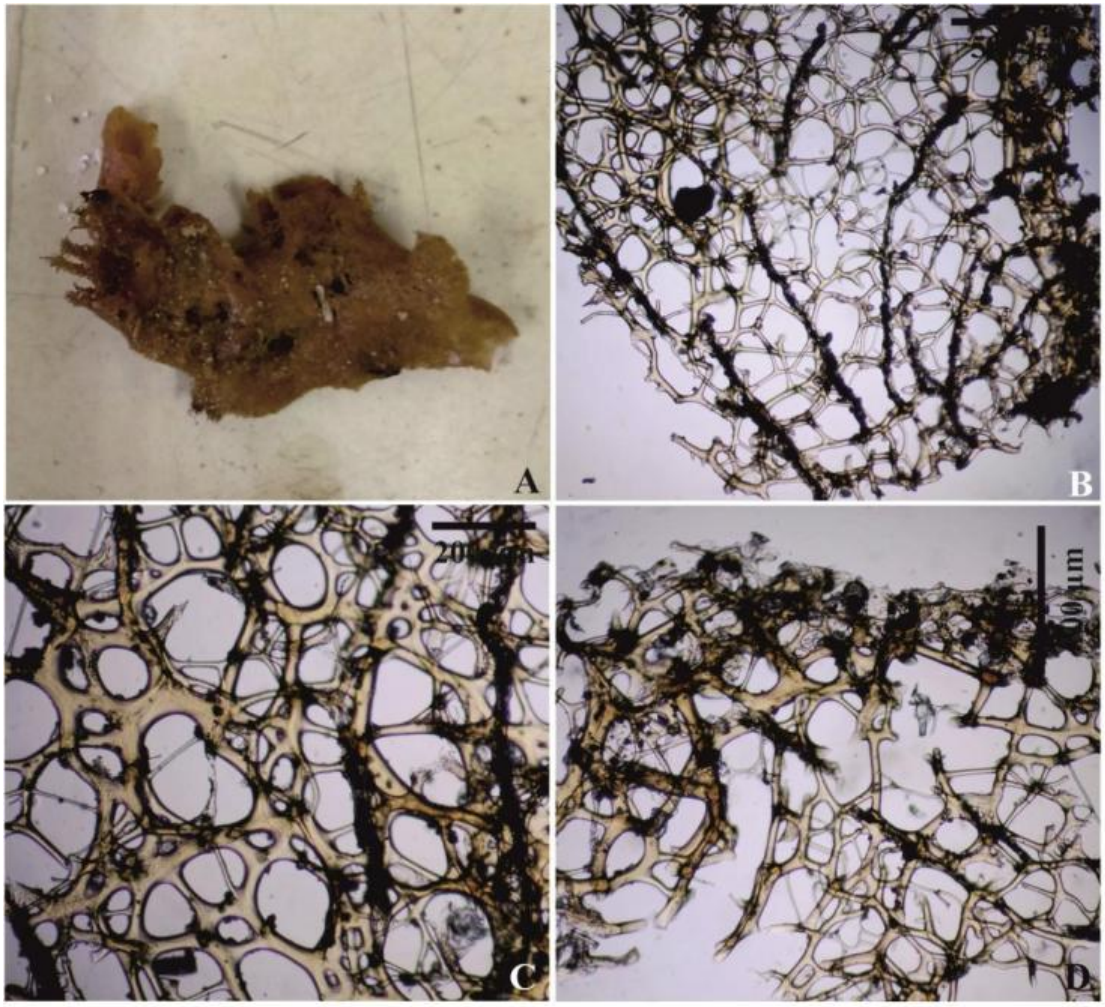


Plate 34: *Hyattella intestinalis* (Lamarck, 1814). A- Preserved specimen (Dry preservation); B- Section showing overall skeletal architecture with cored primary fibres running toward the surface; C- Close-up of the some fibres forming fascicles as they approach the surface (scale= 200 μm); D- Close-up showing the tertiary fibres supporting the surface region (scale= 100 μm).

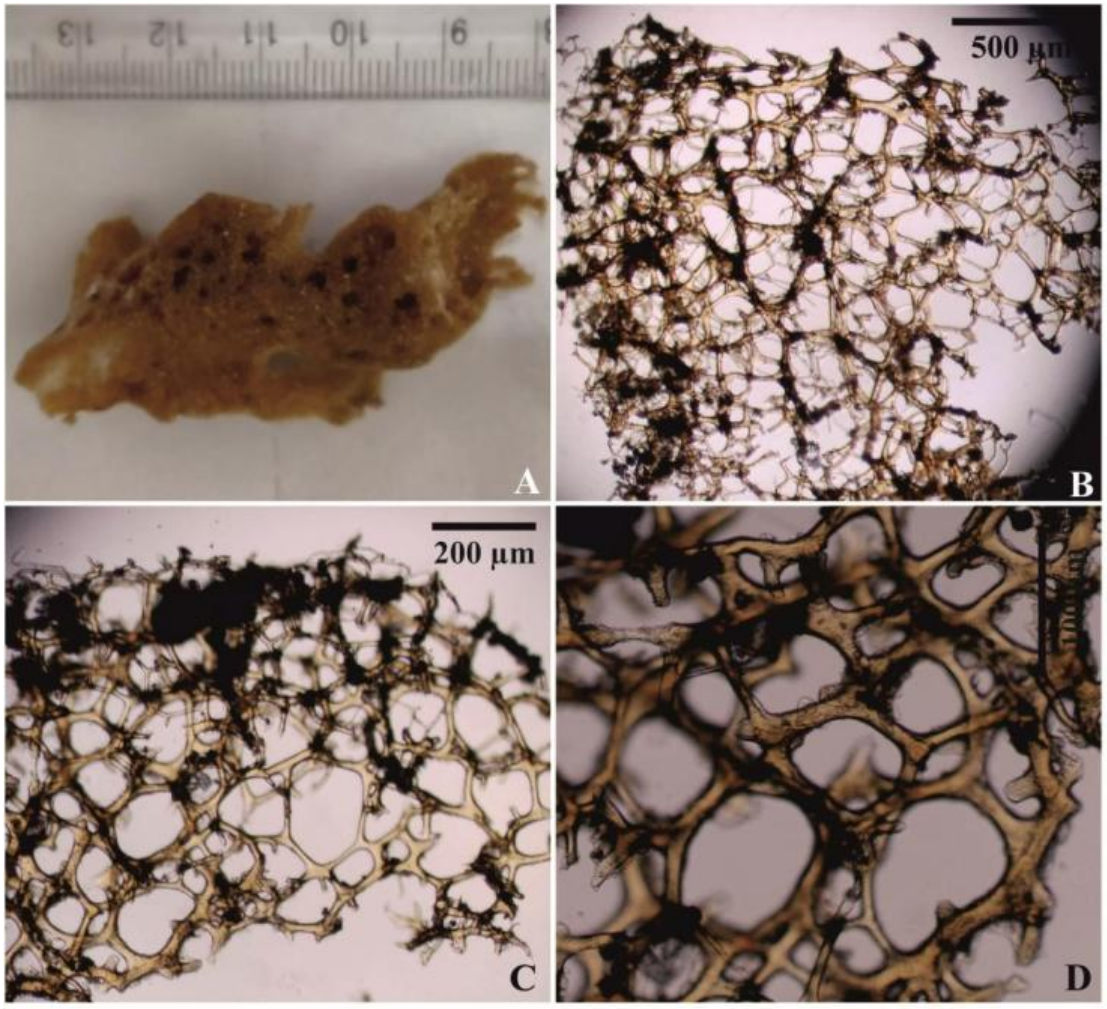


Plate 35: *Hyatella* sp. A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with plumose tracts running up the sponge (scale= 500 µm); C- Tangential surface skeleton (scale= 200 µm); D- Close-up of choanosomal tracts (scale= 100 µm).

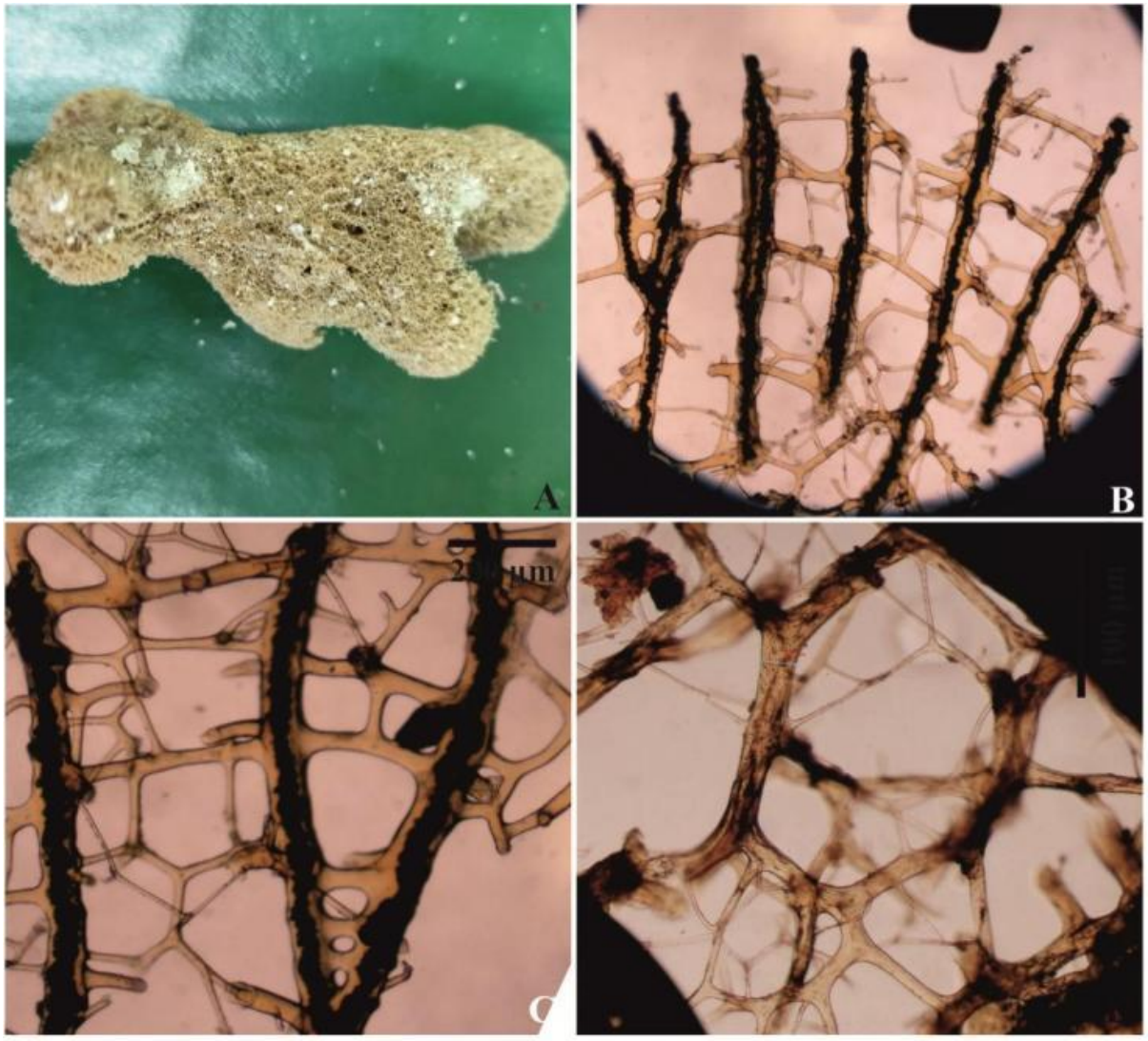


Plate 36: *Scalarispongia androthensis* n.sp. A- Preserved specimen (Dry preservation); B- Section showing overall skeletal architecture with cored primary fibres running parallel to each other and perpendicular to the surface connected by uncored secondary fibres; C- Close-up of the secondary fibres forming the rectangular meshes (scale= 200 μm); D- Close-up showing the secondary and tertiary fibres (scale= 100 μm).

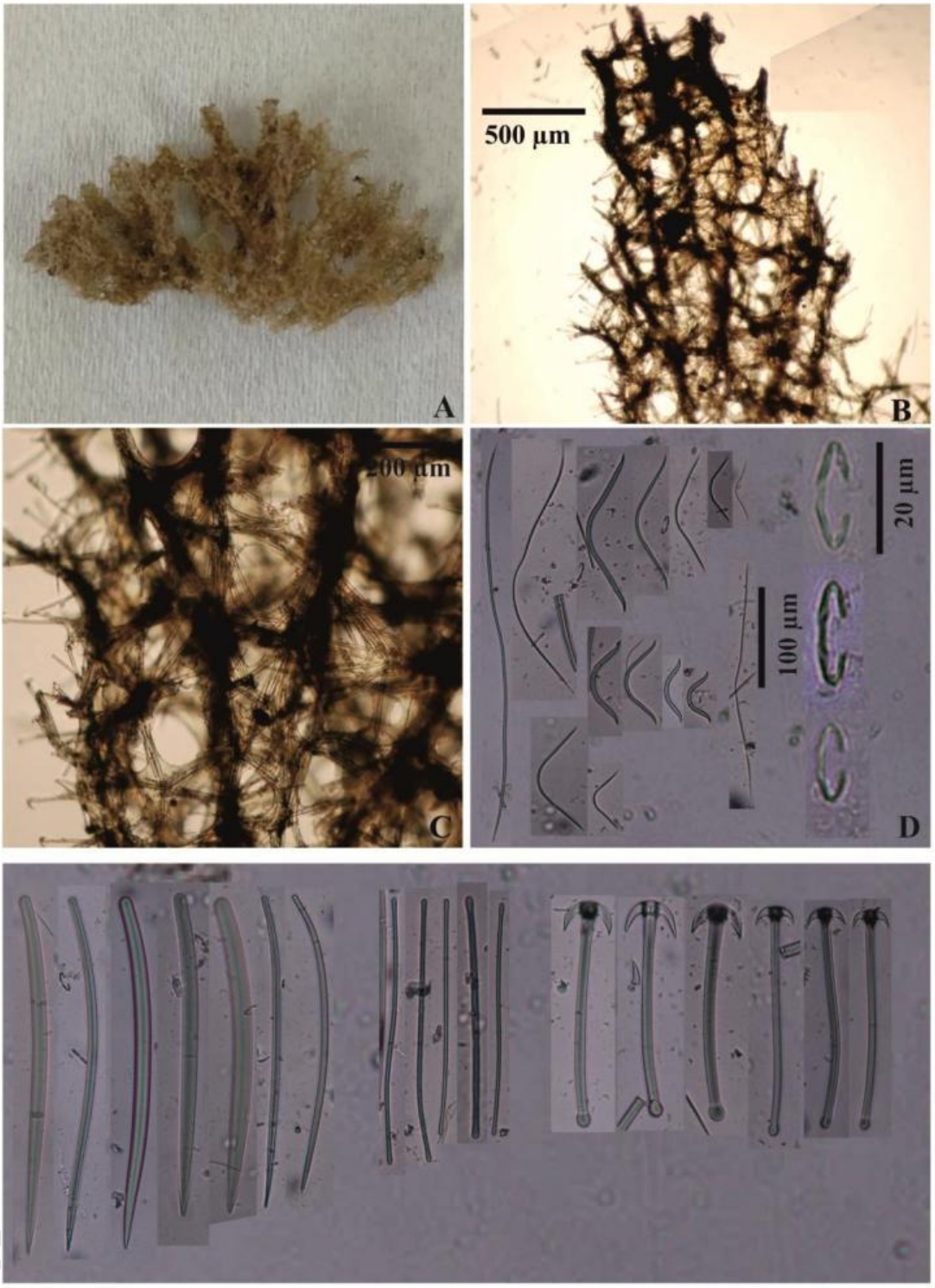


Plate 37: *Acarnus* sp. A-Preserved specimen (Dry preservation); B- Section showing choanosomal skeleton with plumose tracts ascending to surface interconnected by renieroid isotropic tracts, both cored by choanosomal styles and echinated by cladotylotes (scale= 500 µm); C- Close-up of choanosomal tracts showing the cladotylotes echinating the tracts (scale= 200 µm); D- Different types of toxas and isochelae (scale= 100 µm); E- Styles,

tylotes and two types of cladotylotes.

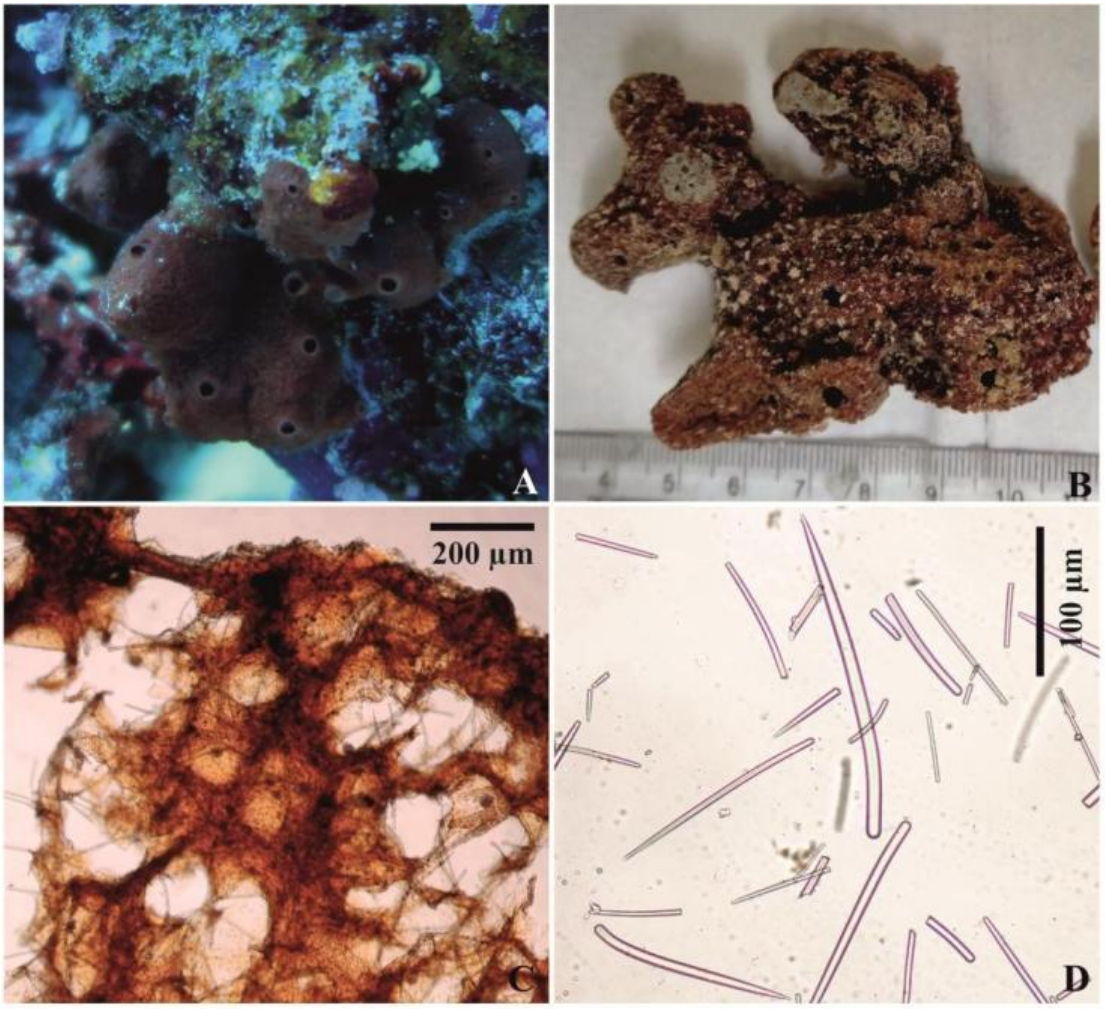


Plate 38: *Axinella minor* Thomas, 1981. A- In-situ; B- Preserved specimen (Dry preservation); C- Choanosomal skeleton showing plumose tracts running toward the surface (scale= 200 µm); D- Styles in a single size class (scale= 100 µm).

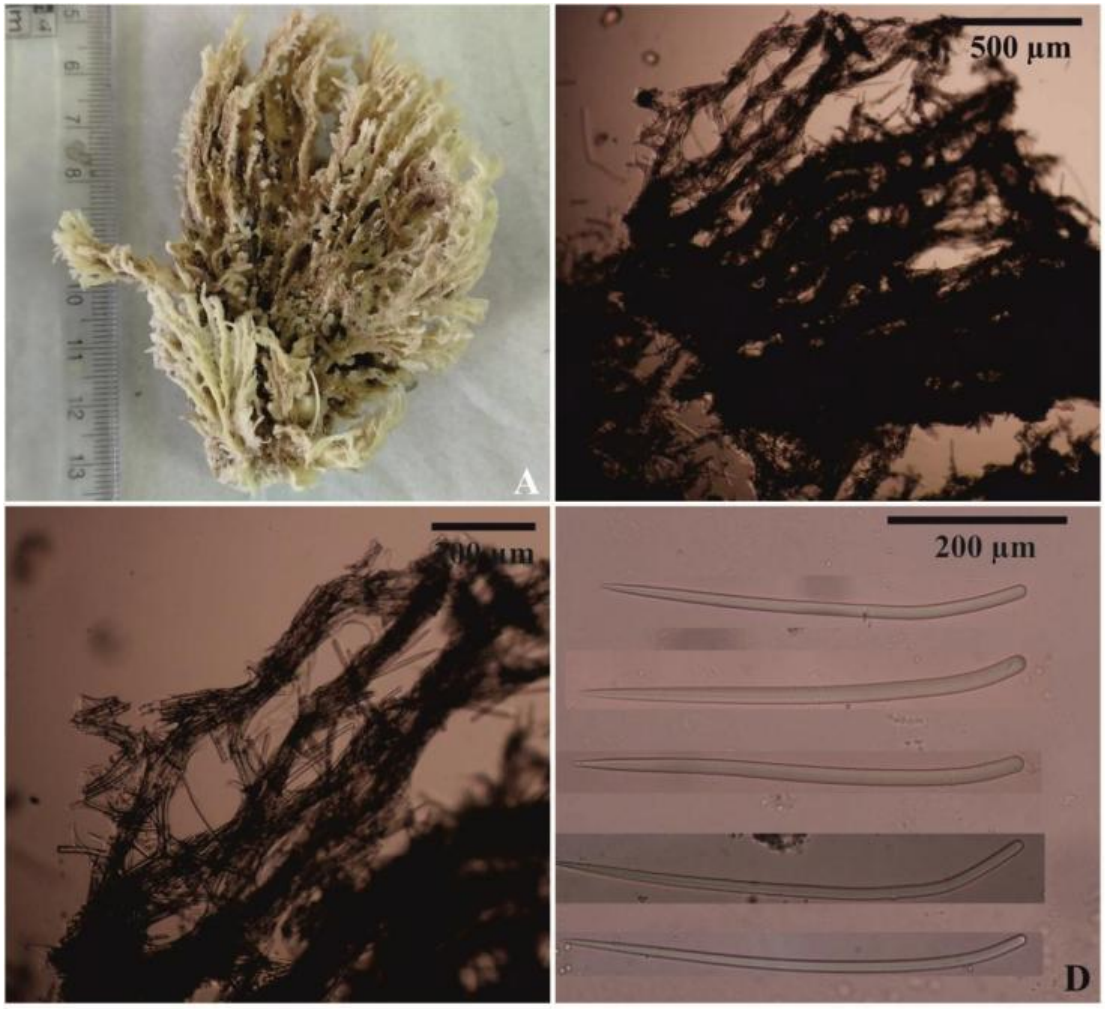


Plate 39: *Phakettia ridleyi* (Dendy, 1887). A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with plumose tracts running up the sponge (scale= 500 µm); C- Close-up of plumose tracts running up toward the surface (scale= 200 µm); D- Styles (scale= 100 µm).

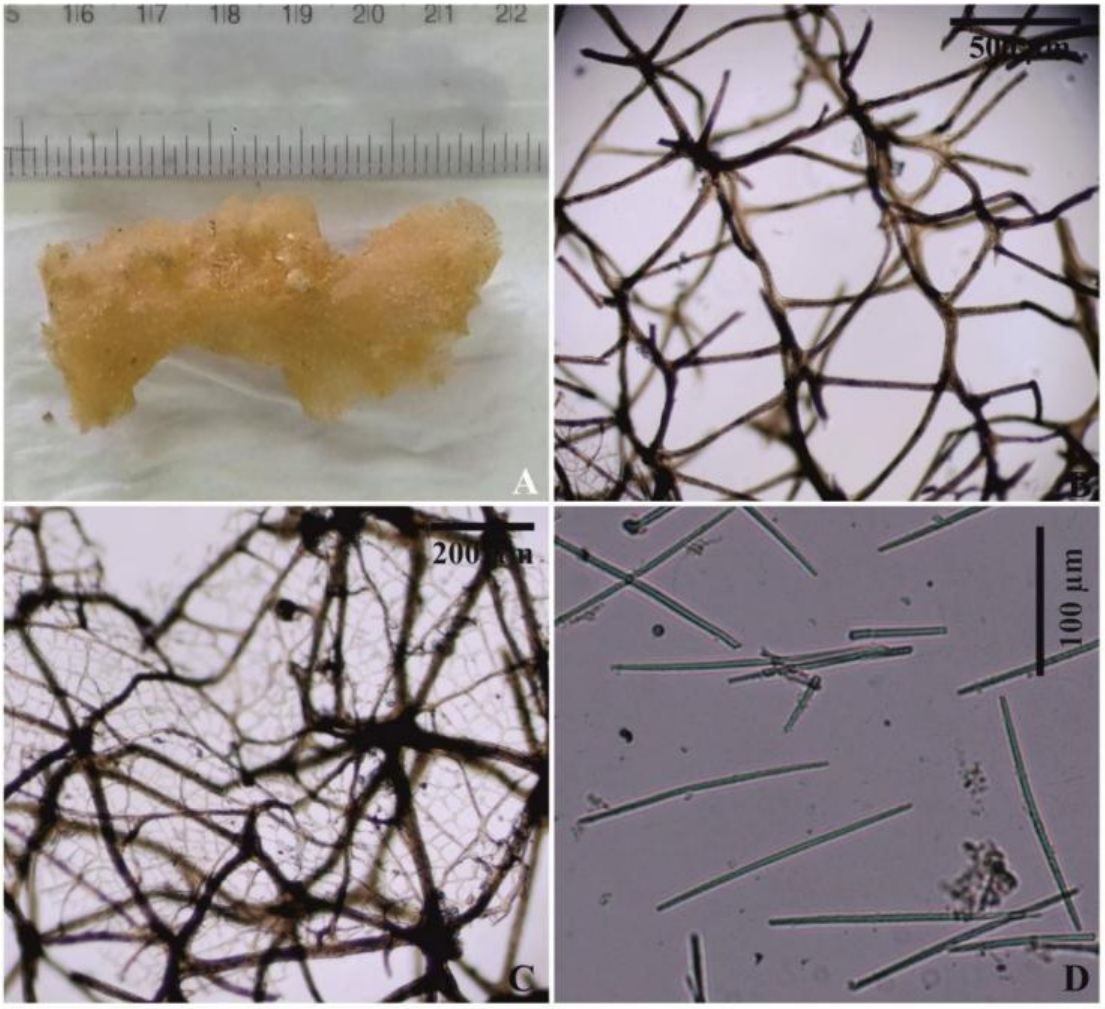


Plate 40: *Callyspongia (Cladochalina) spinnosissima* (Dendy, 1887) . A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with plumose tracts running up the sponge (scale= 500 µm); C- Ectosomal skeleton showing protruding spicule tracts making the surface velvety (scale= 200 µm); D- single size class of oxeas (scale= 100 µm).

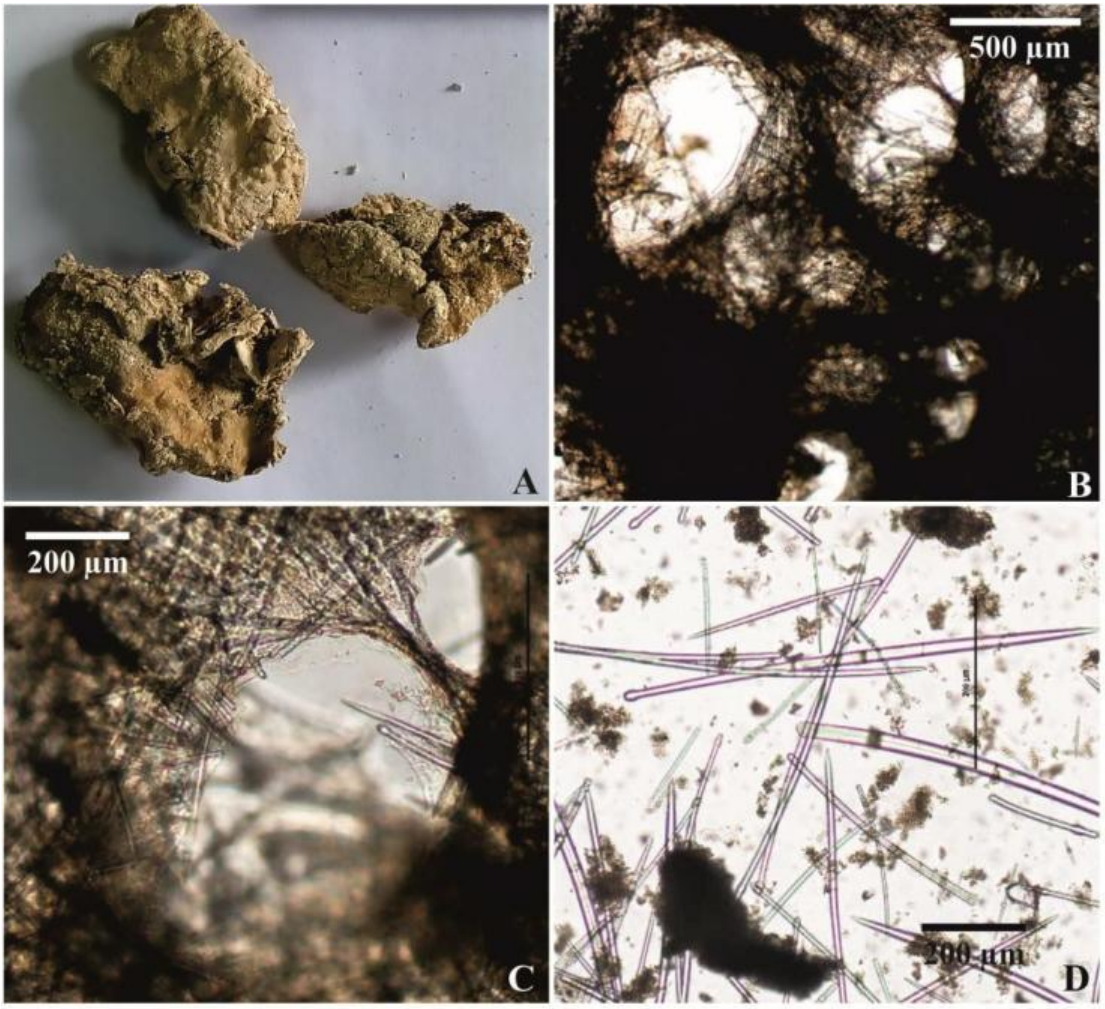


Plate 41: *Spheciospongia inconstans* (Dendy, 1887). A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with free spicules arranged in a confused irregular manner; C- Close-up of spicules arranged around choanocyte chambers (scale= 200 µm); D- Tylostyles (scale= 200 µm).

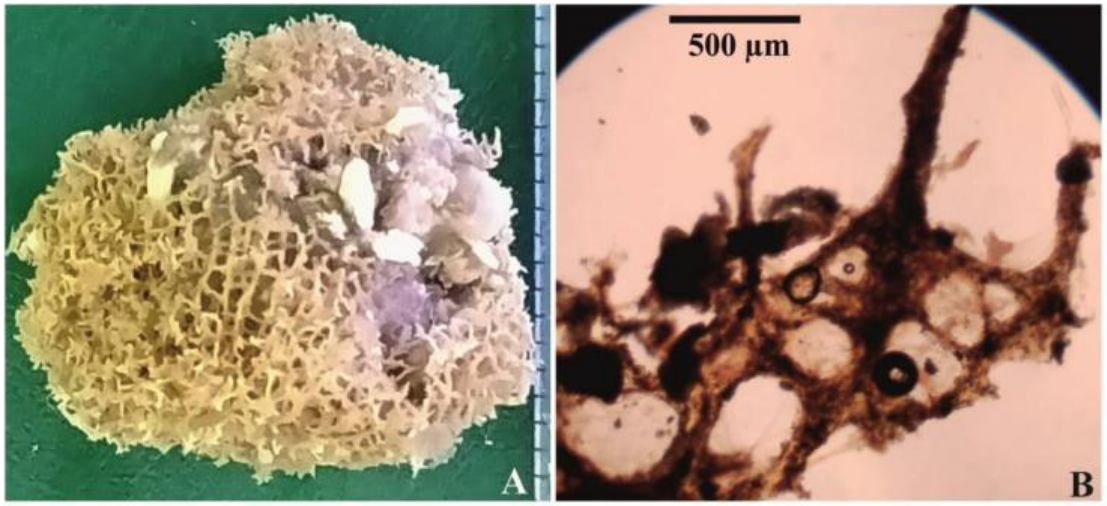


Plate 42: *Ectyodoryx lissostyla* Thomas, 1970. A- Preserved specimen (Dry preservation); B- Primary and secondary fibres are completely cored by detritus and sand (scale= 500 µm).

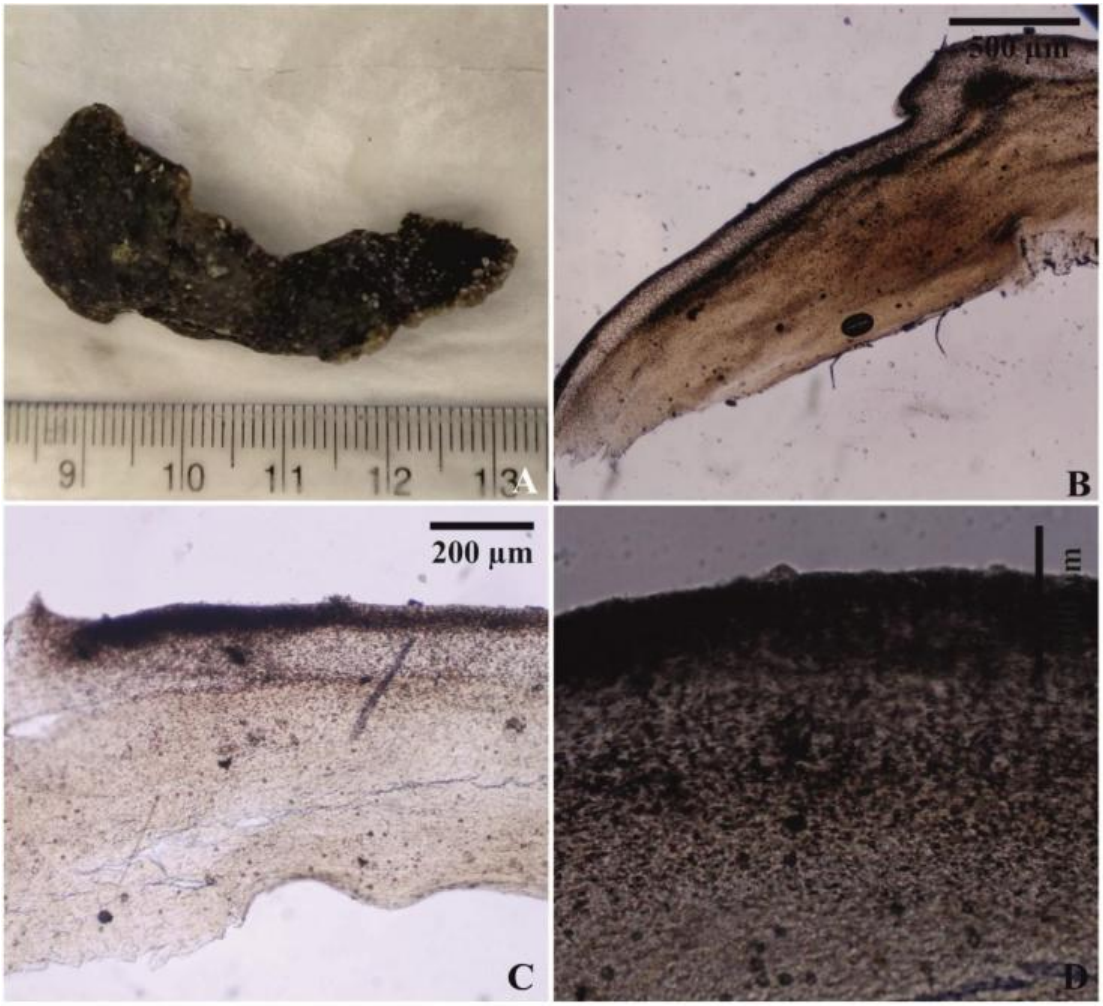


Plate 43: *Chondrilla australiensis* Carter, 1873. A- Preserved specimen (Dry preservation); B- Section showing the overall body organisation (scale= 500 µm); C- Close- up of the paler choanosomal region (scale= 200 µm); D- Close-up of the darker pigmented cortex (scale= 100 µm).

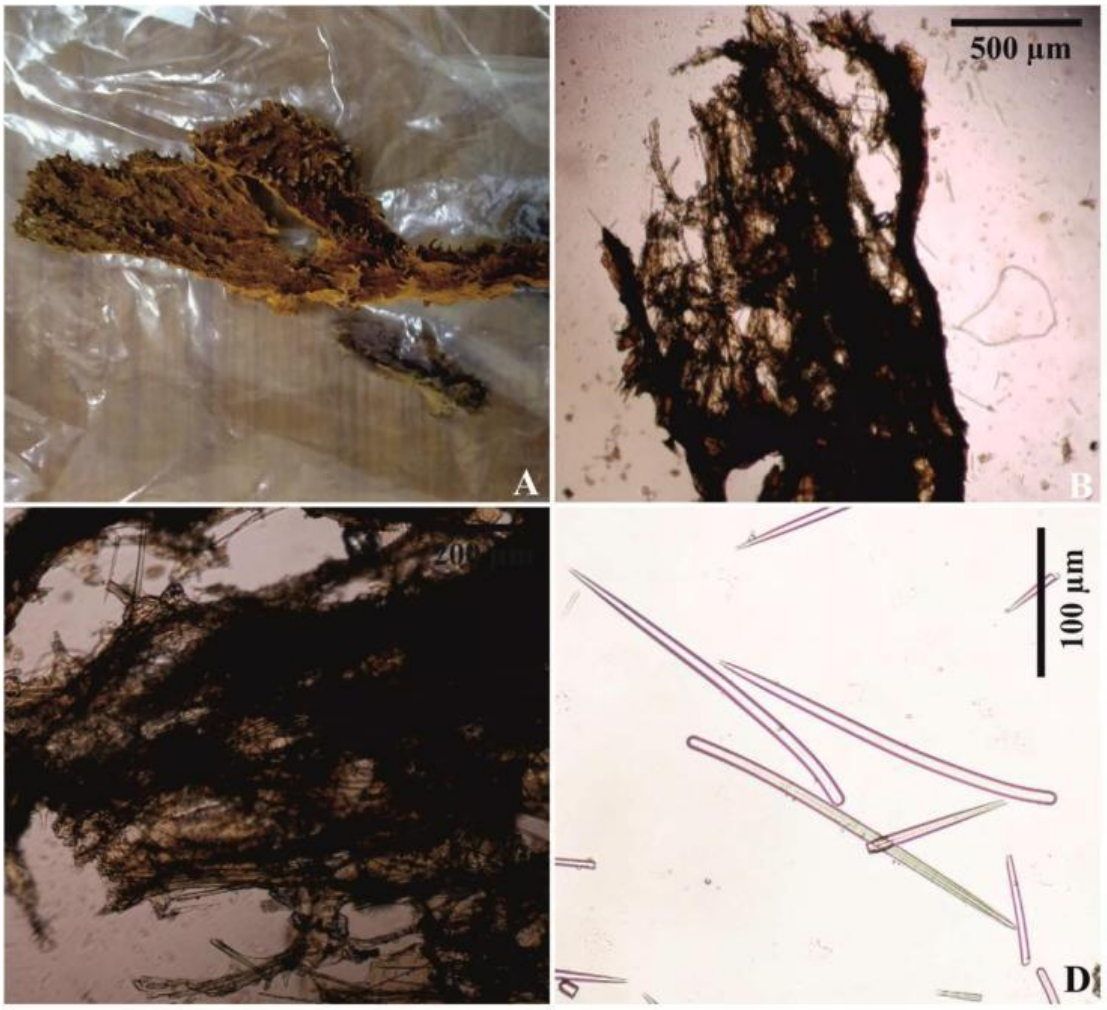


Figure 1: *Phakettia palmata* (Row, 1911) . A- Preserved specimen (Dry preservation); B- Section showing the choanosomal skeleton with plumose tracts running up the sponge (scale= 500 µm); C- Close-up of choanosomal skeletal tracts (scale= 200 µm); D- Styles (scale= 100 µm).