

## RESEARCH ARTICLE

# Taxonomy and diversity of hydroids (Cnidaria: Hydrozoa) of Sergipe, Northeast Brazil

Luana M. Castro Mendonça<sup>1,2</sup>, Carmen R. Parisotto Guimarães<sup>3</sup>, Maria A. Haddad<sup>1</sup>

<sup>1</sup>Instituto de Ciências Biológicas e da Saúde, Universidade Federal de Alagoas. Avenida Lourival Melo Mota, Tabuleiro do Martins, 57072-900 Maceió, AL, Brazil.

<sup>2</sup>Programa de Pós-Graduação em Zoologia, Departamento de Zoologia, Setor de Ciências Biológicas, Universidade Federal do Paraná. Caixa Postal 19020, 81531-980 Curitiba, PR, Brazil. mahaddad.2014@gmail.com

<sup>3</sup>Departamento de Biologia, Centro de Ciências Biológicas e da Saúde, Universidade Federal de Sergipe. Avenida Marechal Rondon, 49100-000 São Cristóvão, SE, Brazil. carmenparisotto@gmail.com

Corresponding author: Luana Marina de Castro Mendonça (luana.biologia@yahoo.com.br)

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**ABSTRACT.** Despite the great advances in research on the taxonomy and ecology of hydroids of the Brazilian coast, those studies are concentrated in the Southeast and South regions of the country, leaving a gap in knowledge from the North and Northeast regions. Aiming to fill part of this gap, we studied the hydroids communities in the state of Sergipe, Northeast Brazil, in the continental shelf and in three estuarine regions. In the continental shelf, samplings with fishing trawls took place during the dry and rainy seasons of 1999–2003 (8 campaigns), from 18 stations distributed at depths of 10, 20, and 30 m. In the estuaries of the rivers Japarutuba, Sergipe and Vaza-Barris three ropes with six polyethylene plates were installed in each place and left submerged for three months in the dry and rainy periods of 2017. Seventy-nine hydroid species of 26 families were identified. Sixteen of these have been assigned to nine Anthoathecata families and the remaining 63 species to 17 Leptothecata families. Among the identified species, 60 are new records from Sergipe and among those, nine are also new records from the Northeast region and two from the Brazilian coast. Our results increase the hydroid records from Sergipe and extend the range of some species inside the Brazilian coast and the Atlantic Ocean, showing the potential for future studies in other environments of the Sergipe coast.

**KEY WORDS.** Anthoathecata, Atlantic Ocean, biodiversity, ecology, Leptothecata, new records.

## INTRODUCTION

Studies on the hydrozoan species of Brazil started as a result of major oceanographic expeditions in the 19<sup>th</sup> and 20<sup>th</sup> centuries (e.g. Allman 1883, 1888, Nutting 1900, 1904, Vervoort 1946). A second wave of studies on benthic hydroids, mainly from the Southeast region, started with the studies of Vannucci (e.g. Vannucci Mendes 1946, Vannucci 1949, 1950, 1951a, 1951b, 1954). Decades later, several studies were published from other locations of Brazil (e.g. Mañal 1983, Migotto and Silveira 1987, Pires et al. 1992, Migotto 1996, Grohmann et al. 1997, Nogueira et al. 1997, Maria A. Haddad unpub. data) and in 2002 a list of the Brazilian Cnidaria was published by Migotto et al. 2002, mentioning 347 species of Hydrozoa to the Brazilian coast. Over the past 20 years, studies on hydroids have focused largely on the fauna from the Southeast region, although in-

vestigations have been undertaken on species elsewhere in the country (Amaral et al. 2000, 2010, Kelmo et al. 2003, Marques et al. 2006, Shimabukuro et al. 2006, Cangussu et al. 2010, Silveira and Morandini 2011, Bouzon et al. 2012, Maria A. Haddad unpub. data). Recently, a review of marine cnidarians of South America was published (Oliveira et al. 2016), updating the number of Brazilian hydroid species to 391 (not including undetermined morphotypes and identifications in genera that had other species mentioned).

However, knowledge of the hydroids of Sergipe is scant, with only four reported species to date. The first record is that of Allman (1888), who reported the sertularellid *Thuiaria hyalina* Allman, 1888 [= *Sertularella diaphana* (Allman, 1885)] from collections undertaken in Sergipe during the Challenger Expedition (1873-1876). The other three species belong to the Thyroscyphidae. The first of these, *Thyroscyphus ramosus* Allman, 1877, was

recorded by Shimabukuro and Marques (2006) from inside the Sergipe River estuary. Mendonça et al. (Luana M.C. Mendonça unpub. data) recorded *Thyroscyphus marginatus* (Allman, 1877) and *Sertularelloides cylindritheca* (Allman, 1888), as well as *T. ramosus*, from the continental shelf.

Other studies have reported hydromedusae from Sergipe: *Aglaura hemistoma*, 1810 Péron and Lesueur and *Liriope tetraphylla* (Chamisso & Eysenhardt, 1821) (Araújo and Ribeiro 2008) on the continental shelf; *Bougainvillia muscus* (Allman, 1863), *Eutima* sp., *Eucheilota duodecimalis* A. Agassiz, 1862 (Araujo et al. 2008) in the Sergipe estuary. A synopsis of knowledge about zooplankton of the Sergipe River summarized the species recorded in the state (Araújo 2006), including the hydrozoans: *Aglaura hemistoma*, *Amphinema dinema* (Péron & Lesueur, 1810), *Blackfordia virginica* Mayer, 1910, *Bougainvillia* sp., *Bougainvillia muscus* (as *Bougainvillia ramosa* (Van Beneden, 1844)), *Cladonema* sp., *Clytia hemisphaerica* (Linnaeus, 1767) (as *Phialidium hemisphaericum* (Linnaeus, 1767)), *Cunina* sp., *Cytaeis tetrastyla* Eschscholtz, 1829, *Ectopleura dumortierii* (Van Beneden, 1844), *Eucheilota* sp., *Laodicea minuscula* Vannucci, 1957, *L. tetraphylla*, *Lizzia blondina* Forbes, 1848 (as *Podocoryna minuta* (Mayer, 1900)), *Obelia* sp., *Phialucium* sp., *Phialopsis diegensis* Torrey, 1909, *Podocoryna* sp., *Podocoryna tenuis* (Browne, 1902), *Podocorynoides minima* (Trincci, 1903) (as *Podocoryne minima* (Trincci, 1903)), *Proboscidactyla ornata* (McCrary, 1859), *Solmaris* sp., and *Turritopsis nutricula* McCrary, 1857.

Based on the significant gap of knowledge of the Brazilian hydrozoans in Sergipe and other states of the North and Northeast, this study aims to inventory the taxonomic composition of the hydroids communities on the continental shelf and in three estuarine regions of Sergipe.

## MATERIAL AND METHODS

### Study area

The coast of the state of Sergipe is located between the coordinates 36°10'W; 10°30'S and 37°25'W; 11°40'S (Fig. 1); it extends for 168 km and is interrupted by several submarine canyons such as the São Francisco, Piranhas, and Japarutuba. Sergipe continental shelf (PCS) is shallow and short, with a slope beginning at a depth of 42 m, and ranges in width between 12 km in front of São Francisco and Japarutuba Canyons, to 34.9 km after the south portion of Piranhas Canyon (Guimarães and Landim 2017).

The material used in the present study was collected from two different environments on the Sergipe coast. The first is the PCS (Fig. 1: PLATFORM) and the second are three estuarine regions of the Japarutuba, Sergipe, and Vaza-Barris rivers (Fig. 1: RIVERS).

### Field and laboratory procedures

The material from the continental shelf was sampled during two different environment monitoring projects under-

taken between 1999 and 2003, realized in a partnership between Petrobrás (Petróleo Brasileiro S.A.), Fapese (Fundação de Apoio à Pesquisa e Extensão de Sergipe), and UFS (Universidade Federal de Sergipe). Double trawls were performed in dry (March 2000, December 1999–2002) and rainy (May and August 1999, June 2001–2003) seasons, using fishing trawls with net sizes and mesh openings equal to those used by the local shrimp fishing activities. The 18 stations sampled were distributed in six transects (A to F) along depths of 10, 20, and 30 m (Fig. 1). After trawling, the organisms were conditioned in ice and fixed in 10% formalin. As Cnidaria polyps were not a group of interest at that time, the material was conserved in 70% ethanol and maintained at the Coleção de Zoologia da Universidade Federal de Sergipe (CZUFS).

The estuarine material was sampled in two campaigns with artificial substrates installed in 2017, in three estuaries of Sergipe: Japarutuba, Sergipe, and Vaza-Barris (Fig. 1). The experimental apparatus was composed of three pairs of PVC plates, attached vertically two by two to a rope as sandwiches, with a weight on the bottom. Each 12 × 12 cm plate was gently sanded on one side to facilitate larval attachment. The experimental plates were submerged in two periods of 2017, between January and April (dry period) and between July and October (rainy period). After three months, the plates were removed and the pairs were placed in plastic bags with local water and menthol (anesthetic) and preserved in 90% ethanol.

It is important to mention that the coast of Sergipe is devoid of rocky shores. However, all the studied species sampled with fishing trawlers were epibionts or grew on hard substrates (e.g. rocks, gravel, shells, tubes) found on soft substrates.

For both environments, hydroids were sorted using a stereomicroscope (Leica M205C) and identified at the family level following largely Millard (1975), Cornelius (1995a, 1995b), and Bouillon et al. (2006).

Final identifications were made after examination of specimens under an optical microscope (Leica DMLB) and consultation to the taxonomic works of Calder (1988, 1991, 1997), Schuchert (1997, 2004, 2005, 2006, 2007, 2008a, 2008b, 2010), Marques (2001), Cunha et al. (2015), Galea et al. (2017), and other specific literature. The taxonomical list follows the most recent data available at WoRMS (2022) for Anthoathecata, and in Moura et al. (2008) and Maronna et al. (2016) for Leptothecata.

Each species was described in terms of its structure (trophosome), basic measurements taken, and informations about fertility, substrate, and cnidocysts if possible. The species were also photographed either with a digital camera (Canon EOS Rebel T5i) or a stereo and optical microscope equipped with a 7 MP camera linked to multifocal capture software (Leica Application Suite). The same software was used to take the measurements from the pictures. The description and measurements refer to the material fixed in formalin (PCS material) or ethanol (estuarine material).

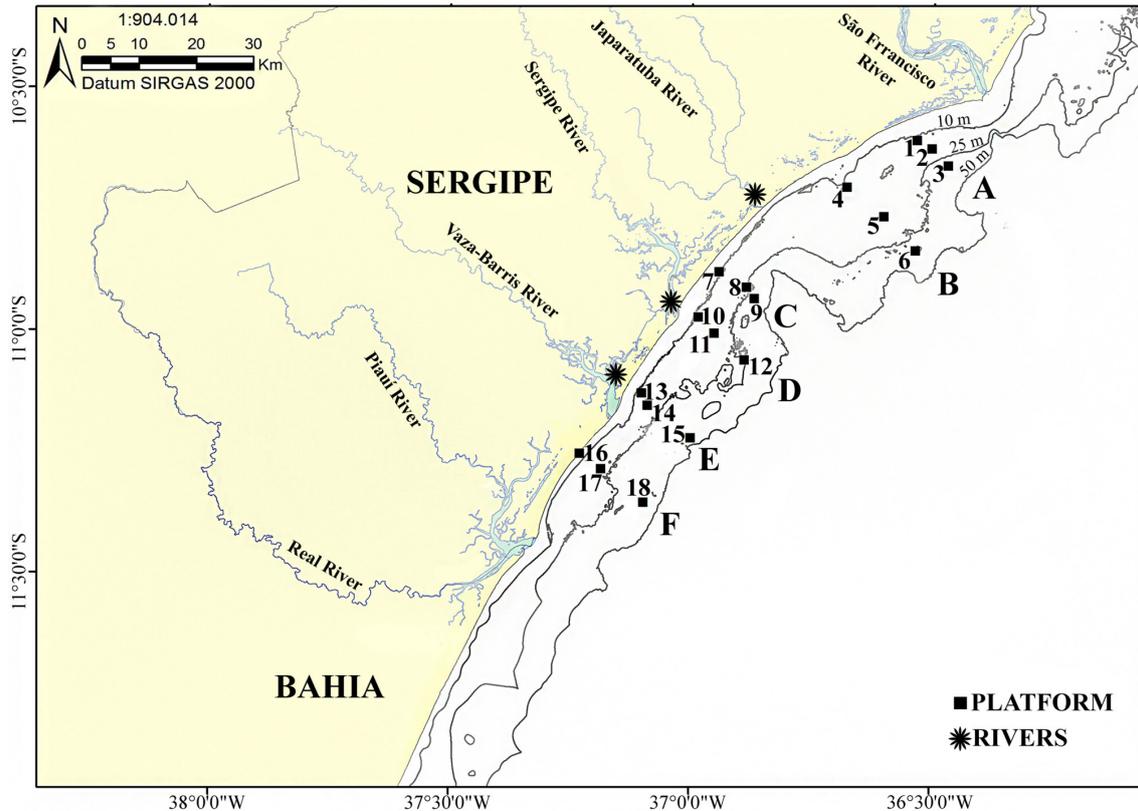


Figure 1. Map of the continental shelf of Sergipe, located between the estuary of the São Francisco River and the Piauí-Real-Fundo estuarine complex, indicating the sampling sites.

To observe the nematocysts and other specimen's details, semi-permanent microscope slides preparations were made from parts of whole colonies using classical methods. We used at least three nematocysts of each type to measure (if fewer were used it was indicated in the species description). The size of the discharged and undischarged nematocysts refers to the length and width of the capsules only (tubule measurements not included).

For each species identified, Brazilian records were summarized, mainly for the polyp phase, including the local of collections. A complete record for Brazilian Cnidaria species is available in Oliveira et al. (2016). The synonyms (original description and records for Brazil) are included and additional references to the complete synonymy are mentioned for each species. All material identified to species level is now part of the CZUFS CNI. Abbreviations: CZUFS CNI – Coleção de Zoologia da Universidade Federal de Sergipe (CZUFS)/Cnidaria collection (CNI); PCS – Continental shelf of Sergipe; SE – Sergipe River; VB – Vaza-Barris River; JB – Japarutuba River; C – Rope (the ropes used to attach the experimental plates); P – Plates (the plates attached to the ropes in the experimental project, in order of depth P12, P34, and P56).

## RESULTS

A total of 79 hydroid species (Cnidaria, Hydrozoa) were identified in the present study (Table 1). Sixteen of these have been assigned to nine Anthoathecata families and the remaining 63 species to 17 Leptothecata families. Within the Anthoathecata, Bougainvilliidae was the most diverse family with four species. As for the Leptothecata, the richest families were Campanulariidae (14 species), Sertulariidae (12 species), and Halopterididae (seven species).

Class Hydrozoa Owen, 1843  
 "Superorder Anthoathecata" Cornelius, 1992  
 Order Aplanulata Collins et al., 2005  
 Tubulariidae Goldfuss, 1818  
*Ectopleura dumortierii* (Van Beneden, 1844)

Fig. 2A–C

Synonyms available from: Schuchert (2010).  
*Tubularia dumortierii* Van Beneden, 1844: 50, pl. 2.  
*Ectopleura dumortierii*: Migotto, 1996: 24.

Description: Hydroids solitary or forming groups of 2 to 11 individuals, up to 18.3 mm high. Stem long, with 3.4 to

Table 1. Hydroid species (Cnidaria: Hydrozoa) sampled between 1999 and 2003 at the continental shelf of Sergipe (PCS) and in 2016 and 2017 at the estuarine regions of the rivers Japarutuba, Sergipe, and Vaza-Barris (Rivers).

Taxa/Stations	PCS	Rivers
Superorder Anthoathecata Cornelius, 1992		
Order Aplanulata Collins et al., 2005		
Tubulariidae Goldfuss, 1818		
<i>Ectopleura dumortierii</i> (Van Beneden, 1844)		x
Order Capitata Kühn, 1913 (sensu stricto)		
Cladocorynidae Allman, 1872		
<i>Cladocoryne floccosa</i> Rotch, 1871		x
Corynidae Johnston, 1836		
<i>Coryne</i> sp. 1		x
<i>Coryne</i> sp. 2	x	
Pennariidae McCrady, 1859		
<i>Pennaria disticha</i> Goldfuss, 1820		x
Zanclidae Russell, 1952		
<i>Zanclaea migottoi</i> Galea, 2008		x
Order Filifera Kühn, 1913		
Bougainvillidae Lütken, 1850		
<i>Bimeria vestita</i> Wright, 1859	x	x
<i>Bougainvillia muscus</i> (Allman, 1863)		x
<i>Calyptospadix cerulea</i> Clarke, 1882		x
<i>Dicoryne</i> sp.		x
Eudendriidae L. Agassiz, 1862		
<i>Eudendrium carneum</i> Clarke, 1882	x	
<i>Eudendrium merulum</i> Watson, 1985		x
Hydractiniidae L. Agassiz, 1862		
Hydractiniidae sp. 1		x
Hydractiniidae sp. 2		x
Oceaniidae Eschscholtz, 1829		
<i>Corydendrium parasiticum</i> (Linnaeus, 1767)		x
<i>Turritopsis nutricula</i> McCrady, 1857	x	x
Superorder Leptothecata Cornelius, 1992		
Campanulariidae Johnston, 1836		
<i>Campanularia</i> sp. 1	x	
<i>Campanularia</i> sp. 2	x	
<i>Orthopyxis crenata</i> (Hartlaub, 1901)		x
<i>Orthopyxis sargassicola</i> (Nutting, 1915)	x	
Clytiidae Cockerell, 1991 sensu novum		
<i>Clytia</i> spp.	x	x
<i>Clytia brevithecata</i> (Thornely, 1900)		x
<i>Clytia elsaeoswaldae</i> Stechow, 1914	x	
<i>Clytia gracilis</i> (Sars, 1850)	x	x
<i>Clytia hemisphaerica</i> (Linnaeus, 1767)	x	
<i>Clytia linearis</i> (Thorneley, 1900)	x	x
<i>Clytia macrotheca</i> (Perkins, 1908)	x	
<i>Clytia noliformis</i> (McCrady, 1859)	x	
<i>Clytia paulensis</i> (Vanhöffen, 1910)	x	x
Obeliidae Haeckel, 1879 sensu novum		
<i>Obelia</i> spp.	x	x
<i>Obelia dichotoma</i> (Linnaeus, 1758)	x	x
<i>Obelia oxydentata</i> Stechow, 1914	x	x
Calycellidae Kramp, 1913		
<i>Calycella</i> sp.		x
Cirrholoveniidae Bouillon, 1984		
<i>Cirrholovenia tetranema</i> Kramp, 1959	x	x
Lovenellidae Russell, 1953		

Continues

Table 1. Continued.

Taxa/Stations	PCS	Rivers
<i>Mitrocomium cirratum</i> Haeckel, 1879	x	x
Hebellidae Fraser, 1912		
<i>Anthohebella communis</i> (Calder, 1991)	x	
<i>Hebella venusta</i> (Allman, 1877)	x	
<i>Hebella scandens</i> (Bale, 1888)	x	
Lafoeidae Hincks, 1868		
<i>Filellum</i> sp.	x	x
Syntheciidae Marktanner-Turneretscher, 1890		
<i>Hincksella formosa</i> (Fewkes, 1881)	x	
<i>Hincksella pusilla</i> (Ritchie, 1910)	x	
<i>Synthecium tubithecum</i> (Allman, 1877)	x	
Haleciidae Hincks, 1869		
Haleciidae sp. 1	x	
Haleciidae sp. 2	x	x
<i>Halecium pusillum</i> Sars, 1856	x	
<i>Nemalcium light</i> (Hargitt, 1924)		x
Aglaopheniidae Marktanner-Turneretscher, 1890		
<i>Aglaophenia latecarinata</i> Allman, 1877	x	
<i>Aglaophenia rhynchocarpa</i> Allman, 1877	x	
<i>Gymnangium allmani</i> (Marktanner-Turneretscher, 1890)	x	
<i>Lytocarpia tridentata</i> (Versluys, 1899)	x	
<i>Macrorhynchia philippina</i> Kirchenpauer, 1872	x	x
Halopterididae Millard, 1962		
<i>Antennella curvitheca</i> Fraser, 1937	x	
<i>Antennella incerta</i> Galea, 2010	x	
<i>Antennella secundaria</i> (Gmelin, 1791)	x	
<i>Halopteris alternata</i> (Nutting, 1900)	x	
<i>Halopteris carinata</i> Allman, 1877	x	
<i>Halopteris tenella</i> (Verrill, 1874)		x
<i>Monostaechas quadridens</i> (McCrady, 1859)	x	
Kirchenpaueriidae Stechow, 1921		
<i>Pycnotheca mirabilis</i> (Allman, 1883)	x	
Plumulariidae McCrady, 1859		
<i>Dentitheca bidentata</i> (Jäderholm, 1905)	x	
<i>Monothecha margareta</i> Nutting, 1900	x	x
<i>Monothecha obliqua</i> (Johnston, 1847)	x	
<i>Plumularia</i> sp.	x	
<i>Plumularia floridana</i> Nutting, 1900	x	x
Sertulariellidae Maronna et al., 2016		
<i>Sertularella diaphana</i> (Allman, 1885)	x	
<i>Sertularella peculiaris</i> (Leloup, 1935)	x	
Sertulariidae Lamouroux, 1812		
<i>Amphisbetia distans</i> (Lamouroux, 1816)	x	x
<i>Diphasia digitalis</i> (Busk, 1852)		x
<i>Diphasia tropica</i> Nutting, 1904	x	
<i>Dynamena crisioides</i> Lamouroux, 1824	x	x
<i>Dynamena disticha</i> (Bosc, 1802)	x	
<i>Idiellana pristis</i> (Lamouroux, 1816)	x	x
<i>Salacia tetracythara</i> Lamouroux, 1816		x
<i>Tridentata loculosa</i> Stimpson, 1854	x	
<i>Tridentata marginata</i> (Kirchenpauer, 1864)	x	
<i>Tridentata rugosissima</i> Thornely, 1904	x	
<i>Tridentata tumida</i> Allman, 1877		x
<i>Tridentata turbinata</i> (Lamouroux, 1816)	x	
Thyroscyphidae Stechow, 1920		
<i>Sertularelloides cylindritheca</i> (Allman, 1888)	x	x
<i>Thyroscyphus marginatus</i> (Allman, 1877)	x	
<i>Thyroscyphus ramosus</i> Allman, 1877	x	
Total	60	37



Figure 2. (A-C) *Ectopleura dumortierii*: (A) general view of a polyp; (B) detail of the neck region (Ne - red arrow) and hydranth with gonophores (Go - red arrows); (C) detail of the distal region of a polyp showing the neck (Ne - red arrow) and the hydranth.

18.3 mm high, arising from a simple and creeping hydrorhiza, without ramifications, isodiametric throughout or slightly widening distally. Stem with perisarc smooth or with annulations, and those, when present in a number of 2 to 7, disposed in irregular intervals. The “neck” (the region between the stem and hydranth) with approximately the same length as the hydranth.

Hydranth balloon or pear-shaped, 0.4–0.63 mm high and 0.2–0.5 mm wide, with one whorl of 9–12 filiform oral tentacles and one whorl of 12 filiform aboral tentacles. One juvenile individual was found with a whorl of 8 capitate tentacles in the oral region and 12 filiform in the aboral one. The majority of the polyps found were without hydranths. Gonophores oval-shaped, 62–93 µm

high, 29–66 µm wide, found in two solitary individuals arising between the aboral tentacles. Two types of nematocysts were observed, both from the coenosarc region of the stem: small stenoteles undischarged (5.3–7.9 × 2.8–7.5 µm) and discharged (5–7.2 × 4.6–4.9 µm); a big one discharged (9.6 × 8 µm); and anisorhiza undischarged (7.3–9.4 × 2.3–3.6 µm).

Material examined: VB – several polyps, two of them with gonophores, from the dry and rainy seasons; SE – infertile polyps from the dry and rainy seasons. CZUFS CNI-00039; CNI-00068; CNI-00069; CNI-0070.

Stations: VB – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56; SE – C1P12, C1P34, C1P56, C2P34, C3P34, C3P56.

Distribution: Brazil – Sergipe (medusa, Araújo 2006), São Paulo (Migotto and Silveira 1987, Migotto 1996, Silveira and Morandini 2011, Oliveira et al. 2016), and Paraná (Bumbeer and Rocha 2012, Nagata et al. 2014, Cabral and Nogueira-Junior 2019). World distribution – Schuchert (2010) stated that the polyp and medusa of *E. dumortierii* has a huge distributional range, including the Atlantic coast of Europe, the Occidental Atlantic (from Cape Cod to South Carolina), and the Mediterranean. Schuchert considers as doubtful the records from the tropical Atlantic, Indian Ocean, and the Pacific Ocean, also stating that these records could be from a different species. Schuchert also cited Galea (2007) who describes *E. dumortierii* from Chile as “indistinguishable from specimens from Europe”, but molecular analysis (16S, not published) showed a distinction between the Chilean and European specimens. However, in recent years, *E. dumortierii* has been recorded in the Pacific Ocean in several works from Galea and coauthors (e.g. Galea et al. 2009, Galea and Schories 2012). The polyp of *E. dumortierii* also has records from the Atlantic coast of Colombia and the medusa from the Pacific (between Colombia and Chile) and Atlantic (Brazil and Uruguay) (see specific records in Oliveira et al. 2016).

Remarks: Polyps found colonizing the plates and also on Ascidiacea, Polychaeta tubes, and the hydroid *Pennaria disticha*. Other hydroids were found colonizing *E. dumortierii*, such as *Clytia gracilis*, *Bimeria vestita*, *Cladocoryne floccosa* (with gonophores), and *Obelia oxydentata* (with gonothecae). *Ectopleura dumortierii* was found with gonophores only in the dry season.

## Order Capitata Kühn, 1913 (sensu stricto)

### Cladocorynidae Allman, 1872

#### *Cladocoryne floccosa* Rotch, 1871

(Fig. 3A)

Synonyms available from: Schuchert (2006).

*Cladocoryne floccosa* Rotch, 1871: 228; –Migotto, 1996: 17, fig. 4a, b.

Description: Colonies erect, polyps up to 3.6 mm high. Stem 0.3–2.7 mm high, 0.06–0.21 mm wide, unbranched or with a small branch, without hydranths, covered by smooth perisarc with a few annulations. Hydranth cylindrical, 0.24–1.1 mm high, 0.14–0.62 mm wide, and with a dome-shaped hypostome. Two whorls of capitate tentacles, the oral one with 6 small ones and

the aboral with 9–14 branched tentacles scattered over the hydranth carrying rows of small pedicellate tentacles. Gonophores spherical, cryptomedusoid, with short pedicels, 0.23–0.37 mm high, 0.18–0.32 mm wide. One gonophore per polyp approximately in the middle of the hydranth body between the aboral tentacles. Nematocysts macrobasic euryteles in the hydranth body, undischarged (32.2–42.7 × 11.3–16.1 µm).

Material examined: VB – abundant colonies with and without gonophores from the dry and rainy seasons; SE – few colonies with and without gonophores from the dry season; CZUFS CNI-00040; CNI-00071; CNI-0072.

Stations: VB – C1P12, C1P56, C2P12, C2P56, C3P34; SE – C1P56, C2P56.

Distribution: Brazil – Pernambuco (Calder and Mañal 1998), Bahia (Grohmann et al. 2003), Espírito Santo (Grohmann et al. 1997), São Paulo (Migotto 1996, Oliveira et al. 2006, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Fernandez et al. 2014, 2015), and Santa Catarina (Miranda et al. 2011). World distribution – considered a circumglobal species with records from tropical and temperate waters of Mediterranean Sea, Indian Ocean and Pacific Ocean (Millard 1975, Schuchert 2006).

Remarks: Polyps found on plates, Bryozoa, Polychaeta tubes, Ostreidae, Ascidiacea, barnacles (Cirripedia), and on the hydroids *Corydendrium parasiticum*, *Diphasia digitalis*, *Eudendrium merulum*, *Obelia oxydentata*, *Pennaria disticha*, and *Plumularia floridana*. *Cladocoryne floccosa* was found fertile in the rainy and dry seasons.

## Corynidae Johnston, 1836

### *Coryne* sp. 1

Fig. 3B

Description: Colony stolonial, polyps up to 1.14 mm high, arising from a simple and creeping hydrorhiza. Perisarc smooth with some annulations in the basal portion, close to the hydrorhiza. Peduncle 0.32–0.76 mm high, width increasing from the basal to the distal portion (between 49–68 µm in basal portion and 83–143 µm in the distal one). Hydranth cylindrical, 0.3–0.41 mm high and 0.1–0.15 mm wide, with scattered capitate tentacles.

Material examined: VB – one infertile colony with three polyps from the dry season.

Station: VB – C1P56.

Taxonomic remarks: Two species of *Coryne* are recorded from the Brazilian coast, *Coryne eximia* Allman, 1859, and *C. pusilla* Gaertner, 1774. Colonies of *C. pusilla* are erect and branched, stem completely annulated or interrupted by smooth portions. Hydranth long, 1.5–2.5 mm high. The characteristics of *C. pusilla* differ from the specimens found in the Vaza-Barris River, which are similar to *C. eximia* as described in the review of the Corynidae family by Schuchert (2001). However, as only a few individuals without gonophores were found in Sergipe and they are not in a good condition for identification; we decided to keep the identification as *Coryne* sp. 1.

Remarks: The colony was found on Ostreidae.

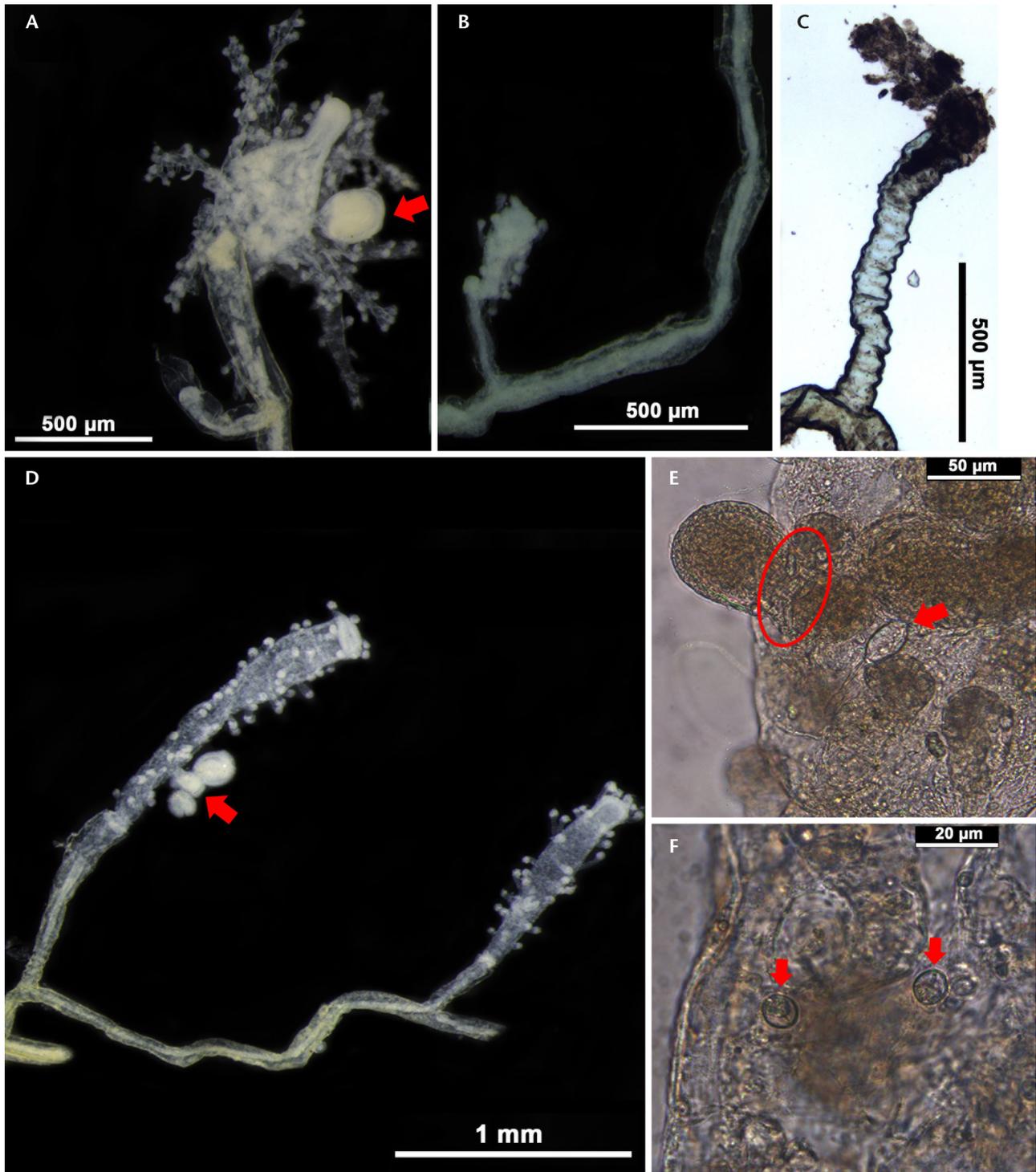


Figure 3. (A) *Cladocoryne floccosa*, detail of a polyp showing a hydranth with gonophore (red arrow); (B) *Coryne* sp. 1 general view of a polyp; (C) *Coryne* sp. 2 general view of a polyp; (D-F) *Zanclea migottoi*: (D) general view of two polyps, one of them with gonophores (red arrow); (E) detail of the medial portion of the hydranth showing a group of nematocysts at the tentacle base (circle) and a discharged nematocyst (red arrow); (F) detail of the hydranth with two undischarged nematocysts (red arrows).

## *Coryne* sp. 2

Fig. 3C

Description: Colony stolonal. Polyps arising from a tubular and creeping hydrorhiza. Two polyps were found, one with hydranth, 1.3 mm high, the other one 2.2 mm high (only the pedicel). Pedicel 112–117  $\mu$ m wide in the basal portion and 127–132  $\mu$ m in the distal portion. Perisarc completely wrinkled along the entire pedicel length, projecting partially over the hydranth base. Hydranth elongated, 405  $\mu$ m high, 154  $\mu$ m wide. Around 10 capitate tentacles, four on the oral region, the others scattered on the hydranth body. Some completely distended tentacles look like filiform ones. Nematocysts stenotele? undischarged in the coenosarc (14.2–15  $\times$  6.8–7.7  $\mu$ m).

Material examined: PCS – two polyps from the rainy season, without gonophores.

Station: PCS – 12.

Bottom: sand.

Taxonomic remarks: *Coryne* sp. 2 resembles *Coryne pusilla* (Schuchert 2001, p. 766, fig. 14A-B), however, due to the small amount of material and its bad condition we decided to keep the identification as *Coryne* sp. 2.

Remarks: unknown substrate.

## Pennariidae McCrady, 1859

### *Pennaria disticha* Goldfuss, 1820

Synonyms available from: Calder (1988) and Schuchert (2006).

*Pennaria disticha* Goldfuss, 1820: 89.

*Halocordyle* sp. –Vannucci, 1950;

*Halocordyle fragilis* –Vannucci, 1951a, 1951b.

*Halocordyle disticha* –Migotto and Silveira, 1987, –Pires et al., 1992, –Grohmann, 1997, –Grohmann et al., 1997, –Kelmo and Santa Isabel, 1998, –Amaral et al., 2009.

Description: Colonies erect up to 9.9 cm high. Stem monopodial with alternating branches forming a feather-like structure, arising from a branched and creeping hydrorhiza. Main axis monosiphonic formed by a thick stem, 0.26–0.53 mm wide. Perisarc thick, smooth, with an annulated portion at somewhat regular intervals, usually above the insertion of the hydrocladium and also on the hydranth pedicels. Hydrocladia 15–20 mm high, 0.14–2.18 mm wide, arising from the stem at angles of 105.2 and 144.8°, carrying hydranths on pedicels. Hydranth pedicels evenly spaced, completely annulated, or only at the base. All hydranth pedicels of the same hydrocladium with approximately the same height and diameter. In some colonies, two pedicels were emerging from the same point on the hydrocladium. Hydranths pear-shaped, 0.33–0.87 mm high, 0.1–0.41 mm wide, with a dome-shaped hypostome. A whorl of 8 to 11 filiform tentacles around the aboral region and 8 to 12 short capitate tentacles distributed in the distal region of the hydranth in two whorls, one oral and the other approximately in the middle of the hydranth. Two to four medusoid-type gonophores per hydranth, 0.23–1.1 mm high, 0.13–0.53 mm

wide, arising from a short pedicel just above the aboral tentacles. Nematocysts stenoteles of various sizes: undischarged (11.1–26.7  $\times$  9.4–17.6  $\mu$ m).

Material examined: VB – abundant colonies with and without gonophores from the dry and rainy seasons; SE – abundant colonies with and without gonophores from the dry and rainy seasons; CZUFS CNI-00041; CNI-00073; CNI-00074; CNI-00075.

Stations: VB - C1P12, C1P34, C1P56, C2P12, C2P56, C3P34, C3P56; SE - C1P12, C1P34, C1P56, C2P34, C2P56, C3P34, C3P56.

Distribution: Brazil – Ceará (Marques et al. 2006, Shimabukuro et al. 2006), Fernando de Noronha (Pires et al. 1992, Amaral et al. 2009), Pernambuco (Calder and Mañal 1998, Oliveira et al. 2009, abstract), Bahia (Kelmo and Santa-Isabel 1998, Grohmann et al. 2003), Espírito Santo (Vannucci 1950, 1951a, 1951b, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci 1950, 1951a, 1951b, Grohmann et al. 2003; 2011), São Paulo (Silveira and Morandini 2011; Fernandez et al. 2014), and Paraná (Bumber and Rocha 2012). World distribution – circumglobal from warm temperate to tropical waters (Gravili et al. 2015).

Taxonomic remarks: *Pennaria disticha* is considered a complex of cryptic species based on the result of mitochondrial 16S analysis (Miglietta et al. 2015, 2018).

Remarks: Colonies with gonophores were found only during the dry period. Found colonizing the plates, Bryozoa, barnacles (Cirripedia), Ostreidae, Polychaeta tubes, Ascidiacea, and the hydroid *Corydendrium parasiticum*.

## Zancleidae Russell, 1953

### *Zanclaea migottoi* Galea, 2008

Fig. 3D–F

*Zanclaea costata* –Migotto, 1996: 20, figs 5A–C (not *Zanclaea costata* Gegenbaur, 1857: 229, pl. 8, figs 4–6).

*Zanclaea* cf. *alba* –Vervoort, 2006: 200, fig. 1A, B, 2.1–2.3 [not *Zanclaea alba* sensu Calder (1988b) = *Acrochordium album* Meyen, 1834: 165, pl. 28, fig. 8].

*Zanclaea migottoi* Galea, 2008: 14–16, figs 3J–L, tab. 1–2.

Description: Colony stolonal, polyps up to 2 mm high, arising from a simple creeping hydrorhiza. Stem 312–803  $\mu$ m high, and width increasing from 74–78  $\mu$ m in the basal portion to 79–138  $\mu$ m at the distal portion. Perisarc wrinkled only at the basal portion of the stem. Hydranth cylindrical, 0.83–1.22 mm high, 0.15–0.19 mm wide, with a short rounded hypostome. Tentacles capitate arranged in a whorl of six in the oral region and 25–42 spread over the body of hydranth. Medusa buds (eumedusoids) well developed in three polyps, 66–172  $\mu$ m high and 62–166  $\mu$ m wide, in small groups of 2 to 4, inserted close to the base of the hydranth, between tentacles. Nematocysts: stenoteles of two size classes, the larger ones undischarged (7.3–10.9  $\times$  7.1–9.6  $\mu$ m), and discharged (8.1–9.3  $\times$  7.3–8.5  $\mu$ m); the smaller ones undischarged (4.2–6.9  $\times$  3.9–6.3  $\mu$ m), found in the tentacles, hydranth body, stem, and hydrorhiza; macrobasic euryteles undischarged (15.5–16.9  $\times$  4.8–5.7  $\mu$ m), abundant in

the stem and hydrorhiza, few found in the hydranth body, forming groups of 2–3 at the base of the tentacles and in the medusa buds.

Material examined: VB – one colony with three polyps from the dry season, two of them with medusa buds; CZUFS CNI-00076.

Station: VB – C2P12.

Distribution: Brazil – Oliveira et al. (2016) considered *Z. migottoi* as a synonym of *Z. costata*, but only for the Southeast and South records (Espírito Santo to São Paulo and the Rio Grande do Sul) (Vanucci 1957, Navas-Pereira 1984, Migotto 1996, Migotto et al. 2002, Oliveira et al. 2006, Oliveira and Marques 2007, Shimabukuro 2007), making necessary a review of the other records for *Z. costata* to Brazil. World distribution – Azores (Vervoort 2006) and Caribbean (Galea 2008).

Remarks: Before the description of *Z. migottoi* by Galea (2008), two species of *Zanclaea* were reported for the Brazilian coast, *Z. costata* Gegenbaur, 1857, for several locations from the northeastern to the southern regions (Navas-Pereira 1984, Migotto 1996, Neuman-Leitão et al. 2008, Oliveira et al. 2006, Silveira and Morandini 2011), and *Z. protecta* Hastings, 1932, recorded only to Espírito Santo (Grohmann 2006). However, Galea (2008) on describing *Z. migottoi* specimens from Guadeloupe compared them with those of *Z. costata* found by Migotto (1996) and concluded that both were the same species. He also added that the records of *Z. costata* for the Atlantic should be revised since this species could be restricted to the Mediterranean. Galea (2008) describes two essential characteristics for the designation of the new species, also present in the Migotto (1996) specimens: the groups of 2–5 macrobasic euryteles at the base of the tentacles and the absence of microbasic mastigophores, which are present in the Mediterranean *Zanclaea costata*. These two characters were identified in the specimens from the Vaza-Barris River, which resembles *Z. migottoi* also by two size classes of stenoteles at the top of the tentacles. The VB specimens are more similar to those described and illustrated by Migotto (1996) than to those presented by Galea (2008); however, the complementation of his description, including new information about the cnidome, confirmed the identification of *Z. migottoi* in the present study.

Remarks: The only colony sampled was colonizing a plate.

Order Filifera Kühn, 1913  
Bougainvilliidae Lütken, 1850  
*Bimeria vestita* Wright, 1859

Fig. 4A–B

Synonyms available from: Schuchert (2007).

*Bimeria vestita* Wright, 1859: 109, pl. 8 fig. 4, Migotto, 1996: 9, fig. 2a, b, Marques et al., 2000: 322, figs 1–3.

*Eudendrium vestitum* Allman, 1888: 3, pl. 1 fig. 1 and 1a, Marques et al., 2000: 322, synonym.

*Bimeria humilis* Allman, 1877: 8, pl. 5 figs 3, 4, Marques et al., 2000: 322, synonym, Fraser, 1944: 49, fig. 17.

Description: Colonies erect, branched or not, up to 2 cm high. Stem monosiphonic, 43–97 µm in diameter, thinner in the basal portion, expanding towards the distal portion, not branched or irregularly branched alternately. Perisarc is moderately thick, wrinkled, and annulated at the base of the pedicels, extending over the hydranth as a thin layer covering the base of the tentacles and hypostome, forming a pseudohydrotheca. Hydranth vase-shaped, 0.25–0.58 mm high, 0.16–0.42 mm wide, arising from a long pedicel, with a conical hypostome. One whorl of 6 to 9 filiform tentacles. Female gonophores as fixed sporosacs with a single egg, 0.12–0.39 mm high, 0.08–0.21 mm wide, arising alternately below the hydranth in short and annulated pedicels, in number from 1 to 6 at each hydranth pedicel.

Material examined: PCS – abundant colonies with and without gonophores from the dry and rainy seasons; VB – abundant colonies with and without gonophores from the dry season; SE – few infertile colonies from the dry season. CZUFS CNI-00001; CNI-00042; CNI-00059; CNI-00077; CNI-00234; CNI-00235; CNI-00271.

Stations: PCS – 1, 4, 5, 8, 10, 11, 12, 14, 15, 16, 17; VB – C1P12, C1P34, C2P34, C3P34; SE – C1P12, C1P56.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Shimabukuro et al. 2006, Marques et al. 2006), Fernando de Noronha (Amaral et al. 2009), Bahia (Kelmo and Santa-Isabel 1998), Espírito Santo (Grohmann et al. 1997), Rio de Janeiro (Grohmann et al. 2011), São Paulo (Migotto 1996, Oliveira et al. 2006, Oliveira and Marques 2011, Silveira and Morandini 2011, Fernandez et al. 2014, 2015), Paraná (Bumbeer and Rocha 2012), and Santa Catarina (Miranda et al. 2011, Bouzon et al. 2012, Alaja-Batista et al. 2020). World distribution – reported as a cosmopolitan species (Millard 1975), but it is unlikely to occur in cold and Arctic waters (Schuchert 2007). The species can be considered as circumglobal in shallow, warm to temperate waters (Calder 2010) with records from the Pacific Ocean, several regions of the Western Atlantic (e.g. Colombia, Venezuela, and Argentina), Europe, South Africa, and the Indian Ocean (Schuchert 2007, Oliveira et al. 2016).

Remarks: The PCS material was formed, mainly, by stems without hydranths, even those with gonophores. The PCS colonies were found on Bryozoa, Anthozoa (*Carijoia* sp.), and the hydroid *Sertularelloides cylindritheca*. Estuarine colonies were found on the plates, Ostreidae, Ascidiacea, and the hydroids *Corydendrium parasiticum* and *Pennaria disticha*.

*Bougainvillia muscus* (Allman, 1863)

Fig. 4E

Synonyms available from: Schuchert (2007).

*Perigonymus muscus* Allman, 1863: 12.

*Bougainvillia maniculata* Haeckel, 1864: 327; –Vannucci and Rees, 1961: 71.

*Bougainvillia ramosa* –Vannucci, 1957; –Vannucci and Rees, 1961: 82.

Description: Colonies stolonial or erect, unbranched, slightly branched or well-branched tree-shaped, up to 19 mm

high. Stem thin, 76–92  $\mu\text{m}$  wide, monosiphonic, branched (in upright colonies) somewhat alternately. Perisarc moderately thick, encrusted with silt, wrinkled mainly at the base of branches, extending to the base of the hydranth, forming a pseudohydrotheca. Hydranth cylindrical (when distended) or spindle-shaped (when contracted), 0.19–0.17 mm high, 0.11–0.16 mm wide. Hypostome rounded to conical. One whorl of 8–12 long filiform tentacles. Female sporosacs oval or rounded in shape, each with a single egg, 0.18–0.23 mm high, 0.09–0.17 mm wide, arising from short pedicels on the main stem or branches just below the hydranths, individually or in groups of up to eight gonophores.

Material examined: VB – few infertile colonies from the dry and rainy seasons; SE – few colonies, one of them with gonophores, from the dry season. CZUFS CNI-00043; CNI-00078; CNI-00079.

Stations: VB – C1P12, C1P34, C1P56, C2P12; SE – C1P12, C1P56, C2P34, C2P56, C3P12, C3P34.

Distribution: Brazil – Sergipe (medusa, as *Bougainvillia ramosa*, Araújo 2006, Araújo et al. 2008), São Paulo (Silveira and Morandini 2011, Fernandez et al. 2014, 2015), Paraná (Bumbeer and Rocha 2012), and Santa Catarina (Bouzon et al. 2012). World distribution – a widely distributed species, perhaps due to human activity (Schuchert 2007), with records from shallow waters of Eastern and Western Atlantic, Mediterranean, Indian Ocean and Pacific Ocean (Schuchert 2007, Calder 2010, Oliveira et al. 2016).

Remarks: Colonies found on the plate, Bryozoa, Ostreidae, Polychaeta tubes, barnacles (Cirripedia), Ascidiacea, and the hydroid *Pennaria disticha*.

### *Calyptospadix cerulea* Clarke, 1882

Fig. 4C–D

*Calyptospadix cerulea* Clarke, 1882: 136, pl. 7, figs 1–9.

*Bimeria franciscana* Torrey, 1902: 28, pl. 1, fig. 4.

not *Bimeria franciscana* –Joyce, 1961: 36, pl. 5, fig. 3, 4 [= *Bimeria humilis* Allman, 1877].

*Garveia franciscana* –Garman et al. 2011: 71.

*Calyptospadix cerulea* –Calder, 2019: 22–23, fig. 2e.

Description: Colonies erect, up to 12 mm high, irregularly divided into several orders, arising from a creeping and branched hydrorhiza. Stem monosiphonic, 73–98  $\mu\text{m}$  wide, usually bearing hydranths at the apex. Many groups of colonies were so intertwined that it was not possible to individualize them. Reproductive stolonial polyps were also found. Perisarc smooth, covered with silt, and annulated at the base of the main stem and/or at the base of the branches, extending over the hydranth, forming a pseudohydrotheca. Hydranths fusiform, 0.22–0.35 mm high, 0.08–0.26 mm wide. Hypostome conical. One whorl of 6 to 8 filiform tentacles. Female sporosacs ovoid, each with a single egg, 0.17–0.28 mm high, 0.08–0.2 mm wide, appearing on pedicels with or without hydranths. One to eight gonophores per branch.

Material examined: VB – abundant colonies with and without gonophores from the dry and rainy seasons; SE – abun-

dant infertile colonies from the dry and rainy seasons; JB – one infertile colony from the dry season. CZUFS CNI-00044; CNI-00080; CNI-00081; CNI-00082; CNI-00083.

Station: VB – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P12, C3P34; SE – C1P12, C1P34, C2P12, C2P56, C3P12, C3P34, C3P56; JB – C3P56.

Distribution: The species is an estuarine endemic. Brazil – Pernambuco (Calder and Mañal 1998), São Paulo (Alaja-Batista et al. 2020), and Paraná (Cangussu et al. 2010, Bumbeer and Rocha 2012). World distribution – widely distributed with records from Eastern and Western Atlantic, Mediterranean, Indian Ocean, and Pacific coasts (Schuchert 2007).

Taxonomic remarks: Recently, Calder (2019) made a comparative evaluation between *Garveia franciscana* (Torrey, 1902) and *Calyptospadix cerulea* Clarke, 1882 and concluded that they are not morphologically different, suggesting the use of the name *C. cerulea* according to the Principle of Priority.

Remarks: Abundant colonies were found in both sampled periods. Found colonizing the plates, Bryozoa, Ostreidae, Polychaeta tubes, barnacles (Cirripedia), Ascidiacea, and the hydroids *Corydendrium parasiticum*, *Eudendrium merulum*, *Pennaria disticha*, and *Plumularia floridana*.

### *Dicoryne* sp.

Fig. 4F–G

Description: Colonies erect, up to 1.24 mm high. Stem monosiphonic, 44–95  $\mu\text{m}$  in diameter, increasing from the base to the distal portion, branched somewhat alternately. Perisarc moderately thick, encrusted with silt, wrinkled in some parts, and annulated at the base of the stem and branches. The perisarc end at the base of the hydranth covers only its basal part not forming a pseudohydrotheca. Hydranths fusiform, 0.16–0.24 mm high, 0.07–0.09 mm wide, with a conical hypostome. A whorl of 10–12 filiform tentacles just at the base of the hypostome. Only one reproductive colony with oval sporosacs 205–284  $\mu\text{m}$  high and 108–220  $\mu\text{m}$  wide, on short pedicels in a branch just below the insertion of the hydranth. A single egg per gonophore.

Taxonomic comments: There are only two valid *Dicoryne* species (Schuchert 2007), *D. conferta* (Alder, 1856) and *D. conybeari* (Allman, 1864). According to Schuchert (2007), the two species are not easily distinguishable. As distinctive features, the author mentioned the presence of two tentaculozooids on the sporosacs, and female sporosac with two eggs in *D. conferta*, and one or two tentaculozooids and one egg for *D. conybeari*. These distinctive characteristics are variable, according to the author, making it even more difficult to distinguish between the two species.

Material examined: VB – few infertile colonies from the dry and rainy seasons; SE – few colonies, one of them with gonophores, from the dry season.

Stations: VB – C1P12, C1P34, C1P56, C3P34; SE – C1P12, C1P34, C2P34, C2P56.

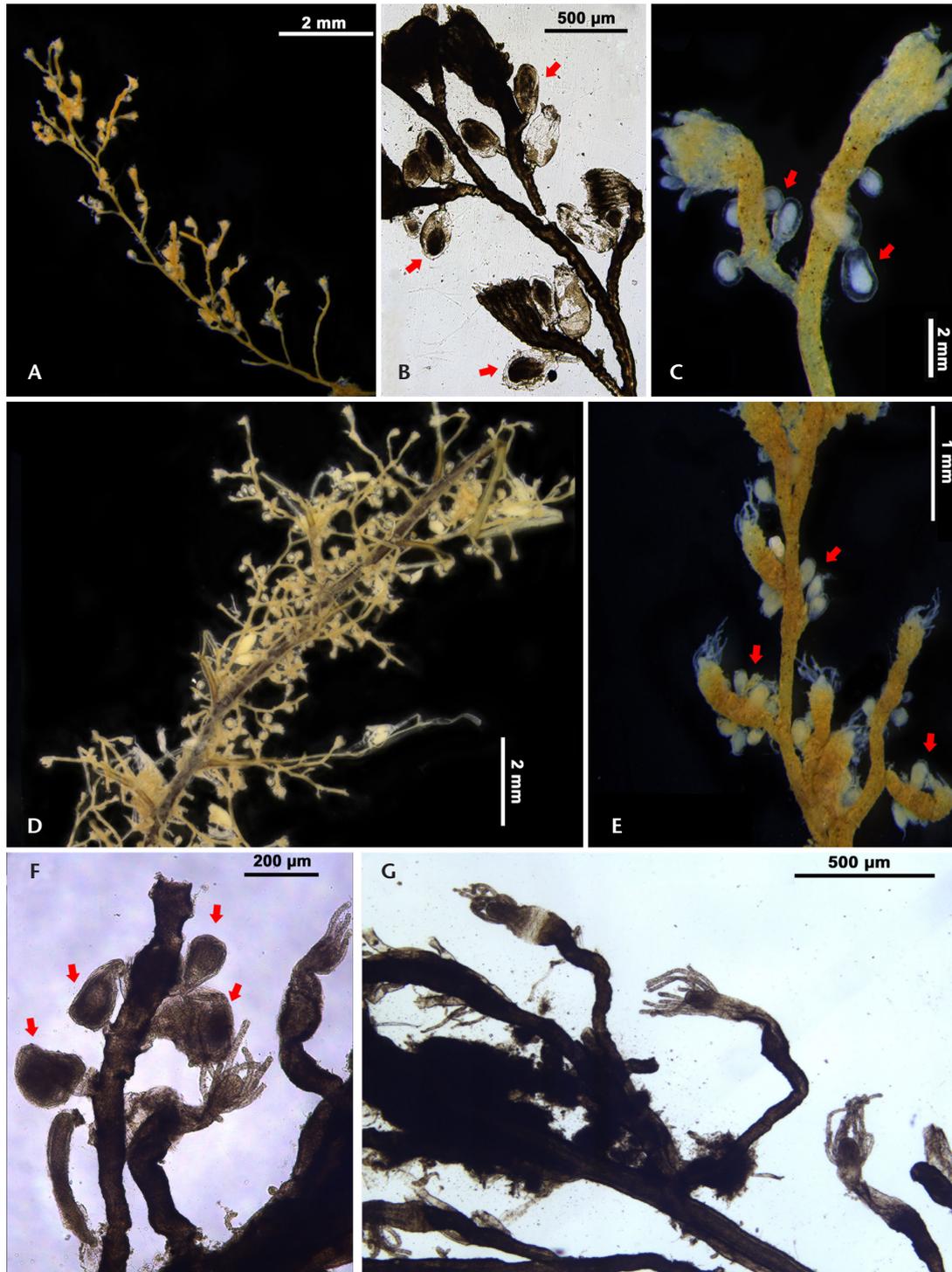


Figure 4. (A-B) *Bimeria vestita*: (A) general view of a stem with hydranths and gonophores; (B) detail of the distal region of the stem showing the hydranths and gonophores (red arrows); (C-D) *Calyptospadix cerulea*: (C) detail of the stem showing hydranths and gonophores (red arrows); (D) general view of a colony; (E) *Bougainvillia muscus*: detail of a stem showing hydranths and gonophores (red arrows); (F-G) *Dicoryne* sp.: (F) detail of a polyp with hydranths and gonophores (red arrows); (G) general view of a colony.

Remarks: Colonizing the plate, Ostreidae, and the hydroids *Pennaria disticha* and *Nemaecium lighti*.

**Eudendriidae L. Agassiz, 1862**  
***Eudendrium carneum* Clarke, 1882**

Fig. 5D–G

Synonyms available from: Schuchert (2008b).

*Eudendrium carneum* Clarke, 1882: 137, pl. 7 figs 10–17, Fraser, 1944: 64, pl. 8 fig. 36, Vervoort, 1968: 8, Millard, 1975: 82, fig. 28, Watson, 1985: 202, figs 59–62, Wedler and Larson, 1986: 84, fig. 6Ba, b, Calder, 1988: 43, figs 33–35, Bavestrello and Piraino, 1991: 197, fig. 1a–c, Marinopoulos, 1992: 57, fig. 2.3, Marques et al., 2000a: 90, figs 35–41, Marques et al., 2000b: 206.

*Eudendrium cunninghami* Kirkpatrick, 1910: 127, pl. 7 figs 1–3, Vannucci, 1954: 101, synonym, Marques et al., 2000b: 207, synonym.

Description: The material was in poor condition, mostly fragmented, without hydranths or with much-degenerated hydranths. Colonies erect and bushy. Stem long, monosiphonic, up to 9 cm high, 0.16–0.2 mm wide, forming intercrossed aggregates. Hydrocladium divided into varying degrees, with terminal hydranths on pedicels of variable length. Perisarc thick, annulated at the base of branches and pedicels, less frequently annulated between pedicels and in their distal parts. Hydranths partially degenerated 0.2–0.34 mm high, 0.13–0.2 mm wide. One whorl of 10–16 filiform tentacles inserted just above the medial region of the hydranth. The form of the hypostome was not noticeable. Mature and spent gonophores surrounded by perisarc without traces of the hydranth, up to 1.3 mm high, 0.96 mm wide. Only female gonophores present, arising as sporosacs on short pedicels with some perisarc annulations. One to six sporosacs per blastostyle, each with one egg. Spadices bifurcated and curved over the sporosac. Eggs are encased in a perisarc cover, typically with two fenestrations per egg. Nematocysts of two types: anisorhiza undischarged (7.4–7.9 × 3.4–3.9 μm); small eurytele undischarged (15.4–18.5 × 9.8–12.5 μm) and discharged (15.3–16.3 × 8.2–11.2 μm) and large undischarged (27.9–34.5 × 14.6–18.4 μm) and discharged (23.3–29.9 × 16.2–17.2 μm).

Material examined: PCS – abundant colonies, few with female gonophores, from dry and rainy seasons. CZUFS CNI-00086.

Stations: PCS – 1, 2, 5, 7, 9, 10, 12, 14, 15, 16.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Marques et al. 2006, Shimabukuro et al. 2006), Fernando de Noronha (Pires et al. 1992, Amaral et al. 2009), Bahia (Kelmo and Santa-Isabel 1998), Pernambuco (Calder and Mañal 1998), Espírito Santo (Grohmann et al. 1997, 2003), Rio de Janeiro (Nogueira et al. 1997), São Paulo (Marques et al. 2001, Silveira and Morandini 2011, Marques et al. 2013, Fernandez et al. 2014, 2015, Alaja-Batista 2020), Paraná (Cangussu et al. 2010), and Santa Catarina (Miranda et al. 2011, Bouzon et al. 2012) (see other records in Oliveira et al. 2016). World distribution – Mediterranean (Bavestrello

and Piraino 1991, Marques et al. 2000b), from New England to Florida (Marques et al. 2000a), South Africa (Millard 1975), and Australia (Watson 1985) (see specific records in Marques 2001 and Schuchert 2008b).

Taxonomic remarks: Despite the poor conditions of the colonies, the morphology of the female blastostyles and gonophores, and the cnidome agree with the diagnostic characteristics of *E. carneum*, namely: “*Eudendrium* with large hererotrichous anisorhizal nematocysts... Spadix of the female gonophore bifurcated... The oocytes, together with the blastostyle, are encased in a perisarc forming a capsule, in which there are typically two fenestrations per oocyte.” (Marques 2001, 355–356). Although Marques (2001) mentions the large hererotrichous anisorhizal type as a character of *E. carneum*, Schuchert (2008b) mentions that these are also reported as isorhiza, and differentiating isorhiza from anisorhiza is not simple.

Remarks: Few colonies found associated with a substratum; those are on Bryozoa, algae, and a thyriscyphid hydroid.

***Eudendrium merulum* Watson, 1985**

Fig. 5A–C

*Eudendrium merulum* Watson, 1985: 200, figs 53–58, –Bavestrello and Piraino, 1991: 200, figs 2–4, –Marques et al., 2000a: 100, figs 64–66, –Marques et al., 2000b: 203, –Peña Cantero and García Carrascosa, 2002: 30, fig. 5a, b, –Bouillon et al., 2004: 59, fig. 35A–G, –Schuchert, 2008b: 717–719, fig. 19, 20.

Description: Male and female colonies, up to 8.3 cm high. Some colonies form aggregates with stems intertwined. Stem monosiphonic, 0.12–0.17 mm in diameter, divided into more than one order, arising from a creeping hydrorhiza. Perisarc thick, smooth, with annulations at the base of pedicels and at the main stem above the insertion of the hydrocladia. Hydranths thin, 0.31–0.92 mm high, 0.29–0.54 mm wide, with a trumpet-shaped hypostome. Hydranths with one whorl of 16–22 filiform tentacles, inserted just below the hypostome. Fixed gonophores with wrinkled perisarc emerging from long pedicels in the male colonies and short ones in the female colonies. Hypostomes and tentacles in male blastostyles were completely reduced. One to three sporosacs per blastostyles, with 3–4 chambers each, connected by sporosac constraints. First chamber 90–114 × 74–76 μm and the last 122–174 × 115–159 μm. Hydranth partially or completely reduced in the female blastostyle, without hypostome. Female blastostyle up to 4.44 mm high and up to 3.01 mm wide. Female sporosac with a simple curved spadix over it. A single egg per sporosac and 4 to 7 sporosacs per blastostyle. Macrobasic euryteles undischarged (23.4–26.8 × 9.6–10.8 μm). Two groups of large microbasic euryteles aligned one at the base of the hydranth and the other at the base of the hypostome (Fig. 5C).

Material examined: VB – abundant colonies, two with female and two with male gonophores, from the dry and rainy season; SE – few infertile colonies from the dry season. CZUFS CNI-00045; CNI-00090; CNI-00091; CNI-00238; CNI-00239.

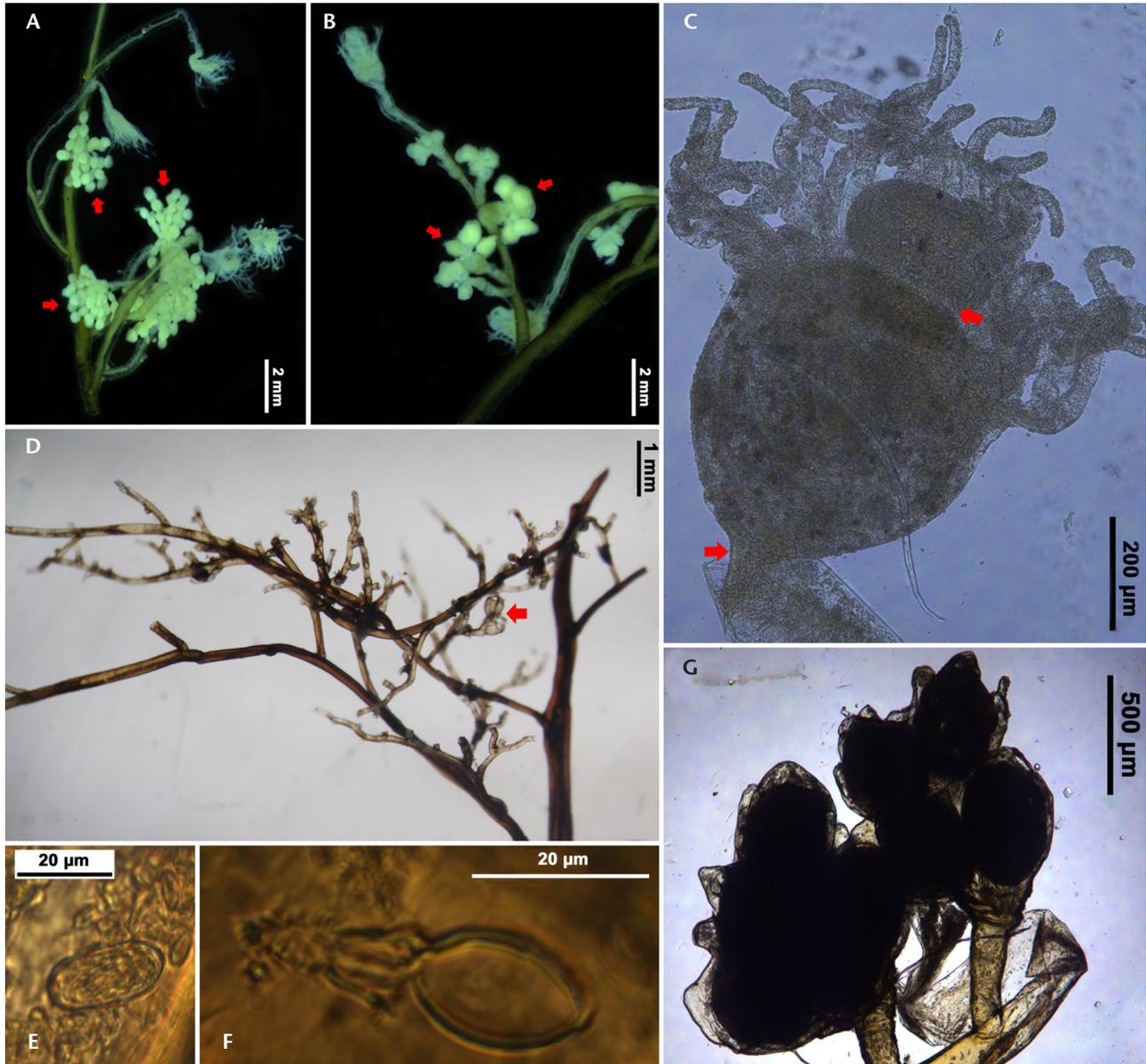


Figure 5. (A-C) *Eudendrium merulum*: (A) detail of one male colony showing hydranths and gonophores (red arrows); (B) detail of female colony showing hydranths and gonophores (red arrows); (C) detail of a hydranth showing the two groups of nematocysts characteristic of the species (red arrows); (D-G) *Eudendrium carneum*: (D) part of a female colony without hydranths highlighting the gonophores (red arrows); (E) an undischarged nematocyst; (F) a discharged nematocyst; (G) detail of two female gonophores.

Stations: VB – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P34, C3P56; SE – C3P12, C3P34, C3P56.

Distribution: Brazil – the only record of this species from Brazil is to Santa Catarina (Marques 2001), however, this record is considered doubtful (Marques 2001, Oliveira et al. 2006) because the specimens examined by Marques (2001) were in poor condition. The author also stated an important difference between the

specimens that he observed and the type material of *E. merulum* that had nematocysts arranged in a “gland ring” (Watson 1985, Schuchert 2008b). This gland-ring was observed in material from Sergipe as a group of nematocysts aligned in the inferior region of hypostome and another group at hydranth base (Fig. 5C, red arrows). World distribution – Australia (Watson 1985), western and eastern Mediterranean (Bavestrello and Piraino

1991, Marques et al. 2000a, Peña Cantero and García Carracosa 2002), Black Sea, Canary islands, Gulf of Biscaya and English Channel (Schuchert, 2008b), and Atlantic region of Morocco (Iazza et al. 2013). Schuchert (2008b) highlights that molecular analysis of 16S DNA suggests that the Atlantic, Mediterranean, and the Black Sea populations were three distinct species and this could indicate that *E. merulum* is a species complex.

Remarks: Colonizing the plates, Bryozoa, Ostreidae, Polychaeta tubes, Ascidiacea, and the hydroids *Corydendrium parasiticum* and *Pennaria disticha*. Material from the rainy season was mainly without hydranths.

### Hydractiniidae L. Agassiz, 1862 Hydractiniidae sp. 1

Fig. 6A

Description: Colonies stolonial with few elongated gastrozooids 0.62–1.1 mm high, 0.12–0.2 mm wide. The basal portion of the polyp looks like a pedicel, annulated at the base becoming cylindrical to fusiform in the distal portion. One whorl of 8–12 filiform tentacles. Hypostome dome-shaped.

Material examined: SE – few infertile colonies from the dry season.

Stations: SE – C1P12, C1P34, C1P56, C2P34, C2P56.

Remarks: Found mainly on the plates but also on Ascidiacea, and *Pennaria disticha* (hydrorhiza).

### Hydractiniidae sp. 2 Fig. 6B–D

Description: Colony stolonial. Gastrozooids cylindrical, 0.47–0.85 mm high, 0.12–0.37 mm wide, with a whorl of 8–10 filiform tentacles. Hypostome dome-shaped. Tentaculozooids 0.66–1.36 mm high and 20–23 µm wide, with numerous nematocysts (unidentified) (23.6–26.4 × 8.5–10.5 µm). Nematocysts microbasic euryteles undischarged (7.7–8.4 × 3.7–4 µm) in the hydranth.

Material examined: VB – few infertile colonies from the dry and rainy seasons.

Stations: VB – C1P12, C1P56, C2P12, C2P34, C2P56.

Remarks: Colonizing the plates, Ascidiacea, Bryozoa, Ostreidae, and *Pennaria disticha* (hydrorhiza).

### Oceaniidae Eschscholtz, 1829 *Corydendrium parasiticum* (Linnaeus, 1767)

Fig. 7A–B

Synonyms available from: Schuchert (2004).

*Sertularia parasitica* Linnaeus, 1767: 1315.

*Corydendrium parasiticum* – Migotto, 1996: 11, fig. 2e.

Description: Colonies erect, up to 6 cm high, arising from a creeping hydrorhiza. Stem polysiphonic, branched, 0.31–0.54 mm wide. Secondary branches connected to the main stem for almost its entire length, gradually curving outward and becoming free in the distal portion. Perisarc smooth, partially covered

by silt, moderately thick in almost all the length of the stem, becoming thinner in the distal portion. Hydranths fusiform and elongated, 0.73–1.39 mm high, 0.23–0.33 mm wide. Hypostome long, dome-shaped, with 25–38 filiform tentacles spread across its body. Gonophores triangular-shaped, 0.22–0.54 × 0.09–0.19 mm, inserted inside the final portion of the stem, just below the hydranth.

Material examined: VB – abundant colonies, one of them with gonophores, from the dry and rainy seasons; SE – few infertile colonies from the dry season. CZUFS CNI-00046; CNI-00092.

Stations: VB – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P34, C3P56; SE – C3P34, C3P56.

Distribution: Brazil – Pernambuco (Calder and Mañal 1998), São Paulo (Migotto 1996, Silveira and Morandini 2011, Fernandez et al. 2014, 2015), and Paraná (Bumber and Rocha 2012). World distribution – probably circumglobal in tropical and subtropical regions (Schuchert 2004).

Remarks: Colonizing the plates, Ostreidae, Polychaeta tubes, Ascidiacea, and *Pennaria disticha*.

### *Turritopsis nutricula* McCrady, 1857

Fig. 7C–D

*Corydendrium nutricula* (McCrady, 1857) (unaccepted combination).

*Modeeria multitentaculata* Fewkes, 1881 (synonym).

Description: Colonies stolonial or erect, irregularly branched, up to 1.5 mm high. Stem monosiphonic, 0.07–0.13 mm wide. Perisarc moderately thick slightly striated at the base of the hydranths. Hydranths fusiform, 0.32–0.78 mm high, 0.09–0.12 mm wide, with a conical and elongated hypostome. Filiform tentacles (7–12) irregularly spread over the half distal portion of the hydranths. Tentacles at the base of the hydranths are shorter than those at the medial and distal portions. A single individual was found with three medusa buds, measuring 0.24–0.3 × 0.12–0.22 mm, inserted at the distal portion in short pedicels. Nematocysts: eurytele undischarged large (one visualized 55.2 × 20.7 µm) and small (18.6–23 × 7.8–9.3 µm), stenoteles discharged (8.1–11.1 × 7.3–9.2 µm). Euryteles were found only in the coenosarc, while stenoteles were present in the hydrorhiza, coenosarc, and hydranth.

Material examined: PCS – abundant infertile colonies from the dry and rainy seasons; VB – abundant infertile colonies from the dry and rainy seasons; SE – one fertile colony from the dry season. CZUFS CNI-00087; CNI-00088; CNI-00095; CNI-00096; CNI-00097; CNI-00098.

Stations: PCS – 1, 4, 10, 11, 12, 16, 17; VB – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P34; SE – C1P12.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Pernambuco (Calder and Mañal 1998), Sergipe (medusa, Araújo 2006), Bahia (Kelmo and Santa-Isabel 1998), Espírito Santo (Grohmann et al. 1997), São Paulo (Migotto 1996, Marques et al. 2001, Oliveira et al. 2006, Oliveira

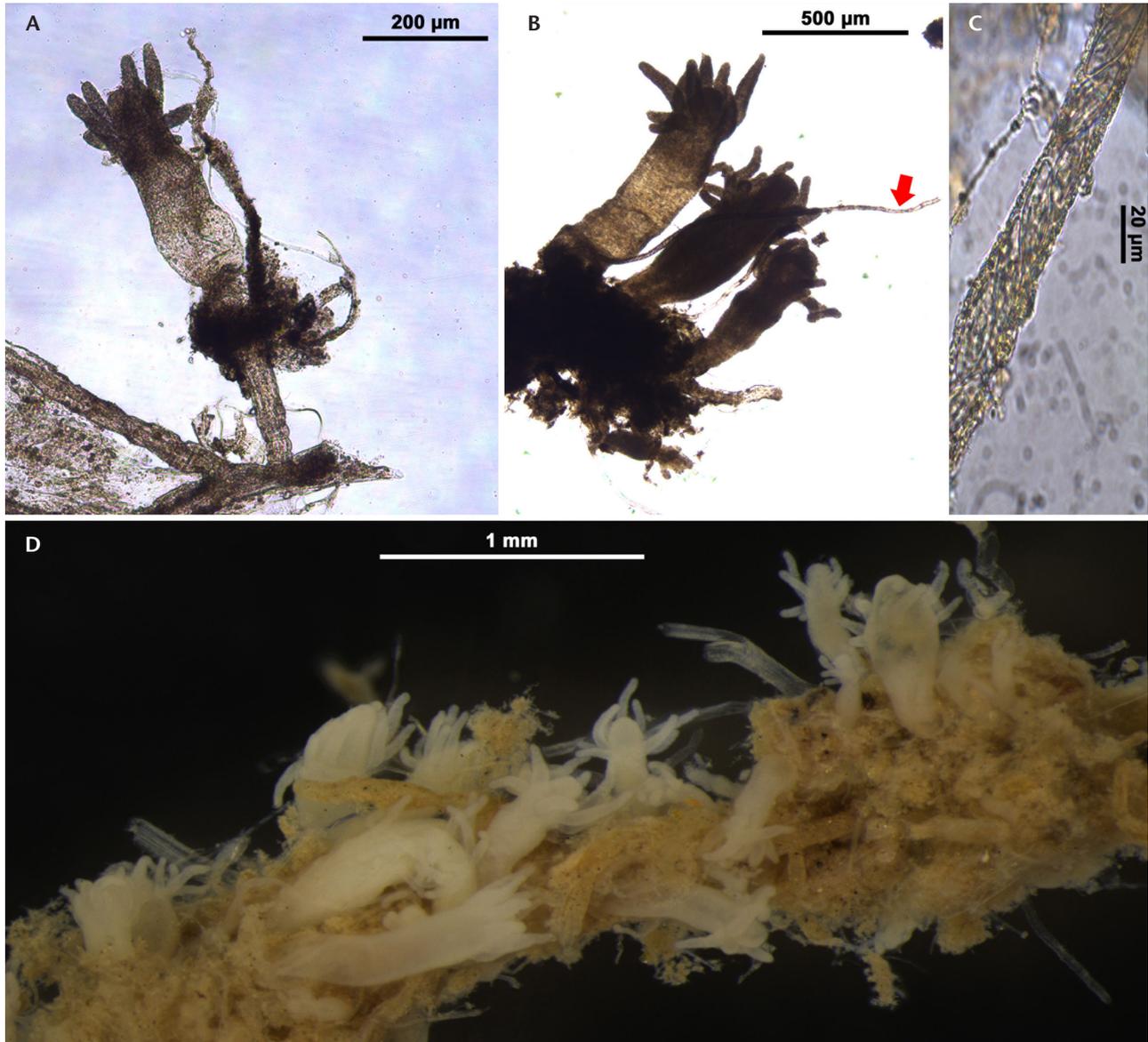


Figure 6. (A) Hydractiniidae sp. 1: general view of a polyp; (B-D) Hydractiniidae sp. 2: (B) general view of three polyps and a tentaculozoid (red arrow); (C) detail of the tentaculozoid with nematocysts; (D) general view of a colony.

and Marques 2011, Silveira and Morandini 2011, Fernandez et al. 2014, 2015), and Paraná (Bumbeer and Rocha 2012, Nagata et al. 2014). World distribution – widely distributed in Western Atlantic (Calder 2019).

**Taxonomic remarks:** For a long time, *T. nutricula* was considered a cosmopolitan species, and all other species of the genus as its synonyms (Martell et al. 2016). However, morphological (Schuchert 2004) and molecular studies (Miglietta et al. 2007, Miglietta 2016, Li et al. 2018) separate the *Turritopsis* species, in exclusive lineages for the Atlantic (*T. nutricula*), Mediterranean

(*T. dohrnii* (Weismann, 1883) and Pacific (*T. rubra* (Farquhar, 1895)). Due to all these taxonomic paths, the synonyms mentioned by Calder (1988) are no longer adequate. A new revision of the genus is required to elucidate the occurrence and distribution of the different species and their synonyms.

**Remarks:** The PCS material was colonizing Anthozoa (*Carijoa* sp.), Bryozoa, and the hydroid *Thyroscyphus ramosus*. Estuarine material was colonizing the plates, Ostreidae, Bryozoa, Ascidiacea, and the hydroids *Corydendrium parasiticum*, *Diphasia digitalis*, *Eudendrium merulum*, and *Pennaria disticha*.

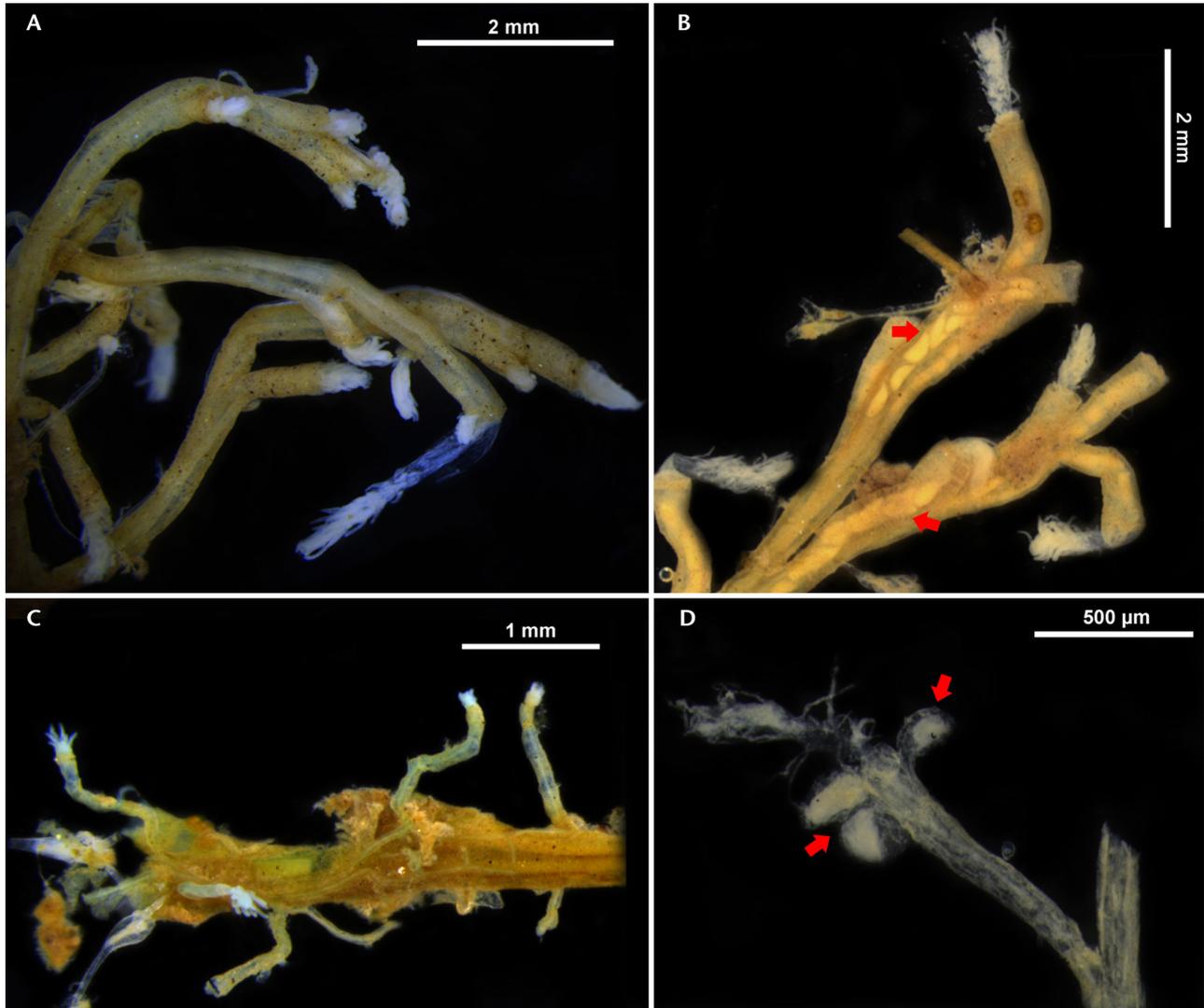


Figure 7. (A-B) *Corydendrium parasiticum*: (A) general view of a colony; (B) detail of a stem showing gonophores (red arrows); (C-D) *Turritopsis nutricula*: (C) general view of a colony; (D) detail of a polyp showing gonophores (red arrows).

Superorder Leptothecata Cornelius, 1992  
 Infraorder Campanulariida Bouillon, 1984 *sensu novum*  
 Campanulariidae Johnston, 1836  
*Campanularia* sp. 1

Fig. 8A

Description: Colony stolonial, polyps up to 698 µm high, arising from a creeping hydrorhiza. Pedicels with a moderately thick perisarc, one large and square-shaped annulus with a rounded corner at the distal end. Hydrothecae cylindrical, 259–347 µm high, 146–258 µm wide, walls with perisarc moderately thick. Diaphragm thin, apparently straight near the hydrothecal base. Margin with 10 rounded cusps, with U-shaped embayments between them.

Material examined: PCS – one infertile colony from the rainy season.

Station: 11.

Bottom: sand.

Taxonomic remarks: Four species of *Campanularia* are recorded to the Brazilian coast: *C. agas* Cornelius, 1982, *C. hesperia* Torrey, 1904, *C. hincksii* Alder, 1856, and *C. lennoxensis* Jäderholm, 1903 (Oliveira et al. 2016), however, the PCS specimens have a completely waved pedicel with a large annulus at the distal end, and that annulus looks square-shape in profile with rounded corners, and this characteristic was not seen in any of the species recorded to Brazil. The PCS specimens resemble *Campanularia volubilis* (Linnaeus, 1758) as described by Cornelius (1995b, p. 232) and also the illustrations for this species made

by Nutting (1901, p. 345, fig. 26), however, *C. volubilis* is a boreal-Arctic species and would not occur in Sergipe. Nevertheless, the absence of gonothecae, nematocysts and hydranths did not allow a better characterization of the PCS specimens.

Remarks: Colonizing algae, and the hydroid *Sertularelloides cylindritheca*.

### *Campanularia* sp. 2

Fig. 8D, G

Description: One stolonial polyp, 1.5 mm high, arising from a creeping hydrorhiza. Pedicel long, with smooth perisarc in almost all the length, a distal end with annulations that become smaller in diameter when coming closer to the end. Subhydrothecal spherule present. Hydrothecae up to 424 µm high, 200 µm of marginal with, with a lateral constriction in the wall just before the hydrothecal margin. Margin with seven long and rounded cusps, separated by large and rounded embayments. The median cusps are smaller than the lateral ones.

Material examined: PCS – one polyp from the rainy season.

Station: PCS – 18.

Bottom: gravel.

Taxonomic remarks: The specimens look like *Campanularia morgansi* as described and illustrated by Millard (1975, p. 216, fig 71C-E), however, the absence of gonothecae and the huge restriction of distribution for *C. morgansi*, made it preferable to leave this identification as *Campanularia* sp. 2.

Remarks: Found on algae.

### *Orthopyxis crenata* (Hartlaub, 1901)

Fig. 10C

Synonyms available from: Galea et al. (2009).

*Eucopella crenata* Hartlaub, 1901b: 364, pl. 22, figs 27–31, 33–35.

Description: Two stolonial polyps, up to 2.5 mm high, arising from a creeping hydrorhiza. Pedicel long, with thin perisarc, waved along its length, annulated at the base and with a constriction at the end, forming a spherule, before the beginning of hydrothecae. Hydrothecae in the form of an inverted bell, 345 µm high and 341 µm wide at the margin (one polyp measured), perisarc moderately thick, margin with waves, without cusps.

Material examined: PCS – two polyps from the rainy season. CZUFS CNI-00099.

Station: PCS – 14.

Bottom: mud.

Distribution: Brazil – Ceará, São Paulo, Rio de Janeiro, and Santa Catarina (Cunha et al. 2015). World distribution – Mediterranean, Western and Eastern Atlantic, Indian Ocean, and Pacific Ocean (Hirohito 1995).

Remarks: Found on *Sertularelloides cylindritheca*.

### *Orthopyxis sargassicola* (Nutting, 1915)

Fig. 10D

Synonyms available from: Calder (1991).

*Clytia sargassicola* Nutting, 1915: 57, pl. 12, fig. 8, 9.

*Orthopyxis lennoxensis* –Vannucci Mendes, 1946: 544, pl. 1, figs 3–5, –Vannucci, 1951a: 81; 1951b: 109, 110, 111, 115, 116 [not *Campanularia lennoxensis* Jaderholm, 1903].

*Orthopyxis crenata* –Vannucci, 1954: 111 [not *Orthopyxis crenata* (Hartlaub, 1901a)].

?*Orthopyxis billardi* –Vannucci, 1954: 112; pl. 3, figs 4–7; pl. 4, fig. 3.

Description: Colonies stolonial, up to 4.7 mm high, arising from a creeping hydrorhiza. Pedicels with thick perisarc, completely annulated, with a constriction at the distal end, forming a spherule, before the beginning of hydrothecae. Hydrothecae cylindrical, 0.59–1.52 mm high, 0.33–1.01 mm wide at the margin, perisarc walls usually thick, margin with 10–12 triangular cusps, sharp and straight, separated by U-shaped embayments. Gonothecae pot-shaped, 0.98–2.54 mm high, 0.51–1.91 mm wide, flattened laterally, arising from the hydrorhiza on short pedicels, the wall with thick perisarc with well-developed waves along its length.

Material examined: PCS – few colonies with and without gonothecae, from the dry and rainy seasons. CZUFS CNI-00100; CNI-00102; CNI-00387; CNI-00388.

Stations: PCS – 5, 6, 8, 9, 11, 12, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Alagoas (Maximiliano Manuel unpub. data), Espírito Santo (Grohmann et al. 1997, 2003, Cunha et al. 2015), Rio de Janeiro (Vannucci 1951a, Nogueira et al. 1997, Grohmann et al. 2003, Cunha et al. 2015), São Paulo (Vannucci 1951a, Oliveira et al. 2006, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Cunha et al. 2015), Paraná (Maria A. Haddad unpub. data), and Santa Catarina (Cunha et al. 2015, Denise M. Menon unpub. data). World distribution – widely distributed in Western Atlantic (Calder 2013).

Remarks: Colonizing algae and Bryozoa.

### Infraorder Obeliida Maronna, Miranda, Peña Cantero, Barbeitos & Marques, 2016

#### Clytiidae Cockerell, 1911 *sensu novum*

#### *Clytia brevithecata* (Thornely, 1900)

Fig. 9A

Synonyms available from: Calder (1991) and Galea (2008).

*Campanularia brevithecata* Thornely, 1900: 454, pl. 44, fig. 8, 8a, 8b.

*Laomedea hummelincki* Leloup, 1935: 19, fig. 7.

*Clytia hummelincki* –Migotto, 1996: 84, fig. 15G.

Description: Two polyps, stolonial, up to 1.9 mm high, arising from a creeping hydrorhiza. Pedicel long, relatively large, perisarc moderately thick, smooth, and with annulations at the base, near the medial region, and in the distal end, just before the hydrothecae. Hydrothecae cup-shaped, shallow, 163 µm high, 209 µm wide at the margin. Hydrothecal wall with a thin and smooth perisarc. Margin smooth and diaphragm thin.

Material examined: VB – two polyps, one from dry and the other from rainy season. CZUFS CNI-00049.

Stations: VB – C2P12, C3P12.

Distribution: Brazil – Bahia (Kelmo and Attrill 2003), Pernambuco (Calder and Mañal 1998), São Paulo (Migotto 1996, Marques et al. 2001, Oliveira et al. 2006, Oliveira and Marques 2011, Silveira and Morandini 2011), Paraná (Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2015). World distribution – Circumglobal in tropical and warm-temperate waters (Calder and Faucci 2021).

Taxonomic remarks: *Clytia hummelincki* (Leloup, 1935) became a junior synonym of *C. brevithecata* (Calder 2021, Calder and Faucci 2021). The description for *C. brevithecata* includes the existence of a subhydrothecal spherule, however in the specimens found at Sergipe there was not a clear spherule, but a rounded shaped enlargement, located just below the diaphragm and followed by the annulations of the pedicel. As the hydrothecal basal chamber is short, we supposed that the subhydrothecal chamber found in specimens from Sergipe is connected with the basal one, not well distinguished from it.

Remarks: Found on Ostreidae and *Eudendrium merulum*.

### *Clytia elsaeoswaldae* Stechow, 1914

Fig. 8C

*Clytia elseae-oswaldae* Stechow, 1914: 125, –Vannucci Mendes, 1946, –Vannucci, 1951a; 1951b [part].

*Clytia hemisphaerica* –Migotto, 1996: 82–84, Oliveira et al., 2016.

*Clytia* cf. *gracilis* sp. 2 –Lindner, 2000: 46.

*Clytia elseaeoswaldae* –Lindner et al., 2011: figs 2–3.

Description: Colony stolonial, arising from a creeping hydrorhiza. Polyps up to 2.4 mm high, with long pedicels. Perisarc thin and smooth with 6–7 rings at the basal portion and 3–10 rings at the distal end. Pedicel covered with diatoms in most of its length. Hydrothecae cylindrical with thin perisarc, 0.35–0.47 mm high and 0.27–0.35 mm of marginal wide. Diaphragm thin and straight, basal chamber narrow. Margin with 9–11 long, pointed cusps, straight or slightly curved, with U-shaped embayments between them. Gonothecae pot-shaped arising from the hydrorhiza, with a smooth and thin wall, and a constriction in the distal portion.

Material examined: PCS – two colonies with gonothecae, one from dry and the other from rainy season. CZUFS CNI-00104; CNI-00291.

Stations: 5, 12.

Bottom: sand.

Distribution: Brazil – Oliveira et al. (2016) refer *C. elsaeoswaldae* and *C. hemisphaerica* to several Brazilian records, that will be presented here, but require caution. *Clytia elsaeoswaldae* has records from Fernando de Noronha (Vannucci 1958, Amaral et al. 2009), Espírito Santo, Rio de Janeiro (Vannucci 1950, 1951a), São Paulo (Vannucci Mendes 1946, Vannucci 1951a, 1951b, Migotto 1996, Migotto et al. 2002, Lindner et al. 2011, Oliveira and Marques 2011, Silveira and Morandini 2011), and Santa Catarina (Denise M. Menon unpub. data). World distribution – from North Carolina the Caribbean Sea,

including Bermuda and Gulf of Mexico (Lindner et al. 2011, Calder 2019).

Taxonomic remarks: According to Lindner et al. (2011) *C. elsaeoswaldae* resembles *C. gracilis* in having inclined hydrothecal cusps and gonotheca with thin wall, but they differ in the type of colonies, mainly stolonial in the first species and branched in the second.

Remarks: Found on algae.

### *Clytia gracilis* (Sars, 1850)

Fig. 8E–F

Synonyms available from: Calder (1991).

*Laomedea gracilis* M. Sars, 1850: 138 [part] [not *Lomedea* (sic) *gracilis* Dana, 1846, a name suppressed for both the Principle of Priority and the Principle of Homonymy (Opinion 1465)].

*Clytia attenuate* Fraser 1938a; –Vannucci Mendes 1946, –Vannucci 1949; 1951a.

?*Thaumantias raridentata* –Vannucci 1951a, 1951b, 1954 [polyp];

Description: Colonies mainly stolonial but sometimes erect, up to 1.8 mm high, arising from a creeping hydrorhiza. Erect colonies with few and irregular branches. Stem monosiphonic, with each ramification arising slightly curved and giving rise to another ramification or a pedicel with hydrothecae. Perisarc smooth, annulated in the stem base, in each ramification, and less frequently in the medial and distal portion of pedicels and before the hydrothecae. Some polyps with pedicels covered by algae. Hydrothecae cylindrical, 0.6–1.1 mm high, 0.28–0.67 mm wide at the margin. Diaphragm thin, straight, near hydrothecal base. Margin with 6–10 sharp cusps, generally slightly curved to the left, with U-shaped embayments between cusps. Gonothecae urn-shaped, 0.57–1.9 mm high, 0.32–1.1 mm wide, arising from hydrorhiza or on short annulated pedicels connected with the pedicels with hydrothecae.

Material examined: PCS – abundant colonies with and without gonothecae, from the dry and rainy seasons. VB – abundant colonies, few with gonothecae, from dry and rainy season; SE – few colonies, one with gonothecae, from the dry and rainy season. CZUFS CNI-00002; CNI-00048; CNI-00105; CNI-00107; CNI-00108; CNI-00109; CNI-00110.

Stations: PCS – 1, 3, 4, 5, 6, 8, 9, 11, 12, 13, 14, 15 e 18; VB – C1P12, C1P34, C1P56, C2P12, C2P34 rep, C2P56, C3P12, C3P34, C3P56; SE – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P12, C3P34.

Bottom: gravel and mud.

Distribution: Brazil – Ceará (Marques et al. 2006), Pernambuco (Calder and Mañal 1998, Oliveira et al. 2009, abstract), Bahia (Grohmann et al. 2003, Kelmo and Attrill 2003), Rio de Janeiro (Grohmann et al. 2011), São Paulo (Marques et al. 2011, Oliveira et al. 2006, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Fernandez et al. 2014, 2015), and Paraná (Bouzon et al. 2012). World distribution – circumglobal, including subpolar regions (Galea 2008).

Remarks: The PCS material was colonizing rocks, algae,

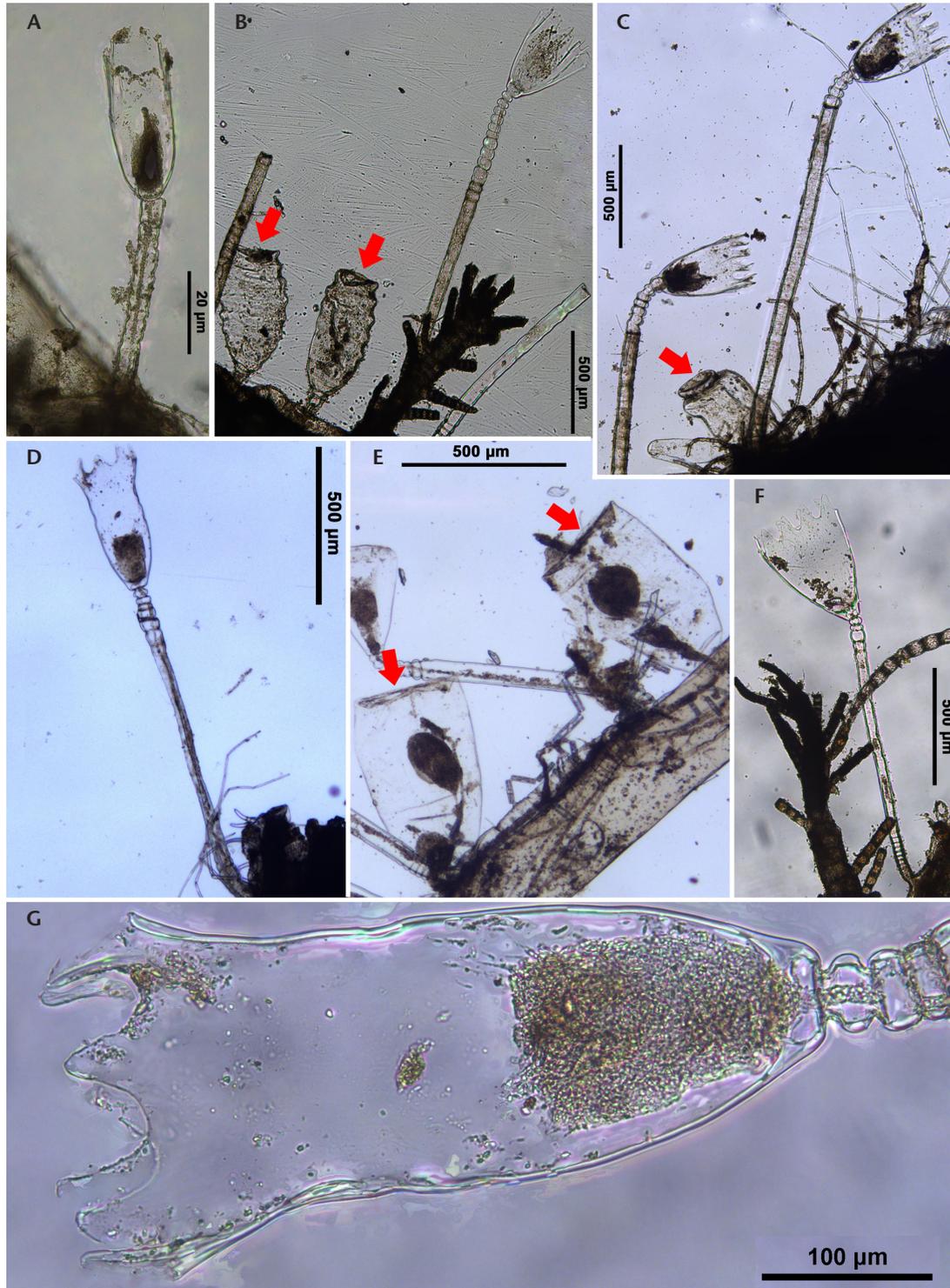


Figure 8. (A) *Campanularia* sp. 1: general view of a polyp; (B) *Clytia hemisphaerica*: general view of polyps and two gonothecae (red arrows); (C) *Clytia elsaeoswaldae*: general view of two polyps and a gonotheca (red arrows); (D, G) *Campanularia* sp. 2: (D) general view of a polyp; (G) detail of the hydrotheca; (E-F) *Clytia gracilis*: (E) general view of two polyps and two gonothecae (red arrows); (F) general view of a polyp.

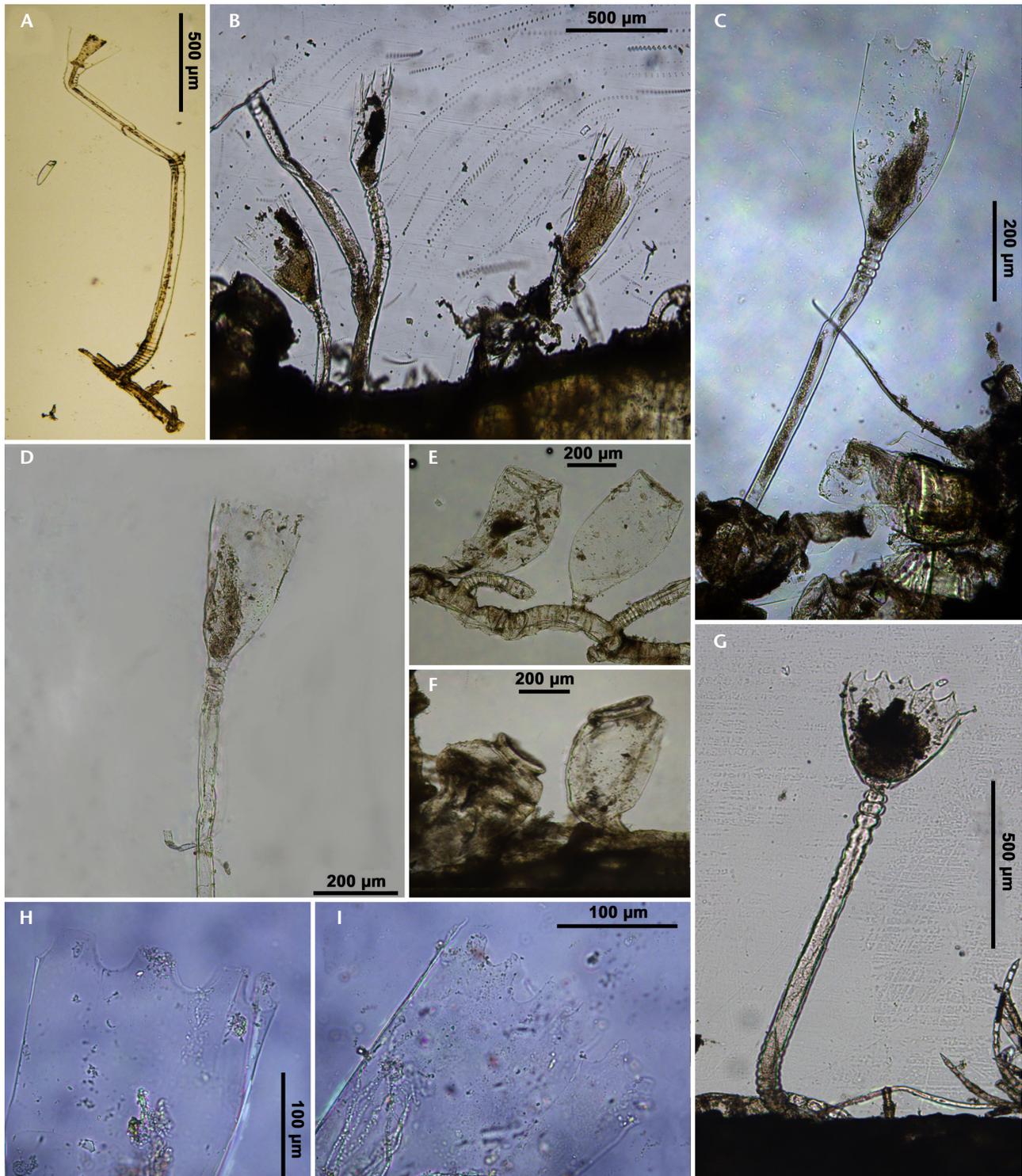


Figure 9. (A) *Clytia brevithecata*: general view of a polyp; (B) *Clytia linearis*: general view of a colony; (C, H) *Clytia macrotheca*: general view of a polyp; (H) detail of the hydrotheca margin; (F-G) *Clytia noliformis*: (F) detail of two gonothecae; (G) general view of a polyp; (D, E, I) *Clytia paulensis*: (D) general view of a polyp; (E) detail of two gonothecae; (I) – detail of the hydrotheca margin.

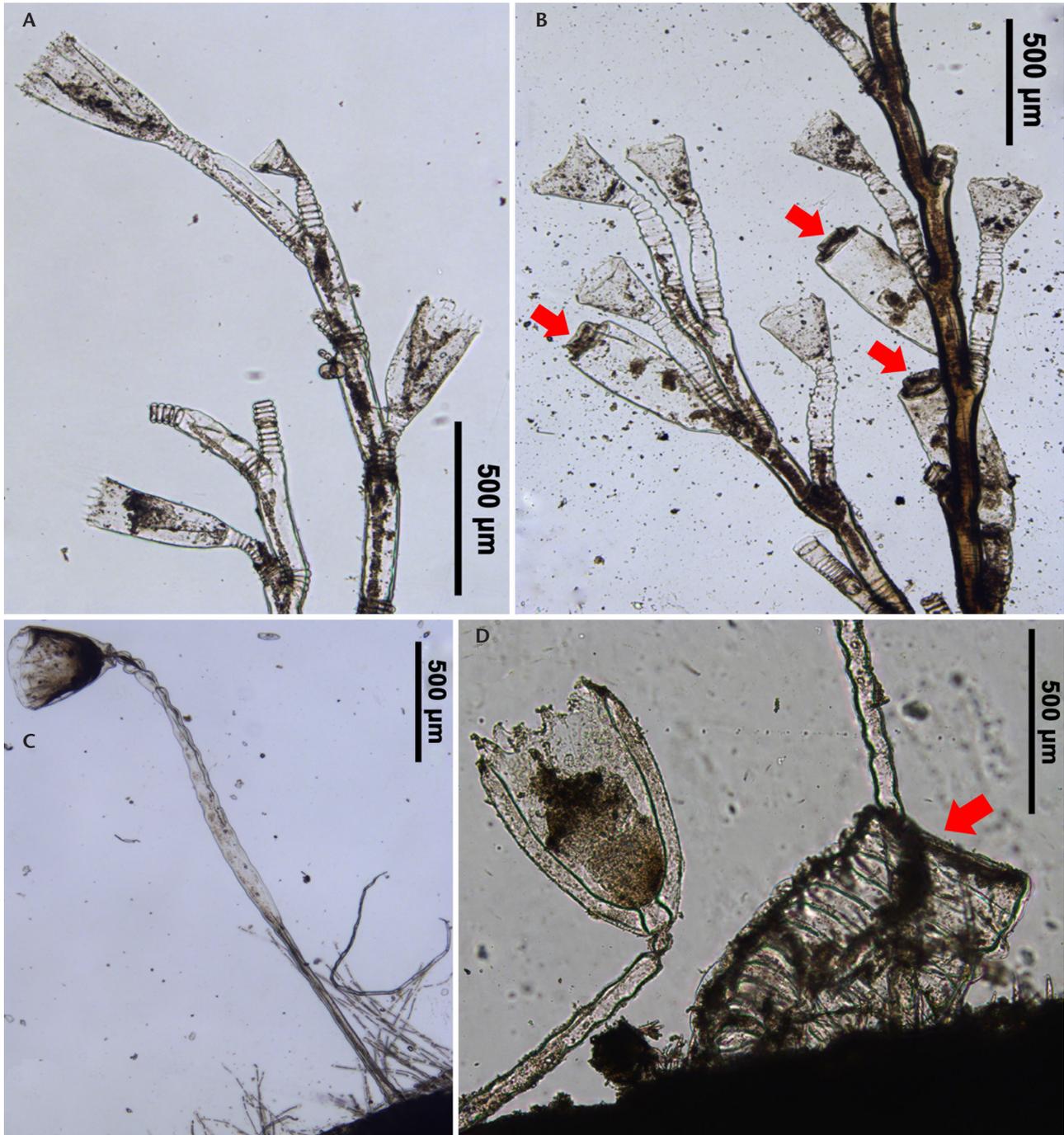


Figure 10. (A) *Obelia oxydentata*: detail of a stem; (B) *Obelia dichotoma*: detail of a stem showing some gonothecae (red arrows); (C) *Orthopyxis crenata*: general view of a polyp; (D) *Orthopyxis sargassicola*: general view of a polyp and a gonotheca (red arrow).

Bryozoa, Ascidiacea, and a thyrscyphid hydroid. Estuarine material found on plates, algae, Bryozoa, Ostreidae, polychaetes tubes, barnacle (Cirripedia), Amphipoda leg, Ascidiacea, and the

hydroids *Bougainvillia muscus*, *Cladocoryne floccosa*, *Corydendrium parasiticum*, *Ectopleura dumortierii*, *Eudendrium merulum*, *Nemalium lighti*, *Pennaria disticha*, and *Plumularia floridana*.

*Clytia hemisphaerica* (Linnaeus, 1767)

Fig. 8B

Synonyms available from: Calder (1991).

*Medusa hemisphaerica* Linnaeus, 1767: 1098 [medusa].

Description: Colonies stolonial, up to 2.1 mm high, arising from a creeping hydrorhiza. Pedicels long and with a thin and smooth perisarc, annulated and/or waved along their entire length or with an annulus at the base and a distal end or, less frequent, in the medial portion of the pedicel. Some colonies with pedicels covered by algae. Hydrothecae cylindrical, 0.38–0.42 mm high, 0.26–0.4 mm of wide at the margin. Diaphragm thin, straight, and near hydrothecal base. Margin with 9–11 short cusps, straight, rounded, or sharp, with U-shaped embayments between cusps. Gonothecae pot-shaped, 0.51–0.66 mm high, 0.26–0.4 mm maximal width, arising from the hydrorhiza in short pedicels. Gonothecal wall waved along its whole length.

Material examined: PCS – one colony with gonothecae from the rainy season. CZUFS CNI-00111.

Station: PCS – 5.

Bottom: sand.

Distribution: Brazil – Pernambuco (Oliveira et al. 2009, abstract), Sergipe (medusa, as *Phialidium hemisphaericum*, Araújo 2006), Bahia (Kelmo and Attrill 2003), Espírito Santo (Grohmann et al. 1997, 2003), Rio de Janeiro (Nogueira et al. 1997), São Paulo (Silveira and Morandini 2011), and Paraná (Maria A. Haddad unpub. data). World distribution – considered cosmopolitan in coastal regions (Cornelius 1995b).

Taxonomic remarks: *Clytia hemisphaerica* is probably a species complex (Boero 2002). There is a discussion about the real distribution of this species in the world and South America. However, the reproductive structure is still considered specific to *C. hemisphaerica*. Phylogenetic analysis also shows that *C. hemisphaerica* forms a clade with *C. elsaeoswaldae* and two morphotypes of *C. gracilis* (Lindner et al. 2011). New studies are needed to highlight the real distribution of this species and also to figure out if *C. hemisphaerica* is a species complex and which species could be part of this. While these issues are not resolved, the Brazilian records will be considered valid here.

Remarks: Found on algae.

*Clytia linearis* (Thornely, 1900)

Fig. 9B

Synonyms available from: Calder (1991).

*Obelia linearis* Thornely, 1900: 453, pl. 44, fig. 6.

Description: Colonies erect or less frequently stolonial, up to 3.16 mm high, arising from a creeping hydrorhiza. Erect colonies with few branches, disposed alternately, each one giving rise to a hydrotheca. Perisarc thin and smooth, annulated at the base and the distal end or completely annulated (mainly in the erect colonies). Hydrothecae cylindrical, 0.45–0.56 mm high, 0.12–0.3 mm of marginal wide, walls with a thin perisarc. Diaphragm thin, straight, and near the hydrothecal base.

Margin with 8–10 deep and sharp cusps, separated by U-shaped embayments, with a visible pleat as a vertical line in the space.

Material examined: PCS – few infertile colonies from the dry and rainy seasons; VB – few infertile colonies from the dry and rainy seasons; SE – three infertile colonies from the dry season. CZUFS CNI-00003; CNI-00050; CNI-00115; CNI-00116.

Station: PCS – 1, 4, 5, 7, 12, 14, 17; VB – C1P12, C1P56, C2P34, C3P34; SE – C1P34, C1P56, C2P56.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Pernambuco (Oliveira et al. 2009, abstract), Bahia (Kelmo and Attrill 2003), Espírito Santo (Grohmann et al. 1997, 2003), Rio de Janeiro (Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Migotto 1996, Marques et al. 2001, Lindner and Migotto 2002, Shimabukuro 2007, Oliveira and Marques 2011, Silveira and Morandini 2011, Fernandez et al. 2014, 2015, Miranda et al. 2015), Paraná (Miranda et al. 2015, Cangussu et al. 2010), and Santa Catarina (Miranda et al. 2015, Denise M. Menon unpub. data). World distribution – considered circumglobal in tropical and subtropical regions (Medel and Vervoort 2000).

Remarks: The PCS material was colonizing algae, Bryozoa, and the hydroid *Amphisbetia distans*. Estuarine material found on Bryozoa, Polychaeta tubes, Ascidiacea, and the hydroids *Bougainvillia muscus*, *Ectopleura dumortierii*, *Eudendrium merulum*, *Obelia oxydentata*, and *Pennaria disticha*.

*Clytia macrotheca* (Perkins, 1908)

Fig. 9C, H

Synonyms available from: Calder (1991).

*Campanularia macrotheca* Perkins, 1908: 146, pl. 3, fig. 12, 13.

Description: Colonies stolonial, up to 2.2 mm high, arising from a creeping hydrorhiza. Pedicels with thin and smooth perisarc, with annulations at the base and distal end. Hydrothecae cylindrical, elongated, 403–460 µm high, 205–391 µm wide at the margin. Margin smooth, perisarc thin, with 8 square-shaped cusps, separated by U-shaped embayments. Diaphragm thin and straight.

Material examined: PCS – three infertile colonies from the rainy season. CZUFS CNI-00004; CNI-00289.

Stations: 5, 12.

Bottom: sand.

Distribution: Brazil – Bahia (Kelmo and Attrill 2003). World distribution – Atlantic North and Caribbean Sea (Calder 2019).

Remarks: Found on Bryozoa.

*Clytia noliformis* (McCrary, 1859) *sensu* Calder, 1991

Fig. 9F-G

Synonyms available from: Calder (1991).

not *Campanularia noliformis* McCrary, 1859: 194, pl. 11, fig. 4 [= ?*Clytia hemisphaerica* (Linnaeus, 1767)] [medusa and hydroid]. *Campanularia ptychocyathus* Allman, 1888; –Vannucci 1951a [polyp]. *Clytia folleata* –Vannucci Mendes 1946; –Vannucci 1951a [non

*Epenthesis folleata* McCrady, 1859 [polyp].  
*Phyalidium folleatum* –Correia 1983 [medusa].  
*Phyalidium noliforme* –Correia 1983 [medusa].  
*Clytia noliformis* auct. Calder, 1991: 65–68, fig. 36.

Description: Colonies stolonial, up to 1.9 mm high, arising from a creeping hydrorhiza. Pedicel with perisarc moderately thick and waved along its length or annulated in both ends. Hydrothecae cylindrical, 0.31–0.46 mm high, 0.27–0.31 mm wide at the margin, cup-shaped, and slightly deep. Margin thin, perisarc moderately thick. Margin with 10–12 short, triangular to round cusps, separated by U-shaped embayments. Diaphragm thick and straight. Gonothecae pot-shaped, 0.52–0.64 mm high, 0.38–0.47 mm wide, with a constriction in the distal end, arising from a creeping hydrorhiza in short pedicels.

Material examined: PCS – abundant colonies with and without gonothecae from dry and rainy seasons. CZUFS CNI-00005; CNI-00117; CNI-00118.

Stations: PCS – 4, 5, 6, 7, 8, 9, 11, 12, 14, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Bahia (Allman 1888, Vannucci 1951a, Kelmo and Attrill 2003, Grohmann et al. 2003), Espírito Santo (Grohmann et al. 2003), Rio de Janeiro (Miranda et al. 2015), São Paulo (Vannucci 1951a, Lindner and Migotto 2002, Oliveira et al. 2006, Oliveira and Marques 2011, Silveira and Morandini 2011), Paraná (Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2015). World distribution – circumglobal, with records from warm waters from the eastern Atlantic, including the Mediterranean Sea, Indian Ocean, and eastern Pacific (Calder 1991, 2013).

Remarks: Colonizing algae, Polychaeta tubes, Bryozoa, Brachyura (Majoidea), and the hydroid *Sertularelloides cylindrica*.

### *Clytia paulensis* (Vanhöffen, 1910)

Fig. 9D, E, I

Synonyms available from: Cornelius (1995b).  
*Campanularia paulensis* Vanhöffen, 1910: 298; fig. 19.

Description: Colonies stolonial, up to 1.4 mm high, arising from a creeping hydrorhiza. Pedicels with a thin and smooth perisarc, annulated in both ends or, less frequently, with 1–2 in the median portion. Hydrothecae cylindrical, 0.42–0.52 mm high, 0.19–0.21 mm wide at the margin. Margin with thin perisarc, apparently with 6–7 bicuspidate cusps, separated by U-shaped embayments. Diaphragm thin and slightly oblique. Gonothecae urn-shaped, 0.58–0.73 mm high, 0.25–0.32 mm wide, arising from the hydrorhiza in short and annulated pedicels.

Material examined: PCS – few colonies with and without gonothecae from the rainy season; VB – few infertile colonies from the dry and rainy seasons; SE – two infertile colonies from the dry season. CZUFS CNI-00051; CNI-00120; CNI-00122.

Station: PCS – 1, 4, 5, 7, 8, 9, 11, 12, 14, 16, 17; VB – C1P34, C1P56, C2P12, C2P34; SE – C1P12, C1P56.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Pernambuco (Calder and Mañal 1998), Alagoas (Shimabukuro 2007), Espírito Santo (Grohmann et al. 1997), and Rio de Janeiro (Grohmann et al. 2011). World distribution – widely distributed in warm tropical and temperate waters (Calder et al. 2019).

Remarks: The PCS material was found on algae and Bryozoa. The estuarine material was found on the plates as well as on Ascidiacea, and the hydroids *Corydendrium parasiticum* and *Pennaria disticha*.

### Obeliidae Haeckel, 1879 sensu novum *Obelia dichotoma* (Linnaeus, 1758)

Fig. 10B

Synonyms available from: Calder (1991).

*Sertularia dichotoma* Linnaeus, 1758: 812.

*Obelia angulosa* –Vannucci 1951a;

?*Campanularia obtusidens* –Vannucci, 1951a.

*Obelia braziliensis* –Vannucci Mendes, 1946; –Vannucci, 1951a [incorrect subsequent spelling].

*Obelia griffini* –Vannucci Mendes, 1946; Vannucci 1949; 1951a, 1954 [polyp].

*Obelia brazilienses* –Vannucci, 1949 [incorrect subsequent spelling] [polyp].

*Obelia hyalina* –Vannucci, 1949; 1951a.

*Obelia hyaliana* –Vannucci, 1955: 56 [incorrect subsequent spelling] [medusa and hydroid].

Description: Colonies erect, sympodial, up to 31.2 mm high. Stem monosiphonic, with an initial bifurcation, moderately wide, branched alternately, each branch gives rise to a short pedicel with one hydrotheca. Perisarc moderately thick, annulated at the stem region above the pedicel insertion. Pedicel with variable length, moderately wide, completely annulated, or with a short smooth portion in the medial region. Hydrothecae cup-shaped, 0.17–0.24 mm high, 0.26–0.34 mm wide, perisarc thin and smooth. Margin smooth and rounded. Diaphragm thin, slightly oblique. Gonothecae pot-shaped, 0.49–0.63 mm high, 0.21–0.27 mm wide with a constriction in the end, arising from short pedicels, mainly annulated.

Material examined: PCS – abundant colonies, few with gonothecae, from the dry and rainy seasons; VB – few infertile colonies from the dry and rainy seasons; SE – abundant colonies with and without gonothecae from the dry and rainy seasons. CZUFS CNI-00008; CNI-00053; CNI-00128; CNI-00129; CNI-00130; CNI-00131; CNI-00132.

Stations: PCS – 4, 5, 11, 12, 13, 14; VB – C1P12, C1P56, C2P12, C2P34, C3P56; SE – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P12, C3P34, C3P56.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Marques et al. 2006), Bahia (Kelmo and Attrill 2003), Espírito Santo (Vannucci 1951a, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci 1951a, Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1951a, Migotto 1996, Marques et al. 2001, Oliveira et al. 2006, Shimabukuro 2007, Cunha and Jacobucci 2010, Oliveira

and Marques 2011, Silveira and Morandini 2011, Marques et al. 2013, Fernandez et al. 2014, 2015, Miranda et al. 2015), Paraná (Cangussu et al. 2010, Bumbeer and Rocha 2012, Miranda et al. 2015, Maria A. Haddad unpub. data), Santa Catarina (Bouzon et al. 2012, Miranda et al. 2011, 2015, Alaja-Batista et al. 2020), and Rio Grande do Sul (Paulo A. Horta unpub. data). World distribution – considered virtually cosmopolitan in coastal waters (Calder et al. 2019).

Taxonomic Remarks: *Obelia dichotoma* is probably a species complex (Calder et al. 2019).

Remarks: The PCS material found colonizing algae, Porifera, Anthozoa (*Carijoa* sp.), Bryozoa, and an aglaopheniid hydroid, *Hincksella formosa*, *Sertularelloides cylindritheca*, and *Synthecium tubithecum*. Estuarine material was found on the plates and also on Bryozoa, Polychaeta tubes, barnacles (Cirripedia), Ostreidae, Ascidiacea, and the hydroids *Bougainvillia muscus*, *Diphasia digitalis*, *Nemalium lighti*, and *Obelia oxydentata*.

### *Obelia oxydentata* Stechow, 1914

Fig. 10A

Synonyms available from: Calder (1991).

*Obelia oxydentata* Stechow, 1914: 131, fig. 7.

*Obelia bidentata* Clark, 1875: 58, pl. 9, fig. 2.

*Gonothyrea bicuspidate* –Vannucci Mendes, 1946: 556, pl. 3, fig. 23 [incorrect subsequent spelling].

*Obelia bicuspidata* –Vannucci Mendes, 1946: 556, –Vannucci 1954 [incorrect subsequent spelling].

*Obelia (?) oxidentata* –Vannucci Mendes, 1946, pl. 2, fig. 22, –Vannucci, 1951a [incorrect subsequent spelling].

Description: Colonies erect, sympodial, up to 9.4 mm high. Stem monosiphonic, moderately thick, branched alternately, each branch giving rise to a short pedicel with one hydrotheca. Perisarc moderately thick, smooth, annulated in the stem just above the pedicel insertion and at both ends of the pedicel. Hydrothecae cylindrical, of variable depth, frequently elongated, 0.39–0.79 mm high, 0.15–0.37 mm wide at the margin, perisarc thin and smooth. Margin with 6–8 bicuspidate cusps, separated by U-shaped embayments. Diaphragm thin and slightly oblique. Gonothecha elongated, 0.42–0.63 mm high, 0.19–0.22 mm maximal width, in form of an inverted cone, arising from a short and completely annulated pedicel from regions of stem without hydrothecal pedicels.

Material examined: PCS – two infertile colonies from the rainy season; VB – abundant colonies with and without gonothecae from the dry and rainy seasons; SE – abundant colonies with and without gonothecae from the dry and rainy seasons. CZUFS CNI-00007; CNI-00052; CNI-00123; CNI-00124; CNI-00125; CNI-00126.

Stations: PCS – 1, 5, 7, 10, 11; VB – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P12, C3P34, C3P56; SE – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P12, C3P34, C3P56.

Bottom: sand and mud.

Distribution: The Brazilian records refer to *Obelia bidentata*. Brazil – Ceará (Marques et al. 2006), Bahia (Kelmo and Attril

2003), Pernambuco (Calder and Maÿal 1998), Rio de Janeiro (Vannucci 1951a, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1951a, Migotto 1996, Marques et al. 2001, Oliveira et al. 2006, Oliveira and Marques 2011, Shimabukuro 2007, Silveira and Morandini 2011, Marques et al. 2013, Fernandez et al. 2014, 2015, Miranda et al. 2015), Paraná (Cangussu et al. 2010, Bumbeer and Rocha 2012, Miranda et al. 2015), and Santa Catarina (Miranda et al. 2015, Alaja-Batista et al. 2020). World distribution – widely distributed in tropical and temperate regions (Medel and Vervoort 2000).

Taxonomic remarks: Some synonyms of *Obelia bidentata* Clark, 1875 available in Calder (1991) could refer to *O. oxydentata*. A revision of the records for both species is needed (Calder 2017, 2019).

Remarks: Unknown substrate for the PCS material. Estuarine specimens were found colonizing Ostreidae, Polychaeta tubes, barnacles (Cirripedia), Ascidiacea, Bryozoa, and the hydroids *Bougainvillia muscus*, *Corydendrium parasiticum*, *Diphasia digitalis*, *Dynamena crisioides*, *Ectopleura dumortierii*, *Eudendrium merulum*, *Nemalium lighti*, *Obelia dichotoma*, *Pennaria disticha*, and *Plumularia floridana*. The species was found reproductive during the rainy and dry seasons.

### Calycellidae Kramp, 1913

#### *Calycella* sp.

Fig. 11A–B

Description: A single colony was found, this one stolonal, with seven polyps arising from a creeping hydrorhiza. Pedicel long, perisarc moderately thick, completely annulated. Hydrothecae tubular, 381–535 µm high, 72–115 µm wide. Internal margin forming a border narrowing from the distal to the basal portion. Operculum conical, formed by 10–12 triangular segments.

Material examined: VB – one infertile colony from the dry season.

Station: VB – C2P12.

Taxonomic remarks: Four species of *Calycella* are valid in WoRMS (2022): *C. gabriellae* (Vannucci, 1951), *C. hispida* (Nutting, 1896), *C. oligista* Ritchie, 1910, and *C. syringa* (Linnaeus, 1767). From those, only *C. gabriellae* were reported to Brazil (Vannucci 1951b, Grohmann et al. 1997, Silveira and Morandini 2011) and *C. syringa* has records to Argentina (see references in Oliveira et al. 2016). The specimens found in Sergipe do not fit the description of *C. gabriellae* because this species is characterized by erect colonies. *Calycella syringa* has similar characteristics to the material described here, with erect structure and pedicel equal or longer than the hydrothecae and completely annulated but this species is Arctic-boreal and thus not found in tropical waters. Another species similar to material from Sergipe is *C. hispida*, however, none of the detailed descriptions for the hydrothecae and pedicel structures were found for this species. Cornelius (1995b) differentiates *C. syringa* from *C. hispida* by the hydranth characteristics and,

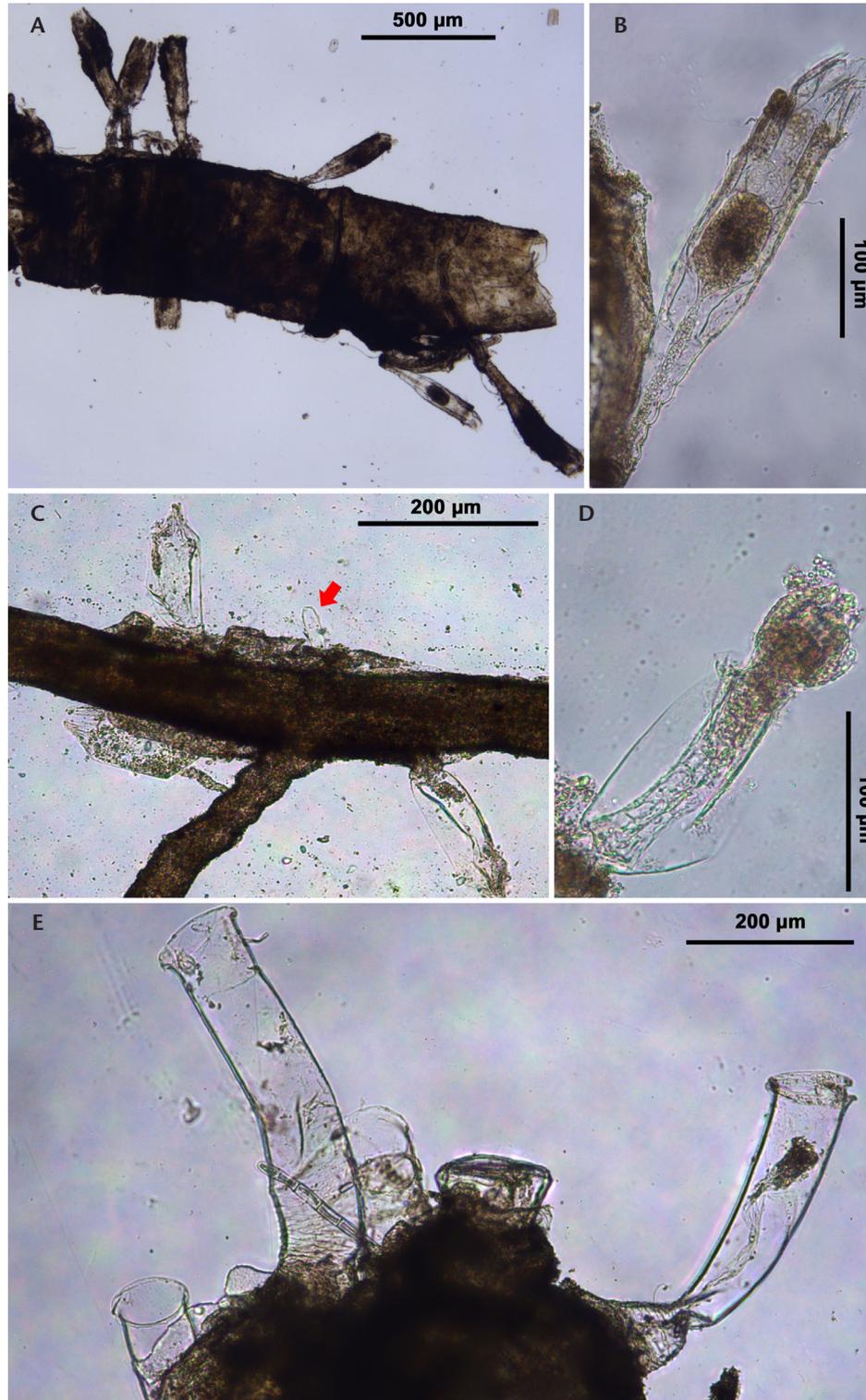


Figure 11. (A-B) *Calycella* sp.: general view of a colony; (B) detail of a polyp; (C-D) *Cirrholovenia tetranema*: (C) general view of a colony highlighting a nematotheca (red arrow); (D) detail of a polyp with hydranth; (E) *Filellum* sp.: general view of a colony.

as the hydranth was only visualized retracted in one polyp in our material, it was not possible to compare it with the description of the species mentioned above. Cornelius (1995b) indicated that the limits between the *Calycella* are not objective.

Remarks: Found on the hydroid *Corydendrium parasiticum*.

**Cirrhoveniidae Bouillon, 1984**  
***Cirrhovenia tetranema* Kramp, 1959**

Fig. 11C–D

Synonyms available from: Galea (2008).

*Cirrhovenia tetranema* Kramp, 1959b: 243, fig. 17A, B.

*Lafoeina amirantensis* –Calder, 1991d: 10, fig. 3, –Calder and Vervoort, 1998: 15, fig. 5, –Calder et al., 2003: 1180, fig. 5, –Migotto and Cabral, 2005: 3, figs 1–3.

Description: Colonies stolonal, arising from a creeping hydrorhiza. Hydrothecae cylindrical, elongated, 161–211 µm high, 56–81 µm wide, arising from a short pedicel. Perisarc moderately thick in the pedicel and thin in the hydrothecae. Operculum with thin wall, without segmentation, arising as a continuation of the hydrothecal margin, folded on itself, forming several pleats. One polyp with hydranth, this expanded, with apparently nine tentacles. Nematocystae arising from the hydrorhiza, 52.3–57.8 µm high, 16.8–17.8 µm wide.

Material examined: PCS – two infertile colonies from the rainy season; VB – abundant infertile colonies from the dry and rainy seasons; SE – few infertile colonies from rainy season. CZUFS CNI-00054; CNI-00133; CNI-00134.

Stations: PCS – 5, 12; VB – C1P12, C1P34, C2P12, C2P34, C2P56, C3P34, C3P56; SE – C1P34, C1P56, C2P12, C2P56, C3P12, C3P56.

Bottom: gravel.

Distribution: The Brazilian records refer to *Lafoeina amirantensis*. Brazil – Pernambuco (Calder and Mañal 1998), Rio de Janeiro (Nogueira et al. 1997), São Paulo (Silveira and Morandini 2011, Marques et al. 2013, Fernandez et al. 2014, 2015, Alaja-Batista et al. 2020), Paraná (Bumbeer and Rocha 2012), and Santa Catarina (Bouzon et al. 2012). World distribution – records from coastal and shelf regions of Atlantic, Indian, and Pacific Oceans (Migotto and Cabral 2005).

Remarks: All the PCS specimens were found on the same morphotype of Bryozoa. The estuarine material was found on Bryozoa, Polychaeta tube, Ascidiacea, and the hydroids *Bougainvillea muscus*, *Cladocoryne floccosa*, *Clytia gracilis*, *Corydendrium parasiticum*, *Eudendrium merulum*, *Nemalium lighti*, *Obelia oxydentata*, *O. dichotoma*, *Pennaria disticha*, and *Plumularia floridana*.

**Suborder Eirenida Maronna, Miranda, Peña  
Cantero, Barbeitos and Marques, 2016**  
**Lovenellidae Russell, 1953**  
***Mitrocomium cirratum* Haeckel, 1879**

Fig. 12A–B

Synonyms available from: Calder (1991).

*Mitrocomium cirratum* Haeckel, 1879: 182, pl. 11, figs 9–11 [medusa].  
*Lovenella cirrata* –Vannucci, 1957: 60 [medusa].

Description: Colonies stolonal, up to 664 µm high, with several pedicels of variable length arising from a creeping hydrorhiza. Perisarc thin and smooth. Pedicel supporting a primary hydrotheca. Hydrothecae shallow, 317–649 µm high, 96–107 µm wide, rarely with renovations in the estuarine material and frequent ones in the PCS material. Secondary hydrothecae, arising inside the primary from pedicel of variable length. Margin entire, diaphragm distinct, large desmocytes present in a ring between diaphragm and margin. Hydranths of variable length, with a whorl of approximately 12 tentacles. Nematocysts mastigophores heteronemes? undischarged (29.4–35 × 8.8–11.2 µm).

Material examined: PCS – three infertile colonies from the dry and rainy seasons; VB – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00056; CNI-00135; CNI-00136; CNI-00137; CNI-00138.

Stations: PCS – 9; VB – C1P34, C1P56, C2P34, C2P56, C3P34, C3P56.

Bottom: mud.

Distribution: Brazil – the only Brazilian record for the polyp stage is from São Paulo (Fernandez et al. 2015). Migotto et al. (2002, as *Lovenella cirrata* (Haeckel, 1879)) mentioned the records for the medusa from Pará (Thiel 1938), São Paulo, and Paraná (Vannucci 1957). There is also a record of the medusa stage in Santa Catarina (Nogueira-Junior et al. 2015). World distribution – records from Atlantic (eastern and western), Indian, and Pacific Oceans (Calder 1991).

Remarks: Colonizing the plate, Bryozoa, Ostreidae, Ascidiacea, and the hydroids *Bimeria vestita*, *Obelia oxydentata*, and *Pennaria disticha*.

**Hebellidae Fraser, 1912**  
***Anthohebella communis* (Calder, 1991)**

Fig. 13A

Synonyms available from: Galea (2013).

?*Hebella scandens* –Vannucci, 1949: 236, pl. 2, fig. 22, 23; 1951a: 82 [not *Hebella scandens* (Bale, 1888)].

*Hebellopsis communis* Calder, 1991: 42, fig. 26; Oliveira et al., 2016: 78.

*Hebella communis* –Grohmann 2006.

Description: Colonies stolonal, up to 1.9 mm high, arising from a creeping hydrorhiza. Pedicels large, arising from the hydrorhiza, with variable length and perisarc moderately thick and completely annulated. Each pedicel gives rise to a hydrotheca. Hydrothecae cylindrical, elongated, 1.43–1.9 mm high, 0.46–0.71 mm wide, with perisarc thin, slightly curved to one side. Margin smooth, curved to the exterior, occasionally with renovations. Hydrothecal base rounded. Nematocysts (unidentified) found at the base of the hydrothecae (13.8–17.5 × 4.4–4.7 µm).

Material examined: PCS – three infertile colonies from the rainy season. CZUFS CNI-00266; CNI-00267.

Stations: PCS – 11 e 18.

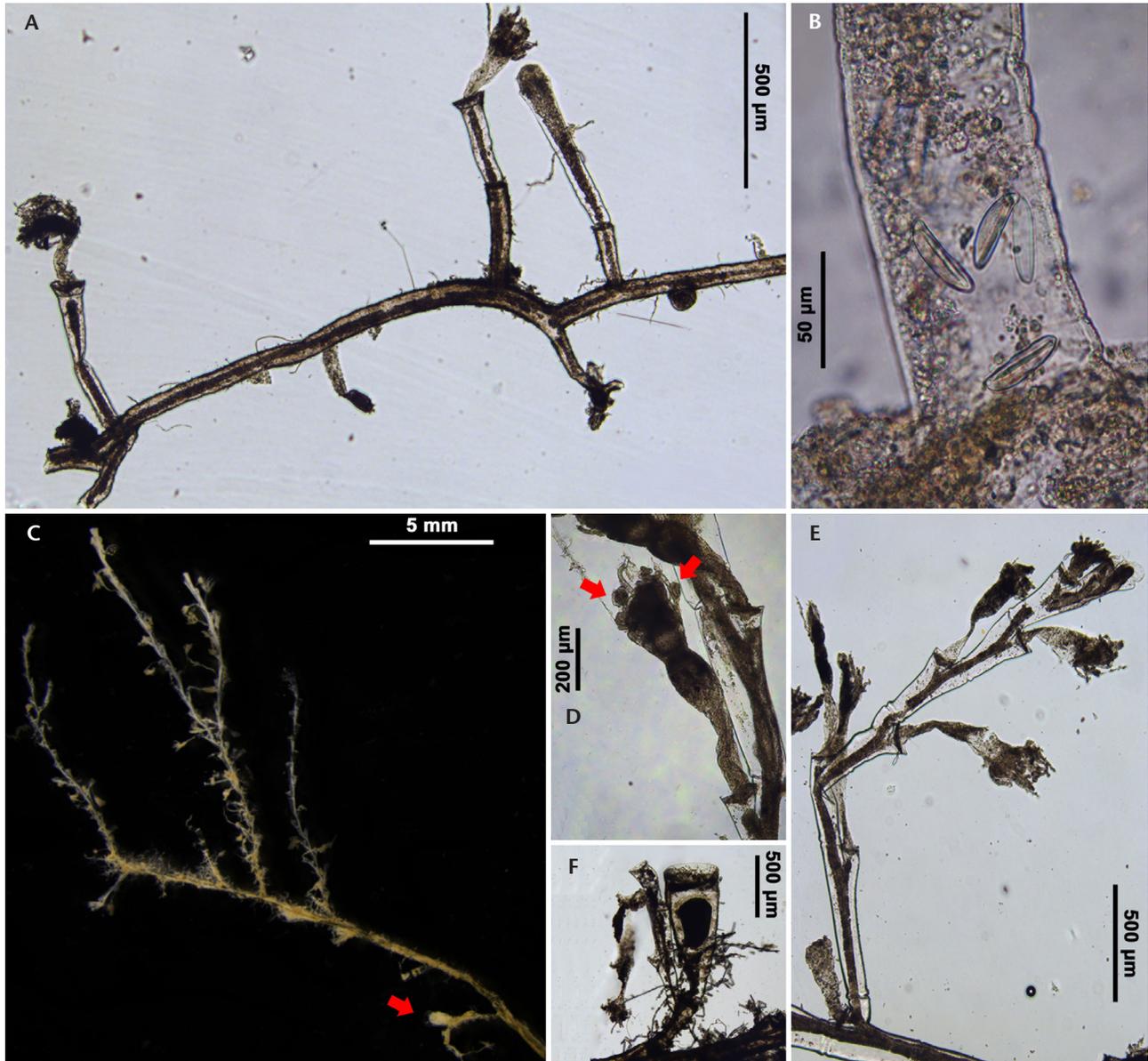


Figure 12. (A-B) *Mitrocomium cirratum*: (A) general view of a colony; (B) detail of the proximal region of a polyp showing some nematocysts; (C-F) *Nemalecium lighti*: (C) general view of a stem showing a gonotheca (red arrow); (D) detail of a colony highlighting a hydranth with a pair of nematodactyls (red arrows); (E) detail of a colony with hydranths; (F) detail of the stem showing a gonotheca.

Bottom: gravel and mud.

Distribution: Brazil – Calder (1991, 2013) considered the records of *Hebella scandens* made by Vannucci (1949, 1950) from Espírito Santo and Rio de Janeiro as *Anthohebella communis*. The species also has records from Rio de Janeiro (Grohmann et al. 2003), Espírito Santo (Grohmann 2006), and São Paulo (Silveira and Morandini 2011), all of them as *Hebellopsis communis*. World distribution – Bermuda (Calder 1991), ?Cuba (Castellanos-Iglesias et al. 2011), Florida (Calder 2013), and Martinique (Galea 2013).

Remarks: Colonies found on the hydroids *Aglaophenia rhynchocarpa*, *Hincksella formosa*, *Sertularelloides cylindritheca*, and *Thyroscyphus ramosus*.

*Hebella venusta* (Allman, 1877)

Fig. 13B

Synonyms available: Calder (1991).

*Lafoea venusta* Allman, 1877: 11, pl. 6, fig. 2, 3.

Description: Colonies stolonal, up to 860 µm high, arising from a creeping hydrorhiza giving rise to large pedicels of variable high. Perisarc moderately thick, smooth or waved. Each pedicel carries a cylindrical and deep hydrotheca, 646–860 µm high, 304–317 µm wide. Hydrothecal wall with distinct waves. Margin smooth, straight, rarely with renovations, damaged in most of the polyps. Nematocysts euryteles? (17.9–22.6 × 5.1–6.2 µm) found on pedicels.

Material examined: PCS – three infertile colonies from the rainy season. CZUFS CNI-00140.

Stations: PCS – 5 e 14.

Bottom: mud.

Distribution: Brazil – Bahia (Shimabukuro 2007). World distribution – Calder (1991) mentioned the records from Bermuda, Western Atlantic, and a doubtful record to the Indian Ocean.

Remarks: Colonies found only on the hydroid *Synthecium tubithecum*.

### *Hebella scandens* (Bale, 1888)

Fig. 13C

Synonyms available from: Boero et al. (1997).

*Lafoea scandens* Bale, 1888: 758, pl. 13, figs 16–19.

*Hebella scandens* Vannucci, 1950: 85, Vannucci, 1951a: 82–83, Deevey, 1954: 270, Vannucci, 1954: 114–115.

*Hebellopsis sinuosa* Vannucci, 1949.

*Hebellopsis besnardi* Vannucci, 1950.

*Hebella cylindrica* –Vannucci 1951a.

Description: Colonies stolonal, up to 455 µm high, arising from a creeping hydrorhiza that gives rise to short and narrow pedicels. Perisarc moderately thick and smooth. Each pedicel

carries a hydrotheca. Hydrothecae cylindrical and elongated, 408–455 µm high, 114–157 µm wide. Hydrothecal wall smooth and with a thin perisarc. Margin smooth, straight, and rarely with renovations. Few hydrothecae with cracks in the edge. Diaphragm visible in few polyps, straight and moderately thick. Few hydranths were found, those partially degraded, but long and with six tentacles.

Material examined: PCS – two infertile colonies one from the dry season and the other from the rainy. CZUFS CNI-00141; CNI-00330.

Station: PCS – 5.

Bottom: sand.

Distribution: Brazil – Ceará (Marques et al. 2006), Espírito Santo (Vannucci 1949, 1951a, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci 1951a, Nogueira et al. 1997, Grohmann et al. 2003, Miranda et al. 2015), São Paulo (Migotto 1996, Silveira and Morandini 2011, Miranda et al. 2015), and Santa Catarina (Shimabukuro 2007, Miranda et al. 2011, 2015, Denise M. Menon unpub. data). World distribution – circumglobal (Millard 1975), except Polar Regions (Calder 2013).

Remarks: Colonies found on the hydroids *Dynamena disticha* and *Tridentata marginata*.

### Order Lafoeida Bouillon, 1984 *sensu novum*

#### Lafoeidae Hincks, 1869

#### *Filellum* sp.

Fig. 11E

Description: Colonies stolonal, up to 915 µm. Hydrothecae sessile, 315–915 µm high, 68–123 µm wide, arising from the

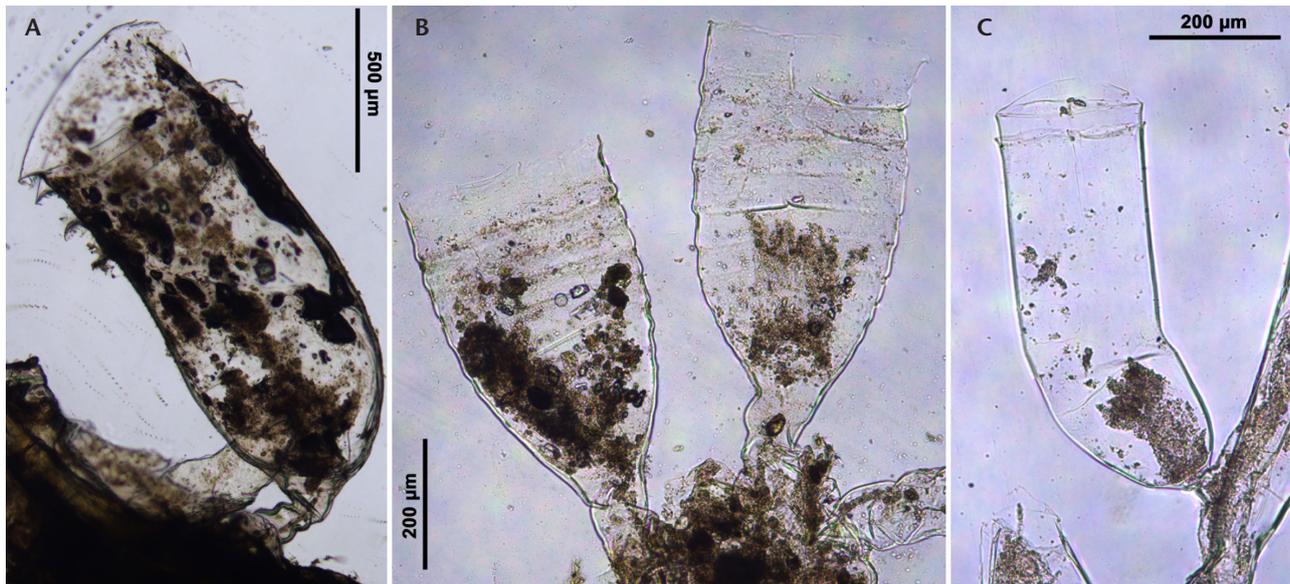


Figure 13. (A) *Anthohebella communis*: general view of a polyp; (B) *Hebella venusta*: general view of two polyps; (C) *Hebella scandens*: general view of a polyp.

hydrorhiza at variable patterns. Hydrothecae with at least half of their size adnate to the substrate and the free part emerging in the opposite direction from the substrate at variable angles. Hydrothecal adnate portion tubular, with numerous external transverse grooves in the exposed portion. Free hydrothecal portion cylindrical, generally elongated, with margin uniform and smooth, generally with renovations.

Material examined: PCS – abundant infertile colonies from the dry and rainy season; VB – few infertile colonies from the dry season; SE – few infertile colonies from the dry and rainy seasons; JB – one infertile colony from the dry season.

Stations: PCS – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16 e 17; VB – C1P56, C2P34, C3P56; SE – C1P34, C2P12, C2P34, C2P56; JB – C3P56.

Bottom: gravel, sand, and mud.

Taxonomic remarks: The specimens found in Sergipe resemble *Filellum serratum* (Clarke, 1879). This species is known by several external transverse grooves in the adnate portion of hydrothecae. However, Marques et al. (2011) discussed that this character is not enough to distinguish it from *F. antarcticum* (Hartlaub, 1904), *F. magnificum* Peña Cantero, Svoboda & Vervoort, 2004 and *F. nitidum* Watson, 2005, because all of them has grooves in the adnate portion of hydrothecae. These authors also specified that only the coppina characteristics are sufficient to differentiate those species. As a coppinia was not found in material from Sergipe, a reliable identification was not possible.

Remarks: Colonies from PCS found on Porifera, Anthozoa (*Carijoa* sp.), Bryozoa, and an aglaopheniid hydroid, a bougainvilliid hydroid, *Eudendrium carneum*, a haleciid hydroid, *Idiellana pristis*, *Obelia* spp., and *Sertularelloides cylindrica*. Estuarine material was found on algae, Bryozoa, and the hydroids *Cladocoryne floccosa*, *Corydendrium parasiticum*, *Eudendrium merulum*, and *Plumularia floridana*.

## Synthechiidae Marktanner-Turneretscher, 1890

### *Hincksella formosa* (Fewkes, 1881)

Fig. 14A–B

Synonyms available from: Galea (2013).

*Sertularella formosa* Fewkes, 1881: 130.

Description: Colonies erect, up to 8 cm high, arising from a creeping hydrorhiza. Stem monosiphonic, divided into internodes by transverse and oblique nodes. Stem internodes giving rise to hydrothecae and hydrocladia, both disposed alternately. Hydrocladia 0.9–2.1 cm long, arising from the stem just below or behind the caulinar hydrothecae in angles of 83–96°. Stem separated into internodes by transverse nodes, each internode with a hydrotheca arising at the distal end, just below the node. Hydrothecae cylindrical, relatively short, 0.93–1.26 mm high, 0.53–0.77 mm of maximum width, arising from a long apophysis concerning the hydrothecal length, with a distinct septum separating the apophysis from the hydrothecae. Hydrothecae adcaulinar wall straight, abcaulinar one slightly convex in the

medial portion. Margin smooth, with several renovations, aperture circular, without operculum. Gonothecae elongated, 1.9–2.4 mm high, 1.0–1.4 mm wide, arising in a short pedicel at the lateral intersection between the stem and the hydrocladium. Adcaulinar and abcaulinar walls of gonothecae convex from the basal to the medial portion and concave in the distal portion. Gonothecal margin with three cusps and an operculum with four valves.

Material examined: PCS – few colonies, three of them with gonothecae, from the dry and rainy seasons. CZUFS CNI-00037; CNI-00142; CNI-00143.

Stations: PCS – 3, 11, 12, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Bahia, sampled by the “Challenger Expedition (1873-1876)” (Allman 1888, as *Sertularia integritheca*). World distribution – widely distributed in tropical regions at Western and Eastern Atlantic (Galea 2013).

Taxonomic remarks: The species was originally described as *Sertularella formosa* Fewkes, 1881 and, later as *Sertularia integritheca* Allman, 1888. It was then relocated in the genus *Synthecium* (as *S. formosum* (Fewkes, 1881), Migotto et al. 2002) and, later was changed to the genus *Hincksella* (Grohmann et al. 2016).

Remarks: unknown substrate.

### *Hincksella pusilla* (Ritchie, 1910)

Fig. 14C–D

Synonyms available from: Galea (2010).

*Sertularella cylindrica* var. *pusilla* Ritchie, 1910: 817, pl. 77, fig. 9. *Hincksella cylindrica*. – Galea, 2010: 20, figs 5N–P (synonymy) (not *Sertularella cylindrica* Bale, 1888: 765, pl. 16, fig. 7).

Description: Colonies erect, up to 10.4 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, unbranched, divided into internodes by slightly oblique nodes. The first internode ahydrothecate, with an indistinct node, separates it from the others. Remaining internodes with hydrothecae. Hydrothecae tubular, 0.36–0.47 mm high, 0.11–0.18 mm wide at the margin, arising from the distal portion of the internodes, adnate to the internode for about one-third of its length, free portion curved slightly to outside. Adcaulinar hydrothecal wall slightly convex and abcaulinar straight, except the base. Margin smooth, aperture rounded, without operculum.

Material examined: PCS – two infertile colonies from the rainy season. CZUFS CNI-00038.

Stations: PCS – 4, 5, 12.

Bottom: sand.

Distribution: Brazil – Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Grohmann et al. 2003), Rio de Janeiro (Miranda et al. 2015), and Santa Catarina (Bouzon et al. 2012). World distribution – circumglobal with records from Atlantic, Pacific, and Indian Oceans (Calder 1991).

Taxonomic remarks: Galea and Ferry (2015) present a discussion in respect to the distinction between *Hincksella cylindrica* var. *pusilla* and *H. cylindrica sensu* Preker and Lawn

(2010), both distinguished by the proportion of hydrothecae attached to the stem, the first having from 1/3 to 1/4 of their length attached and the second at least half of its length. The authors also mentioned that those differences could be enough to raise the variety *pusilla* to species status. Even if *H. pusilla* is not already recognized as valid in WoRMS (2022), the morphology found in specimens from Sergipe matches the description and illustrations of *H. cylindrica* var. *pusilla* presented by Vervoort (1959, p. 245-247, figures 18, 19a), Millard (1975, p. 232-234, figure 76B-E), and Galea and Ferry (2015, p. 236, figure 6H, I).

Remarks: Found colonizing algae, Bryozoa, and the hydroids *Sertularelloides cylindritheca*, and *Thyrosocyphus marginatus*.

### *Syntheticium tubithecum* (Allman, 1877)

Fig. 14E–G

Synonyms available from: Galea (2010).

*Sertularia tubithecica* Allman, 1877: 24, pl. 16, fig. 5, 6.

*Syntheticium tubithecum* Vannucci, 1950: 86, pl. 1, fig. 4, Vannucci, 1951b: 83, Mañal, 1983: 5, fig. 1, 2.

Description: Colonies erect, up to 2.4 cm high, arising from a creeping hydrorhiza. Stem monosiphonic, straight, divided into internodes of variable length, separated by indistinct nodes. Cauline internodes with either a pair of opposite/subopposite hydrothecae or a pair of distal opposite apophysis, each supporting a hydrocladium. Hydrocladium of variable height (6.2–9.2 mm high), arising from the stem at angles of 111–120.6°, unbranched, divided into internodes by transverse nodes, sometimes not visible. Each internode of hydrocladium with a pair of opposite or subopposite hydrothecae. Pairs of hydrothecae of stem and hydrocladium are similar, never touching each other in the inferior or superior region. Hydrothecae tubular, 0.53–0.66 mm high, 0.18–0.24 mm wide, adnate to the stem for more than half of their length, curving abruptly to the exterior in the distal free portion. Adcaulinar hydrothecal wall straight in the adnate portion and convex in the free one, abcaulinar wall slightly convex in the basal portion and concave in the distal one. Hydrothecal margin smooth, generally with renovations, aperture round, without operculum. Male and female colonies found; male gonotheca arising from inside the hydrothecae in the stem and female ones from the stem and the hydrocladia. Male gonothecae elongated, 1.04–1.31 mm high, 0.52–0.58 mm wide, in the form of a cocoon, generally larger in the medial portion, arising from the pedicel inserted in the hydrothecae, perisarc waved in both laterals or waved in the external wall and smooth in the internal one. Female gonothecae small, 0.6–0.79 mm high, 0.64–0.76 mm wide, sac-shaped, wider in the median portion, perisarc with several transverse ribs crossing all their length. The majority of the male and female gonothecae were empty in the material; however, few females had a single egg in the interior. Nematocysts macrobasic mastigophores discharged (34.7–38.1 × 8.4–10.3 µm) in the coenosarc of stem, hydrothecae, hydrocladium, and gonotheca (male and female).

Material examined: PCS – abundant colonies with and

without gonothecae (male and female) from the dry and rainy seasons. CZUFS CNI-00145; CNI-00146; CNI-00147.

Stations: PCS – 4, 5, 9, 11, 12, 15, 16, 18.

Bottom: sand, and mud.

Distribution: Brazil – Pernambuco (Mañal 1983), Espírito Santo (Vannucci 1950), and Rio de Janeiro (Vannucci 1951b, Grohman et al. 2003, Shimabukuro 2007, Miranda et al. 2015). World distribution – widely distributed at Western and Eastern Atlantic (Calder 1991).

Remarks: A few stems were found attached to substrates, including algae, Bryozoa, and *Sertularelloides cylindritheca*. Zooxanthellae were found on the stem, hydrocladium, hydrothecae, and gonangia.

### Order Macrocolonia Leclère, Schuchert, Cruaud, Couloux & Manuel, 2009

#### Haleciidae Hincks, 1869

#### Haleciidae sp. 1

Fig. 15A–B

Description: A single colony with few polyps, 977 µm high. Primary hydrothecae arising directly from the hydrorhiza, 204–303 µm high, 100–109 µm wide at the margin, perisarc thin, wavy at the hydrothecal base. Few secondary hydrothecae short, arising just above the primary ones. One hydrotheca with a tubular hydranth. Gonotheca arising from a short pedicel in the lateral of a primary hydrotheca, pear-shaped, 581 µm high, 365 µm wide, with a lateral aperture with desmocytes at the margin.

Material examined: PCS – one colony with few polyps and one female gonotheca from the dry season.

Station: PCS – 2.

Bottom: mud.

Remarks: Unknown substrate.

#### Haleciidae sp. 2

Fig. 15C–E

Description: Colonies erect, up to 22.8 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, with hydrotheca arising alternately from the stem or irregular ramification. Perisarc is moderately thick, with annulations at the beginning of the stem, in all the segments that carry hydrothecae, and less frequently, at the beginning of the branches. Hydrothecae shallow, 47–64 µm high, 100–153 µm wide, with a desmocyte ring above the diaphragm. Primary hydrothecae sessile, secondary and tertiary ones arising from pedicels of variable heights.

Material examined: PCS – few infertile colonies from the dry and rainy seasons; VB – one infertile colony from the dry season.

Stations: PCS – 4, 5, 11, 12, 18; VB – C2P34.

Bottom: gravel and sand.

Taxonomic remarks: The colony structure resembles *Nemalium lighti*, however, the absence of hydranths and gonotheca did not allow a better identification for this material.

Remarks: Colonizing algae and Bryozoa.

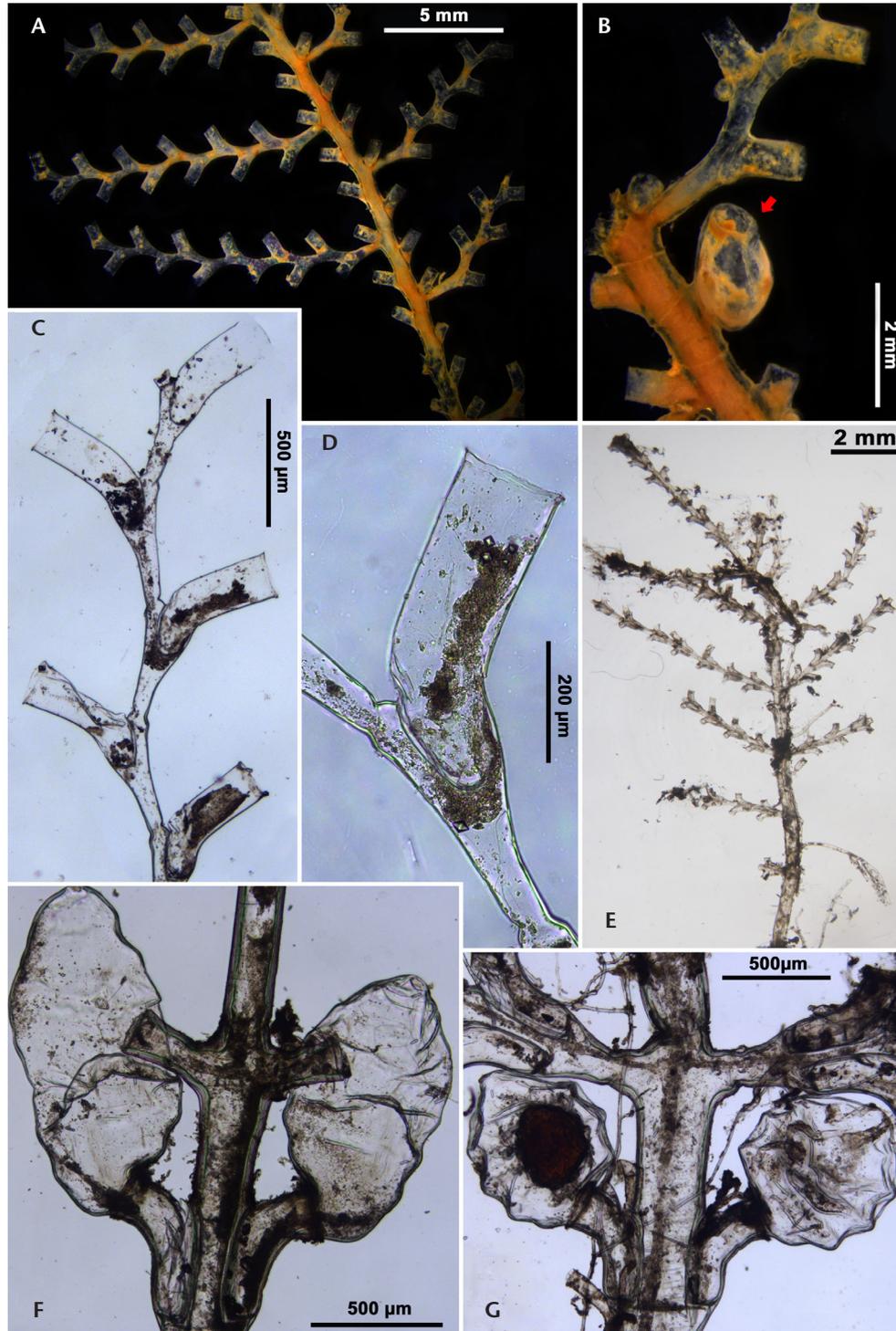


Figure 14. (A-B) *Hincksella formosa*: (A) general view of a stem showing several hydrocladia with hydrothecae; (B) detail of the stem with a gonotheca (red arrow); (C-D) *Hincksella pusilla*: (C) general view of the distal part of a stem with hydrothecae; (D) detail of an intersegment with a hydrotheca; (E-G) *Synthecium tubithecum*: (E) general view of a stem showing stem and hydrothecae; (F) detail of a stem with a pair of hydrothecae bearing two male gonothecae; (G) detail of the stem with a pair of hydrothecae bearing two female gonothecae.

### *Halecium pusillum* Sars, 1856

Fig. 15F–H

Synonyms available from: Peña Cantero and Carrascosa (2002).  
*Eudendrium pusillum* M. Sars, 1857: 154, pl. 1, figs 14–16.

Description: Colonies erect, up to 15 mm high, arising from a creeping hydrorhiza. Stem monosiphonic. Perisarc is moderately thick, with several annulations across it. Hydrocladia arise laterally just below the hydrothecae. Primary hydrothecae shallow, 257–543 µm high, 93–115 µm wide at the margin, with a ring of desmocytes above the diaphragm. Secondary hydrothecae arise directly from the primary ones, supported by a pedicel. One female gonotheca found, 877 µm high, 470 µm wide, completely annulated, with a lateral aperture, desmocytes present. Male gonothecae oval with transverse waves along their length, 437–642 µm high, 231–313 µm wide. Nematocysts microbasic euryteles discharged (8.6–10 × 4.02–4.8 µm).

Material examined: PCS – few colonies with and without gonothecae (male and female) from the dry and rainy seasons. CZUFS CNI-00148; CNI-00324.

Stations: PCS – 5, 6, 16, 17.

Bottom: mud.

Distribution: Brazil – This is the first record from the Brazilian coast. World distribution – Peña Cantero and Carrascosa (2002) and Gravili et al. (2015) considered the species circumglobal distributed, mainly in the Mediterranean and Atlantic portions of Europe and also in the South Atlantic (Franch Guiana, Leloup 1960) and Pacific (Ecuador, Calder et al. 2003). Additionally, there is a record from the Caribbean Sea (Cuba, Castellanos-Iglesias 2017).

Taxonomic remarks: The intensity of the waves found on the perisarc of material from Sergipe is similar to that described by Peña Cantero and Carrascosa (2002) and, quite different from that described by Gravili et al. (2015) that mentions the perisarc waves in pedicel as extremely intense. The intensity of the waves seems to be a variable character, including between colonies in the same place, as in the PCS. *Halecium pusillum* resembles *H. corrugatissimum* Trebilcock, 1928 but is differentiated from this species because *H. corrugatissimum* has hydrothecae with everted margin (Schuchert 2005, p. 635).

Remarks: Zooxanthellae found on the peduncle, ramifications, and gonangia. Colonies found on algae.

### *Nemalecium lighti* (Hargitt, 1924)

Fig. 12C–F

Synonyms available from: Galea (2008).

*Halecium lighti* Hargitt, 1924: 489, pl. 4 fig. 13.

*Nemalecium lighti* – Bouillon, 1986: 73, figs 1–4, pls. 1–3, –Calder, 1991d: 27, fig. 17, 18, –Migotto, 1996: 36, fig. 7H, I, –Gravili-Bonnet and Migotto, 2000: 207, fig. 1, 2.

Description: Colonies erect, up to 41.6 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, branched alternately or irregularly. Perisarc is moderately thick with

annulations at the stem base, each ramification and internode with hydrothecae. Each internode carries a primary hydrotheca. Secondary hydrothecae with pedicel, arising from inside the primary ones or laterally to those, just below the primary hydrothecae. All hydrothecae shallow, 99–111 µm high, 112–132 µm wide, with a ring of large desmocytes. Hydranths elongated, with a constriction just below the tentacle insertion, with a whorl of 15–17 filiform tentacles. Most of the hydranths with a pair of short round nematodactyls. Only female gonothecae found, 1–3 per colony, in the form of an inverted cone, 2–2.6 mm high, 0.56–1.16 mm in maximum width, perisarc thick and smooth, arising from pedicel in the stem and carrying eggs. Nematocysts (large pseudostenoteles) were seen on hydranths and nematodactyls (35–36 × 12 µm).

Material examined: VB – few colonies, one of them with female gonothecae, from the dry and rainy seasons. CZUFS CNI-00055; CNI-00150.

Stations: VB – C1P12, C2P12, C2P34, C2P56, C3P12, C3P34, C3P56.

Distribution: Brazil – Pernambuco (Oliveira et al. 2009, abstract), Espírito Santo (Grohmann et al. 1997), Rio de Janeiro (Nogueira et al. 1997, Miranda et al. 2015), and São Paulo (Marques et al. 2001, 2013, Silveira and Morandini 2011, Fernandez et al. 2015). World distribution – Atlantic, Indian and Pacific (western) Oceans (Calder 1991).

Remarks: Colonizing the plates, and also on Bryozoa, Ostreidae, Ascidiacea, and the hydroids *Corydendrium parasiticum* and *Penmaria disticha*. One case of poisoning is recorded for this species to São Paulo (Marques et al. 2002). Several stems were covered by algae and diatoms.

### Suborder Plumupheniida Maronna, Miranda, Peña Cantero, Barbeitos & Marques, 2016 Aglaopheniidae Marktanner-Turneretscher, 1890 *Aglaophenia latecarinata* Allman

Fig. 16A–B

Synonyms available at: Calder (1997).

*Aglaophenia perpusilla* Allman, 1877: 48, pl. 29, figs 5–7.

*Aglaophenia latecarinata* Allman, 1877: 55, –Vannucci Mendes, 1946, –Vannucci, 1949, 1951a, –Mañal, 1983 [incorrect original spelling].

*Aglaophenia perforata* –Vannucci, 1951b [polyp];

*Aglaophenia minuta* –Mañal, 1973 [polyp].

Description: Colonies erect, up to 9.1 cm high, arising from a creeping hydrorhiza. Stem monosiphonic, unbranched, divided into two regions, a basal one varying in length with few nematothecae, without apophysis or hydrocladia, separated from the distal region by an internode with nematothecae. Cauline nematothecae short, tubular, with a small aperture. The distal region of stem carrying hydrocladia inserted in apophysis separated by internodes. Internodes composed of apophysis carrying one hydrocladium and four nematothecae, one inferior, one front-lateral situated in the hydrocladial

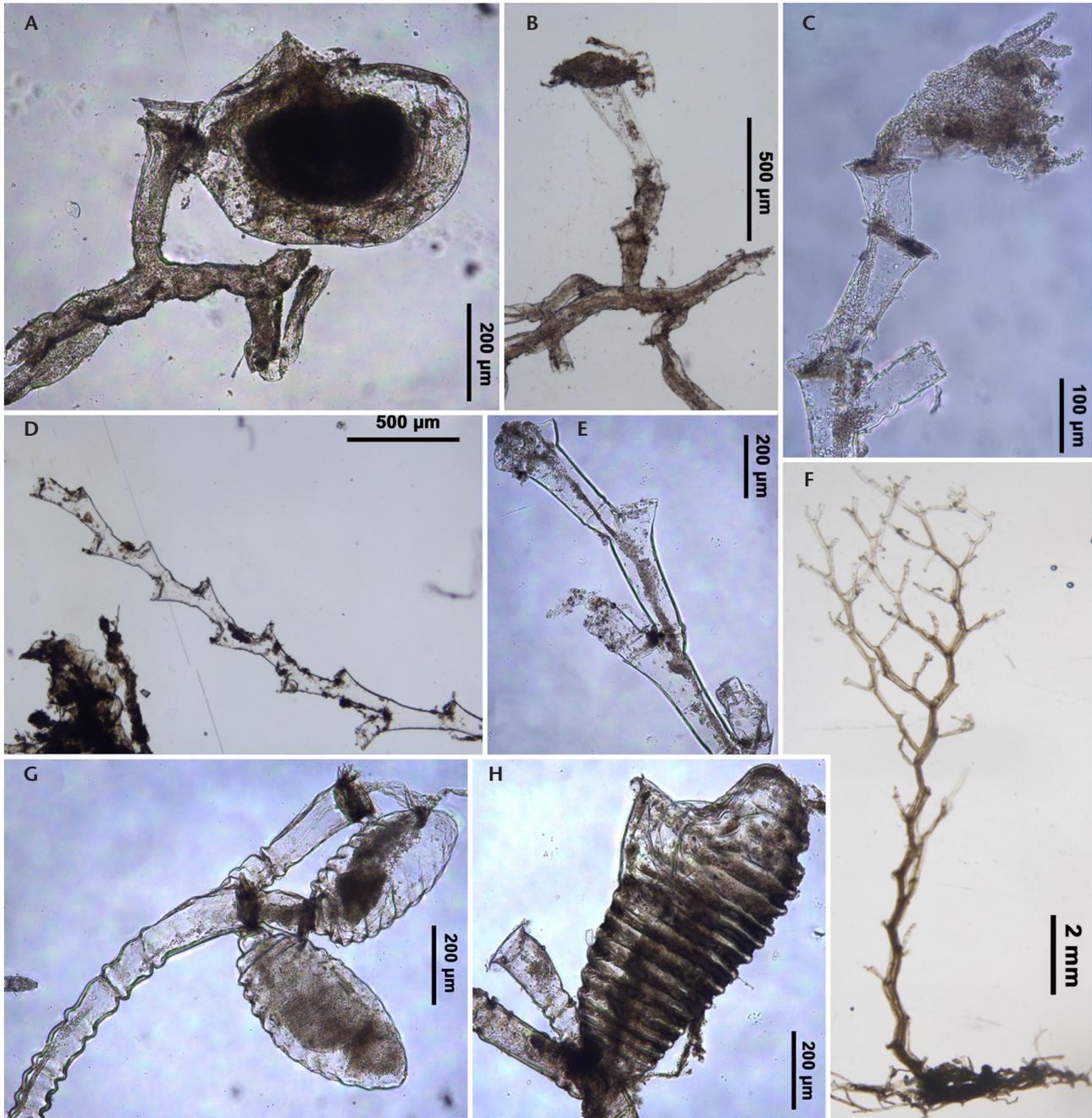


Figure 15. (A-B) *Haleciidae* sp. 1: (A) detail of a polyp with a gonotheca; (B) detail of a polyp with an expanded hydranth; (C-E) *Haleciidae* sp. 2: (C) detail of a stem showing a hydranth; (D) detail of a stem ramification; (E) detail of the distal region of a stem; (F-H) *Halecium pusillum*: (F) general view of a stem; (G) detail of a stem with two male gonothecae; (H) detail of a stem with a female gonotheca.

apophysis, and a pair of small, sac-shaped, axillary ones. Periarcs thick in the stem basal portion, becoming thinner distally and in the hydrocladia. Apophysis short, with a cone-shaped mamelon that gives rise to a hydrocladium alternately, with

spaces between them. Hydrocladia unbranched, 1–5 mm high, arising from angles of 97.9–124.1° from the stem. Hydrocladial internodes are composed of one hydrotheca directed upwards, one median inferior nematotheca, and one pair of lateral ones.

The internode portion opposite to the hydrothecae with two prominent internal septa, one parallel to the intrathecal septa, a second parallel to the lateral nematothecae, and a third one, less prominent, between the other two. Hydrothecae near each other, cylindrical, 259–274 µm high, 152–166 µm wide, adnate to the hydrocladium along almost all its length, with distal portion free. Abcaulinar hydrothecal wall convex in the basal portion and almost straight distally, intrathecal septa prominent, straight or slightly oblique, extending from the adcaulinar portion to the abcaulinar one. Hydrothecal margin with nine cusps, one median, and eight laterals (four on each side). Adcaulinar median cusps are large, sharp, extending from the intrathecal septa to the hydrothecal margin. The first and last pair of cusps beginning in the abcaulinar region, shorter and thinner than the other ones. Intermediate pair of cusps larger and rounded. Inferior median nematothecae tubular, adnate to the hydrothecae by their abcaulinar basal portion, with most of its length free distally and aperture circular. Lateral nematothecae tubular, adnate basally to the internode and laterally to the hydrothecal wall, curved upward, following the hydrothecae format, surpassing the hydrothecal margin, with a circular aperture. Corbulae oval in form, 1482–1655 µm high, 98–124 µm width, with long and elongated extremities, arising from the stem at the basal region, just before the hydrocladial insertion, 1–3 per colony. Each corbula composed of a basal hydrotheca and a nonfragmented rachis, with ribs formed by nematothecae.

Material examined: PCS – abundant colonies with corbulae from the dry and rainy seasons. CZUFS CNI-00011; CNI-00151; CNI-00152; CNI-00153.

Stations: PCS – 1, 2, 3, 4, 5, 6, 8, 9, 11, 12, 15, 16 e 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Marques et al. 2006, Shimabukuro 2007), Fernando de Noronha (Pires et al. 1992, Amaral et al. 2009), Paraíba (Felipe F. Campos unpub. data), Pernambuco (Oliveira et al. 2009, abstract), Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Grohmann et al. 2003, 2016), Espírito Santo (Vannucci 1951b, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci Mendes 1946, Vannucci 1951a, Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1951a, Oliveira et al. 2006, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Marques et al., 2013, Miranda et al. 2015), Paraná (Vannucci Mendes 1946, Miranda et al. 2015, Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2011, 2015, Bouzon et al. 2012). World distribution – records from the Atlantic (western and eastern), Indian, and Pacific (western) oceans (Calder 1997).

Remarks: Colonizing algae, Anthozoa (*Carijoa* sp.), Bryozoa, and the hydroids *Hincksella formosa*, *Sertularelloides cylindricus*, *Syntheicum tubithecum*, *Thyrosocyphus marginatus*, and *T. ramosus*. Autoepizoism was observed, with small stems of *A. latecarinata* colonizing bigger stems of *A. rhynchocarpa*.

## *Aglaophenia rhynchocarpa* Allman, 1877

Fig. 16D, E

Synonyms available from: Calder (1997) and Galea (2013).  
*Aglaophenia rhynchocarpa* Allman, 1877: 40, pl. 23, figs 5–8.

Description: Colonies erect, up to 3.8 cm high, arising from a creeping hydrothiza. Stem monosiphonic, unbranched, separated into two regions, one basal with nematothecae, without apophysis or hydrocladia, articulated with a distal region. Distal region carrying hydrocladia inserted in apophysis and separated by internodes. Internodes composed of apophysis carrying hydrocladium and also by a pair of axillar nematothecae and one inferior nematotheca. Perisarc thick at the basal portion of the stem, becoming thinner distally and at the hydrocladium. Apophysis short, with a mamelon, giving rise to a hydrocladium alternately, with short spaces between them. Hydrocladia unbranched, 929–2643 µm high, arising in angles of 127.7–143.2° from the stem. Hydrocladia divided into internodes; each with a hydrotheca directed upward, one median inferior nematotheca and a pair of laterals ones. Cauline nematothecae tubular, short, with a short aperture. The posterior region with a hydrotheca in each internode, four internal septa, the first positioned at the hydrothecal base, the second parallel to an intrathecal septum base, the third located between the second and the fourth, and the fourth at the base of lateral nematothecae. Hydrothecae next to each other, cylindrical, moderately elongated, 271–184 µm high, 135–170 µm wide, adnate to the hydrocladium along almost all their length, with a distal free portion. Abcaulinar hydrothecal wall convex at the basal portion, concave in the median portion and almost straight distally, intrathecal septum prominent, oblique, extending itself in the adcaulinar portion to the abcaulinar one. Hydrothecal margin with nine cusps, one median, and eight laterals (four on each side). Median abcaulinar cusps long, in the shape of a horn, directed to the exterior and surpassing the hydrothecae. First pair of abcauline cusps posterior to the median ones, short and sharp, not too large, second pair long, larger and sharper, third pair longer, larger and sharper than the first and second ones, and the last pair with short, thin, and sharp cusps. Inferior median nematothecae tubular, adnate to the abcaulinar wall in the basal portion of the hydrothecae, with the distal part of their length free, aperture circular. Lateral nematothecae tubular, adnate basally to the internode and laterally to the hydrothecal wall, curved up, following the hydrothecal form, not reaching its margin, aperture circular. Corbulae elongate, 2652–4501 µm high, 465–880 µm wide, composed of one basal hydrotheca and one unbranched rachis, carrying several processes in the form of spines and ribs formed by nematothecae. Corbulae arising from the stem, between hydrocladia, one to five per colony.

Material examined: PCS – abundant colonies with corbulae from the dry and rainy seasons. CZUFS CNI-00012; CNI-00155; CNI-00156.

Stations: PCS – 1, 3, 5, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17.

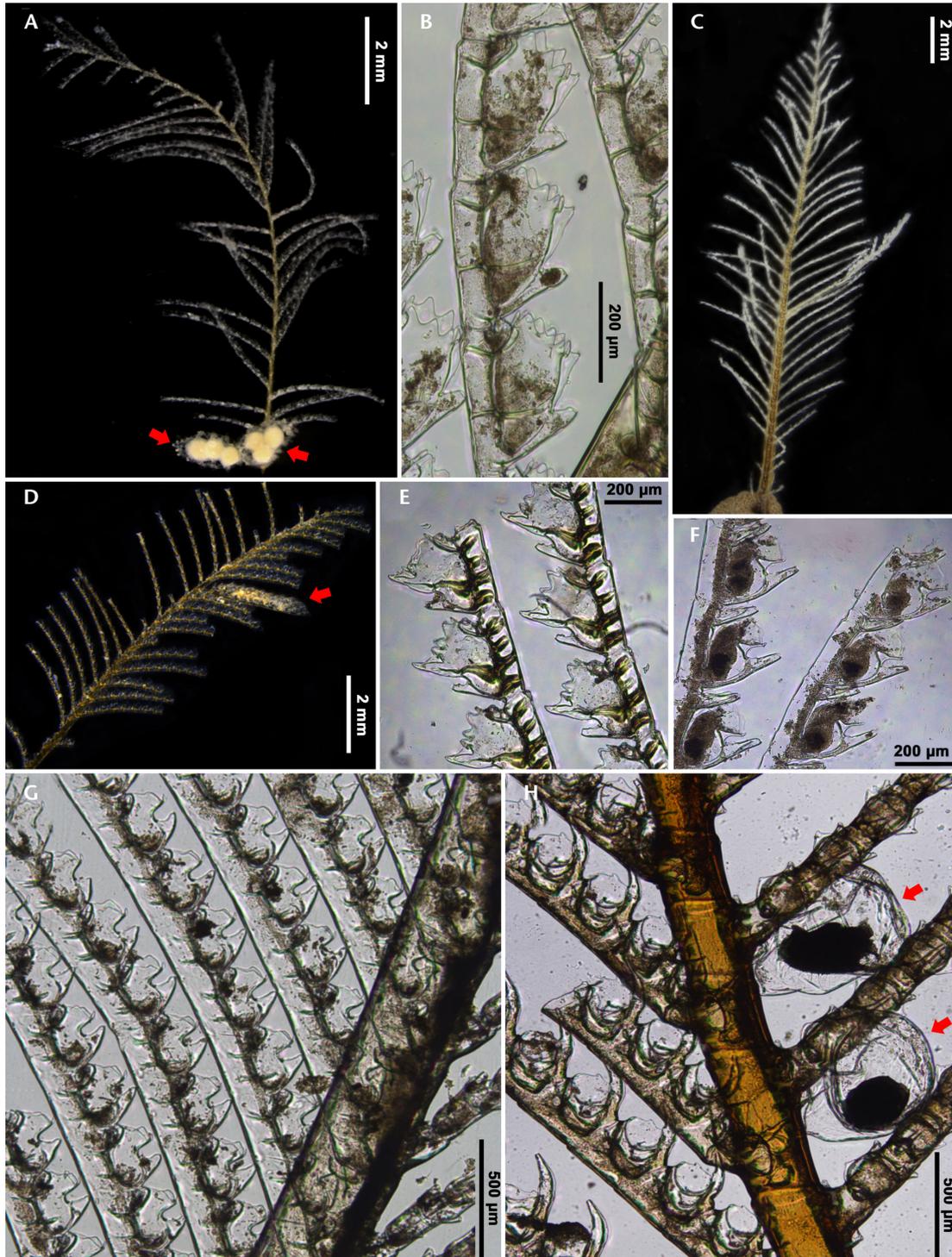


Figure 16. (A-B) *Aglaophenia latecarinata*: (A) general view of a stem with two corbulae (red arrows); (B) detail of a hydrocladium; (C, F) *Macrorhynchia philippina*: (C) general view of a stem; (F) detail of two hydrocladia; (D-E) *Aglaophenia rhynchoarpa*: (D) general view of a stem with a corbula (red arrow); (E) detail of two hydrocladia; (G) *Lytocarpia tridentata*: detail of a stem with several hydrocladia; (H) *Gymnangium allmani*: detail of a stem with several hydrocladia and two gonothecae (red arrows).

Bottom: gravel, sand, and mud.

Distribution: Brazil – Arquipélago do São Pedro e São Paulo (Amaral et al. 2000), Alagoas (Maximiliano M. Maronna unpub. data), Bahia and Espírito Santo (Grohmann et al. 2003), Rio de Janeiro (Grohmann et al. 2011), and Paraná (Miranda et al. 2015). World distribution – Western and Eastern Atlantic (Calder 1997).

Taxonomic remarks: Young colonies differ from the older ones by the size of the inferior median nematotheca, the younger ones being smaller than the adults; besides that, the hydrotheca is shorter and the intrathecal septa are not as angular as in the older colonies.

Remarks: Colonizing algae, Anthozoa (*Carijoa* sp.), Bryozoa, and the hydroids *Hincksella formosa*, *Sertularelloides cylindricheca*, *Tridentata marginata*, *Thyroscyphus marginatus*, and *T. ramosus*. Autoepizoism observed, with small stems of *A. rhynchocarpa* colonizing bigger stems for the same species and *A. latecarinata*.

### *Gymnangium allmani* (Marktanner-Turneretscher, 1890)

Fig. 16H

Synonyms available from: Galea (2013).

*Halicornaria allmani* Marktanner-Turneretscher, 1890: 277 (new name; not pl. 6 fig. 23 = *Gymnangium* sp.).

*Halicornaria pennatula* –Mañal, 1983: 8, fig. 14 (not *Sertularia pennatula* Ellis and Solander, 1786).

*Gymnangium longicaudum* –Migotto et al., 2002 [polyp].

Description: Colonies stolonial, up to 3.6 cm high. Stems without hydrorhiza in the samples. Stem monosiphonic, unbranched, straight or slightly curved back, divided into two regions, a basal one with lateral nematothecae and apophysis without hydrocladium, and a distal one with hydrocladia carrying hydrothecae. Distal regions with internodes are composed of a short apophysis that carries a hydrocladium and nematothecae. Internode apophyses disposed alternately in successive internodes. Hydrocladia 10–13 mm high, arising from angles of 109.1–127.7° at the stem and divided into several internodes by oblique nodes. Each internode is composed of a hydrotheca and three nematothecae, two laterals, and a median one. Hydrothecae cylindrical, short, 185–208 µm high, 171–193 µm wide, curved to the exterior, adnate to the hydrocladium along almost all their length, with a short distal extremity free. Intrathecal septa prominent, extending itself from the abcaulinar margin to half of the hydrothecae, never approaching or achieving the adcaulinar margin. Hydrothecal margin thin, with a pair of short rounded and sharp cusps, curved to the adcaulinar margin. Median nematothecae tubular, long, surpassing the hydrothecal margin, curving to the hydrothecae, becoming less wide slightly from the base to the distal portion, aperture circular. Lateral nematothecae short, funnel-shaped, not reaching the hydrothecal margin, aperture excavated, almost like a spoon. Gonothecae in the form of an inverted cone, 552–668 µm high, 535–591 µm wide, larger in the distal portion, rounded at the basal portion, arising from the stem, in the frontal region,

between hydrocladia. Up to seven gonothecae per colony, each with a single egg.

Material examined: PCS – few colonies, one of them with gonothecae, from the dry and rainy seasons. CZUFS CNI-00013; CNI-00158; CNI-00159.

Station: PCS – 2, 8, 11, 12.

Bottom: mud.

Distribution: Brazil – Pernambuco (Mañal 1983), Espírito Santo (Grohmann et al. 2003), and Rio de Janeiro (Nogueira et al. 1997, Miranda et al. 2015). World distribution – the species seems to be exclusive to Western Atlantic, with records from the Caribbean region and Brazilian coast (Calder 1997, Galea 2013).

Remarks: unknown substrate.

### *Lytocarpia tridentata* (Versluys, 1899)

Fig. 16G

Synonyms available from: Migotto (1996) and Oliveira et al. (2016).

*Aglaophenia tridentata* Versluys, 1899: 47.

*Aglaophenia contorta* Nutting, 1900: 96, –Vannucci Mendes, 1946: 583, –Vannucci, 1951a, 1951b, Mañal, 1973.

Description: Material fragmented, the longest fragment of the stem with 8.7 cm. Colonies erect, stem monosiphonic, unbranched, divided into two regions, a basal one without hydrothecae, nematothecae or hydrocladia, separated from the distal region by oblique hinges. Perisarc thick in stem and thinner in the hydrocladia and hydrothecae. Distal portion with internodes divided by transverse nodes not so visible. Each internode with a hydrocladium and nematothecae. Subsequent internodes with hydrocladium arising alternately. Hydrocladium arising from the stem in angles of 135–159°, divided into internodes each one with one hydrotheca and three nematothecae, two laterals and one median. Hydrocladia 8–13 mm long. Posterior hydrothecal region of each internode with two internal septa, one arising as a continuation of the intrathecal septa and the second just below the insertion of the lateral nematothecae. Hydrothecae tubular, with the distal portion larger, 243–271 µm high, 140–164 µm maximum width. Hydrothecal margin smooth, with three cusps, two lateral short and one medial prominent, curved to the internal portion at the hydrothecal margin. Intrathecal septa generally short, beginning in the adcauline portion of the hydrothecae and reaching half or beyond, but never achieving the abcaulinar margin. Median nematothecae tubular, larger at the base, becoming thinner in the distal portion, basal portion adnate to the hydrothecae and free in the rest of its length, positioned almost in 90° from the stem, aperture spoon-shaped. Lateral nematothecae tubular with the distal portion curved up, surpassing the hydrothecal margin, adnate at base to the hydrocladium and at the lateral portion to the hydrothecae.

Material examined: PCS – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00161; CNI-00162.

Stations: PCS – 1, 2, 5, 8, 10, 11, 12, 16, 17, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Marques et al. 2006), Espírito Santo (Grohmann et al. 2003), Rio de Janeiro (Migotto 1996, Grohmann et al. 2003), and São Paulo (Migotto 1996, Silveira and Morandini 2011). World distribution – exclusive to Atlantic Ocean, with records to Gulf of Mexico, Colombia, and Brazil (Invemar 2018, Obis 2019).

Remarks: unknown substrate.

### *Macrorhynchia philippina* Kirchenpauer, 1872

Fig. 16C, F

Synonyms available from: Calder (1991).

*Macrorhynchia philippina* Kirchenpauer, 1872: 19.

*Aglaophenia philippina* Kirchenpauer, 1872: 45, text-fig. p. 17, pl. 1, fig. 26, pl. 2, figs 26a, b, pl. 7, fig. 26.

*Aglaophenia urens* Kirchenpauer, 1872: 46, pl. 1, fig. 27, pl. 2, fig. 27, pl. 7, fig. 27.

*Aglaophenia perforata* Kirchenpauer, 1872: 25 [nomen dubium] [not *Aglaophenia perforata* Allman, 1885].

Description: Colonies erect, up to 8 cm high, arising from a creeping hydrorhiza. Stem composed by one main axis, with nematothecae and hydrocladia inserted alternately. Stem with a basal region without hydrocladia, with nematothecae, separated from the distal region by an oblique node, followed by several internodes, also separated by oblique nodes. Each internode carries two nematothecae and one hydrocladium arising from an apophysis alternately. Hydrocladia unbranched, 3–7 mm high, divided into internodes, arising from the stem in angles of 127.7–143.9°. Each internode carries a hydrotheca and three nematothecae, two laterals, and one median. Hydrothecae tubular, 222–243 µm high, 151–156 µm maximum width, with the basal region larger, distal region curving to the exterior, adnate to the hydrocladium along almost all their length. Intrathecal septa prominent, V-shaped, arising from the adcaulinar portion of the hydrothecae, curved to the internal portion of the hydrothecae reaching half of it. Hydrothecal margin with sharp cusps in the median region and a pair of lateral small ones. Median nematothecae long, tubular, adnate to the hydrotheca and hydrocladium at the basal portion, free in the rest of its length, generally not reaching the hydrothecal margin. Lateral nematothecae tubular, long, aperture spherical, adnate to the hydrotheca along the basal portion and the free portion turned up, curving outward, surpassing the hydrothecal margin.

Material examined: PCS – two infertile colonies from the rainy season; VB – four infertile colonies from the dry season; SE – two infertile colonies, one from dry and the other from rainy season. CZUFS CNI-00057; CNI-00164; CNI-00165; CNI-00166.

Stations: PCS – 9, 10; VB – C1P56, C2P12, C2P34, C3P34; SE – C1P34, C2P12.

Bottom: mud.

Distribution: Brazil – Pernambuco (Calder and Mañal 1998), Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Agassiz and Hart 1870, Vannucci 1951a, Kelmo et al. 2003), Espírito Santo (Vannucci 1951a), Rio de Janeiro (Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946,

Vannucci 1951a, Migotto 1996, Oliveira et al. 2006, Oliveira and Marques 2011, Silveira and Morandini 2011, Marques et al. 2013, Fernandez et al. 2015, Miranda et al. 2015), Paraná (Miranda et al. 2015, Alaja-Batista et al. 2020), and Santa Catarina (Miranda et al. 2011, 2015, Bouzon et al. 2012). World distribution – circumglobal in tropical and subtropical continental regions (Migotto 1996, Calder 1997, Watson 2002).

Remarks: Mainly colonizing the plates but also on *Corydendrium parasiticum*.

### Halopterididae Millard, 1962 *Antennella curvitheca* Fraser, 1937

Fig. 17D–E

*Antennella curvitheca* Fraser, 1937a: 4, pl. 2, fig. 7.

*Antennella curvitheca* –Van Gernerden-Hoogeveen, 1965: 56, fig. 32, 33.

*Antennella curvitheca* –Schuchert, 1997: 38–40, fig. 13.

Description: Colonies with unbranched hydrocladia arising directly from a creeping hydrorhiza, up to 7 mm high. Hydrocladium is composed of several internodes, separated alternately by oblique and transverse nodes. First segments of hydrocladium smooth, without hydrothecae or nematothecae, followed alternately by one hydrotheca and four nematothecae, a median, a pair of lateral and a superior (not axillar); and one intersegment with a single nematotheca or, less frequently, without nematotheca. Hydrothecae cylindrical, 94–137 µm high, 134–184 µm wide, thick perisarc, adcaulinar portion adnate to the hydrocladium by half of their length, abcaulinar wall straight and adcaulinar with a distinct concave curve. Basal region of hydrothecae with one internal cusp projected to the adcaulinar cavity. All nematothecae two-chambered. Median nematothecae sessile, short and curved, reaching the hydrothecal base. Lateral nematothecae conical, formed by a pedicel shorter than the chamber, reaching almost half of the hydrothecae. Nematothecae superior to the hydrothecae and intersegment similar, mobile, with the inferior and superior chamber with the same size or the inferior one a little bigger.

Material examined: PCS – few infertile colonies, from the dry and rainy seasons. CZUFS CNI-00168; CNI-00169; CNI-00269.

Stations: PCS – 4, 5, 6, 7, 13, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Bahia (Grohmann et al. 2003). World distribution – recorded from the Caribbean, Porto Rico, and Ilha Nevis (Schuchert 1997).

Remarks: Found on algae.

### *Antennella incerta* Galea, 2010

Fig. 17A–C

*Antennella incerta* Galea, 2010: 25, figs 6H1, J, K.

*Antennella incerta* Calder, 2013: 41, fig. 11b, c.

Description: Colonies with unbranched hydrocladium, arising directly from a creeping hydrorhiza, up to 5.2 mm

high. Hydrocladium composed of several internodes, divided alternately by transverse and oblique nodes. First segments of hydrocladia smooth, without hydrothecae and nematothecae, followed alternately by segments composed by one hydrotheca and four nematothecae, one median, a pair of laterals, and a superior axillar, and an intersegment with a single nematotheca. Hydrothecae cylindrical, 156–289  $\mu\text{m}$  high, 179–189  $\mu\text{m}$  wide at the margin. Adcaulinary wall adnate to the hydrocladium by halfway or less of their length. Abcaulinary wall straight, perisarc thick, one cusp in the initial portion turned to the hydrothecal interior. All nematothecae two-chambered. Median nematothecae sessile disposed at a certain distance to the hydrothecae. Lateral nematothecae conical, arising from a long apophysis that alone almost reaches the hydrothecal length, formed by a long pedicel adnate to the hydrothecae and a superior chamber. Lateral nematothecae with a chamber and a part of their pedicel surpassing the hydrothecal margin. Axillar nematothecae short, with chamber aperture, turned to the hydrothecae. Intersegment nematothecae mobile, with the segments almost of the same size. Gonothecae pear-shaped, 406–446  $\mu\text{m}$  high, 125–200  $\mu\text{m}$  in maximum width, arising from the hydrocladium in short pedicels, between the median nematotheca and the hydrotheca. Nematocysts microbasic mastigophores? discharged (14.5–15.2  $\times$  5.1–6.9  $\mu\text{m}$ ).

Material examined: PCS – few colonies, three of them with gonothecae, from the dry and rainy seasons. CZUFS CNI-00172; CNI-00257; CNI-00259; CNI-00260.

Stations: PCS – 5, 12, 13, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: This is the first record from the Brazilian coast. World distribution – Florida (Calder 2013) and Guadeloupe (Galea 2010).

Taxonomic remarks: The material found at Sergipe resembles the species *Antennella incerta* recently described from Guadeloupe (French Antilles) by Galea (2010), matching all characteristics described for it, such as the presence of one nematotheca in the intersegment and an axillar nematotheca, lateral nematotheca surpassing the hydrothecal margin in at least the superior chamber length, and the presence of internal cusps in the abcaulinary hydrothecal portion. Both the description of *A. incerta* made by Galea (2010) and the second record for this species made by Calder (2013) were based on sterile material, so gonothecal morphology could not be compared. However, the sum of the characteristics mentioned above leads to the identification of specimens from Sergipe as *Antennella incerta*.

Remarks: Colonizing algae, Bryozoa, and the hydroids *Sertularelloides cylindritheca*, *Synthecium tubithecum*, and *Thyroscyphus ramosus*.

### *Antennella secundaria* (Gmelin, 1791)

Fig. 17F–G

Synonyms available from: Schuchert (1997).  
*Sertularia secundaria* Gmelin, 1791: 3856.

Description: Colonies with an unbranched hydrocladium arising directly from a creeping hydrorhiza, up to 15.2 mm high. Hydrocladia is composed of several intersegments, separated alternately by transverse and oblique nodes. First segments of hydrocladia smooth, ahydrothecate, and with zero, one or two nematothecae, followed alternately by segments formed by one hydrotheca and four nematothecae, one median, a pair of laterals and a superior axillar; and one intersegment with two nematothecae or, less frequent, with one or none. Intersegment regions sometimes do not present a distinct node, leaving the impression of nonseparation between the hydrothecal segments and the immediately superior segment. Hydrothecae cylindrical, 147–174  $\mu\text{m}$  high, 185–239  $\mu\text{m}$  wide at the margin, adnate to the hydrocladia by half or less of its length. All nematothecae two-chambered. Median inferior nematothecae sessile, short and curved, reaching the hydrothecal base. Lateral nematothecae conical, formed by a short pedicel and chamber, reaching half of the hydrothecae. Intersegmental nematothecae similar to the median inferior one, sessile, inferior and superior chambers of the same size or the inferior a little higher. Some intersegment regions without nematothecae. Gonothecae 387–434  $\mu\text{m}$  high, 233–235  $\mu\text{m}$  wide, arising in short pedicels between the hydrothecae and the median inferior nematothecae, pear-shaped, larger laterally, slightly curved towards the hydrothecae, with one pair of opposite nematothecae in the basal portion. Nematocysts microbasic mastigophores? undischarged (10.7–11.1  $\times$  4.4–4.5  $\mu\text{m}$ ) and discharged (10.2–10.3  $\times$  4.1–4.3  $\mu\text{m}$ ).

Material examined: PCS – few colonies, two with gonothecae, from the dry and rainy seasons. CZUFS CNI-00174; CNI-00175; CNI-00176.

Stations: PCS – 5, 6, 7, 11, 12, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – São Paulo (Fernandez et al. 2015) and Santa Catarina (Bouzon et al. 2012, Miranda et al. 2015). World distribution – cosmopolitan with a preference from warm temperate regions (Schuchert 1997).

Remarks: Colonizing algae and Bryozoa.

### *Halopteris alternata* (Nutting, 1900)

Fig. 18E–F

Synonyms available from: Schuchert (1997) and Galea (2008).

*Plumularia alternata* Nutting, 1900: 62, pl. 4 fig. 1, 2.

*Thecocalus diaphanus* –Vannucci-Mendes, 1946: 576, pl. 5, fig. 46, 47 [not *Halopteris diaphana* (Heller, 1868)]

*Schizotricha billardi* Vannucci, 1951: 88, pl. 3 fig. 19, 20 (in part, Brazilian material only).

*Halopteris diaphana* –Migotto, 1996: 45, fig. 9D, E [not *H. diaphana* (Heller, 1868)].

Description: Colonies erect, up to 20 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, unbranched, separated in three regions, a first basal one, with variable length, similar to a pedicel, larger than the second region and separated from it by constrictions and annulus. A second region without hydrothecae or hydrocladia, higher or of the same

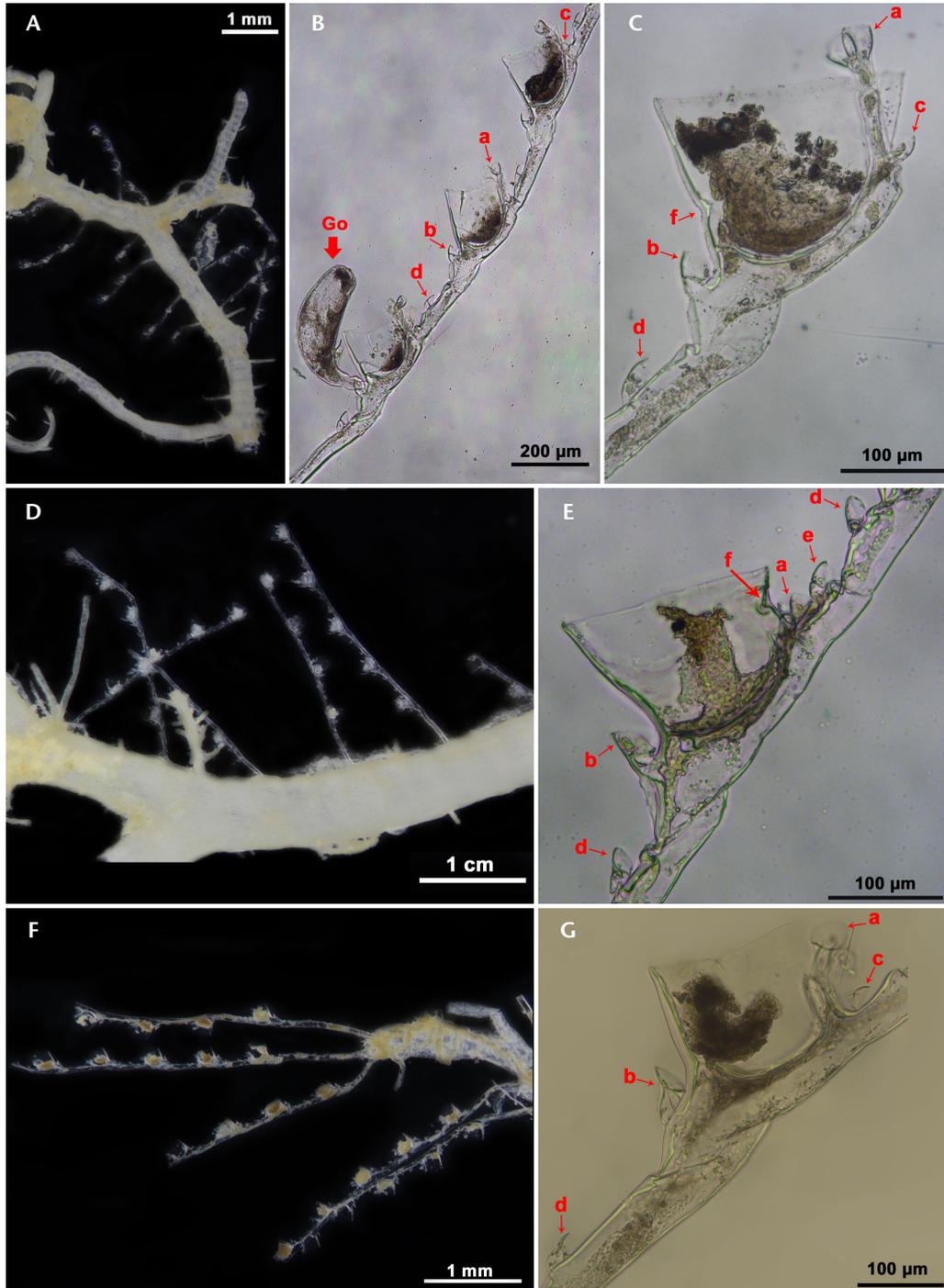


Figure 17. (A-C) *Antennella incerta*: (A) general view of a colony on algae; (B) detail of a hydrocladium showing few hydrothecae, nematothecae and a gonotheca (Go - red arrow); (C) detail of an internode with one hydrotheca and nematotheca; (D-E) *Antennella curvitheca*: (D) detail of a colony on algae; (E) detail of a hydrocladium showing one hydrotheca and nematotheca; (F-G) *Antennella secundaria*: (F) general view of a colony on algae; (G) detail of a hydrocladium showing one hydrotheca and nematotheca. Details on the images: a – lateral nematotheca, b – medial nematotheca, c – upper axillar nematotheca, d – intersegmental nematotheca, e – upper non-axillar nematotheca, f – intrathecal cusp.

high as the first region and separated from the third one by an oblique node. The third region carrying hydrocladium and cauline hydrothecae, separated by internodes, each internode with one hydrotheca, four nematothecae, a median inferior, a pair of laterals and a short axillar superior to the hydrothecae; and one hydrocladium inserted in a lateral apophysis. Axillar nematothecae generally not found in the distal portion of the stem. Stem intersegment carrying one nematotheca. Hydrocladia also segmented, arising alternately from the stem. The first segment of each hydrocladium short, square-shaped, without nematothecae, separated from the next segment by a transverse node. The second segment long, with one nematotheca at the distal portion and an oblique node also at this portion. Other hydrocladial segments followed by regions with one hydrotheca and three nematothecae, one median and a pair of laterals, and intersegments ahydrothecate with a single nematotheca. Hydrothecae cylindrical, 178–234  $\mu\text{m}$  high, 160–169  $\mu\text{m}$  wide, adnate to the hydrocladium along almost half of their length. All nematothecae two-chambered. Median inferior nematothecae placed far from the hydrothecae, conical and immovable. Lateral nematothecae mobile, conical, formed by short pedicel and a superior chamber. Intersegment nematothecae are similar to the median inferior ones but mobile. Axillar nematothecae from cauline hydrothecae mobile. Cauline hydrothecae and nematothecae are similar to the hydrocladial ones. A single colony with gonothecae, those inserted in a single pedicel in the main stem. Gonothecae pear-shaped, 748–774  $\mu\text{m}$  high, 418–431  $\mu\text{m}$  wide, with a pair of opposite nematothecae near the base. Gonothecae aperture rounded to oval with one operculum.

Material examined: PCS – few colonies, one of them with gonothecae, from the dry and rainy seasons. CZUFS CNI-00177; CNI-00178; CNI-00327; CNI-00328.

Stations: PCS – 5, 11, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Arquipélago de São Pedro e São Paulo (Amaral et al. 2000), Alagoas (Maximiliano M. Maronna unpub. data), and São Paulo (Migotto 1996, Oliveira et al. 2006, Shimabukuro 2007, Silveira and Morandini 2011, Fernandez et al. 2014, 2015). World distribution – records to Florida, Caribbean, and Brazil (Schuchert 1997).

Taxonomic remarks: *Halopteris alternata* belongs to a group designated by Schuchert (1997) as *H. diaphana* group, also including *H. billardi* (Vannucci, 1951), *H. diaphana*, *H. tenella* (Verrill, 1874), and *H. platygonotheca* Schuchert, 1997. *Halopteris alternata* differs from *H. billardi* by having a monosiphonic stem and also axillar nematothecae in the hydrothecae; differs from *H. tenella* by having unbranched hydrocladium; and, from *H. diaphana* and *H. platygonotheca* by the form of the female gonothecae, that in *H. diaphana* is distinct, in the form of cornucopia and, in *H. platygonotheca* the gonothecae is flattened like an oar (Schuchert 1997, Calder et al. 2019). A comparative table of the species from *H. diaphana* group is available in Schuchert (1997, p. 42).

Remarks: Found on algae.

## *Halopteris carinata* Allman, 1877

Fig. 18A–B, D

Synonyms available from: Schuchert (1997).

*Halopteris carinata* Allman, 1877: 33, pl. 19, figs 3–7.

Description: Colonies fragmented, longest stem fragment with 8 cm. Stem erect, monosiphonic, straight, perisarc thick. Stem divided into two regions, the first with several internodes of variable length, separated by straight nodes, each internode with nematothecae. The second region with regular segments, separated by oblique nodes, composed by one cauline hydrotheca with three associated nematothecae, a median inferior and a pair of laterals, and four or more distal nematothecae, disposed in pairs after the hydrothecae and one hydrocladium inserted laterally to the hydrothecae at the stem. Hydrocladia unbranched, arising alternately from the stem, composed of segments separated by oblique nodes. First hydrocladial segment ahydrothecate, and with one nematotheca. Further hydrocladial segments generally with one hydrotheca and four nematothecae, positioned concerning the hydrothecae, one median inferior, a pair of laterals, and a superior one, not axillar. Hydrothecae cylindrical, 198–223  $\mu\text{m}$  high, 193–206  $\mu\text{m}$  wide at the margin, adnate to the hydrocladium for more than half of their length, abcaulinar margin straight, margin smooth with one sharp cusp in the distal end. All nematothecae two-chambered. Median inferior nematothecae, apparently immovable, in the form of a spoon. Lateral nematothecae is composed of a pedicel adnate to the hydrothecal wall and a superior concave free chamber that surpass the hydrothecal margin. Superior nematothecae reduced, mobile, with an aperture in the form of a spoon. Intersegment nematothecae similar to the superior ones but higher. Cauline hydrothecae shorter and shallower than the hydrocladial ones. Male and female gonothecae on the same stem. Female gonothecae barrel-shaped, longer than wider, 1533–1570  $\mu\text{m}$  high, 1029–1103  $\mu\text{m}$  in maximum width, flattened laterally with an oval aperture and an operculum, arising from a short pedicel from the stem, generally in groups of three. Up to 11 female gonothecae per colony, one or two per hydrocladium. Male gonothecae small, 420–477  $\mu\text{m}$  high, 176–230  $\mu\text{m}$  in maximum width, sac-shaped, arising from a short pedicel from the hydrocladium, laterally above the hydrothecae. The male and female gonothecae with nematothecae in the basal portion, one and two, respectively. Gonothecal nematothecae mobile, formed by a long pedicel and a conical superior chamber. Nematocysts microbasic mastigophores undischarged (31–35.4  $\times$  10.2–11  $\mu\text{m}$ ) and discharged (27.5–30.4  $\times$  10–11.4  $\mu\text{m}$ ).

Material examined: PCS – few colonies, several of them with gonothecae, from dry and rainy seasons. CZUFS CNI-00014; CNI-00180; CNI-00329.

Station: PCS – 5, 11, 12, 15, 17.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Pernambuco (Calder and Mañal 1998), Alagoas (Maximiliano M. Maronna unpub. data), Espí-

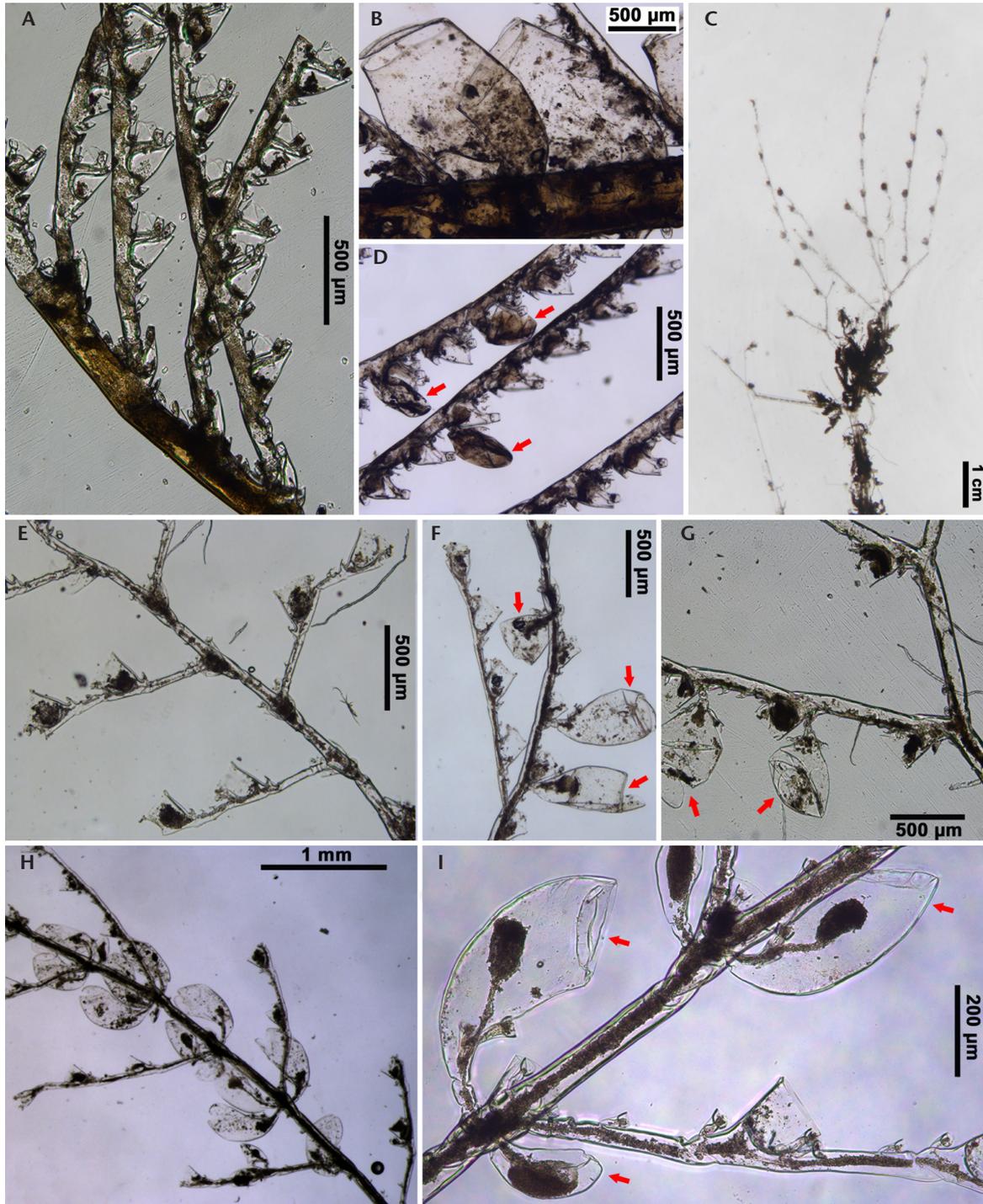


Figure 18. (A-B, D) *Halopteris carinata*: (A) detail of a stem showing few hydrocladia and hydrothecae; (B) detail of stem with two female gonotheca; (D) detail of few hydrocladia with three male gonothecae (red arrows); (C, G) *Monostaechas quadridens*: (C) general view of a colony; (G) detail of a hydrocladium ramification with two gonothecae (red arrows); (E-F) *Halopteris alternata*: (E) detail of a stem showing hydrocladia and hydrothecae; (F) detail of a stem ramification with three gonothecae (red arrows); (H-I) *Halopteris tenella*: (H) detail of a stem with hydrocladia, hydrothecae and gonothecae; (I) detail of a stem with gonothecae (red arrows).

rito Santo, Rio de Janeiro (Grohmann et al. 2003), and Santa Catarina (Miranda et al. 2015). World distribution – recorded mainly from Western Atlantic with preferences for warm regions. Records from the Caribbean, Bermuda, Bahamas, and Florida (Calder 1997).

Remarks: Unknown substrate.

### *Halopteris tenella* (Verrill, 1874)

Fig. 18H-I

Synonyms available from: Schuchert (1997), Galea (2013) and Oliveira et al. (2016).

*Plumularia tenella* Verrill, 1874: 731.

*Halopteris diaphana* –Galea, 2008: 42, fig. 8E, –Calder, 2013: 43, fig. 13B–D [not *H. diaphana* (Heller, 1868)].

*Halopteris constricta* –Migotto, 1996: 44, fig. 9A–C (not *H. constricta* Totton, 1930), Oliveira, 2003; Oliveira et al., 2006 [polyp].  
*Schizotracha tenella* –Calder & Mañal, 1998 [polyp].

Description: Colonies up to 9.3 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, unbranched, divided into two regions, first one basal of variable length, similar to a pedicel, separated from the second one by an oblique node. The first region ahydrothecate with zero to five nematothecae. The second region is composed of internodes, separated alternately by oblique and transverse nodes, all of them with hydrothecae, five to six nematothecae (one median inferior, a pair of laterals, and two or three superior ones), and one hydrocladium, arising laterally above the cauline hydrothecae. Hydrocladia arises alternately from the stem in short apophysis, distant from each other, and also divided into internodes alternately by transverse and oblique nodes. The first segments of each hydrocladium are short, square-shaped, without hydrothecae or nematothecae, separated from the next segment by a transverse node. The second segment is elongated, ahydrothecate, with one or two nematothecae in the medial-superior portion, with an oblique node at the distal end. The remaining hydrocladial segments are followed by intersegment with one hydrotheca and three nematothecae, one median and a pair of laterals, and by short intersegments, ahydrothecate, and with one nematotheca. Hydrothecae cylindrical, 0.12–0.26 mm high, 0.14–0.19 mm in maximum width, adnate to the hydrocladium along almost half of their length. All nematothecae mobile and two-chambered. Median inferior nematothecae distant to the hydrothecae, conical, with the two chambers of similar size or the inferior one a little bigger. Lateral nematothecae conical, formed by a short pedicel and a superior chamber. Intersegment nematothecae are similar to the median ones. Female gonothecae 427–731 µm high, 252–400 µm wide, cornucopia-shaped, up to 18 per stem, arising from the stem and/or hydrocladium in pedicels with two segments. Gonothecal margin turned inside, aperture rounded, with an operculum. Gonothecae with a pair of opposite nematothecae near the base. Nematocysts microbasic euryteles (only one measured, 14.5 × 6.7 µm).

Material examined: VB – several colonies, few with gonothecae, all of them from the rainy season. CZUFS CNI-00058.

Station: VB – C3P56.

Distribution: Brazil – Pernambuco (Calder and Mañal 1998) and São Paulo (Migotto 1996, as *H. constricta* Totton, 1930, Oliveira et al. 2006). World distribution – from Massachusetts to the Caribbean Sea (Calder 1983) and from southern California to Panama (Galea 2013).

Taxonomic remarks: As mentioned in the observations to *H. alternata*, *H. tenella* belongs to the *H. diaphana* group, but can be distinguished from the others by the female gonotheca with cornucopia shape and by having homonomous cauline segmentations.

Remarks: Colonizing the plate.

### *Monostaechas quadridens* (McCrary, 1859)

Fig. 18C, G

Synonyms available from: Schuchert (1997).

*Plumularia quadridens* McCrary, 1859: 199.

*Monostaechas fisheri* –Vannucci 1949, 1950, 1951a [non *Monostaechas fisheri* Nutting, 1905] [polyp].

Description: Colonies up to 23 mm high, arising from a creeping hydrorhiza formed by branched hydrocladia and ramifications, which arise immediately at the superior portion of the anterior part of hydrocladium, forming a scorpioid sympodium. Few stems with the initial part divided into two and, each ramification carrying the hydrocladia structured as scorpioid sympodia. First hydrocladium of each stem formed by an initial portion, similar to a pedicel, with variable length, with two segments, a short and a large one, both ahydrothecate, and generally with three nematothecae. Hydrocladia segmented, divided by transverse nodes. The first segment of each hydrocladium ahydrothecate, with three or more nematothecae, with one transverse node in the proximal region and an oblique one in the distal end. Subsequent segments alternating between ones with hydrothecae and four nematothecae (a median inferior, a pair of laterals, and an axillar one), and ones with ahydrothecate intersegment, and one or two nematothecae, those segments are separated by transverse and oblique nodes alternately. Hydrothecae cylindrical, 197–205 µm high, 251–282 µm wide, abcaulinar margin straight. All nematothecae two-chambered. Median inferior nematothecae mobile, inserted next to the hydrothecae. Lateral nematothecae are formed by a pedicel, parallel to the hydrothecae, and a conical chamber, directed towards the back. Axillar nematothecae small, with the superior chamber aperture directed towards the hydrocladium. Intersegment nematothecae are similar to the median inferior one but smaller. Gonothecae pear-shaped, larger distally, 436–504 µm high, 245–473 µm wide, arising in short pedicels divided into two segments at the hydrocladia in the basal portion of hydrothecae; a pair of nematothecae in the gonothecal basal part, just above the pedicel.

Material examined: PCS – few colonies, one of them with gonothecae, from the dry and rainy seasons. CZUFS CNI-00016; CNI-00182; CNI-00183; CNI-00184.

Station: PCS – 4, 5, 9, 12.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Bahia (Kelmo et al. 2003, Shimabukuro 2007), Espírito Santo (Vannucci 1951a, Grohmann et al. 2003), Rio de Janeiro (Vannucci 1950, Grohmann et al. 2003, Miranda et al. 2015), São Paulo (Migotto 1996, Silveira and Morandini 2011, Miranda et al. 2015), and Santa Catarina (Miranda et al. 2015). World distribution – considered circumglobal from temperate and tropical regions (Schuchert 1997).

Remarks: Colonizing algae, Bryozoa, and *Sertularelloides cylindritheca*.

**Kirchenpaueriidae Stechow, 1921**  
*Pycnotheca mirabilis* (Allman, 1883)

Fig. 19A–C

Synonyms available from: Watson (2005).

*Diplocheilus mirabilis* Allman, 1883: 49, pl. 8, figs 4–7.

*Kirchenpaueria mirabilis* var. *robusta* –Vannucci Mendes, 1946, –Vannucci, 1950 [polypl].

Description: Colonies erect, mostly fragmented, up to 14 mm high, arising from a tubular and creeping hydrorhiza. Stem monosiphonic with the basal region without hydrothecae or nematothecae, divided into one or two segments separated by transverse nodes. The posterior region is formed by hydrocladia arising alternately from the stem and separated by intersegment with oblique nodes in both extremities, one nematotheca in each axis formed by the intersegment and the hydrocladia. Hydrocladia is composed of regions with hydrothecae and intersegments, the first composed by hydrothecae and one median inferior nematotheca and the second one without hydrothecae or nematothecae, those separated by oblique nodes. Hydrothecae occupying almost the entire segment, 179–228 µm high, 200–257 µm of marginal wide, almost entirely adnate to the hydrocladia, with a short free portion next to the margin. Abcaulinar hydrothecal wall concave in the distal portion, below the margin, with long triangular septa that pass obliquely in the middle of the hydrothecae, behind the adcaulinar margin. Median inferior nematothecae sessile, with one chamber, not reaching the hydrothecae base. A single colony was found with one gonotheca, this inserted in a short pedicel at the basal portion of the stem. Gonotheca in the form of an inverted cone, 565 µm high, 690 µm wide, slightly flat laterally, larger in the distal portion, margin smooth, aperture flat towards the gonothecal interior.

Material examined: PCS – few colonies, one of them with one gonotheca, from the dry and rainy seasons. CZUFS CNI-00017; CNI-00185; CNI-00355; CNI-00356.

Stations: PCS – 4, 5, 6, 10, 12, 13, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Paraíba (Felipe F. Campos unpub. data), Espírito Santo (Grohmann et al. 2003), Rio de Janeiro (Vannucci Mendes 1946, Vannucci 1951a), São Paulo (Vannucci Mendes 1946, Vannucci 1950, Silveira and Morandini 2011), Paraná (Maria A. Haddad unpub. data), and Santa Catarina

(Miranda et al. 2011, Bouzon et al. 2012). World distribution – records from the Atlantic, Indian, and Pacific Oceans (Millard 1975, Watson 2005, Ansin Agis et al. 2014).

Taxonomic remarks: Gonotheca found in specimens from Sergipe differs from the description presented by Millard (1975) and Watson (2005), however, the last author mentioned that the gonotheca described was male, resembling the one shown in Millard (1975) that did not mention the sex of the specimens. This could mean that the fertile material found in Sergipe is female.

Remarks: Found on algae.

**Plumulariidae McCrady, 1859**  
*Dentitheca bidentata* (Jäderholm, 1905)

Fig. 20A

Synonyms available from: Migotto and Marques (1999).

*Plumularia bidentata* Jäderholm, 1920: 7, pl. 2, fig. 5, 6.

*Dentitheca crosslandi* –Vannucci, 1949: 250–251, pl. 3, fig. 49, 50.

*Dentitheca bidentata* –Migotto, 1997: 170–171.

Description: Colonies erect, up to 22 mm high, arising from a creeping hydrorhiza. Perisarc thick in the stem, moderately thick in the hydrocladia, and thin in the hydrothecae. Stem monosiphonic, unbranched, divided into one initial portion without hydrocladia, with or without nematotheca or internodes, followed by two or three short internodes, also without hydrocladia, separated by oblique nodes with one frontal nematotheca and, distally, by internodes carrying hydrocladia, those separated by oblique nodes and carrying apophysis and few nematothecae. Hydrocladia 1049–1651 µm high, arising alternately in angles of 124–146° from long apophysis positioned laterally to the stem, directed upward, build of several internodes with hydrothecae, separated from each other by oblique nodes. Each internode from the hydrocladia with one hydrotheca and four nematothecae, one median inferior, a pair of laterals, and one median superior. Hydrothecae 110–132 µm high, 58–98 µm in maximum width, adnate to the hydrocladium almost along all their length, tubular in shape, becoming larger distally. Hydrothecal margin everted, with two large and triangular lateral cusps and a shorter one in the median adcaulinar portion. Usually one internodal septum just below the insertion of lateral nematothecae and another just above insertion of median inferior nematothecae. All nematothecae two-chambered, conical in shape, and mobile. Median inferior nematothecae with a long pedicel and a short superior chamber positioned at the base of the hydrothecae and curved in their direction. Lateral nematothecae with a pedicel shorter than the median inferior one, with the superior chamber surpassing the hydrothecal margin. Median superior nematothecae similar to the lateral ones, positioned at a distance from the hydrothecae. Gonothecae 675–2990 µm high, 510–2706 µm wide, arising from a short pedicel positioned next to the cauline apophysis, in the form of an inverted cone, larger distally, aperture round, with a thin operculum and a male medusoide inside, does not fill the gonothecal space. Gonothecal wall with a thick perisarc.

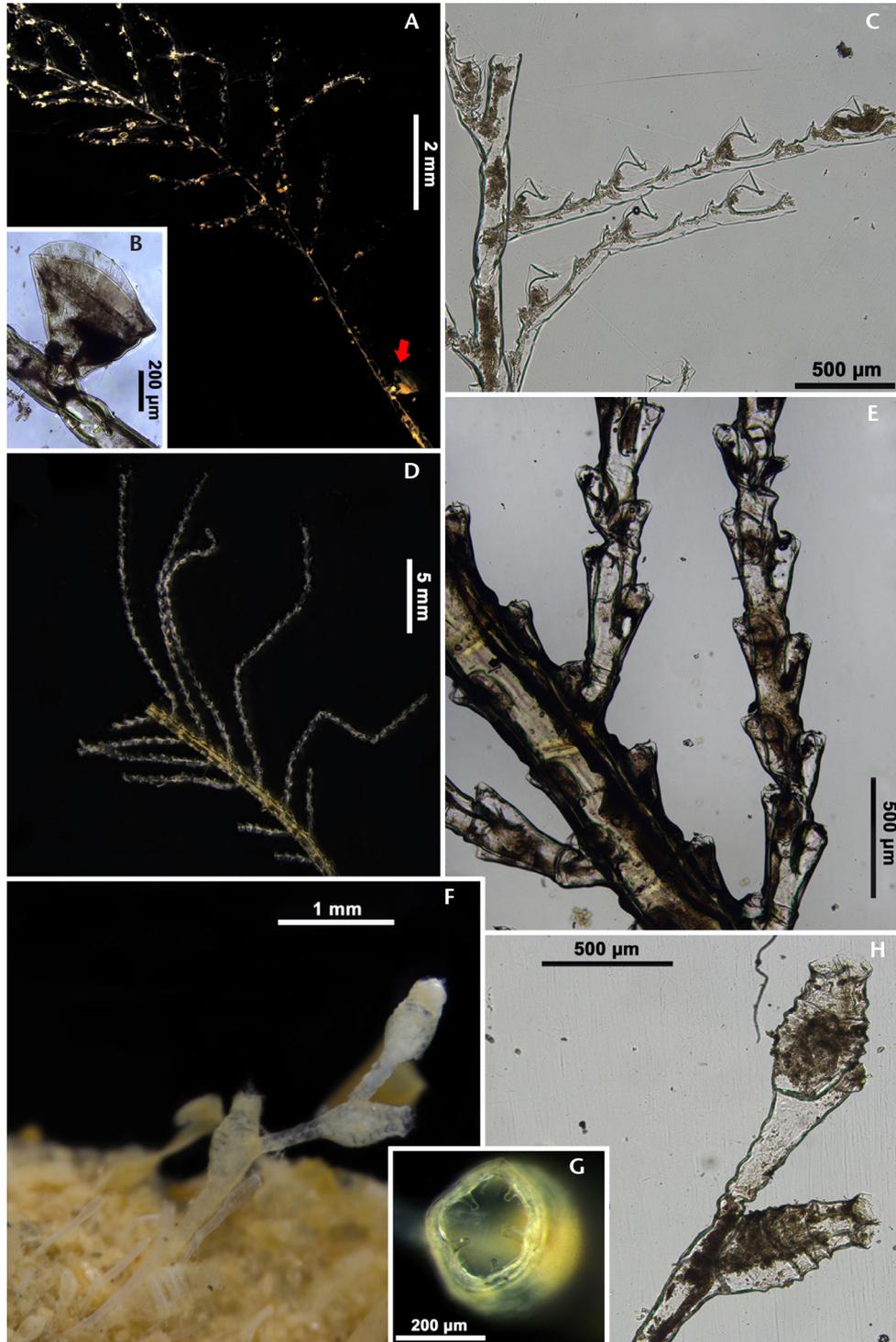


Figure 19. (A-C) *Pycnotheca mirabilis*: (A) general view of a stem with one gonotheca (red arrow); (B) detail of the gonotheca; (C) detail of a stem showing two hydrocladia and few hydrothecae; (D-E) *Sertularella diaphana*: (D) detail of a fragmented stem; (E) detail of a stem with three hydrocladia and several hydrothecae; (F-H) *Sertularella peculiaris*: (F) general view of a colony on Porifera; (G) superior view of the hydrotheca aperture showing the five intrathecal cusps characteristic of this species; (H) detail of a stem with two hydrothecae.

Material examined: PCS – few colonies, one of them with gonotheca, from dry and rainy seasons. CZUFS CNI-00188; CNI-00304; CNI-00305; CNI-00306; CNI-00308.

Stations: PCS – 4, 5, 6, 8, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Pernambuco (Migotto and Marques 1999), Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Grohmann et al. 2003), Espírito Santo (Vannucci 1949, 1951a, Grohmann et al. 1997, 2003), Rio de Janeiro (Nogueira et al. 1997, Grohmann et al. 2003), and São Paulo (Migotto and Marques 1999, Cunha and Jacobucci 2010, Silveira and Morandini 2011). World distribution – records from tropical regions of the Indian Ocean (western) and South Africa (Millard 1975).

Remarks: Found on algae.

### *Monotheca margaretta* Nutting, 1900

Fig. 20C

Synonyms available from: Calder (1997) and Galea (2010).

*Monotheca margaretta* Nutting, 1900: 72, pl. 11, figs 1–3, –Silveira and Morandini, 2011, –Oliveira et al., 2016: 109.

*Monotheca margaretta* f. *typica* Vannucci Mendes, 1946, –Vannucci, 1949, 1950, 1951a, 1951b [polyp];

*Monotheca margaretta* f. *curta* Vannucci Mendes, 1946, –Vannucci, 1951a [polyp];

Description: Colonies erect, up to 11 mm high, arising from a tubular and creeping hydrorhiza. Perisarc thin in the entire colony. Hydrorhiza with several internal perisarc projections and nematothecae. Stem monosiphonic, unbranched, divided into regular internodes separated by transverse nodes. The first internode without hydrocladia or nematothecae, short and square-shaped. Other internodes formed by an apophysis in the distal portion and three nematothecae, two in the axis between the apophysis and the stem and the third one between the proximal transverse node and the apophysis. Apophysis carries one hydrocladium and one hydrotheca. Hydrocladia carries two internodes separated by transverse nodes, the first internode without hydrothecae or nematothecae and the second one with one hydrotheca and three nematothecae, a medial inferior and a pair or laterals. All nematothecae two-chambered and conical. Medial inferior nematothecae long, reaching half the hydrothecal length. Lateral nematothecae long, with an initial portion forming a Y projected to the internode, positioned behind the hydrothecae and surpassing the hydrothecal margin. Hydrothecae cylindrical, deep, 98–138 µm high, 84–119 µm wide, adnate to the internode along almost their length. Internodes and hydrorhizal nematothecae are similar to the medial inferior ones. Gonothecae 2446–2620 µm high, 1535–1566 µm wide, barrel-shaped, one per stem, arising from a short pedicel on the stem at the axis between the internode and a hydrotheca. Gonothecae with several longitudinal pleats in the perisarc.

Material examined: PCS – abundant colonies, several with gonothecae, from the dry and rainy seasons; VB – two infertile

colonies from the dry season. CZUFS CNI-00020; CNI-00060; CNI-00193; CNI-00194; CNI-00195; CNI-00198.

Stations: PCS – 1, 4, 5, 6, 9, 10, 11, 12, 13, 15, 16, 18; VB – C2P34, C3P56.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Marques et al. 2006, Shimabukuro 2007), Fernando de Noronha (Shimabukuro 2007), Paraíba (Felipe F. Campos unpub. data), Pernambuco (Calder and Maýal 1998), Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Grohmann et al. 2003, Kelmo et al. 2003), Espírito Santo (Vannucci 1949, 1951a, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci Mendes 1946, Vannucci 1949, 1950, 1951a, Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1949, 1951a, Migotto 1996, Oliveira et al. 2006, Shimabukuro 2007, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Fernandez et al. 2014, Miranda et al. 2015), Paraná (Vannucci 1951a, Miranda et al. 2015, Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2011, 2015, Bouzon et al. 2012). World distribution – considered circumglobal, with records from Western and Eastern Atlantic and Pacific Oceans (Calder 1997).

Taxonomic remarks: The recognition of *Monotheca* as distinct from *Plumularia* Lamarck, 1816 has been made elsewhere based on evidence of both morphology (Calder 1997) and genetics (Moura et al. 2018).

Remarks: The PCS colonies were colonizing algae, Bryozoa, Gastropoda (*Xenophora* sp.), Polychaeta tubes, rocks, Brachyura (Majoidea), and the hydroid *Hincksella formosa*. Estuarine colonies were colonizing the plates.

### *Monotheca obliqua* (Johnston, 1847)

Fig. 20D–E

Synonyms available from: Watson (2011).

*Plumularia obliqua* Johnston, 1847: 106, pl. 28, fig. 1.

Description: Colonies erect, up to 12.5 mm high, arising from a tubular and creeping hydrorhiza. Stem monosiphonic, sympodial, divided into internodes moderately long, separated by transverse nodes. Initial internodes short, without hydrothecae or nematothecae. Posterior internodes alternately, carrying one apophysis in the distal portion and two nematothecae, one in the axis between the apophysis and the stem and the other in the middle of the internode. Apophysis carrying one hydrocladium with one hydrotheca. Hydrocladia with two internodes separated by transverse nodes, the first one without hydrothecae or nematothecae and the second one with one hydrotheca and three nematothecae, one medial inferior and a pair or lateral. Hydrothecal internode is almost entirely occupied by the hydrotheca, larger distally and with one or two internal septa behind the hydrotheca. Hydrothecae cylindrical, 133–150 µm high, 137–151 µm wide, abcaulinar and adcaulinar wall slightly convex. All nematothecae two-chambered and mobile. Medial inferior nematothecae short, reaching almost the hydrothecal

base. Lateral nematothecae directed outward, inserted in the final portion of the intersegment with hydrothecae, surpassing completely the hydrothecal rim.

Material examined: PCS – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00021; CNI-00197.

Stations: PCS – 5, 6, 12, 13, 15, 18.

Bottom: gravel and mud.

Distribution: Brazil – Rio de Janeiro (Nogueira et al. 1997).

World distribution – considered cosmopolitan (Watson 2011).

Taxonomic remarks: As mentioned above, the recognition of *Monotheca* as distinct from *Plumularia* Lamarck, 1816 has been made elsewhere based on evidence of both morphology (Calder 1997) and genetics (Moura et al. 2018).

Remarks: Found on algae.

### *Plumularia* sp. Pictet, 1893

Fig. 20F

Description: Few fragmented colonies found, longer fragment 18.5 mm high. Stem monosiphonic, unbranched, divided into internodes separated by transverse nodes. Stem internodes carrying an apophysis distally and two nematothecae, one proximal axillar and another in the middle of the internode, and also with few internal septa in the proximal region. Apophysis long, with prominent internal septa, carrying one hydrocladium. Hydrocladia 1.5–12.6 mm high, formed by several intersegments, separated by transverse nodes. Hydrocladia intersegment with or without hydrothecae, alternately. First intersegment short, without hydrothecae or nematothecae and with internal septa. Other intersegments ahydrothecate, short, and sometimes with internal septa in the end and caring one nematotheca. The intersegments with hydrothecae carrying three nematothecae, one medial inferior and a pair of laterals, and also with internal septa in the end. Hydrothecae small, shallow, 74–95  $\mu\text{m}$  high, 94–111  $\mu\text{m}$  wide at the margin, cylindrical, adcaulinar wall convex, completely adnate to the hydrocladia, abcaulinar wall straight, margin smooth, aperture round. Medial inferior nematothecae short, not reaching the hydrothecal base. Lateral nematothecae inserted in the hydrocladia at the distal portion of the hydrothecae, surpassing the hydrothecal margin. Nematothecae of internodes similar to the medial inferior ones.

Material examined: PCS – two fragmented infertile colonies, one from the dry and the other from the rainy season. CZUFS CNI-00022; CNI-00198.

Stations: PCS – 5, 11.

Bottom: sand.

Taxonomic remarks: Besides the similarity between the specimens from Sergipe and the ones described as *Plumularia strictocarpa* by Calder (1997, p. 21–24), the colonies were unfertile and the gonotheca represents a crucial characteristic to distinguish *P. strictocarpa* from *P. setacea* (Linnaeus, 1758). Because of this, we chose to let our material as *Plumularia* sp.

Remarks: unknown substrate.

### *Plumularia floridana* Nutting, 1900

Fig. 20B

Synonyms available from: Calder (1997) and Galea (2008).

*Plumularia floridana* Nutting, 1900: 59, pl. 2, fig. 4, 5, –Migotto, 1996: 55, fig. 10D, F.

Description: Colonies erect, up to 33 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, with or without ramifications, divided into one basal and one distal portion. The basal portion of the stem divided into regular internodes separated by regular transverse nodes, each internode carrying an apophysis distally and two or three nematothecae, one or two axillars, and one opposite to the apophysis. Apophysis short, arising alternately and carrying a hydrocladium. One or two ramifications arise from the same place in the hydrocladia or irregularly arranged, similarly to the primary stem. Hydrocladia 1038–2329  $\mu\text{m}$  high, directed toward the outside, divided alternately into internodes with and without hydrothecae, separated by transverse nodes (proximally) and oblique ones (distally). Internodes without nematothecae or with a single one, and also with one hydrotheca carrying three nematothecae, a medial inferior, and a pair of laterals. Hydrothecae cylindrical, deep, 139–151  $\mu\text{m}$  high, 123–136  $\mu\text{m}$  wide, adnate to the stem along almost half of their length, with the distal portion free, abcauline and adcauline wall slightly convex basally and concave distally. Hydrothecal margin smooth, aperture oval. All nematothecae two-chambered and conical. Medial inferior nematothecae reaching (or almost) the base of the hydrothecae. Lateral nematothecae directed upward and do not reach the hydrothecal margin. Nematothecae in the internodes similar to the medial inferior ones but smaller. Hydranth retracted, with approximately 12 tentacles. Mature gonangia oval, 110–130  $\mu\text{m}$  high, 102–110  $\mu\text{m}$  in maximum width, arising from a short pedicel in the axis between the stem and the hydrocladia. Nematocysts euryteles discharged (23.3–32.7  $\times$  10.1–12.3  $\mu\text{m}$ ).

Material examined: PCS – one infertile colony from the rainy season; VB – abundant colonies with and without mature gonangia from the dry and rainy seasons; SE – several colonies, one of them with mature gonangia, from the dry and rainy seasons. CZUFS CNI-00189; CNI-00190; CNI-00191; CNI-00192.

Stations: PCS – 5; VB – C1P12, C1P34, C1P56, C2P12, C2P34, C2P56, C3P34, C3P56; SE – C1P34, C1P56, C2P12, C2P56, C3P12, C3P34, C3P56.

Bottom: sand.

Distribuição: Brazil – Ceará (Marques et al. 2006, Shimabukuro 2007), Pernambuco (Calder and Mañal 1998), Alagoas (Shimabukuro 2007), Bahia (Kelmo et al. 2003), Espírito Santo (Vannucci 1951a, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci Mendes 1946, Vannucci 1949, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1951a, Migotto 1996, Shimabukuro 2007, Silveira and Morandini 2011, Miranda et al. 2015), Paraná (Cangussu et al. 2010, Maria A. Haddad unpub. data), and Santa Catarina (Alaja-Batista et al. 2020).

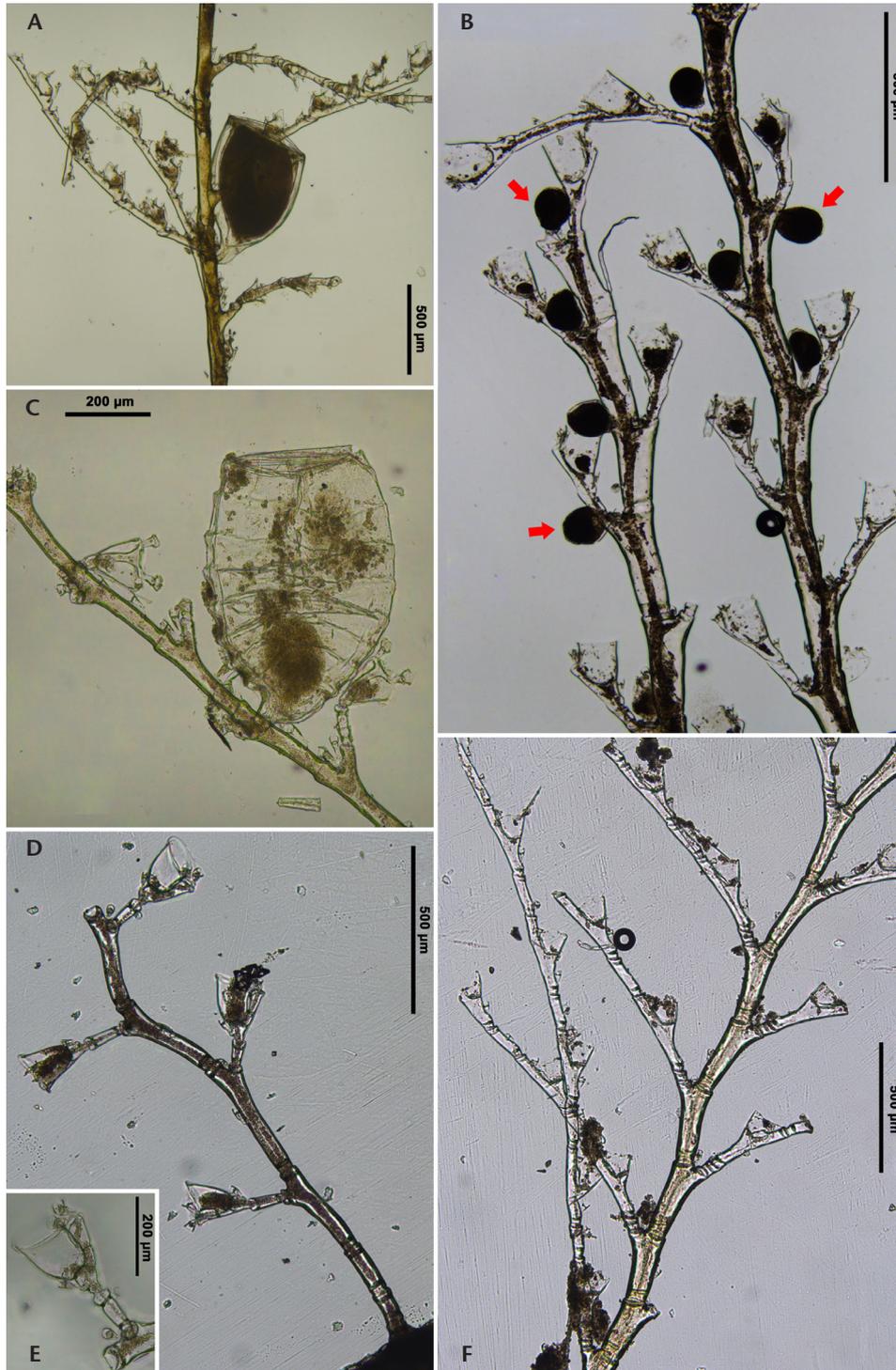


Figure 20. (A) *Dentitheca bidentata*: detail of a stem with few hydrocladia and one male gonotheca; (B) *Plumularia floridana*: detail of a stem showing several hydrothecae and mature gonangia (red arrows); (C) *Monotheca margaretta*: detail of a stem with few hydrothecae and one gonotheca; (D-E) *Monotheca obliqua*: (D) general view of a stem; (E) detail of a hydrotheca; (F) *Plumularia* sp.: (F) detail of a stem showing several hydrocladia and hydrothecae.

World distribution – records from the Atlantic (western and eastern), Indian, and Pacific Oceans (Calder 1997).

Remarks: Unknown substrate to PCS material. Estuarine colonies were colonizing the plates, algae, Anthozoa (*Carijoa* sp.), Bryozoa, barnacle (Cirripedia), Polychaeta tubes, Ostreidae, Ascidiacea, and the hydroids *Bougainvillia muscus*, *Corydendrium parasiticum*, *Diphasia digitalis*, *Ectopleura dumortierii*, *Eudendrium merulum*, and *Pennaria disticha*.

Suborder Sertulariida Maronna, Miranda, Peña  
Cantero, Barbeitos & Marques, 2016  
Sertularellidae Maronna, Miranda, Peña Cantero,  
Barbeitos & Marques, 2016  
*Sertularella diaphana* (Allman, 1885)

Fig. 19D–E

Synonyms available from: Watson (2000).

*Thuiaria distans* Allman, 1877: 27 [secondary homonym; not *Dynamena distans* Lamouroux, 1816].

*Sertularella lata* –Vannucci, 1951a [not *Sertularella lata* (Bale, 1882)] [polyp].

Description: Colonies erect, up to 8 cm high. Stem monosiphonic, divided pinnately on one plane into short internodes, nodes transverse to slightly oblique. Internodes with three cauline hydrothecae and one hydrocladium in the distal end. Cauline hydrothecae disposed one in the axis, one opposite to that, and the third below the hydrocladium. Hydrocladia alternate, arising at the stem in angles of 109–117°. Hydrocladia long, slender, divided into internodes and carrying numerous hydrothecae. The first hydrocladial internode fairly long, slender, and ahydrothecate. Hydrothecae alternate, immersed on internode, separated laterally, each base reaching about half of the subsequent hydrothecae and distal end curved. Hydrothecae 179–230 µm high and 123–143 µm maximum diameter. Hydrothecal margin subcircular with four short, rounded, and equidistant cusps, one abcaulinar, one adcaulinar, and two laterals. Operculum with four triangular valves.

Material examined: PCS – three infertile colonies from dry and rainy seasons. CZUFS CNI-00023; CNI-00199.

Stations: PCS - 5, 8, 11, 12.

Bottom: graver, sand, and mud.

Distribution: Brazil – Fernando de Noronha (Pires et al. 1992), Pernambuco (Nutting 1904), Alagoas (Maximiliano M. Maronna unpub. data), Sergipe (Allman 1888), and Bahia (Kelmo et al. 2003). World distribution – species well distributed in tropical and subtropical regions (Vervoort 1993), considered virtually circumglobal (Watson 2000).

Remarks: unknown substrate.

*Sertularella peculiaris* (Leloup, 1935)

Fig. 19F–H

Synonyms available from: Galea (2008).

*Thyroscyphus intermedius* f. *peculiaris* Leloup, 1935: 33, figs 15–17. *Sertularella conica* –Migotto, 1996: 67, figs 12–K.

Description: Colonies primarily erect, occasionally stolonal, up to 1.8 mm high, branched colonies up to 13 mm, all arising from a creeping hydrothiza. Stolonal polyps are supported by a pedicel with perisarc waved along their entire length. Erect colonies geniculated, up to 14 branches carrying hydrothecae. The perisarc of the branches completely waved, except for a few smooth portions. Hydrothecae vessel shaped, bilaterally symmetrical, alternately arranged, 552–674 µm high and 347–420 µm maximum diameter, adnate to the stem for less than half of their length, wider at the base, narrowing towards the distal portion and widening again at the margin. Hydrothecae wall with 5–7 circular grooves. Rhomboid margin with rounded corners, and four-pointed triangular cusps. Operculum is composed of four triangular valves. Five wide distinct intrathecal cusps inserted just below the opening (Fig. 22G), one abcauline, two lateral-abcaulinar, and 2 lateral-adcaulinar. Stolonal hydrothecae are identical to that described above for the upright form.

Material examined: PCS – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00200; CNI-00201; CNI-00202.

Stations: PCS – 5, 12, 15, 18.

Bottom: gravel, and sand.

Distribution: Brazil – São Paulo (Migotto 1996) and Santa Catarina? (Miranda et al. 2011). World distribution – South Carolina, Bermuda, Caribbean, and Brazil (Galea 2008).

Taxonomic remarks: Galea (2008) presents the latest redescription of *Sertularella peculiaris*, a species described by Leloup (1935) as *Thyroscyphus intermedius* f. *peculiaris* and redescribed by Leloup (1974) as a new species, *S. peculiaris*. Descriptions and illustrations presented by Leloup (1935, 1974) and Galea (2008) show the existence of five wide intrathecal cusps as the main character for the identification of *S. peculiaris*. This characteristic led Galea (2008) to synonymize the records of *S. conica* of Calder (1991) and Migotto (1996), and others to *S. peculiaris*. Calder (1991) clearly mentioned the existence of five internal cusps; while Migotto (1996) does not describe the Brazilian material but he comments that it agrees with the described by Calder (1991). Calder (1991) and Migotto (1996) also mention the record of *S. inconstans* by Vanucci Mendes (1946) as correspondent to *S. conica*. The original description and illustrations of *S. conica* by Allman (1877) do not mention many characteristics of this species, including the existence or not of the intrathecal cusps. A review of the material identified as *S. conica* is necessary to verify its real distribution. Only the record of *S. conica* to São Paulo (Migotto 1996) was synonymized by Galea (2008). The records of *S. conica* are mixed with the ones to *S. tennella* to Brazilian coast, but *S. conica* seems to have records to Espírito Santo (Vannucci 1950, 1951a, Grohmann et al. 1997), Rio de Janeiro (Vannucci 1951a, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1949, 1951a, Shimabukuro 2007, Silveira and Morandini 2011, Miranda et al. 2015), and Santa Catarina (Miranda et al. 2011, 2015). From those records, the Vannucci Mendes (1946) and Vannucci (1949) are the ones with

illustrations for the species and also the mention of three perisarcal thickenings above the hydrothecae opening, which did not match the description of *S. conica*, *S. tenella* or *S. peculiaris*. The study of Miranda et al. (2011) described the presence of submarginal cusps but did not say how many, only commenting that the material matched Calder's (1991) description. As Calder's (1991) records were synonymized to *S. peculiaris*, it seems likely that the record to Santa Catarina made by Miranda et al. (2011) refers to this species. A review of the Brazilian material is necessary to determine which species occur on the coast and their distribution.

Remarks: Colonizing algae and Bryozoa.

### Sertulariidae Lamouroux, 1812 *Amphisbetia distans* (Lamouroux, 1816)

Fig. 21A

Synonyms available from: Peña Cantero and García Carrasco (2002) and Calder et al. (2019).

*Dynamena distans* Lamouroux 1816: 180, pl. 5, fig. 1A, B.

*Sertularia erasmoi* Vannucci Mendes 1946, –Vannucci, 1949, 1951a [polyp].

*Sertularia minuscula* Vannucci, 1949, 1950, 1951a [polyp].

*Tridentata distans* –Calder and Mañal, 1998, –Grohmann, 2006 [polyp].

Description: Colonies erect, up to 11.4 mm high, with several pairs of hydrothecae, arising from a creeping hydrorhiza. Stem monosiphonic, unbranched, basal part ahydrothecate separated by an oblique node. The remaining part of the stem composed of several internodes separated by transverse and oblique nodes, each one with a pair of opposite hydrothecae. Hydrothecae tubular, 0.18–0.22 mm long, increasing in diameter distally, 0.76–0.96 mm maximum diameter, adnate to stem for up to half its high, free distal portion inclined outwards. The adnate portion of the paired hydrothecae in contact. The basal portion of hydrothecae with one or two internal projections. Margin smooth, with two abcauline triangular cusps and a smaller adcauline one. The operculum is composed of two valves, the adcauline usually divided in half. Gonothecae ovoid, 0.73–0.80 mm high, 0.45–0.51 mm wide, circular opening, arising in short pedicel in one of the basal internodes. Nematocysts, probably microbasic mastigophores discharged in coenosarc and hydranth (11.6–13.1 × 3.4–3.9 μm).

Material examined: PCS – abundant colonies, several of them with gonothecae, from the dry and rainy seasons; VB – two infertile colonies, one from dry and the other from rainy season. CZUFS CNI-00025; CNI-00061; CNI-00203; CNI-00204; CNI-00206.

Stations: PCS – 1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18; VB – C1P56, C2P34.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Fernando de Noronha (Pires et al. 1992, Amaral et al. 2009), Ceará (Marques et al. 2006, Shimabukuro 2007), Paraíba (Felipe F. Campos unpub. data),

Pernambuco (Calder and Mañal 1998), Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Grohmann et al. 2003), Espírito Santo (Vannucci 1949, 1951a, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci 1949, 1950, 1951a, Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1949, 1951a, Migotto 1996, Oliveira et al. 2006, Shimabukuro 2007, Oliveira and Marques 2011, Silveira and Morandini 2011, Miranda et al. 2015), Paraná (Miranda et al. 2015, Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2011, 2015, Bouzon et al. 2012). World distribution – circumglobal or likely circuntropical (Calder 1991, Boero and Bouillon 1993, see detailed records in Peña Cantero and García Carrasco 2002).

Taxonomic remarks: The species has been recorded as *Sertularia distans* and *Tridentata distans* in Brazil until the molecular results presented by Moura et al. (2011) and Maronna et al. (2016) resulted in the referral of the species to *Amphisbetia* (new combination by Calder 2019).

Remarks: PCS colonies colonizing algae, Bryozoa, and *Thyrosocyphus ramosus*. The colonies from Vaza-Barris were on *Pennaria disticha*.

### *Diphasia digitalis* (Busk, 1852)

Fig. 21B–C

Synonyms available from: Watson (2000).

*Sertularia digitalis* Busk, 1852: 387, 393.

*Nigellastrum digitale* –Vannucci 1949, 1951a [polyp].

*Diphasia digitalis* –Mañal, 1983: 7.

Description: Colonies erect, up to 32 mm high, arising from a creeping and tubular hydrorhiza. Stem monosiphonic, composed of several internodes. First internode long, ahydrothecate, separated by a transverse node. Hydrocladia 7.5–23.1 mm long, arising from the stem at angles of 97.7–137.6°, also composed of internodes. Stem and hydrocladia with a pair of hydrothecae per internode. Hydrothecae tubular, elongate, 0.85–0.99 mm high, 0.24–0.27 mm in maximum width, expanding from the base to the distal portion, adnate to internode for more than half their high, free end portion slightly curving outward. The adnate portion of paired hydrothecae in contact. Margin quadrangular, operculum with a wide acauline valve.

Material examined: VB – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00062; CNI-00207.

Stations: VB – C1P56, C2P12, C2P34, C3P56.

Distribution: Brazil – Bahia (Nutting 1904), Pernambuco (Mañal 1983, Calder and Mañal 1998), Rio de Janeiro (Vannucci 1949, 1951a, Miranda et al. 2015), São Paulo (Silveira and Morandini 2011, Fernandez et al. 2014), and Santa Catarina (Bouzon et al. 2012). World distribution – circumglobal in tropical and subtropical regions (Watson 2000).

Remarks: Colonies large, mainly colonizing the plates, and partially on Polychaeta tubes, Bryozoa, Ascidiacea, and the hydroids *Corydendrium parasiticum* and *Pennaria disticha*.

## *Diphasia tropica* Nutting, 1904

Fig. 21F

Synonyms available from: Migotto (1996).

*Diphasia tropica* Nutting, 1904: 110.

*Diphasiella ornata* Vannucci, 1949: 239.

Description: Colonies erect, up to 14.2 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, unbranched, divided into two regions, the basal portion ahydrothecate, separated by an oblique node, and the other larger portion composed by internodes successively with and without paired hydrothecae, also separated by oblique nodes. Hydrothecae tubular, narrower in the basal portion, expanding a little to the middle part, 0.49–0.54 mm high and 0.15–0.17 mm maximum diameter, adnate to stem and in contact to each other over half their high, free part facing outside. Hydrothecal perisarc with several circular transverse grooves. Margin smooth, opening square, operculum with one valve.

Material examined: PCS – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00208; CNI-00309; CNI-00310; CNI-00311.

Station: PCS – 5, 6, 8.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Espírito Santo (Vannucci 1949, 1951a, Grohmann et al. 1997, 2003), Rio de Janeiro (Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Migotto 1996, Oliveira et al. 2006, Silveira and Morandini 2011, Miranda et al. 2015), and Santa Catarina (Bouzon et al. 2012). World distribution – species with records from Western and Eastern Atlantic (Calder 1991).

Remarks: Found on algae.

## *Dynamena crisioides* Lamouroux, 1824

Fig. 21I

Synonyms available from: Calder (1991).

*Dynamena crisioides* Lamouroux, 1824: 613, pl. 90, fig. 11, 12, –Pires et al., 1992: 6, –Migotto, 1996: 60, figs 11E–G.

*Dynamena crisioides* f. *typica* Vannucci Mendes, 1946: 557, pl. 3, fig. 24, 25, –Vannucci, 1949: 243, 1954: 115.

Description: Colonies erect, up to 31 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, divided into internodes by transverse nodes. Basal stem segments ahydrothecate, upper part with successive pairs of hydrothecae. Each internode with a proximal hydrocladium, an axillary hydrotheca, and one to three successive pairs of hydrothecae. Only the distal adnate portion of the axillary hydrotheca reaches the base of the subsequent one. Hydrothecal pairs separated along the adnate side. Hydrocladia 7.9–9.6 mm long, arising from a short, straight, or slightly curved apophysis at angles of 127.3–148.6°, divided into internodes of different sizes by transverse nodes. Hydrothecae tubular, elongated, 0.41–0.55 mm high, 0.11–0.16 mm maximum diameter, adnate for more than half their high, curving outwards in the distal portion. Adcauline wall of hydrothecae convex, abcauline straight or

slightly concave. Margin with two lateral wide triangular cusps, rounded at the end, and one short median adcauline. Operculum with two valves, one wide abcauline and one smaller adcauline. Gonothea vase-shaped, 0.97 mm high, 0.46 mm wide, smooth, borne on a short pedicel at the base of stem between the first pair of hydrothecae.

Material examined: PCS – one infertile colony from the rainy season; VB – few infertile colonies from the dry and rainy seasons; SE – few colonies from the dry season, one of them with one gonothea. CZUFS CNI-00027; CNI-00063; CNI-00209; CNI-00210.

Stations: PCS – 7; VB – C1P34, C1P56, C2P34, C2P56; SE – C1P34, C1P56, C2P12, C2P34, C3P12.

Bottom: mud.

Distribution: Brazil – Ceará (Marques et al. 2006), Fernando de Noronha (Pires et al. 1992, Amaral et al. 2009), Paraíba (Felipe F. Campos unpub. data), Pernambuco (Calder and Mañal 1998, Oliveira et al. 2009, abstract), Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Nutting 1904), Espírito Santo (Grohmann et al. 1997), Rio de Janeiro (Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1951a, Migotto 1996, Silveira and Morandini 2011, Miranda et al. 2015), Paraná (Miranda et al. 2015, Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2015). World distribution – circumglobal in tropical and subtropical regions (Calder 1991).

Remarks: Unknown substrate to the PCS material. Estuarine colonies were colonizing the plates, barnacles, ostreids, and ascidians.

## *Dynamena disticha* (Bosc, 1802)

Fig. 21D

Synonyms available from: Calder (1991).

*Sertularia disticha* Bosc, 1802: 101, pl. 29, fig. 2.

*Dynamena cornicina* –Vannucci Mendes, 1946, –Vannucci, 1949, 1950, 1951a, 1951b, Amaral et al., 2009.

*Sertularia cornicina* –Mañal, 1973.

*Dynamena disticha* –Migotto, 1996: 62, fig. 12A–E.

Description: Colonies erect, up to 18 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, unbranched, divided into internodes by oblique or hinged nodes. Basal segments of stem ahydrothecate, articulated with the upper part, which is composed of pairs of hydrothecae. Each pair of hydrothecae is positioned in front of an internode with the side walls connected over half their high, free distal portion curved outwards. Hydrothecae cylindrical, elongated, 0.53–0.61 mm high, 0.16–0.18 mm maximum diameter. Abcauline wall concave, adcauline straight. Hydrothecae internal base with triangular perisarcular projections. Opening oval, margin with two lateral wide cusps, and a smaller adcauline one. Operculum with two valves, one abcauline wide and one adcauline smaller. Gonothea oval, 1.2 mm high, 0.9 mm in maximum width, five to six transverse grooves, arising from a short peduncle at the base of the stem. Nematocysts mastigophore

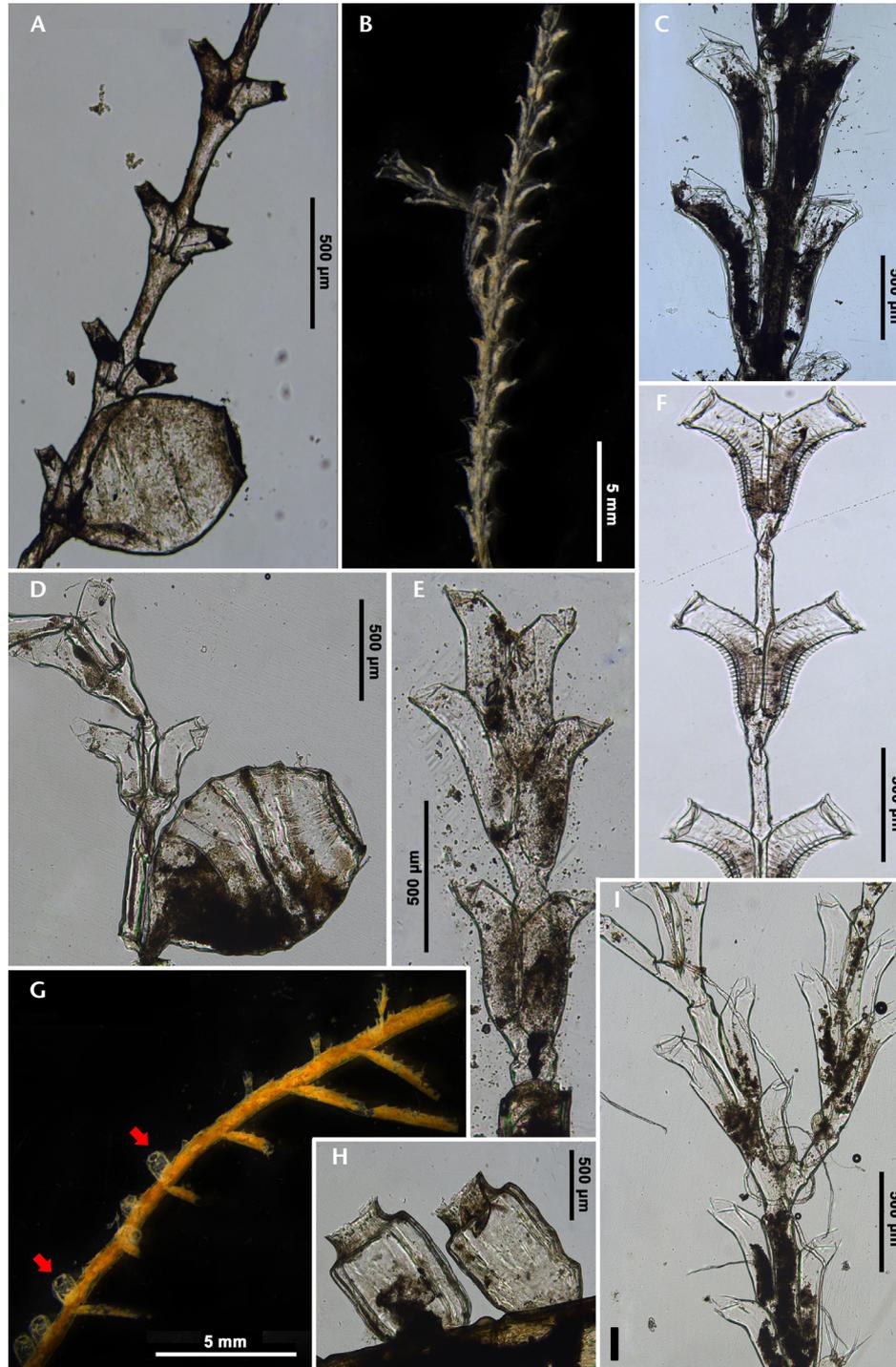


Figure 21. (A) *Amphisbetia distans*: detail of a stem with few hydrothecae and one gonotheca; (B-C) *Diphasia digitalis*: (B) general view of a stem; (C) detail of two pairs of hydrothecae; (D) *Dynamena disticha*: detail of a stem with two pairs of hydrothecae and one gonotheca; (E, G-H) *Idiellana pristis*: (E) detail of the hydrocladium with three pairs of hydrothecae; (G) detail of a stem with few gonothecae (red arrows); (H) detail of two gonothecae; (F) *Diphasia tropica*: detail of a stem with three pairs of hydrothecae; (I) *Dynamena crisioides*: detail of a stem with few hydrothecae.

undischarged (18.4–20.1 × 7.7–10.5 µm) and discharged (18–18.9 × 8.3–8.4 µm) in coenosarc.

Material examined: PCS – few colonies from the rainy season, one of them with one gonotheca. CZUFS CNI-00211; CNI-00315; CNI-00318; CNI-00320; CNI-00321.

Station: PCS – 2, 5, 12, 13, 15, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Fernando de Noronha (Pires et al. 1992, Amaral et al. 2009), Pernambuco (Calder and Mañal 1998), Bahia (Grohmann et al. 2003, 2016), Espírito Santo (Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci 1950, Nogueira et al. 1997, Grohmann et al. 2003, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Vannucci 1951a, Oliveira et al. 2006, Shimabukuro 2007, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Marques et al. 2013, Miranda et al. 2015), Paraná (Miranda et al. 2015, Maria A. Haddad unpub. data), Santa Catarina (Miranda et al. 2011, 2015, Bouzon et al. 2012), and Rio Grande do Sul (Paulo A. Horta unpub. data). World distribution – circumglobal in tropical, subtropical, and temperate regions (Peña Cantero and García Carrascosa 2002).

Remarks: Found on algae.

### *Idiellana pristis* (Lamouroux, 1816)

Fig. 21E, G–H

Synonyms available from: Vervoort (1993) and Watson (2000).

*Idya pristis* Lamouroux, 1816: 200, pl. 5 figs A–E.

*Idiellana pristis* –Migotto, 1996: 65.

Description: Colonies erect, up to 37 mm high, arising from a creeping hydrorhiza. Stem monosiphonic, straight, divided into segments by transverse nodes. The first segment ahydrothecate and the others with hydrothecae and hydrocladia. Hydrocladia 2.7–16.7 mm high, arising alternately from an apophysis, with an axillary hydrotheca and an opposite one. Hydrocladia divided into internodes by transverse nodes. Each internode with several pairs of hydrothecae adnate in more than half their high, free distal portion curved outwards. Hydrothecae elongated, 0.45–0.57 mm high, 0.12–0.14 mm in maximum width, abcauline wall concave, and the adcauline wall convex overlapping the wall of the opposite hydrothecae of each pair. Margin oval with a pair of triangular lateral lobes, operculum with two valves. Gonothecae urn-shaped, 1.13–1.20 mm high, 0.72–0.77 mm maximum diameter, with several longitudinal folds and a narrow circular distal portion, appearing in dorsal rows between the basal and medial parts of the stem. Mastigophore undischarged (21.8–22.8 × 7.8–8.5 µm) and discharged (15.5–21.6 × 7.1–9.6 µm) in coenosarc.

Material examined: PCS – few colonies, two with gonothecae, from the dry and rainy seasons; VB – one infertile colony from the dry season. CZUFS CNI-00029; CNI-00064; CNI-00212; CNI-00213.

Stations: PCS – 7, 11, 13, 16, 17; VB – C2P34.

Bottom: mud.

Distribution: Brazil – Alagoas (Maximiliano M. Maronna unpub. data), Bahia (Allman 1888), São Paulo (Vannucci Mendes

1946, Migotto 1996, Shimabukuro 2007, Silveira and Morandini 2011, Marques et al. 2013, Miranda et al. 2015), Paraná (Miranda et al. 2015), and Santa Catarina (Bouzon et al. 2012). World distribution – species well distributed from tropical to subtropical regions (Vervoort 1993).

Remarks: Unknown substrate for the PCS material. The colony found at the Vaza-Barris River was colonizing a plate.

### *Salacia tetracythara* Lamouroux, 1816

Fig. 22A

Synonyms available from: Bale (1884), Billard (1925), and Watson (2000).

Description: Colonies erect, 7.13 mm and 16.08 mm high, bearing alternating hydrocladia. Stems unbranched arising from a thick, short hydrorhiza, perisarc thick, two lateral rows of unconnected hydrothecae in subopposite pairs, three between successive hydrocladia (one inferior, one axillary, and one opposite). Hydrocladia straight and rigid, on a single plane, alternating, branched once in two hydrocladia. One colony bearing tendrils on all hydrocladia (average: 1.16 ± 0.75 mm). Hydrothecae in two lateral rows in opposite to subopposite pairs, members of the same pair not in contact, but successive hydrothecae of a row in contact or overlapping. Hydrothecae tubular, 0.4–0.5 mm high 0.09–0.12 mm in maximum width, adnate for nearly their entire length, slightly curved distally, aperture rounded, vertical with delicate margin showing signs of renovation, operculum composed of one oval valve attached to abcauline side. No cusps were observed on the margin. Adcauline wall of hydrothecae extended below by a triangular to ovoid adcauline space below each hydrotheca. Only one type of nematocyst was found, probably large microbasic mastigophores. Undischarged and discharged nematocysts were observed on the stem and hydrothecae. See more details in Mendonça et al. (2021).

Material examined: SE – two infertile colonies from the rainy season. CZUFS CNI-00065; CNI-00066.

Stations: SE – C2P12; C2P56.

Distribution: Brazil – Sergipe (Mendonça et al. 2021). World distribution – Australian tropical to temperate east and southeast coast (Lamouroux 1816, Bale 1884, Watson 2000), Indian Ocean (Rees and Vervoort 1987, Schuchert 2003), tropical and subtropical regions of Indo-Pacific (Billard 1925, Gibbons and Ryland 1989, Gravier-Bonnet 2008), and China Sea (Song 2016).

Remarks: Colonizing the plate. Considered an alien species to the Atlantic Ocean (Mendonça et al. 2021).

### *Tridentata loculosa* Busk, 1852

Fig. 22B

Synonyms available from: Migotto (1996) and Galea (2008).

*Sertularia loculosa* Busk, 1852: 393, pl. 19, fig. 9. –Migotto, 1996: 71, fig. 13F–I.

*Sertularia loculosa* –Vannucci Mendes, 1946: 564.

Description: Colonies stolonial up to 1.5 mm, and erect up to 33 mm high, arising from a creeping hydrorhiza. Stem

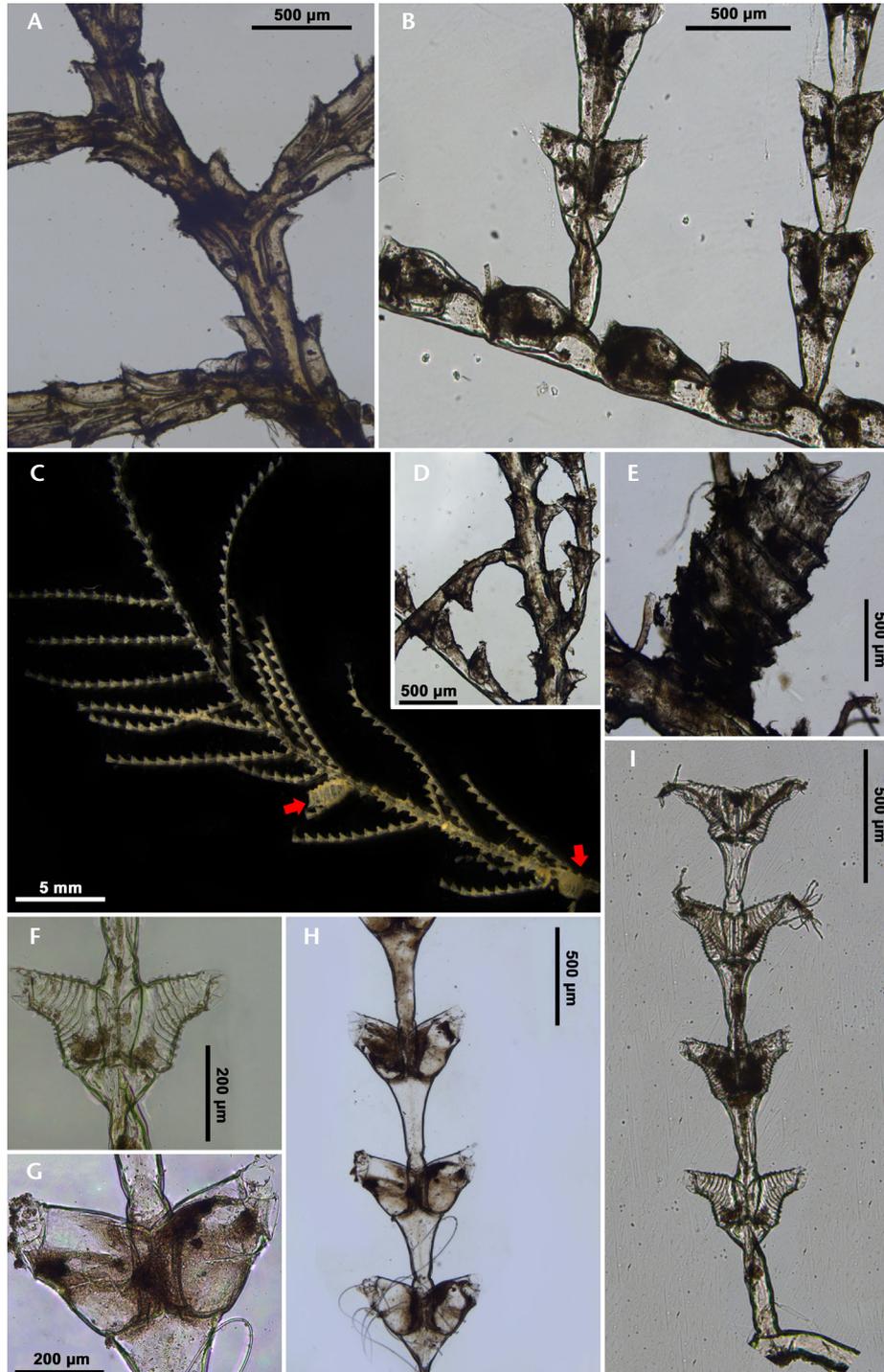


Figure 22. (A) *Salacia tetracythara*: general view of a stem showing few hydrocladia and hydrothecae; (B) *Tridentata loculosa*: detail of the stem with two hydrocladia and few hydrothecae; (C-E) *Tridentata marginata*: (C) general view of a stem with two gonothecae (red arrows); (D) detail of a stem with few hydrocladia and hydrothecae; (E) detail of one gonotheca; (F, I) *Tridentata rugosissima*: (F) detail of one pair of hydrothecae; (I) general view of a stem with several hydrothecae; (G-H) *Tridentata turbinata*: (G) detail of one pair of hydrothecae; (H) detail of a stem with hydrothecae.

monosiphonic, branched or not, divided into internodes by transverse nodes. The first internodes ahydrothecate, the others with a pair of hydrothecae, adnate to the stem by almost all their length. Hydrothecae tubular, short and wide, appearing triangular in front view, 0.25–0.28 mm high, 0.12–0.14 mm in maximum width, free only at the distal end and directed forward. Abcauline wall with an intrathecal septum extending for almost its entire diameter of the hydrothecae, but not touching the adcauline wall. Hydrothecal margin rounded, with two large lateral cusps and one small adcauline one. Operculum with two valves, a large abcauline, and a small adcauline one.

Material examined: PCS – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00030; CNI-00214; CNI-00215.

Stations: PCS – 11, 12, 13.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Espírito Santo (Vannucci 1951a, Grohmann et al. 1997), Rio de Janeiro (Nogueira et al. 1997, Miranda et al. 2015), São Paulo (Vannucci 1951a, Migotto 1996, Oliveira et al. 2006, Oliveira and Marques 2011, Silveira and Morandini 2011, Miranda et al. 2015), and Santa Catarina (Bouzon et al. 2012, Miranda et al. 2015, Alaja-Batista et al. 2020). World distribution – it seems to be a circumglobal species (Migotto 1996), widely recorded in tropical and subtropical regions of Indian and Pacific Oceans, and also with records in the Atlantic coast (Galea 2008).

Taxonomic remarks: The generic affinities of *T. loculosa* are presently unclear; it has been assigned temporarily to *Tridentata* Stechow, 1920 given the general resemblance of its trophosome and gonosome to species of that genus (Calder and Faucci 2021).

Remarks: Found on *Hincksella formosa* and *Sertularelloides cylindritheca*.

### *Tridentata marginata* (Kirchenpauer, 1864)

Fig. 22C–E

Synonyms available from: Calder (1991), Vervoort (1993), and Migotto (1996).

*Sertularia marginata* Kirchenpauer, 1864: 13, fig. 8A–C, Vannucci Mendes, 1946: 567, Pires et al., 1992: 7, Migotto, 1996: 73, fig. 14A–C, Migotto, 1998: 1, fig. 1, 2.

*Sertularia marginata* f. *typica* Vannucci, 1949: 248, 1951a: 84.

*Sertularia marginata* f. *laxa* Vannucci, 1949: 248, 1950: 88; 1951a: 84.

*Sertularia inflata* Maÿal, 1973: 34.

Description: Colonies erect, up to 40 mm high, arising from a creeping tubular hydrorhiza. Stem monosiphonic, divided into internodes by transverse nodes. Basal part of the stem ahydrothecate, separated from the upper part by an oblique hinge. Each internode of the remaining part of the stem with a proximal apophysis gives rise to a hydrocladium, one axillary hydrotheca, and a pair of sub-opposite hydrothecae at the distal end. This latter pair of hydrothecae adnate to the frontal region of the stem. Hydrocladia 2.9–14.8 mm high, arising from the stem at angles of 100–139°, divided into internodes by oblique

nodes. Hydrocladia internodes separated by a hinge, each one with a pair of opposite hydrothecae, except the basal internode which has no hydrothecae. Hydrothecae inflated, 0.21–0.25 mm high and 0.09–0.11 mm in maximum width. Each opposite hydrothecal pair is positioned in front of the hydrocladium, adnate to it for almost their entire length. Both hydrothecal inner front walls were in contact, and with the free distal portion curved forward. Abcauline wall with an intrathecal septum at the curvature of the hydrothecae, directed towards the adcauline margin, but not reaching it. Hydrothecal margin with two wide lateral cusps and a smaller median adcauline. Opening oval, operculum with two valves, one abcauline wide and a smaller adcauline divided in half. Gonothecae cylindrical, elongated, 1.4–2.9 mm high, 0.8–1.5 mm in maximum width, with several perisarcal annulations and two distal spines.

Material examined: PCS – several colonies, three of them with gonothecae, from the dry and rainy seasons. CZUFS CNI-00031; CNI-00216; CNI-00366; CNI-00367; CNI-00370.

Stations: PCS – 1, 2, 5, 6, 11, 12, 13, 16.

Bottom: gravel, sand, and mud.

Distribution: The species has been recorded as *Sertularia marginata* and *Tridentata marginata* in Brazil. Brazil – Ceará (Marques et al. 2006), Fernando de Noronha (Pires et al. 1992, Amaral et al. 2009), Bahia (Grohmann et al. 2003, 2016), Pernambuco (Calder and Maÿal 1998), Alagoas (Maximiliano M. Maronna unpub. data), Espírito Santo (Vannucci 1950, Grohmann et al. 1997, 2003), Rio de Janeiro (Vannucci 1950, Nogueira et al. 1997, Grohmann et al. 2003, Miranda et al. 2015), São Paulo (Vannucci Mendes 1946, Migotto 1996, Oliveira et al. 2006, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Marques et al. 2013, Fernandez et al. 2014, Miranda et al. 2015), Paraná (Vannucci Mendes 1946, Miranda et al. 2015, Maria A. Haddad unpub. data), and Santa Catarina (Shimabukuro 2007, Miranda et al. 2011, 2015, Bouzon et al. 2012). World distribution – circumglobal in tropical and subtropical regions of Atlantic, Pacific, and Indian Oceans (Vervoort 1993), considered alien from Mediterranean (González-Duarte et al. 2013).

Remarks: The material was fragmented in most of the samples. Few colonies found with hydrorhizae were colonizing algae and the hydroid *Thyroscyphus ramosus*.

### *Tridentata rugosissima* (Thornely, 1904)

Fig. 22F, I

Synonyms available from: Migotto (1996) and Galea (2008).

*Sertularia rugosissima* Thornely, 1904: 118, pl. 2, fig. 4, –Migotto, 1996: 75, fig. 14D, E.

*Geminella subtilis* Vannucci Mendes, 1946: 572, pl. 4, fig. 42, 43.

*Sertularia* sp. –Pires et al., 1992: 7.

Description: Colonies erect, up to 12 mm high, arising from a creeping and tubular hydrorhiza. Stem monosiphonic, unbranched, divided into internodes by oblique nodes. The first internode short, ahydrothecate, separated from the others by

an oblique hinge. The other cauline internodes with a pair of opposite hydrothecae. Hydrothecae short, 0.68–0.90 mm high, 0.27–0.34 mm in maximum width, positioned in front of the stem, adnate to it in almost all its length, short distal portion free facing upwards. The lateral adnate portion of the hydrothecal pair in contact with each other. Hydrothecae wall with numerous transverse annulations (characteristic of this species), except in the distal portion. Margin smooth, with three cusps, two laterals, and a small adcauline. Operculum with two valves, a large abcauline, and a small adcauline one, usually divided in half.

Material examined: PCS – few infertile colonies from the dry and rainy seasons. CZUFS CNI-00373; CNI-00374.

Stations: PCS – 5, 6, 11, 12.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Fernando de Noronha (Pires et al. 1992), Pernambuco (Oliveira et al. 2009, abstract, Amaral et al. 2010), Alagoas (Maximiliano M. Maronna unpub. data), Espírito Santo (Grohmann et al. 1997), Rio de Janeiro (Vannucci 1954, Nogueira et al. 1997), São Paulo (Vannucci Mendes 1946, Migotto 1996, Oliveira et al. 2006, Silveira and Morandini 2011, Miranda et al. 2015), Paraná (Vannucci Mendes 1946, Miranda et al. 2015, Alaja-Batista et al. 2020, Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2015). World distribution – circumglobal from tropical to subtropical regions (Medel and Vervoort 1998).

Taxonomic remarks: The species has been recorded as *Sertularia rugosissima* in Brazil.

Remarks: Found on algae, Bryozoa, and a thyriscyphid hydroid.

### *Tridentata tumida* (Allman, 1877)

Fig. 23A–D

Synonyms available from: Calder (1991).

*Sertularia tumida* Allman, 1877: 23, pl. 16, fig. 3, 4.  
not *Sertularia borneensis* f. *parvula* Vannucci, 1949: 249, pl. 3, fig. 47, 48 [= *Dynamena turbinata* Lamouroux, 1816].

Description: Only one erect unbranched colony, 20.3 mm high, without hydrorhiza or basal segment, starting from the first hinge. Internodes separated by a slightly oblique node, not quite distinct, each one with a pair of hydrothecae. Hydrothecae short, inflated, 0.26–0.29 mm high, 0.12–0.17 mm in maximum width, adnate to the stem with at least half their adcauline wall, distal free portion curved outward, except for the apical pair that are directed upward. Adcauline wall convex, abcauline straight, slightly convex in the apical pair. Pairs of hydrothecae of the basal stem internodes do not touch at their adcauline wall; however, toward the distal portion of the stem, they gradually approach at their frontal margin until touching each other from half of the stem to the last pair. Margin hydrothecal with two wide and rounded lateral cusps and a smaller median adcauline not easily visible. Operculum not seen in this material.

Material examined: SE – one infertile colony from the rainy season. CZUFS CNI-00220.

Station: SE – C2P12.

Distribution: Brazil – The species has been recorded as *Sertularia tumida* in Brazil. Bahia (Grohmann et al. 2003), Espírito Santo (Grohmann et al. 2003, Grohmann 2006), Paraná, and Santa Catarina (Miranda et al. 2015). World distribution – considered circumglobal (Calder 1991).

Taxonomic remarks: The only difference found between the material from Sergipe and the description of *T. tumida* by Calder (1991) from Bermuda is in the form of the marginal cusps. The author's illustration shows sharp and pronounced cusps, while in the specimens from Sergipe they are rounded. Maybe this characteristic can be associated with the colony size and, consequently to its age, inasmuch as Calder (1991) refers to big stolonial and ramified colonies, larger and certainly older than ours.

Remarks: unknown substrate.

### *Tridentata turbinata* (Lamouroux, 1816)

Fig. 22G–H

Synonyms available from: Calder (1991), Medel and Vervoort (1998) and Calder (2008).

*Dynamena turbinata* Lamouroux, 1816: 180.

*Sertularia turbinata* – Migotto, 1996: 78, fig. 14F, G.

*Geminella ceramensis* – Vannucci Mendes, 1946: 570.

Description: Colonies erect, up to 15.2 mm high, unbranched, arising from a creeping hydrorhiza. Stem ahydrothecate at the base, internode separated by an oblique hinge, the others by slightly oblique nodes. Long internodes each with a pair of opposite hydrothecae. Hydrothecae short, 0.15–0.22 mm high, 0.13–0.15 mm maximum diameter, inflated at halfway their basal portion, adnate to the stem less than half their height, free portion curving outwards. Abcauline wall is almost straight at the half basal portion, and slightly concave at the curvature. Adcauline wall convex in the adnate portion and straight to perpendicular in the free portion. In some hydrothecae, it is possible to see a crossed line of perisarc at the curvature of the adcauline wall. A perisarc thickening horseshoe shape is visible at the curvature of the abcauline wall, projecting toward the center of the hydrothecae. Margin hydrothecal with three cusps, two wide laterals, and one small median adcauline. Operculum with two valves, one wide and one small. Nematocysts microbasic mastigophores? undischarged (8.2–10.1 × 2.4–3 μm), in hydranth and coenosarc.

Material examined: PCS – few infertile colonies from the rainy season. CZUFS CNI-00221.

Stations: PCS – 5, 12, 15.

Bottom: gravel and sand.

Distribution: The species has been recorded as *Sertularia turbinata* and *Tridentata turbinata* in Brazil. Brazil – Pernambuco (Calder and Mañal 1998), Fernando de Noronha (Amaral et al. 2009), Espírito Santo (Grohmann et al. 1997, 2003), Rio de Janeiro (Nogueira et al. 1997, Grohmann et al. 2003), São

Paulo (Oliveira et al. 2006, Cunha and Jacobucci 2010, Oliveira and Marques 2011, Silveira and Morandini 2011, Marques et al. 2013), Paraná (Maria A. Haddad unpub. data), and Santa Catarina (Miranda et al. 2011, Bouzon et al. 2012). World distribution – circumglobal from tropical to subtropical regions (Millard 1975).

Taxonomic remarks: According to Calder (2019) this species has long been misassigned to a non-monophyletic genus *Sertularia* Linnaeus, 1758 instead of *Tridentata* Stechow, 1920.

Remarks: All colonies were on algae.

### Thyrosocyphidae Stechow, 1920 *Sertularioides cylindritheca* (Allman, 1888)

Fig. 23E

Synonyms available from: Medel and Vervoort (1998), as *Sertularella cylindritheca*.

*Sertularia cylindritheca* Allman, 1888: 5960, pl. 29, fig. 1, 1a.

*Sertularella cylindritheca* –Vannucci, 1951b: 107, 113, 114, –Oliveira et al., 2016: 118.

*Sertularella catena* –Mañal, 1973: 39, fig. 24, 25, 1981b: 228, 1981c: 229, 230, 1981d: 23.

Description: Colonies erect, up to 12 cm high, arising from a creeping hydrorhiza. Stem monosiphonic, separated in internodes by transverse nodes. Internodes with one hydrotheca near the distal portion. Hydrocladia arising from the internodes below the hydrothecae in angles of 109.7–113.8° from the stem. Hydrocladia with variable length (1.4–2.8 cm), with hydrothecae arising alternately in internodes separated by transverse nodes. Hydrothecae arise from internodes in a short apophysis with a visible septum separating it from the hydrothecae. Hydrothecae cylindrical, elongated, 1.5–1.8 mm high, 0.6–0.8 mm wide, basal portion adnate to the stem, the remaining length free. Hydrothecal margin quadrangular with four short cusps, operculum with four valves of the same size. Renovations in the margin were found in several hydrothecae. Gonothecae elongated and inflated, 1.5–1.9 mm high, 0.9–1.1 mm wide, arising from a short pedicel, widening from the base to the medial portion and decreasing in length until the upper portion. One of the gonothecal walls straight and the opposite convex. Gonothecal margin with four equidistant cusps and one operculum with four valves (same size).

Material examined: PCS – abundant colonies, most of them with gonothecae, from the dry and rainy seasons; VB – one infertile colony from the dry season. CZUFS CNI-00034; CNI-00067; CNI-00224; CNI-00225; CNI-00362; CNI-00365.

Stations: PCS – 2, 3, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18; VB – C2P34.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Marques et al. 2006, Shimabukuro 2007), Fernando de Noronha (Pires et al. 1992), Paraíba (Felipe F. Campos unpub. data), Pernambuco (Mañal 1983, Oliveira et al. 2009, abstract), Alagoas (Maximiliano M. Maronna unpub. data), Sergipe (Luana M.C. Mendonça unpub.

data), Bahia (Vannucci 1951a), Espírito Santo (Grohmann et al. 1997), and São Paulo (Migotto 1996, Silveira and Morandini 2011). World distribution – widely distributed from tropical and subtropical regions of Western and Eastern Atlantic (Medel and Vervoort 1998).

Remarks: Most of the PCS material was not in a substrate in the sorting, however, some fragments were found with the tendrils on *Aglaophenia rhynchocarpa*, which could be a dispersion form. The colony found on the estuarine material was colonizing a plate.

### *Thyrosocyphus marginatus* (Allman, 1877)

Fig. 23G

Synonyms available from: Medel and Vervoort (1998), as *Cnidocyphus marginatus*.

*Obelia marginata* Allman, 1877: 9, pl. 6, fig. 1, 2.

*Campanularia marginata* –Vannucci, 1949: 228, pl. 1, figs 7–10, –Vannucci, 1950: 84, 1951a: 82, 1951b: 106, 107, 108, 112, 113, –Mañal, 1973: 58, figs 40–46, 1983: 9, figs 15–17.

Description: Colonies erect, up to 7.1 cm, arising from a creeping hydrorhiza. Stem monosiphonic, separated into internodes by transverse nodes. Internodes with two prominent apophyses that give rise alternately to a hydrotheca and, in the opposite portion to a hydrocladium. Hydrocladia 1.2–4.0 cm high, arising from the stem in angles of 105.2–144.3° generally alternate, equally separated in internodes by transverse nodes. Each internode from the hydrocladium with a distal apophysis carrying hydrothecae. Hydrothecae conical, 0.9–1.0 mm high, 0.5–0.7 mm wide, arising from a short pedicel, adcaular wall convex, abcaular straight. Margin smooth, with occasional renovations, with a ring form thickening. Operculum not seen. Unidentified discharged nematocysts saw on hydrothecae (23.6–26.8 × 6.1–6.9 μm).

Material examined: PCS – abundant infertile colonies from the dry and rainy seasons. CZUFS CNI-00035; CNI-00112; CNI-00163; CNI-00226; CNI-00227; CNI-00389.

Stations: PCS – 5, 8, 9, 11, 12.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Sergipe (Luana M.C. Mendonça unpub. data), Pernambuco (Mañal 1983, Calder and Mañal 1998), Espírito Santo (Vannucci 1949, 1951b, Grohmann et al. 2003), and Rio de Janeiro (Vannucci 1951a, Grohmann et al. 2003, Miranda et al. 2015). World distribution – species recorded from tropical regions of Western and Eastern Atlantic (Medel and Vervoort 1998).

Remarks: One colony found on algae and for the other the substrate is unknown. Zooxanthellae found on hydrothecae and stem.

### *Thyrosocyphus ramosus* Allman, 1877

Fig. 23F

Synonyms available from: Galea (2008).

*Thyrosocyphus ramosus* Allman, 1877: 11, pl. 6, fig. 5, 6, –Migotto,

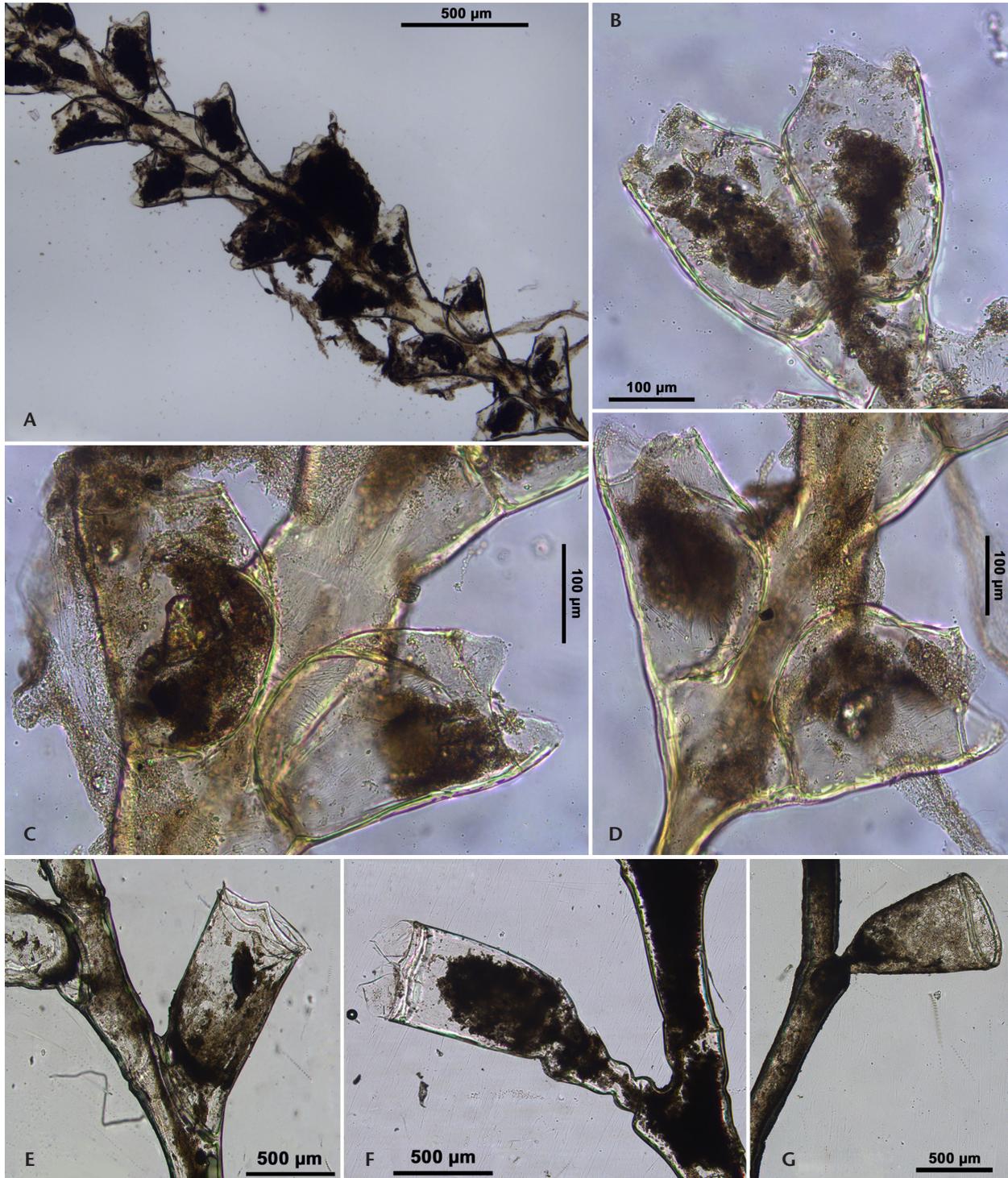


Figure 23. (A-D) *Tridentata tumida*: general view of the basal portion of the stem with hydrothecae (A) and the detail portions of the hydrothecae of the distal (B) medial (C), and basal (D) parts of the stem. (E) *Sertularelloides cylindritheca*: detail of one hydrotheca with margin renovations; (F) *Thyrosocyphus ramosus*: detail of one hydrotheca with margin renovations and the four opercular valves; (G) *Thyrosocyphus marginatus*: detail of a hydrotheca without operculum.

1996: 79, fig. 15A, B, –Shimabukuro and Marques, 2006: 32, figs 2–28.

?*Thyrosocyphus torresii* –Maýal, 1973 [polyp].

?*Thyrosocyphus vitiensis* –Maýal, 1973 [polyp].

Description: Colonies erect, up to 15 cm high, arising from a creeping hydrorhiza. Stem monosiphonic, divided into a defined pattern until third order, internodes separated by transverse well-defined nodes. Each internode with an apophysis in the medial portion and one opposite in the distal one. Each apophysis carries a hydrocladium. Hydrocladia 1.1–4.0 cm high, inserted in the stem in angles of 106.6–146°, equally separated into internodes by transverse nodes. Each hydrocladium internode with two apophyses in same position as the cauline ones, each carrying one hydrotheca. Hydrothecae cylindrical, 1.0–1.8 mm high, 0.4–0.8 µm wide, arising from the apophysis in a pedicel with spiral annulations, adcaulinar wall slightly convex and abcaulinar straight. Margin smooth with four equidistant cusps. Operculum with four triangular valves and rounded bases. Gonothecae conical, 1.4–2.0 mm high, 0.7–1.1 mm wide, longer than the hydrothecae, arising from the apophysis between the hydrothecal apophysis and the hydrocladium.

Material examined: PCS – abundant colonies, few of them with gonothecae, from the dry and rainy seasons. CZUFS CNI-00036; CNI-00230; CNI-00231; CNI-00233; CNI-00379; CNI-00380.

Stations: PCS–1, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18.

Bottom: gravel, sand, and mud.

Distribution: Brazil – Ceará (Marques et al. 2006, Shimabukuro 2007), Pernambuco (Calder and Maýal 1998, Oliveira et al. 2009, abstract), Alagoas (Maximiliano M. Maronna unpub. data), Sergipe (Shimabukuro and Marques 2006, Luana M.C. Mendonça unpub. data), Bahia (Allman 1988), Espírito Santo (Grohmann et al. 2003), Rio de Janeiro (Nogueira et al. 1997), and São Paulo (Migotto 1996, Silveira and Morandini 2011, Miranda et al. 2015). World distribution – species recorded from tropical western Atlantic and west coast of Africa (Migotto 1996).

Remarks: unknown substrate.

## DISCUSSION

This study reports 79 distinct species from Sergipe, being the first comprehensive study on Hydrozoa already been made for the state. Of those species, 71 were identified at the species level and 60 are new records from the state; of those new records, nine are also new for the northeast region and two for the Brazilian coast.

The morphotypes *Coryne* sp. 1 and sp. 2, *Dicoryne* sp., Hydractiniidae sp. 1 and sp. 2, *Campanularia* sp. 1 and sp. 2, Haleciidae sp. 1 and sp. 2, *Calycella* sp., and *Filellum* sp. represent new records from Sergipe even without a specific identification. Among those records, we highlight *Dicoryne* sp. because it is the first record for this genus for the Brazilian coast.

*Antennella secundaria*, *Anthohebella communis*, *Diphasia tropica*, *Eudendrium merulum*, *Mitrocomium cirratum*, *Monotheca*

*obliqua*, *Sertularella peculiaris*, *Tridentata loculosa*, and *Zanclaea migottoi* are new records from the Brazilian Northeast. These species were reported to the Southeastern and Southern regions of Brazil. Of those, it is noteworthy that the only record of *E. merulum* to Brazil (Santa Catarina) was considered doubtful; the material sampled in Sergipe, with male and female colonies, confirms the presence of this species on the Brazilian coast. The species *A. communis* and *M. obliqua* have few records, the first from Espírito Santo and São Paulo, and the second from Rio de Janeiro; however, the resemblance of those species with *Hebella scandens* and *Monotheca margaretta*, respectively, could be masking their distribution. The respective distributional problematics of the species *S. peculiaris* and *Z. migottoi* are presented in the results section of each one, although, even considering the Brazilian records of *S. conica*, the record from Sergipe represents the first for *S. peculiaris* from the Northeast region.

The new records from the Brazilian coast are *Antennella incerta* and *Halecium pusillum*. The first species is reported from Florida (Calder 2013) and Guadeloupe (Galea 2010), and the record for Sergipe is the third of this species in the world and also the first from the South Atlantic. The samples from Sergipe of *A. incerta* are also the first fertile colonies already recorded. *Halecium pusillum* is considered a circumglobal species (Peña Cantero and Carrascosa 2002, Gravili et al. 2015), with the records for the western Atlantic being from the Caribbean (Castellanos-Iglesias 2017) and French Guiana (Leloup 1960), while Sergipe record is the first from Brazil.

It is important to highlight the recent first record of *Salacia tetracythara* for the Atlantic Ocean as an alien species (Mendonça et al. 2021). This species was reported from the Indian and Pacific oceans (Billard 1925, Gibbons and Ryland 1989, Gravier-Bonnet 2008), being common in Australia (Lamouroux 1816, Bale 1884, Watson 2000).

The majority of the species recorded in the present study are widely distributed in the world (circumglobal or circum-tropical species) and also in Brazil, e.g. *Aglaophenia latecarinata*, *Bougainvillia muscus*, *Cladocoryne floccosa*, *Clytia gracilis*, and *Tridentata marginata*. Other species, although common around the world, are scarcely recorded in Brazilian waters, as *Mitrocomium cirratum*, that has been registered (polyp stage) only once in São Paulo (Fernandez et al. 2015); *Antennella secundaria*, in São Paulo and Santa Catarina (Bouzon et al. 2012, Fernandez et al. 2015, Miranda et al. 2015), and *Calyptospadix cerulea*, in Pernambuco and Paraná (Calder and Maýal 1998, Cangussu et al. 2010, Bumber and Rocha 2012).

Another group of species comprises those that are widely found around the world, with multiple records from the southeastern and southern of Brazil, lacking records from the northeast region. Some examples are *Clytia noliformis* and *Monostaechas quadridens* found only in Bahia (Allman 1888, Vannucci 1951a, Grohmann et al. 2003, Kelmo et al. 2003, Shimabukuro 2007), and *Tridentata loculosa* found only in Espírito Santo and Santa Catarina (Vannucci 1951a, Migotto 1996, Grohmann et al. 1997, Nogueira

et al. 1997, Oliveira et al. 2006, Oliveira and Marques 2011, Silveira and Morandini 2011, Bouzon et al. 2012, Miranda et al. 2015). It is also worth highlighting the case of *Sertularella diaphana*, that unlike the specimens mentioned above, has been recorded only from the northeast region (Fernando de Noronha and between Pernambuco and Bahia) (Allman 1888, Nutting 1904, Pires et al. 1992, Kelmo et al. 2003, Maximiliano M. Maronna unpub. data).

There is a group of species apparently exclusive to the Atlantic, with records from both western and eastern regions, but with few records from Brazil, for example *Halopteris tenella* found in Pernambuco and São Paulo (Migotto 1996, Calder and Maÿal 1998, Oliveira et al. 2006) and *Syntheicum tubithecum* found in Pernambuco, Espírito Santo, and Rio de Janeiro (Maÿal 1983, Vannucci 1950, 1951a, Grohmann et al. 2003, Shimabukuro 2007, Miranda et al. 2015). In addition, among the Atlantic there are those common in southeast and south regions of Brazil but not in the northeast, for example *Diphasia tropica* and *Anthohebella communis* (already mentioned above), and also *Hebella venusta*, *Gymnangium allmani*, *Lytocarpia tridentata*, and *Orthopyxis sargassicola*, with one record each, respectively from Bahia (Shimabukuro 2007), Pernambuco (Maÿal 1983), Ceará (Marques et al. 2006), and Alagoas (Maximiliano M. Maronna unpub. data).

This study fills the distributional gap along the Brazilian coast for several species, such as *Cirrholovenia tetranema*, *Diphasia digitalis*, *Halopteris carinata*, *Hebella scandens*, *Obelia dichotoma*, *Pycnotheca mirabilis*, and *Thyroscyphus marginatus*, and also extends the distribution further north along the Brazilian coast for *Anthohebella communis*, *Antennella curvitheca*, *Clytia macrotheca*, *C. noliformis*, *Diphasia tropica*, *Hebella venusta*, *Hincksella formosa*, *Monostaechas quadridens*, *Tridentata loculosa*, and *T. tumida*. Finally, the records of *Antennella incerta* and *Halecium pusillum* extend their distribution further along south the Western Atlantic.

The results presented here not only contribute to the knowledge about the hydroids of the Sergipe coast, expanding the list of species from the state, but also present new records for the Northeast and Brazil. This study also highlights the diversity of hydroids from Sergipe and the potential for other studies in the state to find still more species in new habitats, other depths over the shelf (e.g., infralittoral and abyssal regions), other estuarine regions, artificial rocky shores, and a recently discovered coral bank (shelf) (Elizabeth G. Neves unpub. data). It is important to mention that the Sergipe coast was considered inappropriate for sessile species, such as hydroids, because of the amount of fine particles of sediment dumped by the rivers, especially by the São Francisco River, along the coast. This concept leaves the impression that the bottom of the entire continental shelf was formed by mud and clay, being therefore unsuitable for larval settlement and development of species associated with hard substrates. Our results confirm that small rocks and gravel as well as shells, algae and biogenic structures tubes can maintain a rich community of hydroids in the PCS. Ultimately, we highlight the importance of studying the diversity of the PCS communities which, despite being small, shallow,

and short, it is intensively exploited economically, before we lose the knowledge about its diversity.

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CRPG, LMCM and MAH designed the experiments; CRPG and LMCM conducted the experiments; LMCM analyzed the data; CRPG, LMCM and MAH wrote the paper.

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The authors have declared that no competing interests exist.

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