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New records of bryozoans from Portugal

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Abstract: Unpublished data on 37 bryozoan species collected in different parts of the Portuguese coast are provided. 21 of them are reported from Portugal for the first time. Among them, *Sessibugula barrosoi, Smittina jordii* and *Schizomavella linearis profunda* are reported for the first time since their original descriptions. *Anguinella palmata* was never reported before in Iberian waters, including both Atlantic and Mediterranean coasts. The record of *Celleporella angusta* extends the species' known southern limit of distribution. Another 12 species were previously reported only once in Portugal, sometimes with some doubts. In addition, the ovicell of *Crepis longipes* and the ancestrula of *Herentia thalassae* are here described for the first time. The presence in *Smittina affinis* of a denticulate distal border in the primary orifice and a well-developed peristome are reported. Two species of the genera *Hincksina* and *Hemicyclopora*, left in open nomenclature, are described.

Résumé : *Nouveaux signalements de Bryozoaires au Portugal.* Ce travail synthétise des observations inédites portant sur les 37 espèces de Bryozoaires qui ont été recueillies en différents points de la côte portugaise. Vingt-et-une d'entre elles sont pour la première fois mentionnées du Portugal. Parmi elles, *Sessibugula barrosoi*, *Smittina jordii* et *Schizomavella linearis profunda* sont en outre signalées pour la première fois depuis leurs descriptions originales. *Anguinella palmata* n'avait jamais été observée auparavant dans les eaux ibériques, que ce soit de l'Atlantique ou de la Méditerranée. Le signalement de *Cellepora angusta* éloigne sa limite méridionale de distribution. Douze espèces n'ont été récoltées qu'à une seule reprise au Portugal, parfois avec doute. Nous donnons en outre une première description de l'ovicelle de *Crepis longipes* et de l'ancestrula d'*Herentia thalassae*. La présence, au bord distal de l'orifice zoécial, d'une bordure denticulée et celle d'un péristome bien développé, sont pour la première fois observées chez *Smittina affinis*. Dous nouvelle espèces d'*Hincksina* et *Hemicyclopora* sont décrites mais laissées en nomenclature ouverte.

Keywords: Crepis longipes • *Herentia thalassae* • *Hemicyclopora* • *Hincksina* • Iberian Peninsula • NE Atlantic

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Introduction

While the bryozoan fauna of the Iberian Peninsula as a whole is one of the best known in European waters today (Reverter-Gil et al., 2012), the bryozoan fauna from continental Portugal is one of the least studied in the Iberian Peninsula.

Regarding the Portuguese littoral fauna, only a few works have studied it. Many of them are part of comprehensive faunistic studies, such as Nobre (1903a-b, 1904, 1937 & 1942), Nobre & Braga (1942), Rosas (1944), Saldanha (1974 & 1980), Marques et al. (1982), Boury-Esnault et al. (2001), Harmelin (2001), Marchini et al. (2007), Souto et al. (2010a-b, 2011 & 2013) and Nikulina et al. (2013). Moreover, most of these works lack descriptions, figures and reference material.

In the case of deep water species, although literature is also limited, works usually include descriptions and figures, and reference material is held in different institutions: Jullien (1882 & 1883), Calvet (1907 & 1931), d'Hondt (1974), Hayward (1979), d'Hondt & Hayward (1981) and Harmelin & d'Hondt (1992a & b).

Despite all these limitations, more than 150 bryozoan species are presently known from Portuguese shallow waters, and about 75 species from deep waters around Portugal. Altogether, more than 200 species of bryozoans are known from the exclusive economic zone of Portugal; an updated check-list will be published soon.

During the last years we have taken samples in several localities on the Portuguese coast and have also revised Portuguese material held in different museums. Altogether more than 90 bryozoan species have been identified. In the present paper we include new unpublished data on 37 of these species, including figures and diagnoses or descriptions. Additional data will soon be published in a general check-list. Among them, 21 species were never recorded before in Portugal. Other 12 species were previously reported from Portugal only once. In short, more than one third of the studied species in the present work were previously unknown or little known in Portuguese waters. These new findings confirm that the Portuguese bryozoan fauna is still poorly known.

Material and Methods

In the present study we have included material collected by us in 12 localities along the Portuguese coast. Samples were collected mainly in the intertidal. In the Algarve samples were also taken from fishing nets; however, the boats were small enough as to assure that material was collected near the coastline. We have also revised some samples previously collected in several Portuguese localities, ranging from the intertidal to 1108 m depth, which are conserved in the Museu Nacional de História Natural e da Ciência, Lisbon (MB), the Muséum National d'Histoire Naturelle, Paris (MNHN), and the Natural History Museum, London (NHMUK) (see Figure 1 & Table 1).

The samples were examined with a stereomicroscope and uncoated material was photographed with a Zeiss EVO LS15 scanning electron microscope; additional photographs were taken under a stereomicroscope with a Leica DFC 425 digital camera. Measurements were taken with the software ImageJ® on the SEM photographs. Reference material will be sent to the Museo Nacional de Ciencias Naturales, Madrid (MNCN).

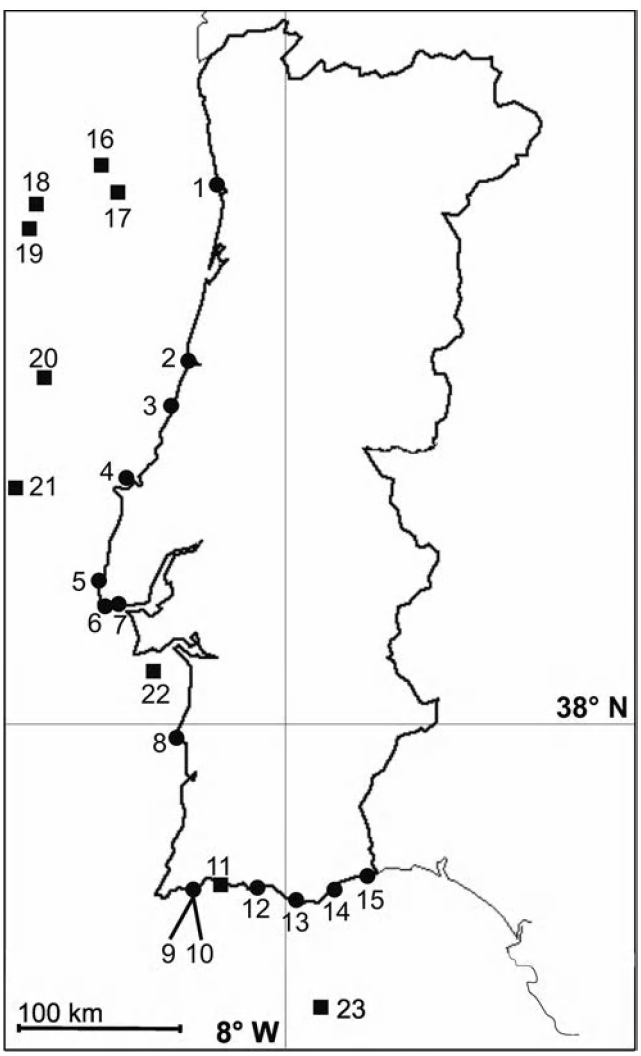

Figure 1. Sampling localities in Portuguese waters (circles: intertidal; squares: offshore) (see also Table 1).

Table 1. Sampling localities in the Portuguese littoral, and material from museums (see also Figure 1).

Station number	Locality	N	W	Depth (m)	Date
1	Leça de Palmeira	41°12'33"	08°42'53"	Intertidal	11/06/2010
2	Buarcos	40°10'43"	08°54'20"	Intertidal	11/06/2010
3	Vale Furado	39°41'06"	09°03'26"	Intertidal	12/06/2010
4	Beach of Baleal	39°22'19"	09°19'57"	Intertidal	14/06/2010
5	Boca do Inferno	38°41'34"	09°26'02"	0-7	13/06/2010
6	Cascais	38°41'41"	09°25'07"	On a hull	20/03/2012
7	Beach of Azarujinha, Estoril	38°42'02"	09°23'21"	Intertidal	23/05/1978
8	Beach of São Torpes, Sines	37°55'06"	08°48'15"	Intertidal	21/08/1978 15/10/1981
9	Harbour of Ferragudo, Portimão	37°08'10"	08°31'38"	No data	27/03/2004
10	Marina of Portimão	37°07'05"	08°31'38"	On a pontoon	31/03/2004
11	Armaçao de Pêra	37°06'00"	08°21'24"	No data	23/03/2004
12	Beach Maria Luísa, Albufeira	37°05'22"	08°11'23"'	Infralitoral	28/03/1979
13	Laguna of Faro	37°00'41"	07°59'54"	Intertidal	21/03/2004
14	Beach of Fuseta	37°03'17"	07°45'14"	Intertidal	25/03/2004
15	Santa Luzia, Tavira	37°06'00"	07°40'00"	Intertidal	28/03/2004
16	"Poseidon" st. 3	41°12.2'	09°21.4'	850-1000	20/11/1984
17	"Poseidon" st. 2	41°09.3'	09°20'	800-900	20/11/1984
18	"Poseidon" st. 13	40°09.1'	09°49.9'	35-930	21/11/1984
19	"Poseidon" st. 12	40°08.2'	09°50.5'	1050	21/11/1984
20	C.E. Charcot St. 1	40°01'	09°44'	130	3/12/1968
21	"Poseidon" st. 15	39°12.1'	10°09.2'	450-520	22/11/1984
22	Off Sado River	No data	No data	No data	No data
23	Balgim DW157	36°21.0'	07°55.8'	1108	05/1984

Results

Class *Stenolaemata* Borg, 1926
Order *Cyclostomata* Busk, 1852
Family *Plagioeciidae* Canu, 1918
Plagioecia sarniensis (Norman, 1864)
(Fig. 2A)

Diastopora sarniensis Norman, 1864: 89, pl. 11, figs 4-6.
Plagioecia sarniensis (Norman): Harmelin, 1976: 136, pl. 9, fig. 3, pl. 20, figs 6-11; Hayward & Ryland, 1985: 100, fig. 34.

Material examined

St. 11: (Armaçao de Pêra) several colonies on *Myriapora truncata* (Pallas, 1766) and on stones collected in fishing boats on the beach.

Remarks

Plagioecia sarniensis is present in the east Atlantic, from the English Channel to Angola and in the whole Mediterranean, but it was never reported before from Portugal.

Diplosolen obelia (Johnston, 1838)

Tubulipora obelia Johnston, 1838: 269, pl. 38, figs 7, 8.
Diplosolen obelium (Johnston): Harmelin, 1976: 143, pl. 9, figs 5-7, pl. 22, figs 4-8, pl. 23, figs 1-3.
Diplosolen obelia (Johnston): Hayward & Ryland, 1985: 102, fig. 35.

Material examined

St. 11: (Armaçao de Pêra) several colonies on stones collected in fishing boats on the beach.

Remarks

Diplosolen obelia is distributed in the northeast Atlantic and throughout the Mediterranean. In Portugal, this species was reported previously only from Póvoa de Varzim, in fishing nets (Nobre, 1903a, as *Diastopora obelia*).

Family *Frondiporidae* Busk, 1875
Frondipora verrucosa (Lamouroux, 1821)
(Fig. 2B & C)

Krusensterna verrucosa Lamouroux, 1821: 41, pl. 26, fig. 5, pl.74, figs 10-13.

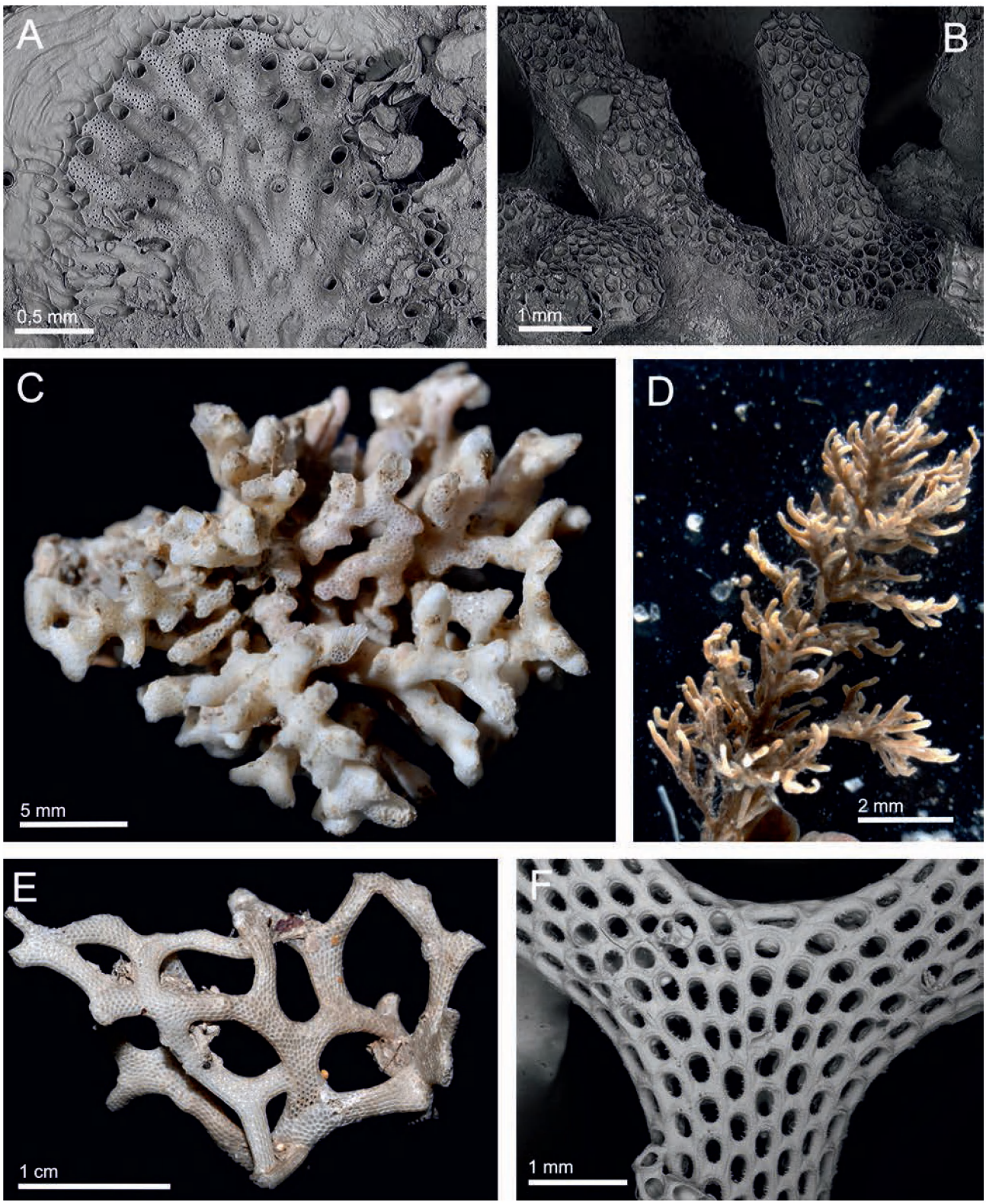

Figure 2. A. Part of a colony of *Plagioecia sarniensis* (St. 11: Armaçao de Pêra). **B.** Branches of *Frondipora verrucosa* (St. 11: Armaçao de Pêra). **C.** Same, a complete colony. **D.** Colony of *Anguinella palmata* (St. 4: Beach of Baleal). **E.** A colony of *Biflustra arborescens* (St. 9: Ferragudo, Portimão). **F.** Same, detail of a branching.

Frondipora verrucosa (Lamouroux): Busk, 1875: 39; Harmelin, 1976: 192, pl. 35, figs 1-12.

Material examined

St. 11: (Armaçao de Pêra) one colony with gonozooids, on a stone collected in fishing boats on the beach.

Remarks

Frondipora verrucosa is a common species in the Mediterranean but less commonly reported from the northeast Atlantic, and was never reported before in Portugal.

Family *Crisiidae* Johnston, 1838
Filicrisia geniculata (Milne Edwards, 1838)

Crisia geniculata Milne Edwards, 1838: 197.
Filicrisia geniculata (Milne Edwards): Hayward & Ryland, 1985: 40, fig. 9.

Material examined

St. 4: (Beach of Baleal) abundant, with gonozooids. St. 5: (Boca do Inferno, intertidal) several colonies.

Remarks

Filicrisia geniculata seems to be a boreal species, reported from the Arctic seas and in different localities in the European Atlantic coasts, from Norway to the Strait of Gibraltar, and also in the western Mediterranean. There are also reports from the North American Pacific coast. In Portugal, *F. geniculata* was reported only once to date, from the Costa da Arrábida (Saldanha, 1974 & 1980).

Class *Gymnolaemata* Allman, 1856
Order *Ctenostomata* Busk, 1852
Family *Pachyzoontidae* d'Hondt, 1983
Pachyzoon atlanticum d'Hondt, 1983

Pachyzoon atlanticum d'Hondt, 1983: 95, 96, figs 54, 55.

Material examined

St. 23: (MNHN 15895) Balgim st. DW157, 36°21.0'N-07°55.8'W, 1108 m.

Remarks

Pachyzoon atlanticum is present in the northeast Atlantic, between 800 and 1600 m depth, on muddy or sandy bottoms (d'Hondt, 1983). It was also reported from New Caledonia between 595 and 2103 m depth by d'Hondt & Gordon (1996) although the geographical distance makes this record unlikely.

This species was already reported from Portugal (off Aveiro at 1170 m depth) by d'Hondt & Hayward (1981) prior to the formal description of the species. The present sample, collected off south Faro, was originally identified by J.-L. d'Hondt, but was never reported in any publication, and was thus unpublished until now.

Family *Nolellidae* Harmer, 1915
Nolella gigantea (Busk, 1856)

Farrella gigantea Busk, 1856: 93, pl. 5, figs 1, 2.
Nolella gigantea (Busk): Prenant & Bobin, 1956: 235, fig. 103; d'Hondt, 1983: 45, fig. 23 B, E, pl. 2, fig. 4.
Nolella stipata Gosse, 1855: 35, pl. 4, fig. 29; Hayward, 1985: 88, fig. 26.

Material examined

St. 4: (Beach of Baleal) abundant.

Remarks

Nollela gigantea seems to be a cosmopolitan species, being only absent in polar seas; however, its real distribution is uncertain due to frequent confusion with *Nolella dilatata* (Hincks, 1860) and also to its debatable synonymy with *Nolella stipata* Gosse, 1855. In Portugal, *N. gigantea* was only reported once previously, from the Costa da Arrábida (Saldanha, 1974 & 1980).

Anguinella palmata van Beneden, 1845
(Fig. 2D)

Anguinella palmata van Beneden, 1845: 34, pl. 4, figs 18-24; Prenant & Bobin, 1956: 238, fig. 105; d'Hondt, 1983: 43, fig. 25 B; Hayward, 1985: 92, fig. 29.

Material examined

St. 4: (Beach of Baleal) several small colonies.

Description

Colonies erect, anchored to the substratum by slender kenozooidal rhizoids, and forming dense earthy brown tufts, up to 3 cm high but even up to 20 cm according to Prenant & Bobin (1956). Surface with a muddy texture caused by the accretion of sediment. Clumps look like minute specimens of the alga *Codium tomentosum* Stackhouse. The colony comprises a main stem concealed by numerous secondary branches in a spiral arrangement. Autozooids are budded laterally from secondary branches, closely spaced along the axis. Autozooids cylindrical, opaque, 0.840 mm long by 0.015 mm wide, slightly incurved towards the colony axis. Polypide small.

Remarks

According to Hayward (1985) *A. palmata* seems to be widely distributed in the temperate north Atlantic, although there are also records from California, Peru, Senegal, Ghana, Congo and Brazil (see d'Hondt, 1983; Cook 1985; Vieira et al., 2008). This species is not readily recognized as a bryozoan, and is probably frequently overlooked. According Hayward (1985) *A. palmata* lives between tide-marks on sheltered rocky shores, being most abundant in muddy areas. The material that we have studied was collected in a rocky exposed shore, a habitat also reported by Cook (1985) in her work on Bryozoa from Ghana.

Anguinella palmata was never collected before in Iberian waters, including both Atlantic and Mediterranean coasts. Most of the material studied, collected in June, comprised young, small colonies.

Family *Mimosellidae* Hincks, 1877
Bantariella verticillata (Heller, 1867)

Valkeria verticillata Heller, 1867: 129, pl. 6, fig. 4.
Mimosella verticillata (Heller): Prenant & Bobin, 1956: 264, fig. 117; d'Hondt, 1983: 77, fig. 43A, B, E; Hayward, 1985: 114, fig. 38.

Material examined

St. 4: (Beach of Baleal) several colonies on different substrates.

Remarks

Bantariella verticillata has been reported from several localities in the tempered north Atlantic and in the Mediterranean; there are also records from Indonesia, Japan and Pacific coast of North America (d'Hondt, 1983). In Portugal, this species was reported previously only from Costa da Arrábida (Saldanha, 1974, as *Mimosella verticillata*).

Order *Cheilostomata* Busk, 1852
Family *Membraniporidae* Busk, 1852
Biflustra arborescens (Canu & Bassler, 1928)
(Fig. 2E & F)

Acanthodesia arborescens Canu & Bassler, 1928: 15, pl. 1, figs 2-5.
Biflustra arborescens (Canu & Bassler): Winston, 2005: 7, figs 4-6.

Material examined

St. 9: Several colonies and fragments collected from fishing nets in the harbour of Ferragudo (Portimão).

Description

Zoarium erect, branching and anastomosing, brownish coloured. Branches foliaceous and bilaminar, slightly dilated at bifurcations. Zooids square to subrectangular, 0.341-0.556 (mean 0.435) mm in lenght by 0.250-0.441 (mean 0.321) mm in width. Opesia oval or almost circular, 0.255-0.418 (mean 0.319) mm in lenght by 0.178-0.304 (mean 0.230) mm in width. Lateral walls rough, projecting frontally. Cryptocyst granular, narrow, more developed proximally, with denticles arising from its edge in its proximal half. Interzooecial communication via multiporous septula. Avicularia and ovicells absent.

Remarks

Although the genus *Biflustra* d'Orbigny, 1852 has been frequently used by palaeontologist (see Berning, 2006), in studies on Recent faunas it has been overlooked in favour of *Membranipora* de Blainville, 1830 or *Acanthodesia* Canu & Bassler, 1920, even although Lagaaij (1952) already resurrected the genus. Recently, several authors have stressed again the validity of the genus *Biflustra* (e.g. Winston, 2005; Tilbrook, 2006) for membraniporid species with no gymnocyst and moderate to extensive cryptocyst.
In Atlantic Iberian waters *B. arborescens* was reported only twice: a small erect fragment at 10 m depth in Bilbao (Álvarez, 1990a, as *Membranipora arborescens*); and a small encrusting fragment in Redondela (Huelva) at 22 m depth, as well as erect and encrusting fragments at 24 m depth in Trafalgar (Álvarez, 1992a & b, as *Membranipora arborescens*). The present record is thus the first of the species from Portuguese waters.

Family *Calloporidae* Norman, 1903
Alderina imbellis (Hincks, 1860)
(Fig. 3A)

Membranipora imbellis Hincks, 1860: 275, pl. 30, fig. 1.
Alderina imbellis (Hincks): Prenant & Bobin, 1966: 212, fig. 66 III-V; Hayward & Ryland, 1998: 168, figs 45, 47A.

Material examined

St. 19: (MB37-000032) "Poseidon" st. 12, 40°08.2'N-09°50.5'W, 1050 m, one ovicellate colony on a stone.

Description

Colonies encrusting, unilaminar, with oval autozooids, 0.500-0.624 (mean 0.570) mm long, by 0.390-0.490 (mean 0.430) mm wide. Cryptocyst reduced, opesia oval or pyriform, occupying most of the frontal area. Gymnocyst reduced. Spines and avicularia absent. Ovicell globular, prominent, 0.270 mm long by 0.200 mm wide, with a

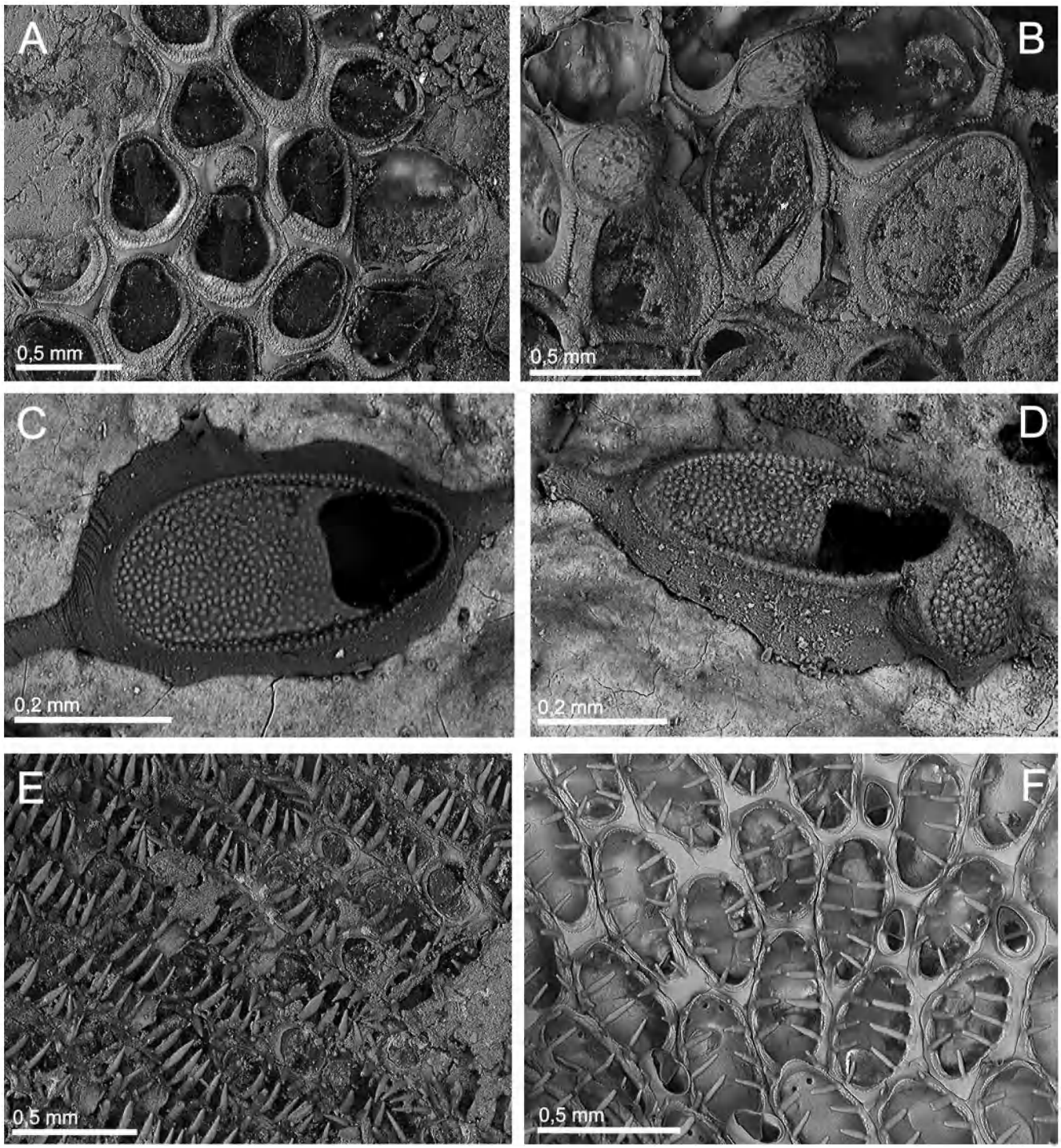

Figure 3. A. Detail of *Alderina imbellis*, showing an ovicellate zooid (St. 19: MB37-000032). **B.** *Copidozoum planum*, with two ovicellate zooids and an avicularium (St. 11: Armaçao de Pêra). **C.** A zooid of *Crepis longipes* showing the operculum (St. 17: MB37-000033). **D.** same, ovicellate zooid. **E.** Colony of *Hincksina* sp. with flattened spines (St. 11: Armaçao de Pêra). **F.** Same, colony with cylindrical spines.

largely membranous ectooecium and a marked ridge enclosing a broad area of granular endooecium. Numerous basal pore chambers.

Remarks

Alderina imbellis seems to be a temperate species, ranging from the North Sea to the northern Iberian Peninsula, and it is rare in the Mediterranean. It was never reported before from Portugal.

Copidozoum planum (Hincks, 1880)
(Fig. 3B)

Membranipora plana Hincks, 1880: 81, pl. 11, fig. 2.
Copidozoum planum (Hincks): Prenant & Bobin, 1966: 254, fig. 85; Hayward & Ryland, 1998: 180, figs 47C, 51A.

Material examined

St. 11: (Armaçao de Pêra) one ovicellate colony on a stone collected in fishing boats on the beach.

Description

Colonies encrusting, unilaminar, with oval autozooids, large, 0.528-0.600 (mean 0.564) mm long by 0.346-0.412 (mean 0.384) mm wide, lightly calcified. Gymnocyst reduced to a small proximal area. Cryptocyst narrow, finely granular. Spines absent. Interzooidal avicularia 0.327-0.464 (mean 0.390) mm long, with a straight, narrow rostrum directed distally and a semicircular opesia. Ovicell prominent, with membranous ectooecium and a coarsely granular endooecium.

Remarks

Copidozoum planum seems to be a warm temperate species with a circum-subtropical distribution. In Europe it is frequent in the Mediterranean and extends north to near the English Channel, but it was never reported before from the Atlantic coast of the Iberian Peninsula.

Family *Cymuloporidae* Winston & Vieira, 2013
Crepis longipes Jullien, 1883
(Fig. 3C & D)

Crepis longipes Jullien, 1882: 26, pl. 17, figs 60, 61; Reverter-Gil et al., 2011: 2, figs 1-4.

Material examined

St. 17: (MB37-000033) "Poseidon" st. 2, 41°09.3'N-09°20'W, 800-900 m, fragments of colonies and isolated autozooids, on a stone.

Remarks

Crepis longipes, recently redescribed by Reverter-Gil et al. (2011), was already collected in the same area reported here. Two characters, previously unknown in the species, were observed in the present material. The zooidal operculum was never seen in *C. longipes*; although Harmer (1926) stated that in this species the operculum is small, occupying the distal half of the terminal opesia, his record actually corresponds to *Crepis sidneyi* Reverter-Gil et al., 2011. We have seen that the operculum of *C. longipes* is small, semi-elliptical, occupying less than the distal half of the opesia (Fig. 3E). This operculum clearly differs from the one present in *Crepis harmelini* Reverter-Gil et al., 2011, the other species of the genus also present in the NE Atlantic. The ovicell of *C. longipes* was also undescribed to date. It is small, not prominent, not closed by the zooidal operculum, recumbent upon and concealing part of the cauda of the distal zooid; the ectooecium is mostly membranous, with a basal calcified band, smooth, forming a narrow rim overarching the orifice, continuous laterally with concealed cauda of distal zooid; the endooecium is uniformly granular (Fig. 3F). This ovicell also differs from the one present in *C. harmelini*, the only known ovicell in the genus *Crepis* to date (see Reverter-Gil et al., 2011), being proportionally smaller and with the calcified band of ectooecium overarching the orifice less developed.

Family *Flustridae* Fleming, 1828
Hincksina sp.
(Fig. 3E & F)

Material examined

St. 11: (Armaçao de Pêra) several ovicellate colonies on stones collected in fishing boats on the beach.

Description

Colonies encrusting, unilaminar. Autozooids oval to rectangular, 0.368-0.672 (mean 0.504) mm long by 0.228-0.338 (mean 0.272) mm wide, with a small gymnocyst and a narrow cryptocyst around the proximal half of the opesia. A pair of erect, oral spines and 6 to 11 flattened or cylindrical mural spines. Interzooidal avicularium rectangular, bearing a semicircular to ogival mandible. The ovicell is immersed in the distal autozooid.

Remarks

We have found several colonies of *Hincksia* sp. with 9 to 11 flattened or even subclavate marginal spines (Fig. 3C), corresponding to the typical form of *Hincksina flustroides* (Hincks, 1877) as described by Hincks (1877 & 1880). Other colonies presents 6 to 9 cylindrical marginal spines

(Fig. 3D), as depicted by Gautier (1962) for the form *crassispinata*. However, the autozooids of our material are smaller than the original measurements given by Gautier (1962). Anyway, in the colonies with flattened spines that we have studied it is also possible to find zooids with cylindrical spines, while in the colonies with cylindrical spines there are also some flattened spines.

It seems to be some confusion in the literature with regard to the distinctive characters of the *H. flustroides* and the form *crassispinata* (e.g., Calvet, 1902; Gautier, 1962; Prenant & Bobin, 1966; Zabala, 1986; Zabala & Maluquer, 1988; Hayward & Ryland, 1998). Therefore, it is possible that both morphotypes represent only the extremes of the ecological and/or geographical variation of the species, without taxonomical significance. Conversely, more than one species may have been reported under *H. flustroides*. A thorough study of Atlantic and Mediterranean material will be necessary to disclaim this, but this is beyond the aim of the present paper. The genus *Hincksina* is presently being revised by B. Berning and collaborators. We therefore refrain from giving a specific attribution at present.
The genus *Hincksina* was never reported before from Portugal.

Family *Bugulidae* Gray, 1848

Bugula calathus Norman, 1868
(Fig. 4A)

Bugula calathus Norman, 1868: 218, pl. 6, figs 3-8; Prenant & Bobin, 1966: 498, figs 158 (II), 160 (VIII), 165, 166); Hayward & Ryland, 1998: 214, fig. 65.

Material examined

St. 11: (Armaçao de Pêra) on *Celleporina caminata* collected from fishing nets.
NHMUK 1899.7.1.4595: off coast of Portugal, HMS Porcupine, Busk Coll.

Remarks

Bugula calathus is present in the northeast Atlantic, from the British Isles to the Strait of Gibraltar, and also in the western Mediterranean.

The sample revised at the NHMUK was collected by the sampling survey "Porcupine", from an unrecorded locality in Portugal. All studied material from Portugal belongs to the subspecies *B. calathus calathus*. This species was never reported before from Portuguese waters.

Bugula flabellata (Thompson *in* Gray, 1848)

Avicularia flabellata Thompson *in* Gray, 1848: 106.
Bugula flabellata (Thompson *in* Gray): Prenant & Bobin, 1966: 503, figs 158 (X, XI), 160 (I, I'), 161 (III-V), 167); Hayward & Ryland, 1998: 216, fig. 66.

Material examined

St. 11: (Armaçao de Pêra) on *Pentapora foliacea* (Ellis & Solander, 1786) from fishing nets. St. 22: (NHMUK 1872.2.3.137 B) Off Sado River, Coll. S. Kent.
NHMUK 1872.2.3.146 B: Norna Exp. 1870, West Coast Spain & Portugal, Coll. S. Kent.

Remarks

Bugula flabellata seems to be a widely distributed species in temperate seas all around the world, as it is a successful fouling species. In Portugal, *B. flabellata* was reported before only from Costa da Arrábida (Saldanha, 1974). Rosas (1944) and Ryland (1960) also reported this species from Portugal, but without further data.

Sessibugula barrosoi López de la Cuadra & García-Gómez, 1994
(Fig. 4B)

Sessibugula barrosoi López de la Cuadra & García-Gómez, 1994: 690, figs 3C-E, 4.

Material examined

St. 11: (Armaçao de Pêra) one ovicellate colony on a stone collected from fishing nets.

Description

Colony encrusting, unilaminar, with autozooids in linear series. Zooids rectangular, delicate and translucent, 0.564-0.728 (mean 0.630) mm long by 0.255-0.385 (mean 0.312) mm wide, with transverse walls inclined distally. Gymnocyst extensive, slightly calcified, more developed proximally. Two pairs of oral spines and one or two spines on the proximal margin of the opesia. Cryptocyst absent. Ovicell spherical, hyperstomial, not closed by the operculum, recumbent on the gymnocyst of the succeeding zooid. Ectooecium membranous except for a basal and proximal calcified ring. Interzooidal communication by uniporous septula in transversal walls and multiporous plates in lateral walls. Avicularia absent.

Remarks

Sessibugula barrosoi does not seem to have been rediscovered since its original description by López de la Cuadra & García-Gómez (1994) from the Spanish Atlantic area of the Strait of Gibraltar.

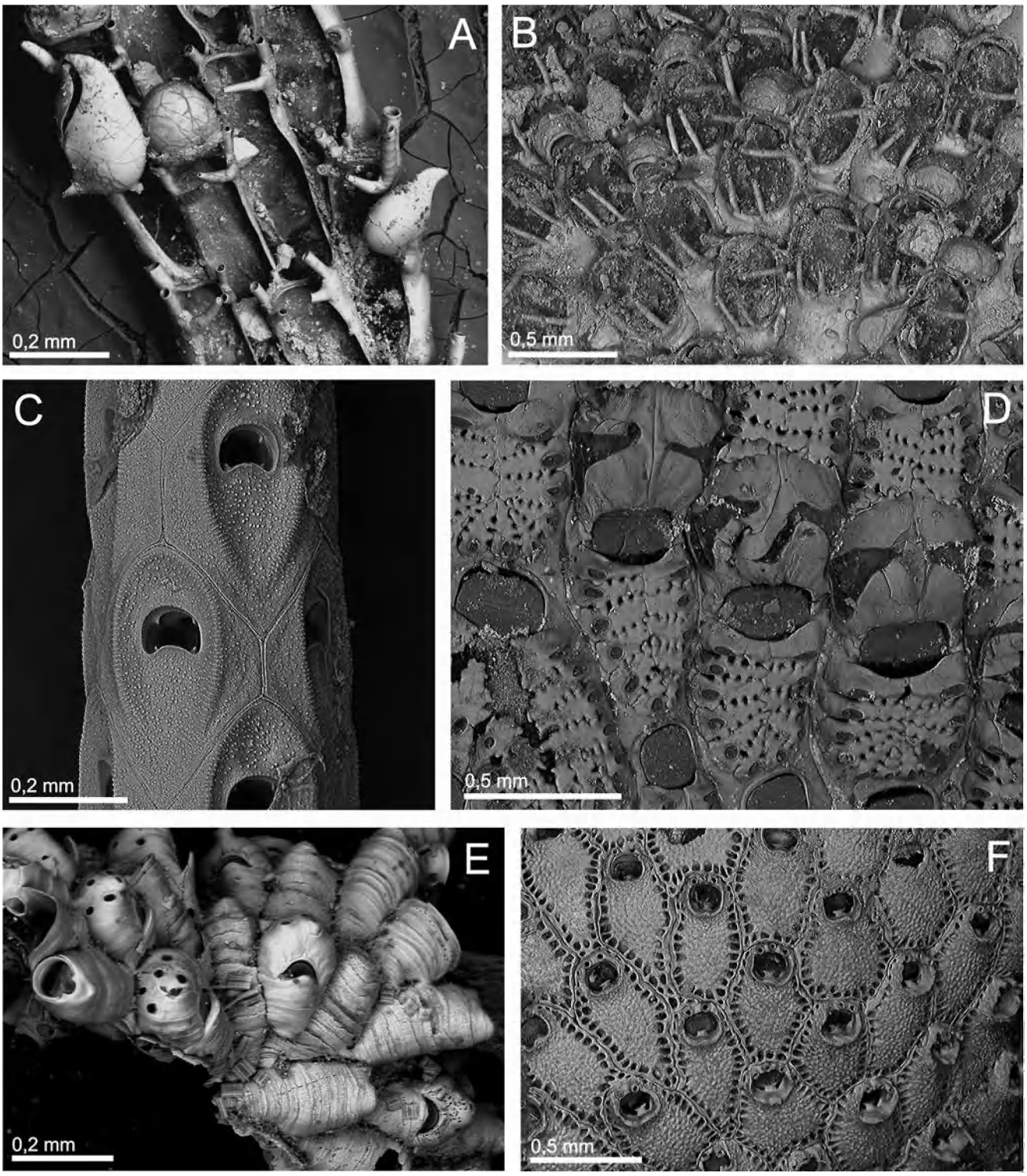

Figure 4. A. Detail of *Bugula calathus* (NHMUK 1899.7.1.4595; photo by M.E. Spencer Jones). **B.** *Sessibugula barrosoi* with ovicellate zooids (St. 11: Armaçao de Pêra). **C.** *Cellaria* cf. *salicornioides* (St. 16: MB37-000017). **D.** Ovicellate zooids of *Figularia figularis* (St. 11: Armaçao de Pêra). **E.** *Celleporella angusta* (St. 3: Vale Furado). **F.** *Escharella variolosa* (St. 11: Armaçao de Pêra).

Family *Cellariidae* Fleming, 1828

Cellaria* cf. *salicornioides Lamouroux, 1816

(Fig. 4C)

Cellaria salicornioides Lamouroux, 1816: 127; Álvarez, 1989: 297, pl. 1, fig. 6; López de la Cuadra & García-Gómez, 1996: 158, figs 1C, 3, 4; Hayward & Ryland, 1998: 308, figs 104A, 105C (not D), 108.

Material examined

St. 16: (MB37-000017) "Poseidon" st. 3, 41°12.2'N-09°21.4'W, 850-1000 m.

Diagnosis

Colonies erect, flexible, with slender, long branches. Autozooids benzene-hexagonal, 0.413-0.572 (mean 0.472) mm long by 0.218-0.337 (mean 0.273) mm wide; successive autozooid in a series not in contact. Opesia in the distal third of the frontal surface, 0.057-0.080 (mean 0.066) mm long by 0.082-0.112 (mean 0.097) mm wide; semicircular, with convex proximal edge, bearing a short denticle near each corner; distal edge with an immersed narrow shelf ending in a pais of teeth at about the level of the proximal denticles.

Remarks

The present material corresponds with the most recent descriptions of *C. salicornioides* regarding the shape and arrangement of autozooids, and the shape of the orifice, including the convex proximal border with two stout denticles and the distal immersed and teeth (see Álvarez, 1989; López de la Cuadra & García-Gómez, 1996; Hayward & Ryland, 1998; Hayward & McKinney, 2002). However, we have neither seen the distinctive avicularium, which anyway is sporadic, nor the ovicells; moreover, the present material comes from deep waters, while *C. salicornioides* is considered a shallow waters species. For these reasons, we prefer to cite this material as *Cellaria* cf. *salicornioides*.

Cellaria salicornioides seems to be widespread throughout the Mediterranean, ranging northwards along the European Atlantic coast to Shetland. In Portugal it was reported before only from off the southwestern coast by Calvet (1931).

Infraorder *Ascophorina* Levinsen, 1909

"Grade" *Acanthostega* Levinsen, 1902

Family *Cribrilinidae* Hincks, 1879

Puellina (Cribrilaria) venusta Canu & Bassler, 1925

Puellina venusta Canu & Bassler, 1925: 22, pl. 2, fig. 5; Hayward & Ryland, 1998: 336, fig. 119 C, D.

Puellina (Cribrilaria) venusta Canu & Bassler: Bishop & Household, 1987: 28, figs 43-49, 99.

Material examined

St. 11: (Armaçao de Pêra) several ovicellate colonies on stones collected from fishing nets. St. 20: (MNHN 6769) C.E. Charcot St. 1, 40°01'N-09°44'W, 130 m.

Remarks

Puellina venusta seems to be widely distributed in the east Atlantic and in the western Mediterranean. In Portugal this species was previously recorded from off Póvoa de Varzim at 140 m depth (d'Hondt, 1974, as *Cribrilaria radiata*; Reverter-Gil & Fernández-Pulpeiro, 2001); and off Sado River at 250-300 m depth, near Cape Saint Vincent at 114-117 m depth, and off SW Faro at 112 m depth (Harmelin, 1978 as *Cribrilaria venusta*).

Rosas (1944) reported *Cibrilina radiata* (Moll, 1803) from Foz do Douro, on stones and shells in the intertidal. However, *Puellina radiata* is considered a Mediterranean species, and its previous records from the Atlantic may belong to different species, frequently to *P. venusta* (see Bishop & Household, 1987) but also to *Puellina innominata* (Couch) (see Reverter & Fernández, 1996). Therefore, it is impossible to know the validity of that record without revising the original material.

The sample studied at the MNHN, collected off Figueira da Foz at 130 m depth, was originally identified by J.-L. d'Hondt as *Colletosia radiata*, but it does not seem to have been reported in any publication.

Puellina (Cribrilaria) hincksi (Friedl, 1917)

Cribrilina radiata var. *hincksi* Friedl, 1917: 236.
Puellina (Cribrilaria) hincksi (Friedl): Harmelin, 1988: 30, figs 5, 9.

Material examined

St. 11: (Armaçao de Pêra) one large ovicellate colony from fishing nets, on a stone.

Remarks

Puellina hincksi and *Puellina (Cribrilaria) innominata* (Couch, 1844) are closely similar species, which may even share similar environments (Harmelin, 1988). The former differs from the latter by the smaller size of the frontal shield and the ovicell, and by the longer and distally serrated avicularium, frequently recumbent on the frontal shield of a neighbouring autozooid. *Puellina hincksi* has previously considered as a typical Mediterranean species, nevertheless it is also present in the Canaries. In Portugal

this species was previously reported only from caves in Sagres (Harmelin, 2001).

Figularia figularis (Johnston, 1847)
(Fig. 4D)

Lepralia figularis Johnston, 1847: 314, pl. 56, fig. 2.
Figularia figularis (Johnston, 1847): Hayward & Ryland, 1998: 338, fig. 120.

Material examined

St. 11: (Armaçao de Pêra) one ovicellate colony on a stone collected from fishing nets.

Remarks

Figularia figularis is widely distributed in the northeast Atlantic, from the British Isles to the Mediterranean. It is a rather common species, that is already known from the Iberian Peninsula but which has never been reported before from Portugal.

"Grade" *Hippothoomorpha* Gordon, 1989
Family *Hippothoidae* Busk, 1859
Celleporella angusta Álvarez, 1991
(Fig. 4E)

Celleporella angusta Álvarez, 1991: 117, pl. 11, 12.

Material examined

St. 3: (Vale Furado) several ovicellate colonies (with embryos) on the alga *Hypnea* sp.

Remarks

Celleporella angusta and *Celleporella hyalina* (Linnaeus, 1767) are two closely related species with overlapping distributions. *Celleporella angusta* differs from *C. hyalina* by the smaller size of all parameters, especially a remarkable smaller relation between androzooids and autozooids; by the smaller and quadrate sinus, and by the presence in the female zooids of a conspicuous triangular projection over the orifice. As *C. angusta* was described 20 years ago, previous records of *C. hyalina* from Portugal, made by Nobre (1903a-b & 1904, as *Schizoporella hyalina*), Rosas (1944, as *Schizoporella hyalina*), Saldanha (1974) and Marques et al. (1982), may actually correspond to both species. We have collected *C. hyalina*, with embryos, in Leça de Palmeira (St. 1), Buarcos (St. 2), Vale Furado (St. 3), beach of Baleal (St. 4), and Boca do Inferno (St. 5).

Celleporella angusta was reported from Brittanny and Arcachon (France) (Reverter et al., 1995), in several localities in the Basque Country (Álvarez, 1988, as *Celleporella hyalina*; Álvarez, 1991) and all along the Galician coast (Reverter Gil & Fernández Pulpeiro, 2001; Soto García et al., 2002). The present record of *C. angusta* is thus the first one from the Portuguese coast and the southernmost to date.

"Grade" *Umbonulomorpha* Gordon, 1989
Family *Romancheinidae* Jullien, 1888
Escharella variolosa (Johnston, 1838)
(Fig. 4F)

Lepralia variolosa Johnston, 1838: 278, pl. 34, fig. 4
Escharella variolosa (Johnston): Hayward & Ryland, 1999: 132, figs 41, 42B.

Material examined

St. 11: (Armaçao de Pêra) several ovicellate colonies on stones, collected in fishing boats on the beach.

Remarks

This species is widely distributed in the northeast Atlantic and western Mediterranean. In Portugal, *E. variolosa* was only reported once, with doubts, from the Costa da Arrábida by Saldanha (1974).

Escharella ventricosa (Hassall, 1842)

Lepralia ventricosa Hassall, 1842: 412.
Escharella ventricosa (Hassall): Hayward & Ryland, 1999: 128, figs 37D, 39.

Material examined

St. 11: (Armaçao de Pêra) one colony on a stone collected in fishing boats on the beach.

Remarks

Escharella ventricosa is widely distributed in the northeast Atlantic and western Mediterranean. In Portugal, this species was reported previously only once, from Foz do Douro, by Rosas (1944, as *Mucronella ventricosa*).

Hemicyclopora sp.
(Fig. 5 A-D)

Material examined

St. 9: (Ferragudo, Portimão) two colonies on stone and shell, collected from fishing nets. St. 17: (MB37-000035) "Poseidon" st. 2, 41°09.3'N-09°20'W, 800-900 m, two ovicellate colonies and a young colony with ancestrula.

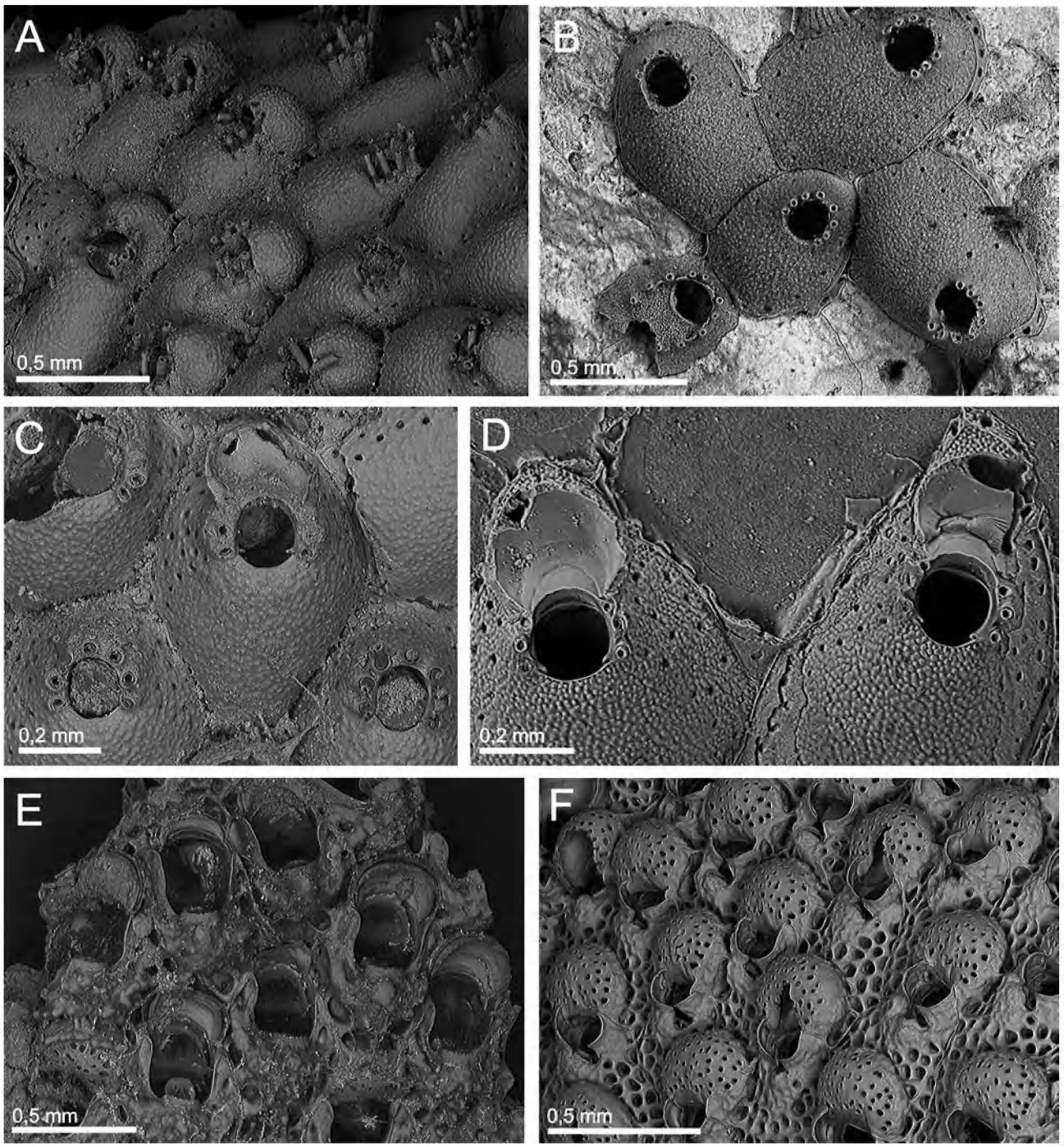

Figure 5. A-D: *Hemicyclopora* sp. **A.** Ovicellate and non ovicellate zooids, showing the oral spines (St. 9: Ferragudo, Portimão). **B.** Ancestrula and periancestrular zooids (St. 17: MB37-000035). **C.** Primary orifice of ovicellate and non-ovicellate zooids (St. 9: Ferragudo, Portimão). **D.** Two developing ovicells (St. 17: MB37-000035). **E.** *Umbonula ovicellata* (St. 11: Armaçao de Pêra). **F.** Ovicellate zooids of *Smittina affinis* showing developed peristomes (St. 11: Armaçao de Pêra).

Description

Colony forming irregular, unilaminar incrustations. Autozooids oval to polygonal, large, 0.607-0.834 (mean 0.715) mm long by 0.407-0.583 (mean 0.492) mm wide, strongly convex, separated by deep grooves. Frontal shield thick, granular, with one series of marginal, rounded pores in periancestrular zooids, and two or three distal series in successive zooids. Lateral walls extremely reduced;

numerous small basal pore-chambers present. Orifice orbicular, longer than wide, 0.137-0.182 (mean 0.162) mm long by 0.104-0.152 (mean 0.123) mm wide. Proximal border shallowly concave, separated from the semi-elliptical anter by a pair of small, thick, triangular condyles. Six to eight stout, hollow, articulated oral spines, reduced to six in ovicellate zooids. Ovicell kenozooidal, budded from the maternal zooid and restring on the substratum, acleithral, globular, 0.206-0.262 (mean 0.237) mm long by 0.241-0.313 (mean 0.294) mm wide, imperforate and granular. Ancestrula oval, small, longer than wide. Opesia distinctly reduced to the distal third, proximal border concave, surrounded by seven hollow spines; two pairs of additional lateral spines. Early astogeny starts with one single distal zooid.

Remarks

The autozooids of the present material resemble several other European species of the genus *Hemicyclopora*. *Hemicyclopora discrepans* (Jullien *in* Jullien & Calvet, 1903), present off the NW Iberian Peninsula, differs in shape of the orifice and constantly has eight spines in ovicellate and non ovicellate zooids. *Hemicyclopora polita* (Norman, 1864), already known from the north of the Iberian Peninsula, differs also in the shape of the orifice and condyles, and has six oral spines, reduced to four in ovicellate zooids. The orifice, condyles and the number of spines in our material may correspond to *Hemicyclopora multispinata* (Busk, 1861) a poorly known species present in the northeast Atlantic from the Bay of Biscay to Madeira (Hayward & Ryland, 1999). However, according to these authors this species has significantly smaller autozooids and a triangular projection proximal to the orifice, that was already described and figured by Busk (1861) but which is not present in our material.

The material from St. 9 (Portimão, S Portugal) comes from an unknown depth; as the samples were collected by small fishing boats, they probably do not come from deep waters. The material from St. 16 (off Oporto, N Portugal) comes from 800-900 m depth. Despite the geographical and bathymetrical differences, the material shows similar morphology and measurements. The genus *Hemicyclopora* is presently being revised by J.-G. Harmelin (pers. comm.). We therefore refrain from giving a specific attribution at present.

Family *Umbonulidae* Canu, 1904
Umbonula ovicellata Hastings, 1944
(Fig. 5E)

Umbonula ovicellata Hastings, 1944: 277, figs 1A, 2A, B; Hayward & Ryland, 1999: 106, figs 26B, 28.

Material examined

St. 11: (Armaçao de Pêra) a small ovicellate colony collected on a stone in fishing boats.

Remarks

Umbonula ovicellata is present in the northeast Atlantic, from southwest of the British Isles to the Strait of Gibraltar, and is also widespread in the Mediterranean.

In Portugal there may have been a single previous record from Portinho da Arrábida, reported as *Umbonula verrucosa* by Rosas (1944) but we cannot comment on the true identity of that material.

"Grade" *Lepraliomorpha* Gordon, 1989
Family *Smittinidae* Levinsen, 1909
Smittina affinis (Hincks, 1862)
(Figs 5F & 6A)

Smittia affinis Hincks, 1862: 206, pl.12, fig. 2.
Smittina affinis (Hincks): Hayward & Ryland, 1999: 254, figs 111, 112 A, B.

Material examined

St. 11: (Armaçao de Pêra) some ovicellate colonies on stones collected in fishing nets.

Description

Colony encrusting, unilaminar, orange coloured when alive. Autozooids oval to hexagonal, 0.479-0.669 (mean 0.567) mm long by 0.265-0.482 (mean 0.347) mm wide. Frontal shield convex, evenly perforated by large, round pores. Primary orifice orbicular, 0.116-0.145 (mean 0.128) mm long by 0.163-0.200 (mean 0.176) mm wide, with an anvil-shaped lyrula and two small, sharp condyles pointing medially. Distal margin of the orifice with 5-10 small denticles. Oral spines absent. Peristome erect, thin, interrupted proximally by a small suboral avicularium with acute, triangular rostrum transversely directed. In older zooids the peristome is better developed, extending onto the ovicell and nearly closing over the proximal gap, almost forming a closed tube. Ovicell globular, prominent, 0.213-0.269 (mean 0.242) mm long by 0.275-0.332 (mean 0.307) mm wide with a peripheral rim of secondary calcification and central ectooecium perforated by numerous, small, round pseudopores.

Remarks

Our material presents some denticulations in the distal margin of the orifice, previously reported only by López de la Cuadra & García-Gómez (1993) in material from the Strait of Gibraltar, but not in northern material of the

species. Moreover, the peristome of our material is extremely well-developed, nearly forming a closed tube. Perhaps both characters represent geographical variation.

Smittina affinis is an uncommon species, distributed in the northeast Atlantic from the British Isles to the Strait of Gibraltar. It is known from the northern and southern coasts of the Iberian Peninsula, but it was never found before in Portugal.

Smittina cervicornis (Pallas, 1766)

Millepora cervicornis Pallas, 1766: 252.
Smittina cervicornis (Pallas): Hayward & McKinney, 2002: 49, fig. 22 A-C.

Material examined

St. 9: (Ferragudo, Portimão) in fishing boats.

Remarks

Smittina cervicornis is a common species in the Mediterranean, extending in the Atlantic from the north of Spain to Cape Verde and Ghana. In Portugal it was reported previously only once, from off Vilanova de Milfontes (37°40.8'N-08°50.7'W), at 54 m depth (Pérès, 1959, as *Porella cervicornis*).

Smittina jordii Reverter-Gil & Fernández-Pulpeiro, 1999
(Fig. 6B & C)

Smittina jordii Reverter-Gil & Fernández-Pulpeiro, 1999: 39, figs 2 B-D, 3 A, B.

Material examined

St. 19: (MB37-000018) "Poseidon" st. 12, 40°08.2'N-09°50.5'W, 1050 m, one ovicellate colony. St. 21: (MB37-000019) "Poseidon" st. 15, 39°12.1'N-10°09.2'W, 450-520 m, one colony.

Description

Colony encrusting, unilaminar, forming small withish crusts. Autozooids, oval to rhomboid, 0.683-0.870 (mean 0.744) mm long by 0.441-0.642 (mean 0.527) mm wide, arranged in radiating series. Frontal shield convex, granular, uniformely perforated by numerous small round pores. Primary orifice orbicular, wider than long, 0.110-0.131 (mean 0.118) mm long by 0.142-0.162 (mean 0.152) mm wide; lyrula anvil-shaped with straight distal edged; condyles small, acute triangular, proximomedially directed. Peristome developed as a thin circular rim surrounding the orifice, less developed proximomedially but complete; a small suboral avicularium immediately proximal to the peristome, 0.076 mm long by 0.055 mm wide, with a semi-elliptical rostrum directed proximally. No spines. Ovicell hyperstomial, irregularly globular, 0.180-0.235 (mean 0.200) mm long by 0.250-0.310 (mean 0.270) mm wide, perforated by small round pseudopores. Astogeny spiral, with zooids becoming increasingly larger.

Remarks

Smittina jordii does not seem to have been rediscovered since its original description by Reverter-Gil & Fernández-Pulpeiro (1999) from the NW Iberian Peninsula at 594 m depth. Measurements of the present material are slightly smaller than the holotype of the species.

Family *Bitectiporidae* MacGillivray, 1895
Pentapora ottomuelleriana (Moll, 1803)

Eschara Otto-Mülleriana Moll, 1803: 60, pl. 3, fig. 5.
Pentapora ottomulleriana (Moll): Zabala, 1986: 403, fig. 133.

Material examined

St. 11: (Armaçao de Pêra) a small colony on *Myriapora truncata* collected in fishing boats.

Remarks

Pentapora ottomulleriana was previously considered to be an endemic Mediterranean species that nevertheless has been reported once from Portugal by Saldanha (1974), from the Costa da Arrábida.

Schizomavella linearis profunda Harmelin & d'Hondt, 1992
(Fig. 6D)

Schizomavella linearis profunda Harmelin & d'Hondt, 1992a: 45, pl. 6, figs A, B.

Material examined

St. 18: (MB37-000028) "Poseidon" st. 13, 40°09.1'N-09°49.9'W, 35-930 m, one colony on *Reteporella* sp.

Remarks

The colony examined, with 5-6 oral spines, fits the description of the subspecies *S. linearis profunda* introduced by Harmelin & d'Hondt (1992a). However, the autozooids of the present material are flatter than the autozooids in the holotype of the subspecies (MNHN 19949), and the avicularia are more distally placed. *Schizomavella linearis profunda* does not seem to have been recorded since its original description.

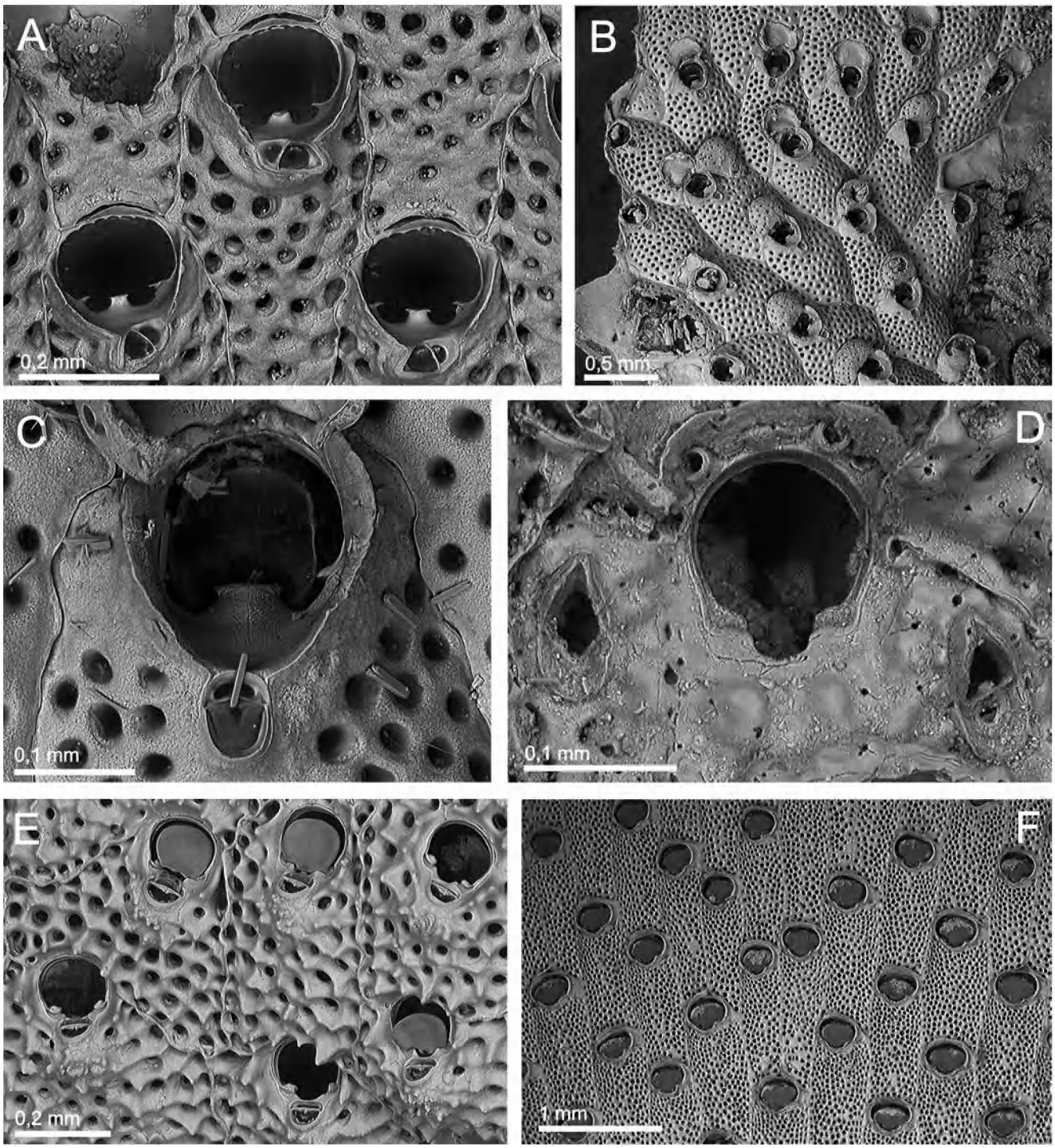

Figure 6. A. Primary orifices of *Smittina affinis* showing denticulated distal border and the suboral avicularium (St. 11: Armaçao de Pêra). **B.** Portion of a colony of *Smittina jordii* with ovicellate and non-ovicellate zooids (St. 19: MB37-000018). **C.** Same, primary orifice. **D.** Primary orifice and avicularia of *Schizomavella linearis profunda* (St. 18: MB37-000028). **E.** *Schizomavella grandiporosa* (St. 3: Vale Furado). **F.** *Watersipora subtorquata* (St. 13: Laguna of Faro).

Schizomavella grandiporosa Canu & Bassler, 1925
(Fig. 6E)

Schizomavella grandiporosa Canu & Bassler, 1925: 26, pl. 3, fig. 1; Souto et al., 2013: 361, fig. 24.4.

Material examined

St. 3: (Vale Furado) some ovicellate colonies. St. 4: (Beach of Baleal) some young colonies on *Sabellaria*.

Remarks

Schizomavella grandiporosa is an uncommon species that was only recently redescribed by Souto et al. (2013). This species is only known from the Atlantic coast of Morocco, Algeria, and the Ría of Ferrol (NW Spain). Thus, the present record is the first one in Portuguese waters, and fills the gap between the northernmost and the southernmost records of the species.

Family *Watersiporidae* Vigneaux, 1949
Watersipora subtorquata (d'Orbigny, 1852)
(Fig. 6F)

Escharina torquata [Milne] Edwards: d'Orbigny, 1842, pl. 4, fig. 3.
Watersipora subtorquata (d'Orbigny, 1852): Ryland et al., 2009: 55, figs 3, 4A, C, E, F.

Material examined

St. 6: (Cascais) on a hull. St. 9: (Ferragudo, Portimão). St. 10: (Marina of Portimão) on *Mytilus*. St. 13: (Laguna of Faro) on a bivalve shell.

Remarks

Watersipora subtorquata, as recently redescribed by Ryland et al. (2009) was not previously reported from Iberian waters, although some previous records as *Watersipora subovoidea* (d'Orbigny, 1852) may actually belong to *W subtorquata* (see César-Aldariz et al., 1997).

Family *Cryptosulidae* Vigneaux, 1949
Cryptosula pallasiana (Moll, 1803)

Eschara pallasiana Moll, 1803: 64, pl. 3, fig. 13.
Cryptosula pallasiana (Moll): Hayward & Ryland, 1999: 194, figs 74 C, 76.

Material examined

St. 1: (Leça de Palmeira) some colonies on *Sabellaria*. St. 2: (Buarcos) some colonies on *Sabellaria*. St. 4: (Beach of Baleal) some colonies on stone. St. 5: (Boca do Inferno, 7 m depth) some colonies on stones and *Sabellaria*. St. 7: (MB37-000001) Beach Azarujinha, São João do Estoril, on stones. St. 8: (MB37-000002) Beach de São Torpes, Sines. St. 13: (Laguna of Faro) on bivalve shells.St. 14: (Beach of Fuseta) on bivalve shells. St. 15: (Santa Luzia, Tavira) on bivalve shells.

Remarks

Cryptosula pallasiana seems to be a widespread invasive species, reported from all around the world. In Portugal, it was cited only from Foz do Douro (Rosas, 1944, as *Lepralia Pallasiana*) and from Ria de Aveiro (Marchini et al., 2007).

Family *Escharinidae* Tilbrook, 2006
Herentia thalassae David & Pouyet, 1978
(Fig. 7 A-D)

Herentia (Herentia) thalassae thalassae David & Pouyet, 1978: 172 part, pl. 1, fig. 1, ?non 2.
Herentia thalassae David & Pouyet: Berning et al., 2008: 1524, fig. 4.

Material examined

St. 17: (MB37-000007) "Poseidon" st. 2, 41°09.3'N-09°20'W, 800-900 m, two ovicellate colonies and one young colony, on a stone.

Description

Colony encrusting, unilaminar, initially multiserial, later with ribbons consisting of about four series of zooids. Zooids hexagonal to polygonal, 0.660-1.109 (mean 0.839) mm long by 0.602-0.786 (mean 0.685) mm wide, broader proximally, separated by deep grooves. Frontal wall distinctly rising distally towards an elevated orifice; imperforate except for a row of 10-17, rounded, marginal pores. Primary orifice in autozooids wider than long 0.114-0.153 (mean 0.134) mm long by 0.144-0.191 (mean 0.157) mm wide; anter horseshoe-shaped, with an immersed, very narrow shelf; proximal margin straight, with a sinus relatively broad and deep, ending in a transverse ellipse; condyles distinct, as long as proximal margin, narrowing towards sinus. Aperture in ovicellate zooids larger, anter D-shaped, proximal margin wider with a slightly broader sinus, condyles distinctly narrower and almost straight. Four to five oral spines, and up to six or seven in periancestrular zooids. Avicularium single, situated at proximolateral zooecium margin at some distance from lateral wall; rostrum oval, oriented distolaterally or laterally; crossbar bilateral symmetrical, strong. Ooecium spherical, rising well above colony surface; exposed surface smooth with a curved, flattened rim at an acute angle to frontal plane.

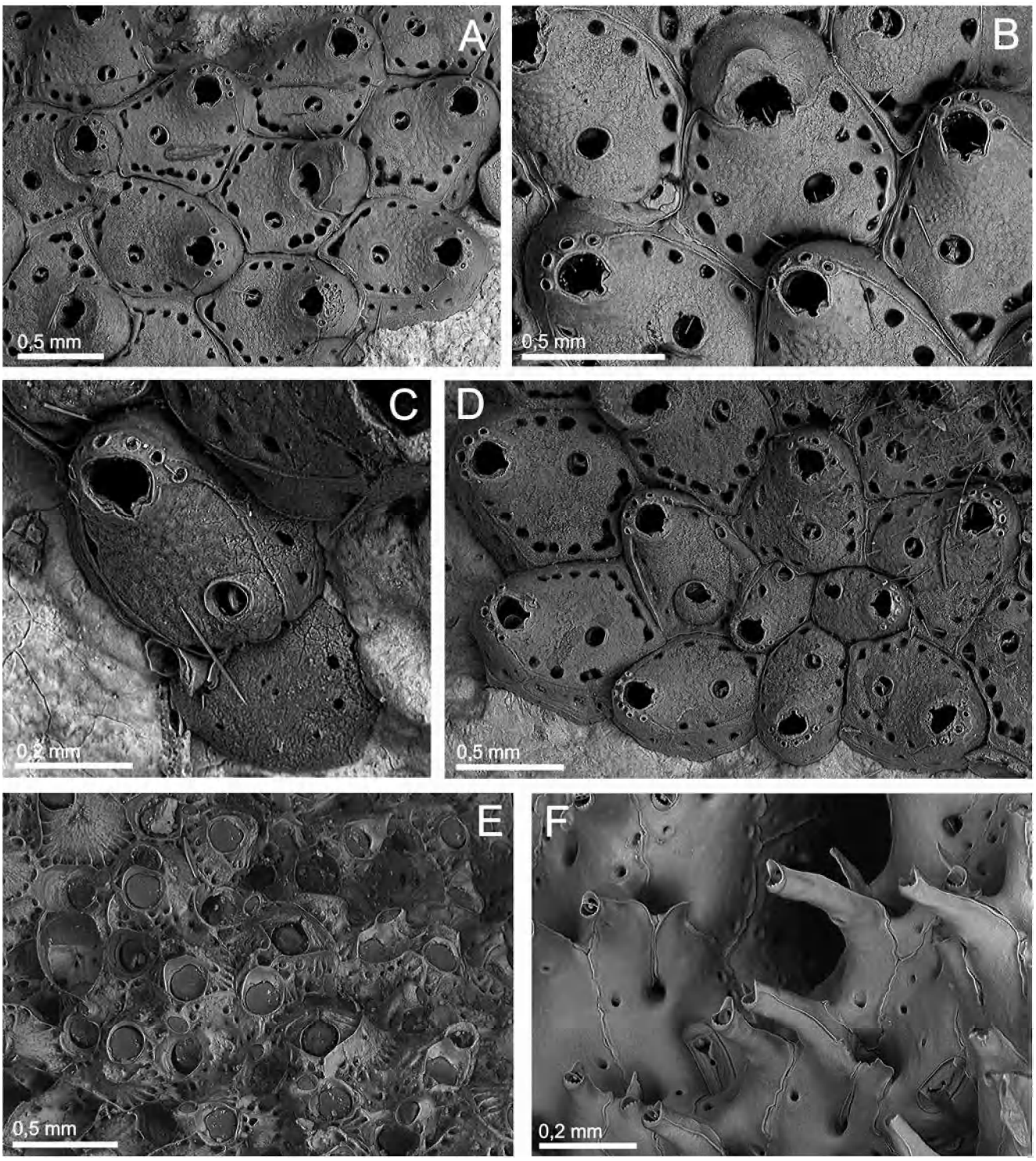

Figure 7. A-D: *Herentia thalassae* (St. 17: MB37-000007). **A.** Group of zooids, one of them regenerated (left). **B.** Ovicellate and non-ovicellate zooids, with 4-5 spines. **C.** The kenozooidal ancestrula. **D.** Periancestrular area. **E.** *Turbicellepora magnicostata* (St. 4: Beach of Baleal). **F.** *Reteporella couchii* (St. 11: Armaçao de Pêra).

Kenozooidal ancestrula observed once, about as long as wide, with an irregular outline; gymnocystal frontal wall moderately convex, smooth, entirely calcified apart from three small central pores; some six pores, perhaps remaining of articulated spines, forming a circle at about mid-distance between margin and ancestrula centre. First autozooid budded distally, from which a single proximo-lateral zooid is formed at a 90º angle before distolateral, lateral and proximal periancestrular zooids are produced; periancestrular area therefore asymmetrical.

Remarks

Herentia thalassae has been recently redescribed by Berning et al. (2008). The material here described fully coincides with that description, except in the number of oral spines: 4-5, and up to 7-8 in periancestrular zooids, against 3-4 in adult zooids and 6 in early astogenetic zooids (B. Berning, pers. comm.). The small colonies are also iron oxide-stained, and some zooids present a poor state of preservation or clear marks of damage and regeneration (Fig. 7A), which, as suggested by the previous authors, could had been caused by predation.

The kenozooidal ancestrula of *H. thalassae* is here described for the first time. It is similar to that existing in *Herenthia hyndmanni* (Johnston, 1847), a closely related species that was also redescribed by Berning et al. (2008).

According to these authors, *H. thalassae* had only been recorded with certainty off northwestern Spain, at 480-520 m depth. Some other material collected from the southern Portuguese outer shelf presents a similar morphology, but with smaller zooids. *Herentia hyndmanni* has been reported in Portugal from several locations in the north at 330-430 m depth (d'Hondt, 1974), in caves at Sagres (Boury-Esnault et al., 2001, as *Escharina hyndmanni*), and from SE Faro at 485 m depth (Harmelin & d'Hondt, 1992a, as *Escharina hyndmanni*). As descriptions and illustrations are not given in these articles, it is impossible to judge, without seeing the original material, if these records really correspond to *H. hyndmanni* or to other related species, like *H. thalassae*.

Family *Celleporidae* Busk, 1852
Turbicellepora magnicostata (Barroso, 1919)
(Fig. 7E)

Schismopora magnicostata Barroso, 1919: 346, figs 23-32.
Turbicellepora magnicostata (Barroso): Hayward & Ryland, 1999: 338, figs 157, 158 A, B.

Material examined

St. 4: (Beach of Baleal) several colonies on *Sabellaria* (with embryos). St. 8: (MB37-000009, MB37-000022) Beach São Torpes, Sines. St. 12: (MB37-000004) Beach Maria Luísa, Albufeira, infralittoral.

Unrecorded locality in the Algarve.

Remarks

Turbicellepora magnicostata is present in different localities in the northeast Atlantic, from the British Isles to Morocco and in the western Mediterranean. It is a well known species in Spanish waters (see Álvarez, 1990b), but it was never recorded before in Portugal.

Family *Phidoloporidae* Gabb & Horn, 1862
Reteporella couchii (Hincks, 1878)
(Fig. 7F)

Retepora couchii Hincks, 1878: 355, pl. 18, figs 1-6.
Reteporella couchii (Hincks): Hayward & Ryland, 1999: 370, figs 173, 174.

Material examined

St. 11: (Armaçao de Pêra) two small colonies on a stone collected in fishing boats.

Remarks

Reteporella couchii is distributed in the northeast Atlantic and western Mediterranean. The present record is the first one from Portugal.

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