



Bryozoans of the expeditions of the *Pourquoi Pas?* in the English Channel and around the British Isles between 1914 and 1930

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Abstract: A revision was carried out of bryozoan specimens collected between 1914 and 1930 by the French research vessel *Pourquoi Pas?* in the English Channel and around the British Isles, and stored in the *Muséum National d'Histoire Naturelle* in Paris. A total of 87 species was identified, of which 15 belong to the order Cyclostomata and 72 to the order Cheilostomata. Morphological and biological data are provided for four species as some taxonomic comments for another four species. Two new species, *Escharella cryptoecium* sp. nov. and *Escharella pseudopunctata* sp. nov., are described. It is further proposed that species of the genus *Haywardipora* Soule, Soule & Chaney, 1996 be reclassified in the genera *Escharella* Gray, 1848 and *Elleschara* Gordon, 1984.

Résumé : *Bryozoaires des expéditions du Pourquoi Pas ? en Manche et autour des Îles Britanniques entre 1914 et 1930.* Ce travail est consacré à la révision des spécimens de bryozoaires récoltés entre 1914 et 1930 par le navire océanographique français *Pourquoi Pas?* en Manche et autour des îles Britanniques, conservés dans les collections du *Muséum National d'Histoire Naturelle* de Paris. Au total, 87 espèces ont été identifiées, 15 appartenant à l'ordre des Cyclostomata et 72 à l'ordre des Cheilostomata. Des renseignements morphologiques et biologiques sont fournis pour 4 espèces ainsi que des commentaires taxonomiques pour 4 autres. Deux espèces nouvelles, *Escharella cryptoecium* sp. nov. et *Escharella pseudopunctata* sp. nov., sont décrites. On propose également que les espèces du genre *Haywardipora* Soule, Soule & Chaney, 1996 soient incluses dans le genre *Escharella* Gray, 1848 et *Elleschara* Gordon, 1984.

Keywords: Bryozoa • *Escharella* • *Haywardipora* • *Elleschara* • New species • NE Atlantic

Introduction

The French research vessel *Pourquoi Pas?* conducted several surveys in different areas of the world (Antarctic, Arctic, Mediterranean Sea and Northeast Atlantic) under the

command of Jean-Baptiste Charcot. The ship sank in 1936, during a research survey on the coast of Iceland.

During the surveys, oceanographic, topographic and meteorological data were collected, as well as samples of flora and fauna. The faunal material was deposited in the *Muséum National d'Histoire Naturelle* in Paris, and parts of it have been studied by different authors. Specifically, the Antarctic bryozoan specimens collected between 1903 and 1905 were studied by L. Calvet (1909), and those collected

in Arctic waters were recently studied by d'Hondt & Mascarell (2004). Material collected on the second Antarctic survey (1908-1910) has not yet been studied. At least part of the material collected from the Mediterranean Sea has been lost; it was loaned by Jean-Baptiste Charcot to Marcel Prenant for examination and was not found after the death of the latter.

Material and Methods

In the present study, we examined some of the samples collected by the *Pourquoi Pas?* in the Northeast Atlantic, specifically in the Bay of Biscay, English Channel and around the British Isles. The samples were deposited in the *Muséum National d'Histoire Naturelle* in Paris, and correspond to 24 sampling stations, the locations and coordinates of which are indicated in Table 1, along with the depth and date of sampling.

All of the samples were available as dried specimens,

except for two stored in alcohol. A total of 147 samples were examined, 43 of which were not included in our study because of insufficient data regarding their origin or because they were Antarctic species (*Beania erecta* Waters, 1904; *Celleporella antarctica* Moyano & Gordon, 1980; *Inversiula nutrix* Jullien, 1909; *Isoschizoporella tricuspis* (Calvet, 1909); *Reteporella hippocrepis* (Waters, 1904); *Cellarinella* sp.; *Fasciculipora* sp.). D'Hondt & Mascarell (2004) also encountered this problem when examining Arctic material from the *Pourquoi Pas?*. Ultimately, 104 clearly labelled samples were examined. The label of each indicated the station at which the sample was collected, and in some cases the coordinates and the depth. All of the prior labelled identifications were checked, and all of the colonies present in the samples were identified.

Specimens were identified with a binocular microscope (Nikon SMZ10 or Wild M8). Some uncoated samples were examined and photographed in a variable-pressure scanning electron microscope (LEO 435VP).

Table 1. Location of the sampling sites.

Tableau 1. Localisation des sites d'échantillonnage.

Station	Samples	Latitude N	Longitude W	Deep (m)	Date
1	9914	51°37'12"	013°13'48"		1920
1 (5)	9808, 9812	57°38'48"	013°36'00"	90	29-juin-21
6	9843, 9844, 9845, 9846, 9849, 9850, 9852, 9856	49°48'00"	001°42'00"	60	2-oct-30
7	9851, 9855	49°28'48"	002°45'36"	65	3-oct-30
9	6326	47°47'24"	004°02'24"	32	30-août-21
11	18718	48°49'48"	001°47'24"	20	25-sep-29
15	18710, 18711	48°43'48"	001°45'00"	25	26-sep-29
16	18708	48°42'36"	001°42'36"	20	29-sep-29
17	4231, 4232, 4233, 4234, 4235, 4236, 4238, 4239, 5474, 18692, 18695, 18696, 18697, 18698, 18712, 18719, 18720	48°37'12"	002°25'00"	50	28-sep-29
18	4184, 4185, 4186, 4187, 4188, 4189, 4190, 4191, 4192, 4193, 4194, 4195, 4196, 4197, 4198, 4199, 4200, 4201, 4202, 4203, 4205, 4206, 4208, 4209, 4210, 4211, 4212, 4213, 4214, 4215, 4216, 4217, 4218, 4219, 4220, 4221, 4222, 4223, 4224, 4225, 4227, 4228, 4229, 4230, 18702	48°50'24"	002°19'12"	110	29-sep-29
20	9907		English Channel	80	1924
26	4244, 7677		English Channel		
29	9951		English Channel		
30	4242		Atlantic and E. Channel		1920
43	9912		English Channel		1921
76	4245		English Channel		
101	13633		English Channel		1-juin-14
108	13632		English Channel		27-juin-14
201	9810, 9817, 9818	57°31'48"	013°36'00"	90	
204	9807, 9808, 9811, 9900, 9901	58°00'00"	013°55'12"	175	30-juin-21
207	9816, 9853	57°43'48"	004°18'00"	240	2-juil-21
537	4267		English Channel		
	9848		Copenhagen		8-sep-30
	9858		N. Cherbourg		1930

Measurements of the specimens were made on the photographs thus obtained. They are expressed in mm and identified by the following abbreviations: AZL: Autozoid length. AZW: Autozoid width. OL: Orifice length. OW: Orifice width.

Systematic list and localities

The bryozoans studied during the present study corresponded to 87 species, of which 15 belong to Order Cyclostomata and 72 to Order Cheilostomata.

The classification adopted for the cyclostomes is that followed by Hayward & Ryland (1985), with modifications included from more recent studies, whereas that adopted for the cheilostomes was that of Gordon (2006 a, b).

The inventory of the species identified, including the identification of the sampling stations where they were collected and number of samples, is provided below.

PHYLUM BRYOZOA Ehrenberg, 1831

Class Stenolaematoda Borg, 1926

Order Cyclostomata Busk, 1852

Family Crisiidae Johnston, 1847

Crisia denticulata (Lamarck, 1816) (St. 9: 6326)

Family Tubuliporidae Johnston, 1838

Tubulipora liliacea (Pallas, 1766) (St. 1 (5): 9812).

Tubulipora lobifera Hastings, 1963 (St. 11: 18718; St. 16: 18708).

Tubulipora penicillata (Fabricius, 1780) (St. 18: 4213).

Exidmonea atlantica (Forbes in Johnston, 1847) (St. 1 (5): 9808; St. 76: 4245).

Family Diasporidae Gregory, 1899

Eurystrotos compacta (Norman, 1866) (St. 18: 4223, 18702).

Diplosolen obelia (Johnston, 1838) (St. 18: 4230; St. 204: 9901).

Plagioecia patina (Lamarck, 1816) (St. 6: 9849, St. 18: 18702).

Plagioecia sarniensis (Norman, 1864) (N. Cherbourg: 9858).

Family Annectocymidae Hayward & Ryland, 1985

Annectocyma major (Johnston, 1847) (St. 204: 9900).

Entalophoroecia deflexa (Couch, 1842) (St. 7: 9855; St. 11: 18718; St. 18: 4191, 4196, 4218, 4229, 4230, 18702; St. 204: 9900, 9901; N. Cherbourg: 9858).

Family Horneridae Smitt, 1867

Hornera lichenoides (Linnaeus, 1758) (St. 26: 4244, St. 1 (5): 9808).

Family Lichenoporidae Smitt, 1867

Disporella hispida (Fleming, 1828). (St. 6: 9844, 9845; St. 11: 18718; St. 17: 18696, 18720; St. 18: 4188, 4189, 4199, 4208, 4218, 4219, 4230, 18702; St. 108: 13632; N. Cherbourg: 9858).

Coronopora truncata (Fleming, 1828) (St. 204: 9807).

Patinella radiata (Audouin, 1826) (St. 18: 4217; Sample 9854).

Order Cheilostomata Busk, 1852

Family Electridae d'Orbigny, 1851

Electra pilosa (Linnaeus, 1767) (St. 6: 9856; St. 7: 9855; St. 11: 18718; St. 17: 18692, 18695, 18696, 18697, 18698, 18719, 18720; St. 18: 4184, 4187, 4188, 4190, 4191, 4193, 4194, 4195, 4196, 4198, 4201, 4202, 4209, 4210, 4212, 4220, 4223, 4230, 18702).

Conopeum lacroixi (Audouin, 1826) (St. *Rivage de Charlotten*: 9848; St. west cost of Isle Bodero: 9850).

Pyripora catenularia (Fleming, 1828) (St. 18: 4196, 4200, 4211, 4216, 4223, 18702).

Family Aeteidae Smitt, 1868

Aetea sica (Couch, 1844) (St. 18: 4188, 4200, 4214, 4218, 18702;).

Family Calloporidae Norman, 1903

Callopora craticula (Alder, 1856) (St. 18: 4193, 18702;).

Callopora dumerilii (Audouin, 1826) (St. 6: 9843, 9844; 9856; St. 11: 18718; St.16: 18708; St. 17: 4232, 4236, 4239, 18698, 18719; St. 18: 4187)

Callopora lineata (Linnaeus, 1767) (St. 6: 9845; St. 11: 18718; St. 17: 4239, 18692, 18696, 18719, 18720; St. 18: 18702).

Callopora rylandi Bobin & Prenant, 1965 (St. 18: 4230).

Amphiblestrum flemingii (Busk, 1854) (St.18: 4194, 4196, 18702; St. 201: 9817, 9818; St. 204: 9811; St. 207: 9816, 9853; N. Cherbourg: 9858).

Amphiblestrum auritum (Hincks, 1877) (St. 11: 18718; St. 17: 18718, 18720; St. 18: 4199).

Caulorhamphus spiniferum (Johnston, 1832) (St. 11: 18718; St. 17: 18692; St. 18: 4184, 4186, 4201, 4206, 4207, 4208, 4209, 4210, 4212, 4214, 4223, 4230, 18702).

Copidozoum exiguum (Barroso, 1920) (St. 11: 18718).

Family Flustridae Fleming, 1828

Flustra foliacea (Linnaeus, 1758) (St.6: 9849; St.17: 5474, 18692, 18696, 18697, 18719, 18720; St. 18: 4198, 4201).

Carbasea carbasea (Ellis & Solander, 1786) (St. 26: 7677).

Hincksina flustroides (Hincks, 1877) (St. 16: 18708; St. 17: 18720).

Family Bugulidae Gray, 1848

Bicellariella ciliata (Linnaeus, 1758) (St. 18: 18702).
Dendrobeania fessa Kluge 1955 (St. 26: 7677).

Family Beaniidae Canu & Bassler, 1927

Beania mirabilis Johnston, 1840 (St. 18: 18702;).

Family Candidae d'Orbigny, 1851

Scrupocellaria scrupea Busk, 1852 (St. 6: 9843; St. 26: 7677).

Family Cellariidae Fleming, 1828

Cellaria fistulosa (Linnaeus, 1758) (St. 6: 9846; St. 29: 9951; St. 30: 4242; St. 43: 9912; N. Cherbourg: 9858).
Cellaria sinuosa (Hassall, 1840) (St. 1: 9914; St. 20: 9907).

Family Cribrilinidae Hincks, 1879

Puellina innominata (Couch, 1844) (St. 17: 18697; St. 18: 18702).
Puellina venusta Canu & Bassler, 1925 (St. 18: 4200).

Family Hippothoidae Busk, 1859

Hippothoa divaricata Lamouroux, 1821 (St. 7: 9855; St. 11: 18718; St. 16: 18708; St. 17: 4238, 18698, 18719; St. 18: 4187, 4189, 4190, 4195, 4196, 4197, 4200, 4206, 4207, 4208, 4209, 4210, 4212, 4213, 4214, 4217, 4218, 4219, 4220, 4221, 4222, 4223, 4224, 4227, 4228, 4229, 4230, 18702).
Hippothoa flagellum Manzoni, 1870 (St. 6: 9852; St. 7: 9855; St. 11: 18718; St. 17: 18695, 18696; St. 18: 4185, 4196, 4201, 4207, 4218).
Celleporella hyalina (Linnaeus, 1767) (St. 17: 18692, 18696, 18697, 18719, 18720; St. 18: 4184, 4189, 4190, 4196, 4198, 4201, 4209, 4212, 4217, 4219, 4220, 4221, 4228, 4230, 18702; St. 26: 7677).
Celleporella angusta Álvarez, 1991 (St. 18: 4196).

Family Chozoporidae Vigneaux, 1949

Chozopora brongniartii (Audouin, 1826) (St.6: 9843, 9856; St. 7: 9855; St. 11: 18718; St. 17: 18698, 18719, 18720; St. 18: 4187, 4188, 4195, 4196, 4197, 4198, 4200, 4201, 4202, 4206, 4208, 4212, 4216, 4217, 4219, 4220, 4221, 4222, 4225, 4227, 4228, 4230, 18702; St. 108: 13632).

Family Adeonidae Busk, 1884

Anarthropora monodon (Busk, 1860) (St. 207: 9853).
Reptadeonella insidiosa (Jullien in Jullien & Calvet, 1903) (St. 18: 4191, 4194, 4211, 4214, 4219, 4220, 4229; N. Cherbourg: 9858).
Reptadeonella violacea (Johnston, 1847) (St. 15: 18711; St. 18: 4230, 18702).

Family Bryocryptellidae Vigneaux, 1949

Palmiskenea skenei (Ellis & Solander, 1786) (St.1: 9914; St.30: 4242, St. 201: 9810).
Porella compressa (Sowerby, 1805) (St. 18: 4218).
Porella concinna (Busk, 1854) (St. 11: 18718; St 18: 4195, 4196, 4197, 4200, 4216, 4230; St.101: 13633).
Porella minuta (Norman, 1868) (St. 18: 4225, 4227).

Family Romancheinidae Jullien, 1888

Escharella immersa (Fleming, 1828) (St. 11: 18718; St. 15: 18710; St. 17: 18697, 18720; St. 18: 4185, 4187, 4188, 4189, 4195, 4196, 4198, 4200, 4202, 4206, 4207, 4208, 4209, 4211, 4213, 4214, 4215, 4216, 4219, 4230, 18702).
Escharella klugei Hayward, 1979 (St. 18: 4192).
Escharella labiosa (Busk, 1856) (St.6: 9843, 9844; St. 7: 9855; St. 11: 18718; St. 15: 18710, 18711; St. 16: 18708; St. 17: 18719; St.18: 4184, 4185, 4186, 4189, 4194, 4195, 4196, 4197, 4199, 4206, 4213, 4218, 4219, 4220, 4222, 4223, 4225, 4228, 4229, 4230, 18702).
Escharella laqueata (Norman, 1864) (St. 207: 9816).
Escharella octodentata (Hincks, 1880) (St. 18: 4223, 4228; St. 207: 9853).
Escharella variolosa (Johnston, 1838) (St. 6: 9843, 9844; St. 7: 9855; St 11: 18718; St. 15: 18711; St. 16: 18708; St. 17: 18719; St. 18: 4201, 4216, 4224, 18702; St. 207: 9853).
Escharella ventricosa (Hassall, 1842) (St. 6: 9856; St. 11: 18718; St. 17: 18697; St. 18: 4187, 4196, 4200, 4213, 4214, 4217, 4218, 4230, 18702).
Escharella cryptoecium sp. nov. (St. 15: 18711; St. 18: 4203, 4212).
Escharella pseudopunctata sp. nov. (St: 101: 13633).
Escharoides coccinea (Abildgaard, 1806) (St. 6: 9844, 9852; St. 11: 18718; St. 15: 18711; St. 16: 18708; St. 17: 4238, 18695, 18696; St. 18: 4186, 4192, 4195, 4212, 4218, 18702).
Neolagenipora eximia (Hincks, 1860) (St. 11: 18718).

Family Smittinidae Levinsen, 1909

Smittina bella (Busk, 1860) (St. 16: 18708).
Smittina landsborovii (Johnston, 1847) (St. 6: 9856;)
Parasmittina trispinosa (Johnston, 1838) (St. 7: 9855; St 18: 18702).
Prenantia cheilostoma (Manzoni, 1870) (St. 18: 4230).
Smittoidea reticulata (MacGillivray, 1842) (St. 18: 4189, St. 207: 9853; N. Cherbourg: 9858).

Family Bitectiporidae MacGillivray, 1895

Pentapora fascialis (Pallas, 1766) (St. 18: 4214, 18702; N. Cherbourg: 9858).
Schizomavella auriculata (Hassall, 1842) (St. 11: 18718; St. 18: 18702 St. 108: 13632).
Schizomavella cornuta (Heller, 1867) (St. 11: 18718; St. 17: 18692, 18695, 18719, 18720; St. 18: 4185, 4189, 4230, 18702).

Schizomavella hastata (Hincks, 1862) (St. 11: 18718; St. 17: 4232, 4233, 4234, 4239, 18720; St. 101: 13633)

Schizomavella linearis (Hassall, 1841) (St. 6: 9843, 9844, 9852; St. 7: 9851; St. 11: 18718; St. 16: 18708; St. 17: 4231, 4232, 4233, 4234, 4238, 4239, 18695, 18696, 18697, 18698, 18712, 18719, 18720; St. 18: 4196, 4218, 4230, 18702; St. 43: 9912; St. 101: 13633; St. 207: 9816; N. Cherbourg: 9858).

Family Schizoporellidae Jullien, 1883,

Schizoporella cornualis Hayward & Ryland, 1995 (St. 6: 9843; St. 17: 4232, 4233, 4239; St. 18: 4188, 4201, 4206, 4208, 4214, 4218, 4225, 4230, 18702)

Schizoporella patula Hayward & Ryland, 1995 (St. 11: 18718).

Family Cryptosulidae Vigneaux, 1949

Cryptosula pallasiana (Moll, 1803) (St. 6: 9846, St. 7: 9855).

Family Microporellidae Hincks, 1879

Microporella ciliata (Pallas, 1766) (St. 6: 9843; St. 7: 9855; St. 11: 18718; St. 16: 18708; St. 17: 18692, 18695, 18696, 18697; St. 18: 4185, 4186, 4187, 4189, 4190, 4191, 4195, 4196, 4198, 4200, 4201, 4207, 4208, 4211, 4212, 4213, 4214, 4217, 4218, 4219, 4220, 4221, 4222, 4223, 4224, 4227, 4228, 4229, 4230, 18702).

Fenestulina malusii (Audouin, 1826) (St. 6: 9856; St. 18: 4196).

Family Escharinidae Tilbrook, 2006

Escharina hyndmanni (Johnston, 1847) (St. 18: 4206).

Phaeostachys spinifera (Johnston, 1847) (St. 6: 9844, 9845, 9856; St. 18: 4188, 4193, 4199, 4201, 4207, 4208, 4210, 4213, 4214, 4215, 4216, 4217, 4220, 4227, 4229, 4230, 18702).

Family Celleporidae Johnston, 1838

Cellepora pumicosa (Pallas, 1766) (St. 6: 9844, 9856; St. 11: 18718; St. 15: 18711; St. 16: 18708; St. 17: 4231, 4232, 18692, 18695, 18696, 18697, 18712, 18719, 18720; St. 18: 4185, 4188, 4205, 4218, 4230, 18702; St. 26: 7677; St. 29: 9951).

Buffonellaria divergens (Smitt, 1873) (St. 18: 4210).

Celleporina caliciformis (Lamouroux, 1816) (St. 6: 9844; St. 17: 18692, 18696, 18720; St. 18: 4234, 18702).

Lagenipora lepralioides (Norman, 1868) (St. 18: 4211).

Omalosecosa ramulosa (Linnaeus, 1767) (St. 43: 9912).

Turbicellepora incrassata (Lamarck, 1816) (St. 6: 9856; St. 7: 9855; St. 11: 18718; St. 15: 18711; St. 17: 4231, 4232, 4234, 4235, 4238; 18692, 18695, 18696, 18712, 18719, 18720; St. 18: 4184, 4196, 4202, 4208, 4216, 4218, 4228, 4230, 18702; St. 43: 9912).

Turbicellepora magnicostata (Barroso, 1919) (St. 17: 18720).

Family Phidoloporidae Gabb & Horn, 1862

Rhynchozoon bispinosum (Johnston, 1847) (St. 6: 9843; St. 17: 18712, 18719; St. 18: 4185, 4197, 4214, 4218, 18702; N. Cherbourg: 9858).

Schizotheca fissa (Busk, 1856) (St. 11: 18718).

Remarks on the systematic list

All the species included in the list, except the two species new for science, are previously known in the area of study. However, remarks on some species must be made.

Electra pilosa (Linnaeus, 1767) is one of the most common species on the European Atlantic coast. It lives mainly in the intertidal zone and in the first few metres of the sublittoral zone, usually on algae. The deepest this species has been previously reported is 80 m (Prenant & Bobin, 1966; Hayward & Ryland, 1998). However, in the *Pourquoi Pas?* collection, it occurred at 110 m (station 18), on hard substrates such as shells and stones.

Most of the colonies of *Pyripora catenularia* (Fleming, 1828) examined showed much more compact growth than is typical, with uniserial colonies uncommon and those made up of three or four series of zooids much more frequent.

Celleporella hyalina (Linnaeus, 1767) is an abundant species intertidally and in the first few metres of the sublittoral zone on the European coast. Specimens are usually found on brown algae, specifically *Laminaria* spp., although all of the specimens examined were present on hard substrates, such as shells and stones. The specimens from station 18 were collected from a depth of 110 m, which is not common for this species.

The most common habitat of *Fenestulina malusii* (Audouin, 1826) is laminarian forests at depths of less than 50 m. Its occurrence at 110 m (station 18) is therefore unusual. Gautier (1962) mentions the species in samples collected from a depth of 300 m in the Mediterranean Sea, but this identification must be revised.

Some of the species included in the list have been changed of name in recent articles, which in occasions do not seem to have received well-deserved attention. Therefore we include a list with the valid name, the name replaced in base of the International Code of Zoological Nomenclature (2000) (Art. 23.1), as well as the reference of the author who has proposed the change:

Conopeum lacroixi (Audouin, 1826) [*Conopeum seurati* (Canu, 1928)] (d'Hondt, 2006)

Schizomavella cornuta (Heller, 1867) [*Schizomavella cuspidata* (Hincks, 1880)] (Hayward & McKinney, 2002).

Celleporina caliciformis (Lamouroux, 1816) [*Celleporina hassallii* (Johnston, 1847)] (d'Hondt, 2000).

Turbicellepora incrassata (Lamarck, 1816) [*Turbicellepora avicularis* (Hincks, 1860)] (d'Hondt, 1997).

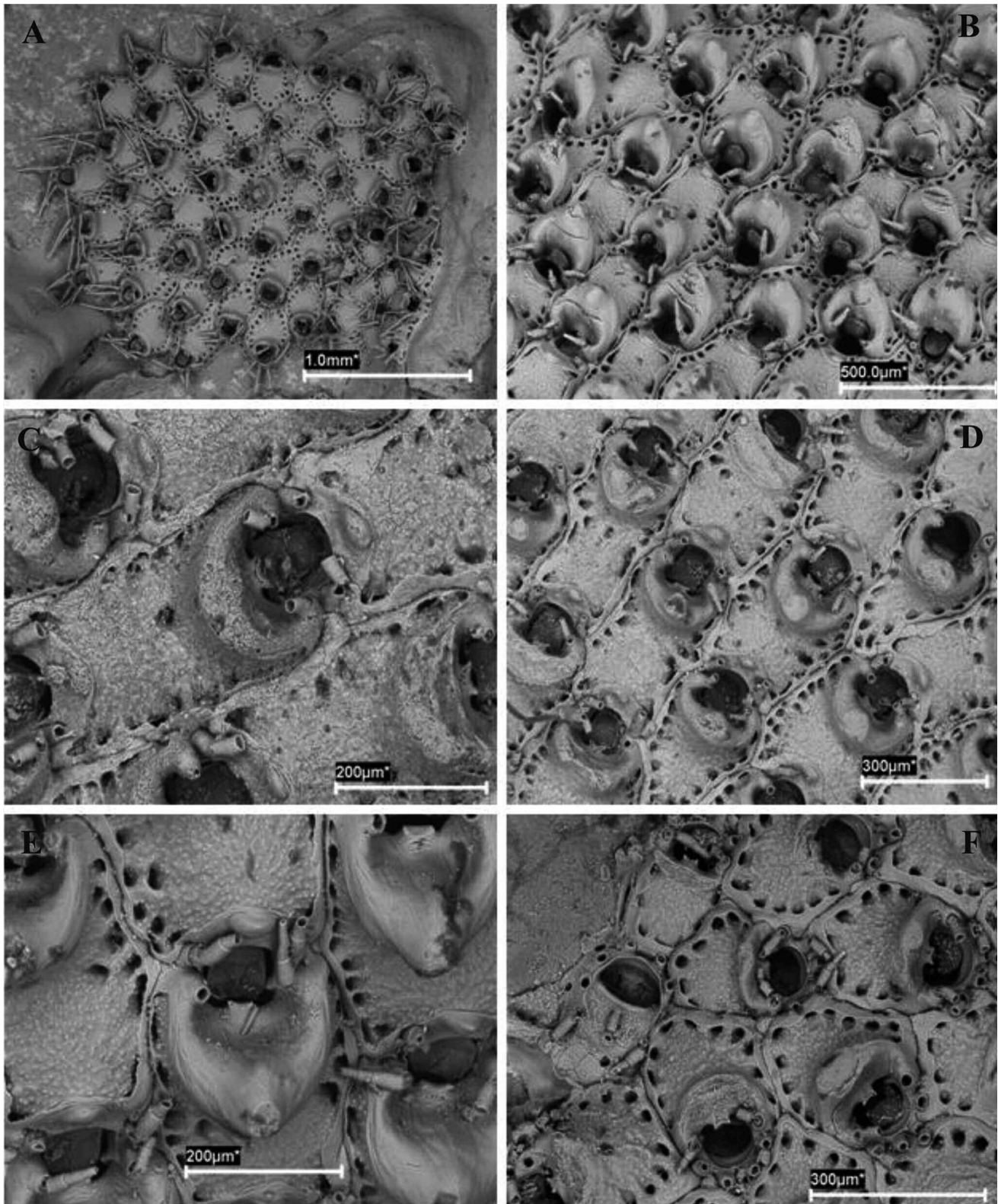


Figure 1. *Escharella cryptoecium* sp. nov. (MNHN-BRY-20062). **A.** Aspect of a colony. **B.** Zooids with very well-developed peristomes (Holotype). **C-E.** Views of ovicellate zooids (Holotype). **F.** Ancestrula and early astogeny.

Figure 1. *Escharella cryptoecium* sp. nov. (MNHN-BRY-20062). **A.** Aspect de la colonie. **B.** Zoïdes avec péristome très développé. **C-E.** Différents aspects des zoïdes ovicellés. **F.** Ancestrule et autozoïdes périancestrulaires.

Description of new species

Escharella cryptoecium sp. nov.

(Fig. 1)

Holotype

MNHN-BRY-20062 (marked in red): *Pourquoi Pas?*, st. 15, Baie de Cancale, 25 m, 29/09/1929, 48°43'30"N-1°44'50"W.

Other material

MNHN-4203 (2 colonies): 48°50'08" N- 2°19'15" W, 110 m; *Pourquoi Pas?*, 29/09/1929, St. 18. MNHN-4212 (2 colonies): 48°50'08" N- 2°19'15" W, 110 m; *Pourquoi Pas?*, 29/09/1929, St. 18. MNHN-BRY-20062 (7 colonies): *Pourquoi Pas?*, st. 15, Baie de Cancale, 25 m, 29/09/1929, 48°43'30"N-1°44'50"W.

Etymology

The name *cryptoecium* refers to the hidden position of the ovicel.

Description

Colony encrusting unilaminar, multiserial. Zooids hexagonal to rectangular, separated by marked sutures. Frontal surface more or less flat, fine granulate, centrally imperforate, with a single row of marginal areolar pores.

Primary orifice orbicular. Lyrula marked, wider than long, with distinctly concave edges, weakly bifid. Condyles small. Frontal wall close to the orifice occupied by a thick peristome, particularly well developed in the median zone. Orifice with 6 distal spines, reduced to 4 or 5 in well-calcified zooids, and to 4 in ovicellate ones.

Ovicell immersed in the distal zooid, only visible by

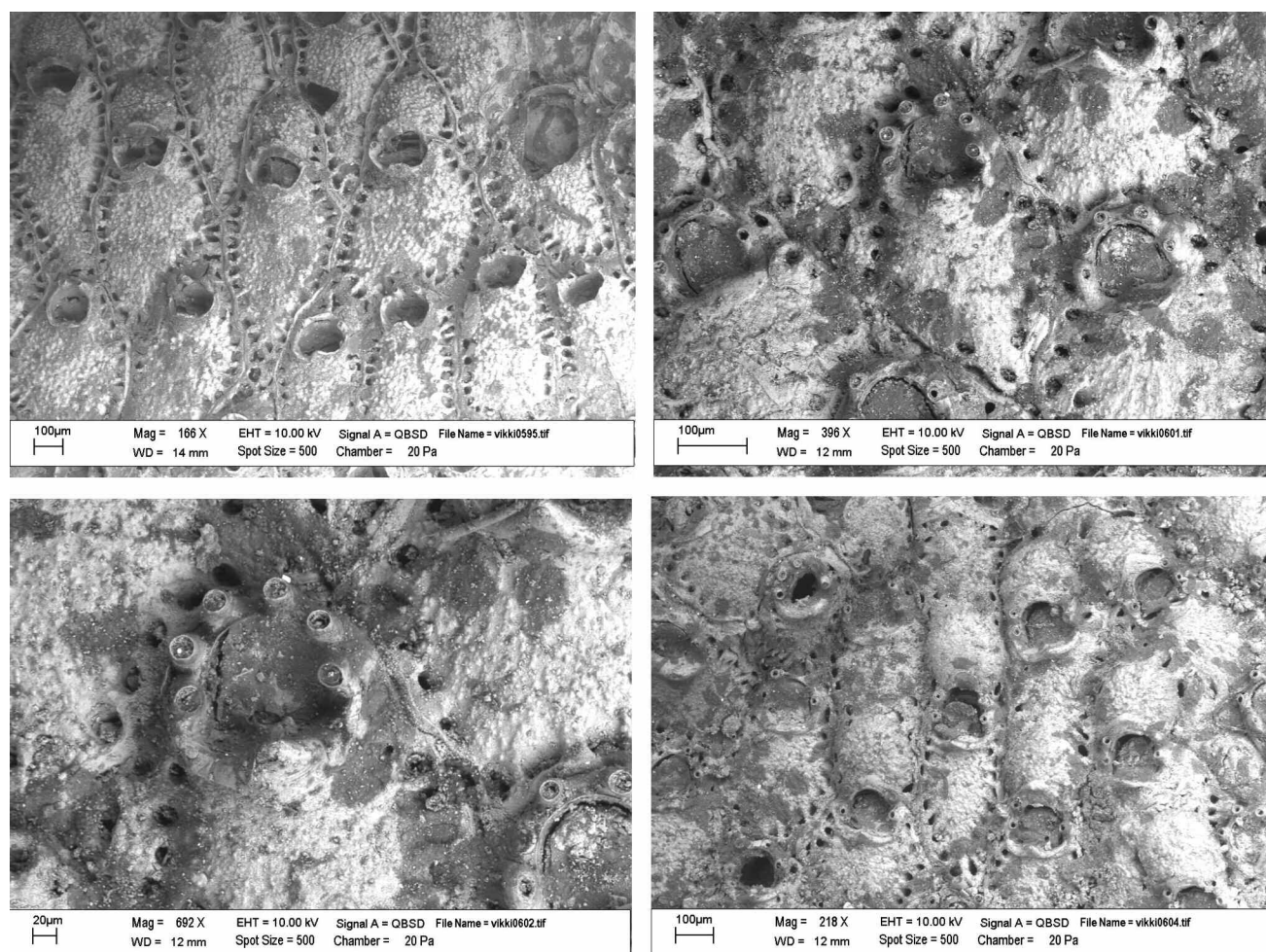


Figure 2. Neotype of *Escharella immersa* (Fleming, 1828) deposited in the Natural History Museum, London (photographs sent by M. Spencer Jones).

Figure 2. Néotype d'*Escharella immersa* (Fleming, 1828) déposé au Natural History Museum of London (Photographies envoyées par M. Spencer Jones).

transparency in slightly calcified zooids. Externally, the presence of the ovicell is indicated by a wider space between the 2 distalmost spines on the orifice of the maternal zooid, and the presence of a smooth, variably developed protuberance at the proximal end of succeeding zooid.

No avicularia present.

Ancestrula (Fig. 1F) oval, of length 0.26 mm and width 0.18 mm, with a circular area surrounded by 9 spines. Distal opesia semicircular, of length 0.07 mm and width 0.10 mm, with a concave proximal edge. Astogenesis begins with budding of a distal zooid and two disto-lateral zooids.

Measurements

MNHN-BRY-20062 (Holotype). AZL: 0.39 ± 0.047 (11). AZW: 0.26 ± 0.032 (11). OL: 0.10 ± 0.009 (12). OW: 0.10 ± 0.005 (12).

Discussion

The genus *Escharella* Gray, 1848 is characterized by an imperforate frontal wall in which only marginal areolae are apparent. The orifice, always surrounded by spines, has a well marked lyrula, and when condyles are present, they are small. Avicularia are never present in species of this genus. The ancestrula produces a distal individual followed by two distolateral individuals. We think that inclusion of the material examined in the genus *Escharella* is totally justified, as the specimens share all of the characteristics mentioned; however, we did not find any species in the literature that wholly coincides with the colonies we examined.

One of the characteristics that is particularly important for differentiating species of the genus *Escharella* is the number of oral spines, and there are at least six species that also possess 6 oral spines: *E. praealta* (Calvet, 1906), *E. connectens* (Ridley, 1881), *E. labiata* (Boeck in Smitt, 1868), *E. acuta* Zabala, Maluquer & Harmelin, 1993, *E. quadrata* López de la Cuadra & García Gómez, 2001 and *E. immersa* (Fleming, 1828). Accurate descriptions of these species can be found in different papers: Hayward (1979, 1994), López de la Cuadra & García Gómez (1988, 1993 & 2001), Zabala, Maluquer & Harmelin (1993) and Hayward & Ryland (1999).

Escharella labiata, a species with an Arctic distribution, possesses between 4 and 6 spines, as in the specimens under study; however, the orifice in *E. labiata* is clearly much wider than long and the distal border is finely denticulate, and there is a row of small marginal pores on the ovoid, convex zooids. *Escharella praealta* and *E. quadrata* possess 6 spines that are retained in the ovicellate zooids, whereas in the specimens examined the individuals only retain 4 spines. *Escharella connectens* also has 6 spines, of which only 4 are retained in ovicellate zooids, and also presents a well

developed peristome, although this species, unlike our specimens, does not possess condyles and has a weakly developed lyrula. *Escharella acuta* also coincides with our material in terms of the number of spines on both autozooids and ovicellate zooids, but the peristome is very different, as the medioproximal area is very sharp, and the lyrula weakly developed. Finally, *E. immersa* (for which we have studied photographs of the neotype provided by M. Spencer Jones; see Fig. 2) always presents 6 spines and has a secondary orifice marked by a fine peristome with a median umbo, whereas in our material there is a well developed peristome; furthermore, the lyrula is totally different from the anvil-shaped lyrula of *E. immersa*.

Because of the relative abundance of our species in an area that was previously well studied, it is possible that some previous reports of *E. immersa* in this area may actually correspond to *E. cryptoecium* sp. nov.

Escharella pseudopunctata sp. nov.

(Figs 3-4)

Holotype

MNHN-BRY-20063 (marked in red): *Pourquoi Pas?*, juin 1914, St. 101, English Channel.

Paratypes

MNHN-BRY-20064 : *Pourquoi Pas?*, juin 1914, St. 101. 2 colonies: Paratype 1 (marked in red); Paratype 2 (not marked).

Etymology

The name *pseudopunctata* refers to the large number of pore openings on the frontal surface of the zooids.

Description

Colony encrusting unilaminar, multiserial. Zooids hexagonal to oval, with smooth, slightly convex frontal surface. Periancestrular zooids with a single row of marginal pores, but soon additional pores appear in succeeding zooids and can occupy the entire frontal surface. These pores do not perforate the frontal wall, but arise as a result of secondary calcification; in transparent walls it is possible to observe the tubules that run from the pores to the margins of the zooid.

Secondary orifice campanulate. Primary orifice with a small, well-delineated, quadrangular lyrula and small rounded condyles on both sides. Six distal spines, retained in ovicellate zooids.

Ovicell circular, of length 0.23 mm and width 0.30 mm, not prominent, and almost entirely immersed by calcification of the distal zooid.

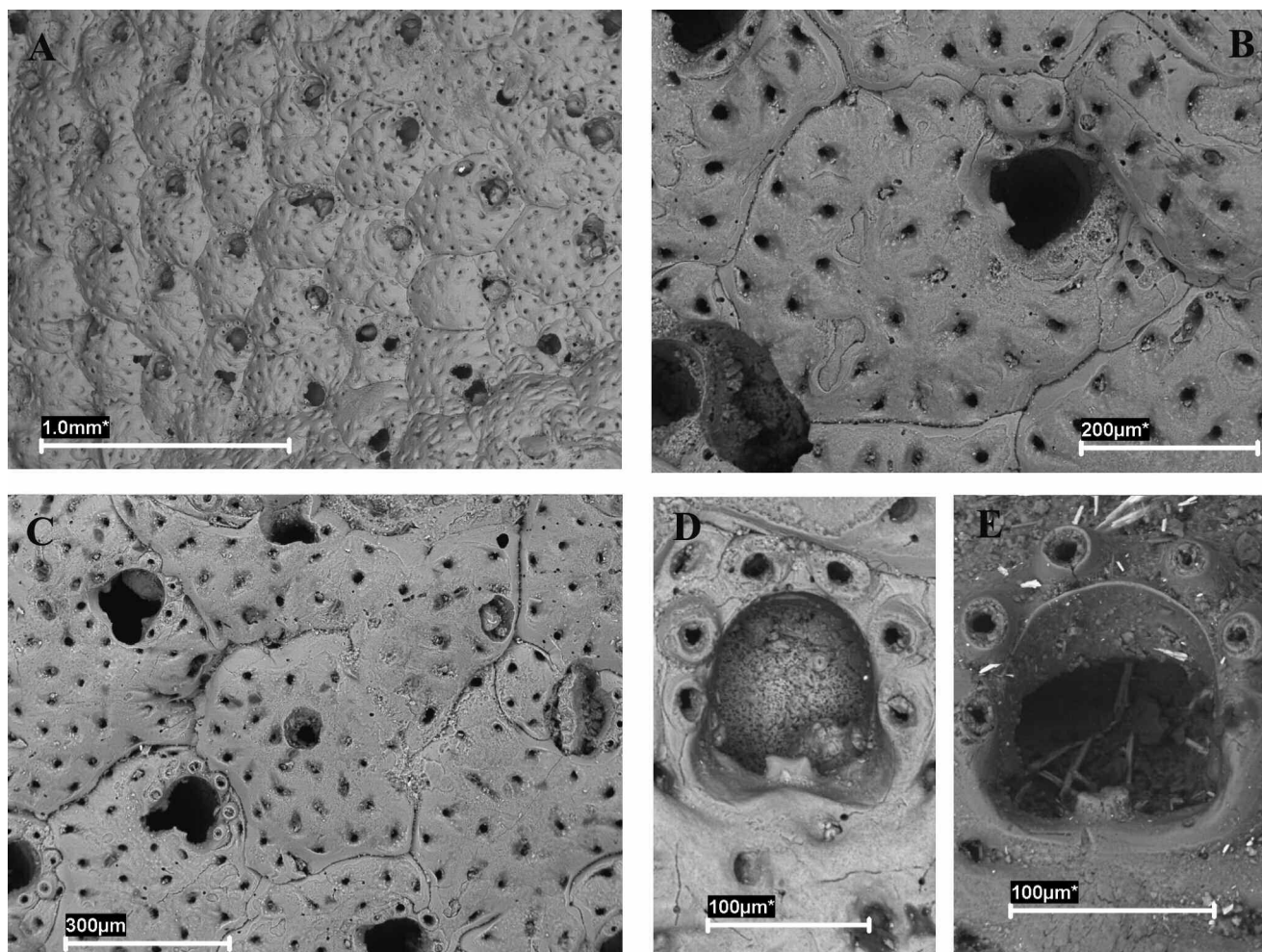


Figure 3. *Escharella pseudopunctata* sp. nov. (MNHN-BRY-20063, holotype). **A.** Aspect of a colony. **B.** Zooid. **C.** Autozooids and reduced kenozooids. **D, E.** Orifices.

Figure 3. *Escharella pseudopunctata* sp. nov. (MNHN-BRY-20063, holotype). **A.** Aspect de la colonie. **B.** Zoïde. **C.** Aspect des zoïdes supposés avortés. **D, E.** Orifices.

Avicularia not present.

The only ancestrula observed is seriously damaged. It is oval, of length 0.32 mm and width 0.24 mm, with a circular area surrounded by 10 spines; opesia semicircular, of length 0.14 mm and width 0.13 mm. Astogenesis begins with budding of a distal zooid and two distolateral zooids, all of which are smaller than succeeding autozooids.

Irregularly shaped structures sometimes observed between autozooids, usually situated at the sides of the orifice of the autozooids. Frontal wall of similar structure to that of the autozooids. These structures may be abortive zooids with no opening.

Large, more or less circular perforations, of 0.08 mm diameter, randomly distributed on the frontal surface of both abortive zooids and autozooids, sometimes even connecting with the primary orifice of the laterals (Figs 3A, C & 4C.). This may suggest that the perforations are not

reduced orifices, but it is difficult to hypothesise about their origin and function.

Measurements

MNHN-BRY-20063 (Holotype). AZL: 0.53 ± 0.040 (12). AZW: 0.42 ± 0.061 (12). OL: 0.12 ± 0.012 (13). OW: 0.10 ± 0.009 (13).

Discussion

A literature search did not reveal any species description that totally coincided with our material.

We have decided to assign the specimens to the genus *Escharella* Gray, 1848 because of the aspect of the orifice, presence of lyrula and condyles, absence of avicularia, the aspect of the ancestrula and astogenesis. It is important to point out that, as indicated in the description, the frontal

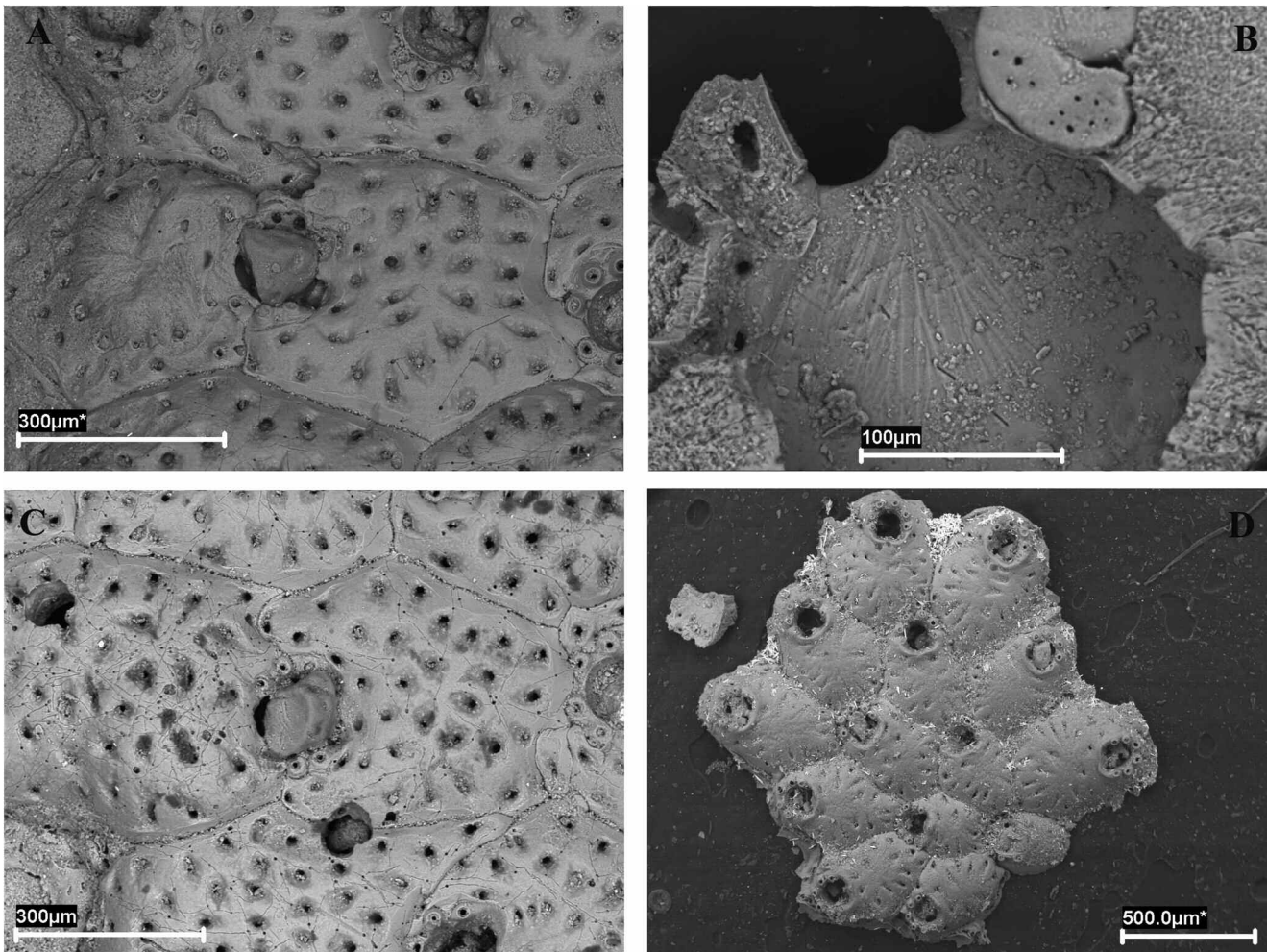


Figure 4. *Escharella pseudopunctata* sp. nov. **A & C.** Ovicellate zooids (MNHN-BRY-20063, holotype). **B.** Imperforate frontal shield (MNHN-BRY-20064, paratype 2). **D.** Zone of astogenetic change (MNHN-BRY-20064, paratype 1).

Figure 4. *Escharella pseudopunctata* sp. nov. **A & C.** Zoïde ovicellé (MNHN-BRY-20063, holotype). **B.** Surface frontale non perforée (MNHN-BRY-20064, paratype 2). **D.** Zone de changement morphologique des autozoïdes (MNHN-BRY-20064, paratype 1).

pores do not perforate the frontal wall of the zooid, but arise as a result of secondary calcification and are actually extensions of the marginal pores, to which they connect by tubules. We believe that this sole character does not justify the erection of a new genus.

The main difference from other species of *Escharella* is the presence of pores in the secondary calcification, which in the specimens examined occupy all of the frontal wall, and which are not present in other species of this genus (see references in the discussion of *E. cryptoecium*), although supplementary pores may also sometimes appear in *E. immersa* (see Gordon, 1989: Pl. 15, fig. D). Despite this, only two other species of *Escharella* have 6 spines in both ovicellate and non ovicellate zooids: *E. praealta* (Calvet, 1906) and *E. quadrata* López de la Cuadra & García Gómez, 2001, but the shape of the lyrula, development of peristome and ovicell are very different.

The existence of the tubular pores made us consider assigning of our species to the genus *Haywardipora* Soule, Soule & Chaney, 1996. One of the characteristics of this genus is a large number of frontal pores, distributed in three or four rows, or as in *Haywardipora rylandi* Soule, Soule & Chaney, 1996, covering all of the frontal wall. In addition, and with the exception of the type species, the members of this genus have a tubular peristome that surrounds the entire orifice, in which spines are incorporated, internally crossed by a descending ridges (Soule, Soule & Chaney, 2005). None of these characteristics are present in the material under study. Furthermore, the validity of this genus is questionable (Dr. D.P. Gordon, personal communication, July 2006); Gordon (2006a) includes it as a junior synonym of the genus *Escharella*.

In our opinion, the genus *Haywardipora* is artificial. *Haywardipora rugosa* Soule et al, 1996, nominated as the

type species of the genus, does not possess many of the characteristics indicated in the diagnosis of the genus. We believe that *H. rugosa* may fit within the genus *Escharella* because, as in *E. pseudopunctata* sp. nov., the frontal pores arise from the marginal pores and do not perforate the frontal wall. Other characters such as the shape of the orifice, the presence of a lyrula and spines, the shape of the ovicell, absence of avicularia, etc., are clearly consistent with this genus.

The other species originally included in the genus *Haywardipora* do not fit within the genus *Escharella*. The zooids are morphologically very similar to those of *Elleschara bensoni* (Brown, 1954), the type species of the genus *Elleschara* Gordon, 1984. Both have a tubular peristome in which a crown of spines is incorporated; in both, ovicells appear suspended by the distal part of the peristome, similar to those in the genus *Temachia* Jullien, 1882 (see Reverter-Gil & Fernández-Pulpeiro, 1999). The main difference is that Gordon (1984) describes the genus *Elleschara* as without a lyrula, whereas species belonging to the genus *Haywardipora* do possess a lyrula. However, Gordon (personal communication, March 2007), has informed us of the presence of a true lyrula in *E. bensoni*. Taking this into account, all species of the genus *Haywardipora*, except the type species, should be included within the genus *Elleschara*, which we consider valid, even though Gordon (1989) considered *Elleschara* as a synonym of *Escharella*. Moreover, Dr. Gordon now shares our opinion regarding the genus *Elleschara* (personal communication, March 2007).

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