

Three new species of Iberian cheilostomate Bryozoa

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Three new species of Iberian cheilostomate bryozoans are described from material held in our own collection as well as in the bryozoan collection in the Museo Nacional de Ciencias Naturales, Madrid. Chaperiopsis hirsuta sp. nov., from the Mediterranean, is the second species of this genus in European waters. Metroperiella gay sp. nov. and Schizoporella artabra sp. nov. are described from material collected in Galicia (north-western Spain).

Keywords: Bryozoa, new species, *Chaperiopsis*, *Metroperiella*, *Schizoporella*, Iberian Peninsula

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INTRODUCTION

We are currently undertaking the first stage of a project entitled 'Iberian Fauna: Bryozoa', a long-term research project in which we aim to combine and update all previous citations for Bryozoa in the Iberian Peninsula and Balearics, and to provide new data from the collection of new material. For this, in addition to the obligatory literature search, we are revising our own Iberian material and that deposited in diverse collections, whether published or not.

At present, and although a complete catalogue does not yet exist, we consider that the bryozoological fauna of the Iberian Peninsula is one of the best known in European waters, with approximately 450 recent species cited in this region. Despite this, our overall knowledge is still fragmentary and undoubtedly includes many taxonomic errors, which are gradually being corrected in various studies. The greater ease of access to original reference material and, above all, the use of the electron microscope enable better characterization of species, and makes possible to detect misidentifications and misinterpretations of the species concept as well. Revision of material stored in collections has thus become an essential part of the work of taxonomists.

In the present study, we present 3 new species of cheilostomate Bryozoa. All of the material originates from the Iberian Peninsula, and therefore extends our knowledge of the bryozoan fauna in these waters and in Europe.

MATERIALS AND METHODS

We examined Iberian material originally stored in our own collection—both published and unpublished—as well as unpublished material deposited in collections in the Museo Nacional de Ciencias Naturales de Madrid (MNCN). Other

reference material was also examined at the Natural History Museum, London (NHM), and Muséum National d'Histoire Naturelle, Paris (MNHN).

The observations were made with a LEO 435 VP scanning electron microscope on uncoated material. The measurements were made in a camera lucida attached to a Leica MZ16 binocular microscope.

SYSTEMATICS

Genus *Chaperiopsis* Uttléy, 1949

Chaperiopsis hirsuta sp. nov.

(Figures 1–2; Table 1)

TYPE MATERIAL

Holotype: MNCN-25.03/3741: north of Columbrete Grande, Islas Columbretes, 20 July 1996, FAUNA IV, Station 295 B1, 43 m (39°54' 02"N–39°53' 98"E; 000°41' 08"E–000°41' 11"E). Colony preserved in alcohol 70°.

Paratypes:

Paratype 1: MNCN-25.03/3742: north-east of Cabo de Pera, Mallorca (Balearics), 27 June 1994. FAUNA III, Station 194A, 58–59 m (39°46' 09"N–39°44' 17"N; 3°22' 04"E–3°35' 45"E). Colony preserved in alcohol 70°.

Paratype 2: MNCN-25.03/3743: north-east of Cabo de Pera, Mallorca (Balearics), 27 June 1994. FAUNA III, Station 194A, 58–59 m (39°46' 09"N–39°44' 17"N; 3°22' 04"E–3°35' 45"E). One uncoated colony in a SEM slide.

Paratypes 3–8: MNCN-25.03/3744-9: north of Columbrete Grande, Islas Columbretes, 20 July 1996, FAUNA IV, Station 295 B1, 43 m (39°54' 02"N–39°53' 98"E; 000°41' 08"E–000°41' 11"E). Colonies preserved in alcohol 70°.

Paratypes 9–11: MNCN-25.03/3750-2: north of Columbrete Grande, Islas Columbretes, 20 July 1996, FAUNA IV, Station 295 B1, 43 m (39°54' 02"N–39°53' 98"E; 000°41' 08"E–000°41' 11"E). Three uncoated colonies in a SEM slide.

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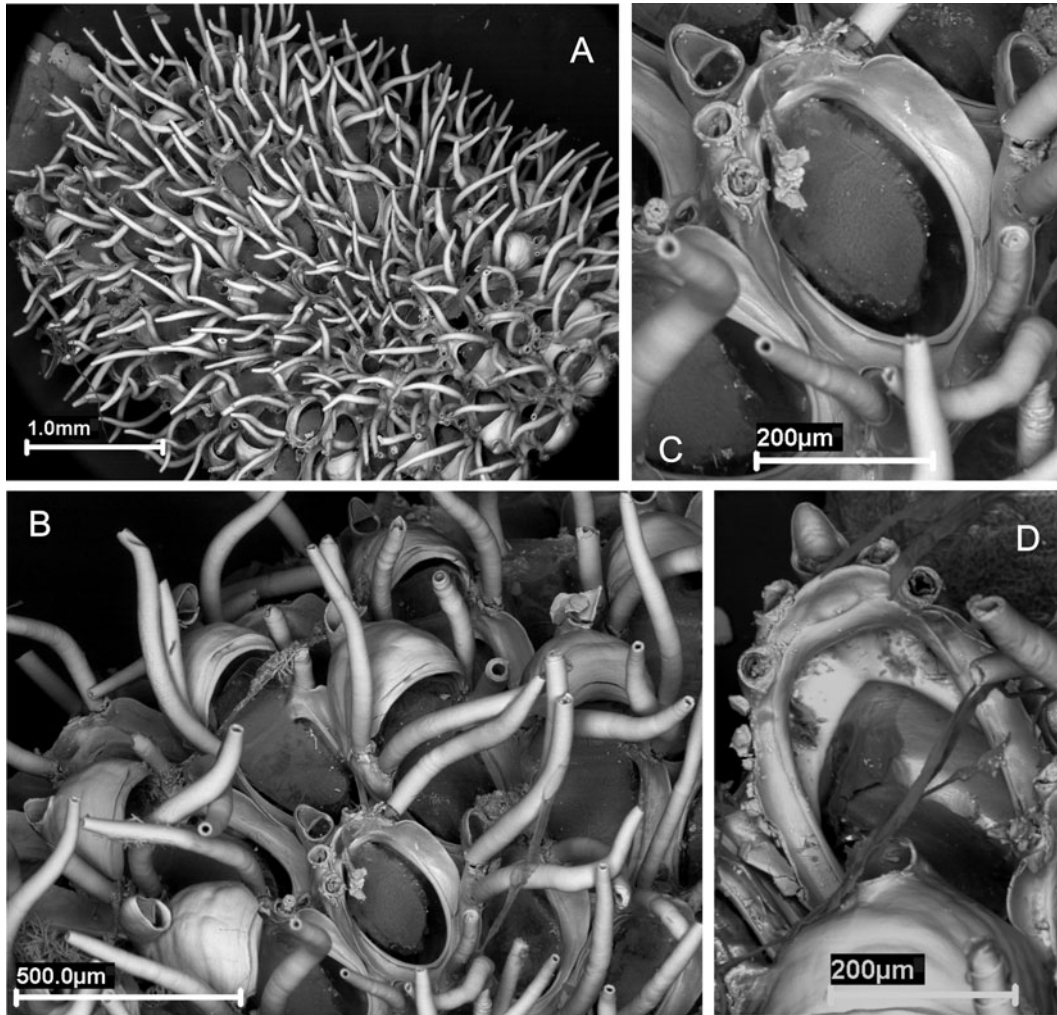


Fig. 1. *Chaperiopsis hirsuta* sp. nov. (MNCN: paratype 2). (A) View of the colony; (B) detail showing ovicellate and non-ovicellate zooids, spines, and distal avicularia; (C) an autozooid; (D) ocluser laminae.

ETYMOLOGY

hirsuta: alluding to the hirsute appearance of the colony.

DESCRIPTION

Colony encrusting, unilaminar, forming copper-coloured crusts, hirsute appearance owing to presence of zooidal spines. Autozooids oval, elongate, in alternating radiating series. Membranous area oval, occupying almost all of the frontal wall. Cryptocyst smooth, more developed proximally, narrowing gradually towards the distal extreme; its internal border finished off by a flared ring. Ocluser laminae distal, V-shaped, arising in the medial portion of the opesia. Gymnocyst smooth, developed mainly proximally. A vertical peripheral lamina arises from the proximal third, surrounding all of the distal part of the zooid; more conspicuous laterally, with appearance of two well-developed laminar wings. Two pairs of basally articulated, thick, straight spines present on the distal rim, even in the ovicellate zooids, their bases placed outside the peripheral lamina. The 4 spines are similar in both thickness and length, which may greatly exceed the zooidal length. The spines, which are never bifurcate, may present different curvatures and regenerations, and may even modify their growth to avoid the adjacent spines (Figure 2A). Autozooids with a medio-distal dietella and

two pairs of lateral dietellae. Distal sessile avicularium present in all zooids, attached between the distal-most pair of spines, and originating from the medio-distal dietella; rounded triangular in outline, narrowed at the apertural bar; mandible ogival, directed distally. Occasionally, an avicularium with short peduncle may appear on the proximal gymnocyst of some zooids, this is difficult to see owing to the development of zooidal spines; rostrum and mandible similar to the sessile avicularium. Ovicell hyperstomial, hemispheric and prominent, with a narrow transversal fenestra parallel to the proximal border. Distally shows an avicularium with distally directed rostrum similar to the sessile avicularium but slightly larger; its curved peduncle covers the apex of the ovicell vertically, and is fused with the ectooecium. Ancestrula, surrounded by periancestrular zooids in the material observed and difficult to see; circular, diameter 0.26 mm, with 9 spines: two disto-lateral pairs and 5 proximal.

REMARKS

Chaperiopsis hirsuta sp. nov. characterized by the oval autozooids with a gymnocyst surrounded internally by a flared ring, and by the presence of two pairs of thick spines which may greatly exceed the length of the autozooid. Furthermore, a distal sessile triangular avicularium is attached

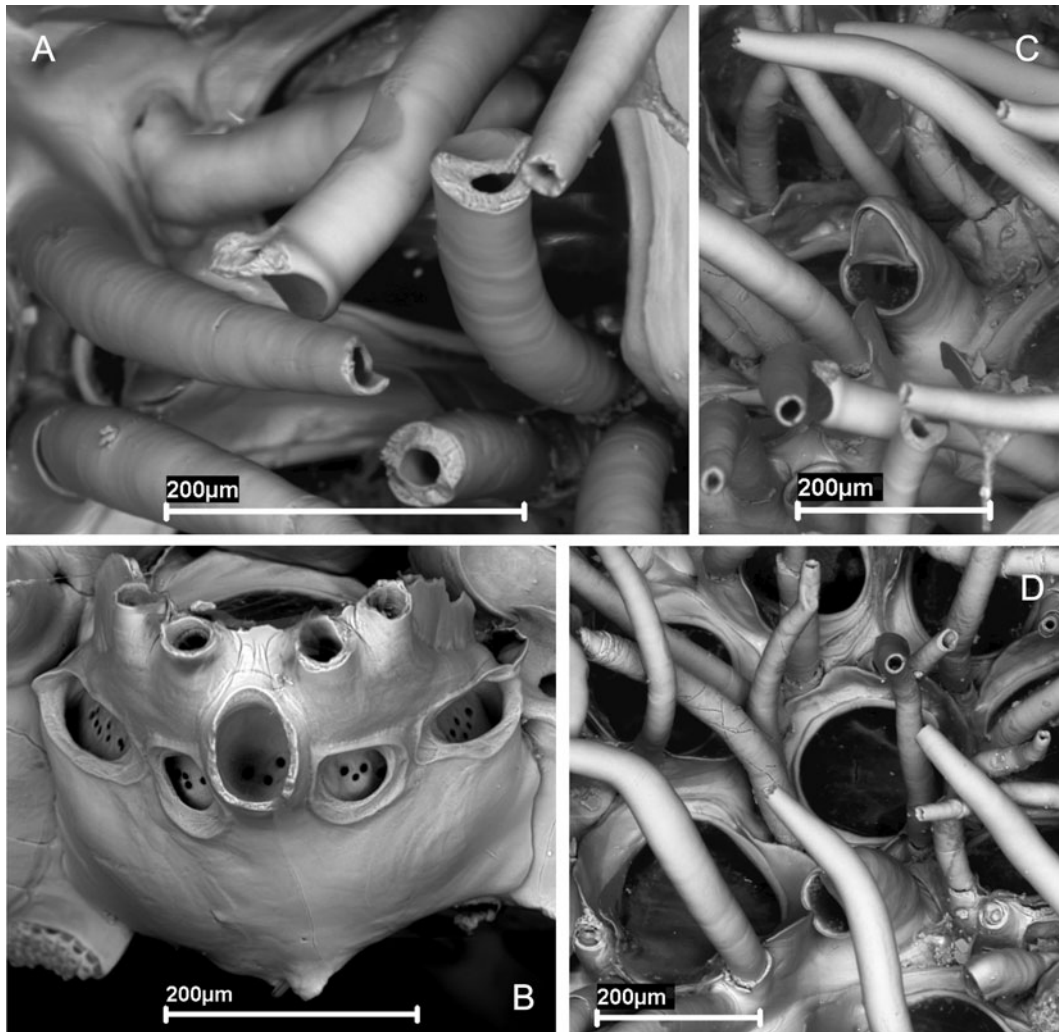


Fig. 2. *Chaperiopsis hirsuta* sp. nov. (MNCN: paratype 2). (A) Broken spines with regenerations; left above the peduncle of a proximal avicularium; (B) dietellae; (C) a proximal pedunculate avicularium; (D) ancestrula (centre), periancestrular zooids and a proximal avicularium.

between the distal-most pair of spines, while a proximal pedunculate avicularium is infrequent.

Some 50 recent species have been described as belonging to the genus *Chaperiopsis*, most in the southern hemisphere (Bock, 2002) (e.g. Busk, 1884; Osburn, 1950; Brown, 1952; Uttley & Bullivant, 1972; Gordon, 1984, 1986; Hayward & Thorpe, 1988; Reverter Gil & Fernández Pulpeiro, 1995; Fernández Pulpeiro & Reverter Gil, 1998). However, only one species of the genus is known in European waters, *Chaperiopsis annulus* (Manzoni, 1870). This species differs greatly from *Ch. hirsuta* sp. nov. because it has rounder

zooids, with a pair of poorly developed distal spines, and a second bifurcate or even trifurcate pair; occlusor laminae horseshoe-shaped; proximal avicularia more abundant, with a longer and narrower peduncle; and ovicell with a wider fenestra and often 1 or 2 distal pedunculate avicularia.

Of the remaining species of the genus, many have more or less branched or swollen spines, sometimes more than 4, or the frontal surface is obscured by calcification (subgenus *Clipeochaperia* Uttley & Bullivant, 1972), which enables them to be clearly differentiated from *C. hirsuta* sp. nov. Among those with 4 erect distal spines, some lack a sessile distal

Table 1. Measurements (in mm) of *Chaperiopsis hirsuta* sp. nov. (MNCN: holotype).

	Autozooid		Distal avicularia		Ovicell avicularia		Ovicell	
	Length	Width	Length	Width	Length	Width	Length	Width
(N)	20	20	20	20	15	15	21	21
Min	0.321	0.230	0.077	0.051	0.092	0.061	0.158	0.219
Max	0.490	0.342	0.112	0.087	0.133	0.102	0.245	0.357
MEAN	0.422	0.289	0.095	0.068	0.114	0.081	0.207	0.309
STD	0.045	0.033	0.019	0.011	0.011	0.009	0.021	0.027

Min, minimum; max, maximum.

avicularium, such as *Chaperiopsis galeata* (Busk, 1854), *Chaperiopsis indefensa* Hayward & Thorpe, 1988, *Chaperiopsis rotundata* Hayward & Thorpe, 1988 and *Chaperiopsis patulosa* (Waters, 1904), although in the latter species it may appear occasionally. In addition, in all of these species the spines are poorly developed. *Chaperiopsis cervicornis* (Busk, 1854) possesses a distal avicularium, but small and inconspicuous, and additional spines orientated towards the frontal membrane. In *Chaperiopsis lanceola* Hayward & Thorpe, 1988 and *Chaperiopsis protecta* (Waters, 1904) the avicularium is acutely triangular, not rounded; in addition, in both species the pair of proximal spines is more developed, and there may be one or two conspicuous proximal columnar avicularia. *Chaperiopsis quadrispinosa* (Kluge, 1914) and *Chaperiopsis rubida* (Hincks, 1881) present 4 erect, cylindrical and rather thick spines, all persisting in ovicellate zooids, as in *C. hirsuta* sp. nov.; however, in the former, the spines are fusiform, with the proximal pair curving medially, and it presents abundant proximal avicularia, whereas the latter has one or two very conspicuous proximal avicularia, with pointed basal processes. In *Chaperiopsis spiculata* Uttley, 1949, the proximal pair of spines is much more developed than the distal pair, and the proximal avicularia present distal spiny projections. Finally, in *Chaperiopsis splendida* Gordon, 1986, the proximal pair of spines is much thicker and flatter than the distal pair, and curve above the opesia overlapping and joining the peduncle of the proximal avicularium.

Genus *Metroperiella* Canu & Bassler, 1917

Metroperiella gay sp. nov.

(Figure 3 A–D; Table 2)

TYPE MATERIAL

Holotype: MNCN-25.03/3738: V-16, Ría de Vigo, 11 June 1992. 42°11'30"N 008°5'30"W, 40 m. Coated.

Paratypes:

Paratype 1: Personal collection: V-16, Ría de Vigo, 11 June 1992. 42°11'30"N 008°5'30"W, 40 m. Dry.

Paratype 2: MNCN-25.03/3739: V-16, Ría de Vigo, 11 June 1992. 42°11'30"N 008°5'30"W, 40 m. Dry.

Paratype 3: MNCN-25.03/3740: V-26, Ría de Vigo, 2 August 1985. 45°13'5"N 8°49'58"W, 34 m. Dry.

COMPARATIVE MATERIAL EXAMINED

Codonella atlantica Canu & Bassler, 1928: type. MNHN, Paléontologie, Canu Coll., without registration number. Morocco. *Codonellina lacunata* Hayward & Hansen, 1999: holotype: NHM-1998.7.29.1. English Channel, 7 November 1961. 49°46'N 0°48'W. Coll. N.A. Holme. Paratypes: NHM-1998.7.29.3–6. English Channel, 7 November 1961. 49°46'N 0°48'W. Coll. N.A. Holme.

ETYMOLOGY

gay: the material ascribed to this new species was kept in a closet for years, and now it has come out of the closet.

DESCRIPTION

Colony encrusting, unilaminar, forming small circular patches. Autozooids rounded hexagonal, convex, separated by distinct grooves, placed in alternating series. Frontal shield smooth, uniformly perforated by some 40 circular pores, except in a small area proximal to the orifice and the

proximal end of the autozooid. Primary orifice subcircular; proximal border shallowly concave with two small rounded condyles. Laminal peristome well developed in the proximal half of the orifice. Oral spines absent, except in periancestrular zooids, which present 2–3 thin oral spines. Small suboral avicularium, placed on a small umbo just below the orifice, connected to the peristome; oval, with apertural bar complete. Ovicell globular, wider than long, united with the peristome. Ectooecium almost entirely membranous, forming a basal ring of calcification; entooecium marked with radial ridges and perforated by rounded pores except in the central area. Ancestrula tatiform, partially covered in the material examined. Astogenesis begins with two disto-lateral zooids, similar to successive autozooids but smaller, perforated by some 20 pores, and with 2–3 spines.

REMARKS

Four colonies encrusting dead shells were examined; all were collected in the Ría de Vigo in 1985 and 1992, from gravelly seabed. This species is characterized by hexagonal autozooids, with a smooth surface perforated by some 40 circular pores, a vertical laminal peristome developed in the proximal half of the circular primary orifice, and a small oval suboral avicularium.

Metroperiella gay sp. nov. is very similar to *Codonellina lacunata* Hayward & Hansen, 1999, a species described in the English Channel, whose type material we have had the opportunity to study. However, there are clear differences between the two species, the most noteworthy being the presence in *M. gay* sp. nov. of a suboral avicularium, while in the same position *C. lacunata* has an oval chamber with a membranous surface. Furthermore, in *M. gay* sp. nov. the orifice is more rounded and has rounded condyles, the peristome begins towards the lateral half of the edge of the orifice (Figure 3C) and is basically vertical, whereas in *C. lacunata* the condyles are triangular, the peristome reaches the distal ends of the primary orifice and its edge is clearly flared. Moreover, a small proximal or proximo-lateral area without pores is usually observed in the zooids of *M. gay* sp. nov. but not in *C. lacunata*. Finally, in the colonies of *C. lacunata* the zooids are arranged in very clear radial series.

The present species also presents some similarities to *Codonella atlantica* Canu & Bassler, 1928, a species from Morocco, poorly described in the original paper; however, we have studied the type material held at the MNHN (Figure 3 E, F). *Codonella atlantica* presents a larger orifice, with the proximal border more concave and two small triangular condyles; the peristome reaches the distal ends of the primary orifice, like in *C. lacunata*, but it is somewhat quadrangular in outline, with straight lateral walls and two marked proximo-lateral corners. Zooids are larger, also perforated by rounded pores, but the imperforate central area is more extensive, while there is no imperforate proximo-lateral area. Finally, the ovicell is comparatively smaller.

Hayward & Hansen (1999) placed their species in the genus *Codonellina*; despite the differences between *M. gay* sp. nov., *C. atlantica* and *C. lacunata*, it is clear that the three species are closely related, and therefore we consider that they should be included in the same genus. However, several authors (e.g. Harmer, 1957; Hayward, 1974; Gordon, 1984; Zabala, 1986) have discussed the possible synonymy between the genera *Metroperiella* Canu & Bassler, 1917 and *Codonellina* Bassler, 1934.

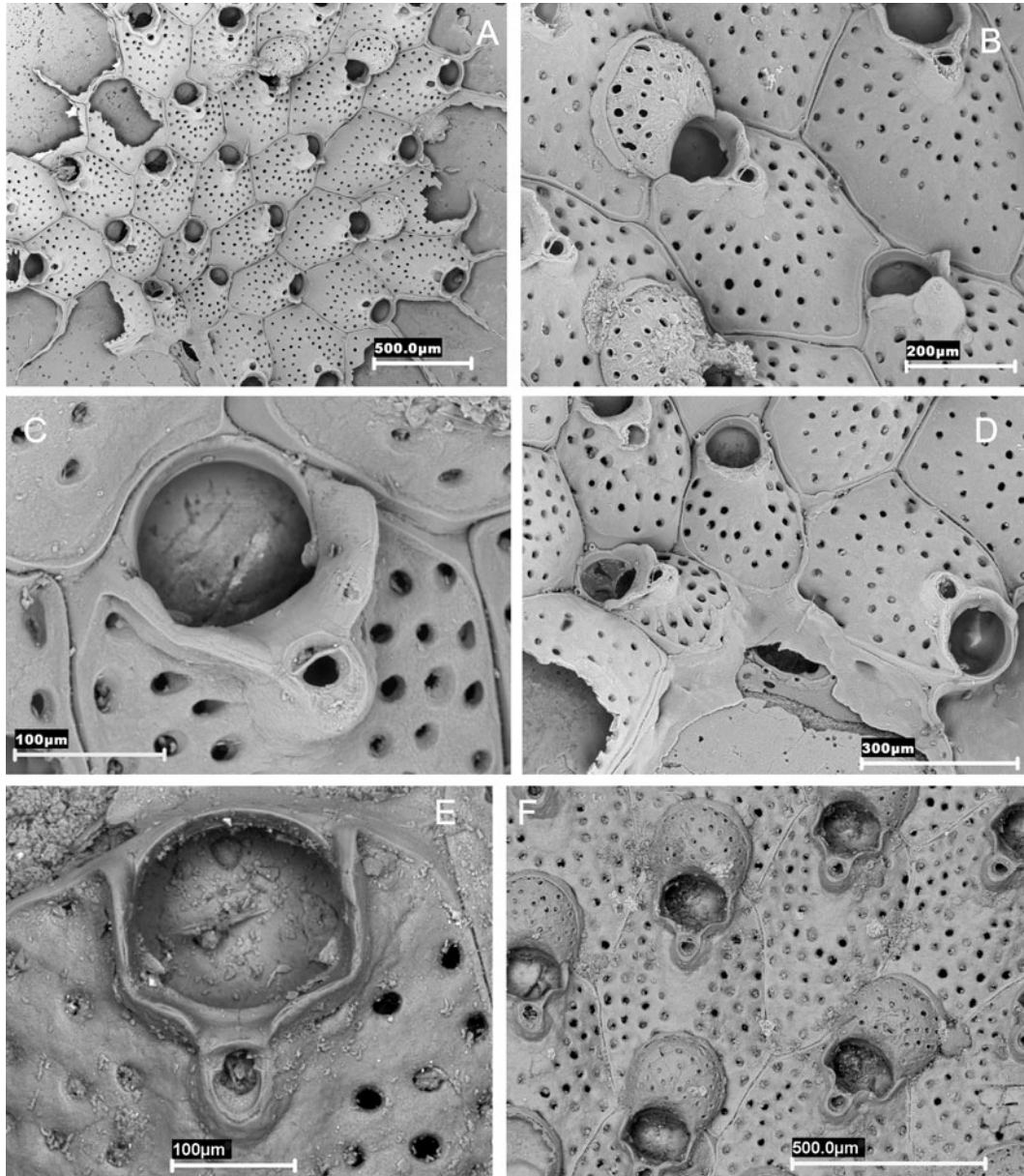


Fig. 3. (A–D) *Metroperiella gay* sp. nov. (MNCN: holotype). (A) View of the colony with ovicellate zooids and periancestrular area; (B) an ovicellate zooid; (C) primary orifice; (D) ancestrula (partially covered) and periancestrular zooids, (E–F) *Codonella atlantica* Canu & Bassler, 1928 (MNHN: type); (E) primary orifice; (F) some ovicellate zooids.

The genus *Metroperiella* was introduced by Canu & Bassler (1917) for *Schizoporella lepralioides* Calvet in Jullien & Calvet, 1903, a species described in the Azores and widely cited in the Mediterranean. On the other hand,

the same authors (Canu & Bassler, 1927) described the genus *Codonella* for *Lepralia galeata* Busk, 1854; as this generic denomination was pre-occupied, Bassler (1934) substituted it with *Codonellina*.

Table 2. Measurements (in mm) of *Metroperiella gay* sp. nov. (MNCN: holotype).

	Autozooid		Orifice		Avicularia		Ovicell	
	Length	Width	Length	Width	Length	Width	Length	Width
(N)	32	32	18	18	6	6	11	11
Min	0.398	0.276	0.112	0.122	0.056	0.051	0.107	0.235
Max	0.622	0.480	0.148	0.158	0.082	0.071	0.219	0.265
MEAN	0.518	0.373	0.131	0.133	0.068	0.058	0.193	0.253
STD	0.051	0.046	0.010	0.010	0.009	0.008	0.030	0.012

Min, minimum; max, maximum.

Lepralia galeata is a perfectly defined species, which has been re-described by López Gappa (1981), and whose type material is deposited in the Natural History Museum, London (registration no: 1854.11.15.265; López Gappa, personal communication, September, 2008).

In contrast, there is no type material of *S. lepralioides* and moreover, its identity is not clear as numerous authors have suggested the possibility that this species is in fact a junior synonym of *Flustra montferrandi* Audouin, 1826, a species described in the Red Sea, for which there is also no type material. It would therefore be necessary to design neotypes for both species to be able to resolve this question definitively. Only once this problem has been resolved, can the most likely synonym between the genera *Codonellina* and *Metroperiella* be decided on.

At present, and as in recent studies this synonym has been informally accepted (see Tilbrook, 2006; Bock, 2007;

Gordon, 2007), we have placed our species in the genus *Metroperiella*.

Genus *Schizoporella* Hincks, 1877

Schizoporella artabra sp. nov.

(Figure 4; Table 3)

Schizoporella dunkeri (Reuss): Lanza Suárez & Fernández Pulpeiro, 1984: 280; Reverter Gil, 1995: 175.

Schizoporella hesperia Hayward & Ryland: Reverter-Gil & Fernández-Pulpeiro, 1999: 43, figure 4 A, B.

TYPE MATERIAL

Holotype: MNCN-25.03/3753: Ría de Ferrol, D-12a, 43°27'36"N 008°17'30"W, 13 June 1989, 20 m. Uncoated, on a SEM slide.

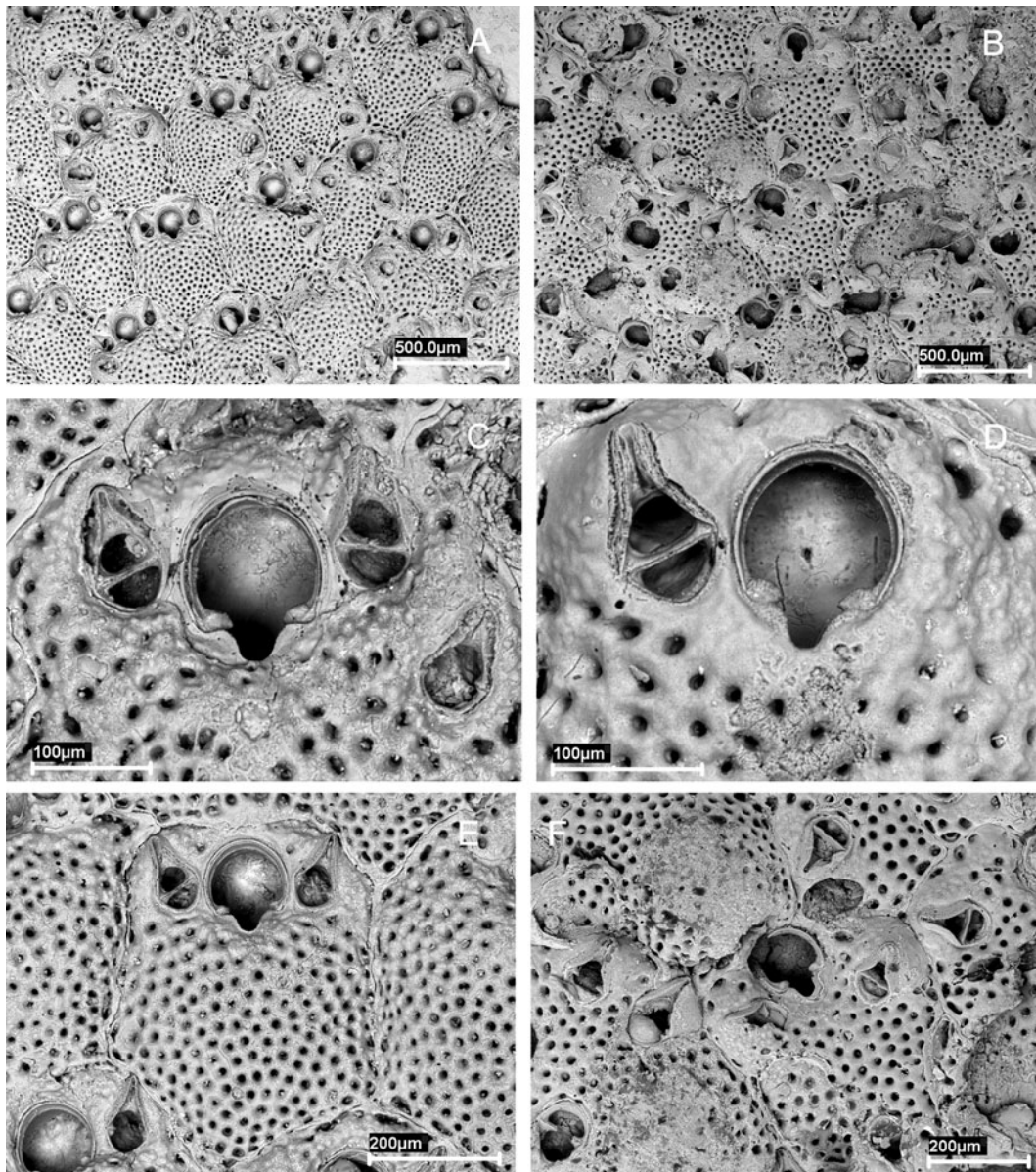


Fig. 4. *Schizoporella artabra* sp. nov. (A) (MNCN: holotype), view of the colony with some extra avicularia; (B) (MNCN: paratype 4), an ovicellate zooid (centre) and extra avicularia; (C) (MNCN: holotype), primary orifice and three avicularia; (D) (MNCN: paratype 3), primary orifice and one avicularium; (E) (MNCN: holotype), autozooid; (F) (MNCN: paratype 4), ovicellate zooid and extra avicularia.

Table 3. Measurements (in mm) of *Schizoporella artabra* sp. nov. (MNCN: holotype).

	Autozoid		Orifice		Sinus Width	Avicularia		Ovicell	
	Length	Width	Length	Width		Length	Width	Length	Width
(N)	20	20	20	20	20	20	20	20	20
Min	0.439	0.286	0.128	0.092	0.020	0.102	0.051	0.321	0.306
Max	0.663	0.495	0.158	0.122	0.056	0.143	0.082	0.388	0.429
MEAN	0.567	0.417	0.142	0.109	0.039	0.119	0.066	0.354	0.363
STD	0.052	0.049	0.009	0.007	0.010	0.012	0.008	0.024	0.035

Min, minimum; max, maximum.

Paratypes:

Paratype 1: MNCN-25.03/3754: Ría de Ferrol, D-12a, 42°27'36"N 008°17'30"W, 13 June 1989, 20 m. Dry.

Paratype 2: MNCN-25.03/3755: Ría de Ferrol D-8b, 43°28'03"N 008°18'36"W, 22 October 1990, 16 m. Dry.

Paratype 3: MNCN-25.03/3756: Ría de Ferrol D-18b, 43°28'15"N 008°15'30"W, 22 October 1990, 15 m. Dry.

Paratype 4: MNCN-25.03/3757: Ría de Ferrol, D-12a, 43°27'36"N 008°17'30"W, 13 June 1989, 20 m. Coated.

Paratype 5: personal collection: Ría de Ferrol, D-12a, 42°27'36"N 008°17'30"W, 13 June 1989, 20 m. Dry.

ETYMOLOGY

artabra: the Ría de Ferrol, where the material here ascribed to this new species was collected, is placed in the 'Artabrian Gulf.

DESCRIPTION

Colony encrusting, unilaminar, forming whitish crusts. Autozooids oval to hexagonal, irregularly arranged and separated by distinct sutures. Frontal shield convex, smooth to slightly rough, uniformly perforate by small round pores. Primary orifice orbicular with a V-shaped rounded sinus occupying a half of the proximal border; long more than 1/4 of the orifice. Condyles conspicuous, elliptical, with acute corners. No oral spines. Avicularia single or paired, sometimes absent; proximal portion level with the proximal border of the orifice, distal end exceeding the distal end of the orifice; rostrum triangular, disto-laterally directed; crossbar slender, complete. In some material autozooids may present 1–6 extra avicularia, with structure similar to oral avicularia, placed in the margins of the zooid and directed outwards. Ovicell hyperstomial, rounded, scarcely prominent. Frontal surface with a rough imperforate central area; periphery of the ovicell perforated by pores similar to those of the frontal surface of the zooid, and continuous with it. Kenozooids present in some material. Size and shape similar to autozooids, but without orifice; sometimes with a distal adventitious avicularium (Paratype 5).

REMARKS

The genus *Schizoporella* Hincks, 1877 is well defined, and numerous species have been described throughout the world. Hayward & Ryland (1995) have re-described the species present in the British Isles, but there are undoubtedly many other species in European waters.

Schizoporella artabra sp. nov. characterized by a primary orbicular orifice, with a V-shaped rounded sinus occupying half of the proximal border, flanked by condyles with acute corners; the proximal portion of the avicularia is level with

the proximal border of the orifice, while its distal end exceeds the distal border of the orifice. Finally, the ovicell is scarcely prominent. No other species from Europe or from elsewhere, display a similar combination of characters.

The material here ascribed to *S. artabra* sp. nov. was previously cited by us as *Schizoporella dunkeri* (Reuss, 1848) (Lanza Suárez & Fernández Pulpeiro, 1984; Reverter Gil, 1995), and later as *Schizoporella hesperia* Hayward & Ryland, 1995 (Reverter Gil & Fernández-Pulpeiro, 1999). However, we now consider that the differences between our material and *S. hesperia* are sufficiently important not to ascribe it to this species. The most important differences include: the absence of umbo in our material, a more orbicular orifice, a more open sinus, condyles with acute corners, and also the position and orientation of the avicularia, situated more distally than in *S. hesperia*, and forming a smaller angle with the longitudinal axis of the autozoid. Furthermore, in our material we did not observe the presence of the dimorphic zooids described in *S. hesperia*, but we did observe 1–6 extra avicularia at the edges of the autozoid.

Extra avicularia have been reported in *Schizoporella ansata* as defined by Canu & Bassler (1930) and Gautier (1962). Ryland (1968) considered that these records actually belong to *Schizoporella magnifica* Hincks, 1886; this author also cited extra avicularia in this species. However, *S. magnifica* (as described by Hayward & Ryland, 1999) clearly differs from *S. artabra* sp. nov. having an orifice that is longer than wide, with a deep, narrow, U-shaped sinus; the avicularia, usually paired and with a voluminous cystid, which occupies an even more distal position than in our material; and by the egg-shaped ovicell.

Other species of the genera *Schizoporella*: *S. dunkeri* (Reuss, 1848), *S. unicornis* (Johnston in Wood, 1844), *S. errata* (Waters, 1878) and *S. cornualis* Hayward & Ryland 1995, were found at the same site where the material of *S. artabra* sp. nov. was collected. However, all of these show clear differences, especially in the form of the orifice and the sinus, and in the position and orientation of the avicularia, which make them perfectly distinguishable.

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