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Sponge biodiversity of Beauchêne and the Sea Lion Islands and south-east East Falkland, Falkland Islands, with a description of nine new species

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Sponge samples were taken by scuba diving from six sites around Sea Lion Island (Sea Lion, Sea Lion Easterly and Brandy Islands), three sites south-east of East Falkland (Motley Island, Green Island and Triste Island) and six sites around Beauchêne Island. Nine new species are described: Iophon roseum *sp. nov.,* Clathria *(*Microciona*)* tenebrosa *sp. nov.,* Clathria *(*Microciona*)* cheeki *sp. nov.,* Hymedesmia *(*Hymedesmia*)* laptikhovskyi *sp. nov.,* Hymedesmia *(*Hymedesmia*)* croftsae *sp. nov.,* Myxilla *(*Ectyomyxilla*)* beauchênensis *sp. nov.,* Tedania *(*Tedania*)* livida *sp. nov.,* Amphilectus fimbriatus *sp. nov. and* Isodictya cutisanserina *sp nov. Additional information is provided on several species recently described from the Falkland Islands and* Amphimedon marsei *is newly reported. The biogeography of the sponge fauna of the southern Falkland Islands is discussed.*

Keywords: sponge, Falkland Islands, biogeography, scuba diving, taxonomy

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INTRODUCTION

The Falkland Islands are an archipelago comprised of two main islands, East and West Falkland, and 778 smaller ones. The Falkland Islands and the wider Patagonian Shelf are framed by the Falklands/Malvinas Current Front also known as the Argentine shelf-break front (Acha *et al.*, 2004), Patagonian shelf break front (SBF, Franco *et al.*, 2008) and Shelf-break Frontal System (SBFS, Martos & Piccolo, 1988). The main feature of this front is the Falklands Current which originates as the Antarctic Circumpolar Current in the Drake Passage (Peterson and Whitworth III, 1989). The Falkland Current reaches the shelf south of the Falkland Islands and splits into two main northward-flowing branches: to the west of the islands a weaker western branch; and to the east the stronger eastern branch (Bianchi *et al.*, 1982). The north-western waters are dominated by the Argentine Drift which is cold temperate, warmer and less saline than the waters of the Falkland Current (Zyrianov & Severov, 1979). These current systems split the marine environment in the Falklands into two different ecological regions with the north-western areas dominated by temperate waters and the south-eastern areas dominated by colder sub-Antarctic waters (Arkhipkin *et al.*, 2013). All of the southern Falkland Islands are under the influence of the Southern Front (SF) (Arkhipkin *et al.*, 2013). The Southern Front is situated in an area that has a very steep shelf slope (from 120–250 m) that rises up from the Falkland Trough to the shelf adjacent to Beauchêne Island. The SF is occupied mainly by waters of the Transient Zone situated between Falkland shelf waters and Eastern Falkland Current. This area is highly productive as indicated by chlorophyll *a* concentrations in surface and near-bottom layers (Arkhipkin *et al.*, 2013).

The sponges of the shallow waters of the Falkland Islands are poorly known. Until recently only three expeditions had studied the sponge fauna, namely the Scotia Expedition (1903–1904) (Topsent, 1915), the Swedish Antarctic expedition (1901–1903) (Burton, 1934) and the Discovery expeditions (1925–1929) (Burton, 1932). The 60 stations at which sponges were obtained by these expeditions ranged from 0–313 m in depth, however only 30% were from shallow infralittoral and circalittoral coastal sites (up to 50 m) with the majority being deeper offshore sites. Sampling was carried out by a variety of remote methods including dredging, otter trawling, beam trawling and tow nets.

Recent work has revealed the potential for studying sponge biodiversity through diving surveys (Boury-Esnault, 1971; Wiedenmayer, 1977; Pansini, 1987; Picton & Goodwin, 2007; Goodwin & Picton, 2009; Willenz *et al.*, 2009; Goodwin *et al.*, 2011), particularly in areas where many species are small and in habitats which are difficult to sample by other means (Vacelet & Perez, 1998). Sampling by scuba diving enables the study of bedrock habitats and

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encrusting species which are likely to be under-sampled by remote methods and consequently has the potential to significantly increase the number of species recorded (Picton & Goodwin, 2007; Goodwin & Picton, 2009). Additionally scuba diving surveys enables the *in situ* appearance of species to be recorded, providing information of great use to field surveyors.

The sponge fauna of the Jason Islands (north-west of the Falkland Islands) and Stanley (north-east of the archipelago) was recently sampled using scuba diving by Goodwin *et al.* (2011), who described 12 new sponge species. By using the same sampling methodology to sample a contrasting ecological region we hoped to improve current knowledge of the biodiversity of shallow water Falkland Island sponges, particularly the distribution of these newly described species, and how the contrasting oceanographic influences in the two areas affect the sponge communities.

MATERIALS AND METHODS

Specimens were collected by scuba diving. Sponges were selected by eye; the divers attempted to sample species that looked different from those previously sampled during the dive. The aim was to sample as many different species as possible, rather than gaining any quantitative information. Once selected, three photographs of each specimen were taken *in situ* using housed digital SLR cameras (Nikon D70 and Nikon D300 in Subal housings with Ikelite DS125 substrobe and SB800 flash units both with 60 mm macro lenses). A small piece (approx 1 cm^2) of tissue was then removed. After collection the samples were transferred to 95% ethanol for storage.

Tissue slides were prepared by sectioning a very thin portion of tissue at a 90° angle through the sample. This was then dehydrated in absolute ethanol for 4 min and placed in clove oil for a further 4 min, to clarify the tissue, before being mounted on a microscope slide in Canada balsam. A coverslip was then placed on the slide and and it was then kept at 50°C for at least 48 h to allow the mountant to dry. Spicule preparations were prepared by dissolving the tissue in a drop of concentrated nitric acid directly on a microscope slide. The slide was heated over a spirit burner to aid the reaction. Once the acid had burnt off, the remaining spicules were rinsed in water and ethanol and then mounted in Canada balsam as above.

The tissue slide was used primarily for identification to genus level. Spicule measurements were taken from the spicule preparations; at least 20 spicules of each type were measured using ProgRes® CapturePro 2.7 Software (JENOPTIK Optical Systems, Jena, Germany). Type material is in the zoology collections of the Ulster Museum, National Museums Northern Ireland. Material in these is indicated by BELUM (Belfast Ulster Museum) Mc (Porifera collections).

Information on extant species was obtained from the World Porifera Database (Van Soest *et al.*, 2013). Type specimens were examined from several collections; those examined are listed in the text, institutional abbreviations used are as follows: BMNH – Natural History Museum, London; NMSZ – Zoology collections of the National Museums of Scotland; BELUM – Ulster Museum, National Museums Northern Ireland.

THE STUDY SITES

Dive site names correspond to those from the Shallow Marine Surveys Group Southern Island Cruise (SMSG, 2009); sponge samples were not collected on all survey dives. The survey was part of the Stanley-based Shallow Marine Surveys Group's exploration of the inshore marine environment of the Falkland Islands.

Beauchêne Island lies 80 km south of the southernmost point (Porpoise Point) of the mainland of East Falkland Island and 51 km south of the Sea Lion Islands. Beauchêne and Sea Lion are National Nature Reserves. The smaller islands adjacent to Sea Lion – Whisky, Brandy and Sea Lion Easterly – are privately owned reserves. Further north is the Lively Island Group with Lively Island being the largest with the smaller North East and Philimore Islands off its north coast. The Lively Island group is an Important Bird Area (FK010) (BirdLife International, 2014). Motley Island, Green Island and Triste Island lie to the south of the Lively Group (see Figure 1 for more detail).

Sponge samples were taken from six sites around Sea Lion Island (Sea Lion, Christmas and Brandy Islands), three other sites south-east of east Falkland in the Lively Island Group, Motley Island, Green Island and Triste Island and six sites around Beauchêne Island (Figure 1, Table 1). For safety, dive depths were limited to 20 m because of the lack of a recompression chamber.

RESULTS

In total 189 specimens were collected from the 15 survey sites. Twenty-seven distinct sponge entities were recorded from 19 different genera. It was possible to identify 21 of these entities to species level and of these nine were species new to science (Table 1). Sponge diversity was highest at Beauchêne Island with 15 sponge entities being recorded from one site (Beauchêne Island site 001, Table 1).

SYSTEMATICS

This section gives descriptions of the species new to science and notes on species of interest recorded. Species are listed in taxonomic order (as currently defined by the World Porifera Database (Van Soest *et al.*, 2013)).

Order POECILOSCLERIDA Topsent, 1928
Suborder MICROCIONINA Hajdu, Van Soest & Hooper, 1994
Family ACARNIDAE Dendy, 1922
Genus *Iophon* Gray, 1867
Iophon roseum sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6306] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 001, Falkland Islands (52°54.665′S 59°11.096′W; water depth sampled: 16–22 m), Collected by C. Goodwin and J. Jones, 20 December 2009 and 22 December 2009.

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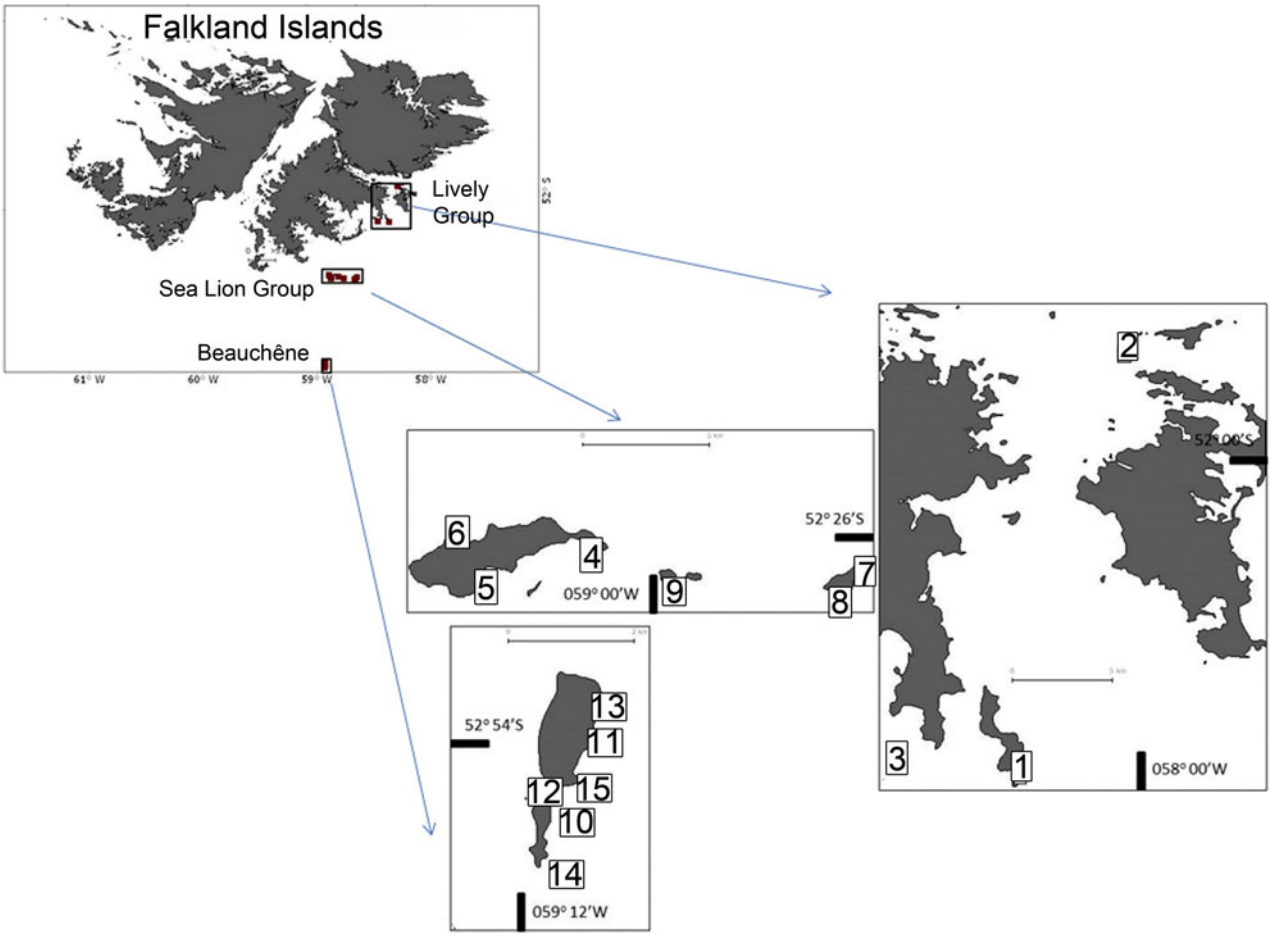

Fig. 1. Location of the Falkland Islands (inset) and the sampling stations.

Paratypes: Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6316] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 002, Falkland Islands (52°53.994′S 59°10.706′W; water depth sampled: 20–25 m), Collected by C. Goodwin and J. Jones, 20 December 2009. [BELUM.Mc6325] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 002, Falkland Islands (52°53.994′S 59°10.706′W; water depth sampled: 20–25 m), Collected by C. Goodwin and J. Jones, 20 December 2009.

Etymology

From the latin meaning rosy. Named for its characteristic pink or pale red colour.

External morphology (Figure 2A)

In situ: Massive pink to pale red sponge. Massively encrusting sponge formed of large mounds, often up to 4 cm in height, each bearing a terminal oscule. The surface of sponge covered in smaller lumps. Preserved in alcohol: light brown, compressible, with large spaces present in choanosome. Ectosome slightly darker brown, smooth, shiny distinct layer, but not readily detachable.

Skeleton (*Figure 12A*)

Choanosome: Reticulation of styles in bundles 2–4 spicules thick. Chelae abundant throughout the choanosome. Ectosome: Regularly spaced bundles of tylotes fanning out to form continuous surface layer with some spicules lying parallel to the surface.

Spicules

(1) Fusiform, often slightly curved, styles with abrupt points. The majority of the styles are smooth but some have a slight roughening at their head (Figure 2B, E). [BELUM.Mc6325]: 243(264)285 by 6.9 (8.8)11.6 μm; [BELUM.Mc6306]: 244(268)285 by 4.4(7.8)9.8 μm; [BELUM.Mc6316] 245(267)292 by 5.7(7.7)9.3 μm.
(2) Ectosomal tylotes with spherical, spined ends (Figure 2C, D). [BELUM.Mc6325]: 203(236)262 by 5.4(7.4)10.8 μm on widest part of shaft [BELUM.Mc6306]: 215(239)256 by 5.0(6.3)9.5 μm; [BELUM.Mc6316] 192(230)256 by 3.8(6.0)8.2 μm.
(3) Small spurred anisochelae (Figure 2F). Length [BELUM.Mc6325] 14.7(15.9)17.4 μm; [BELUM.Mc6306] 13.2(15.4)18.4 μm; [BELUM.Mc6316] 11.6(14.3)17.0 μm.

Diagnosis

There are several species of South Atlantic and Antarctic *Iophon* species which possess only smooth styles as choanosomal spicules (Table 2). However only one of these, *Iophon timidum* Desqueyroux-Faúndez & Van Soest (1996), lacks bipocilli. *Iophon timidum* possesses similar sized styles (186–259 μm) and ectosomal tylotes (150–250 μm), but has two categories of chelae (10–16 and 5–10 μm), and the

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Table 1. Species recorded at each dive sampling site. Filled circles are records with samples, unfilled circles are photographic records only.

	East Falkland, Lively Island			Sealion Islands						Beauchêne Island						
	1. The Mott, Motley Island, 18–22 m,52°09.177′S 58°35.911′W	2. Green Island, 5–8 m, 51°57.826′S 58°30.932′W	3. Triste Island, 15–18.8 m, 52°08.917′S, 58°41.352′W	4. Sealion Island Site 001, 10–11.4 m, 52°26.090′S 59°02.754′W	5. Sealion Island Site 002, 12–16 m, 52°26.731′S 59°06.402′W	6. Sealion Island Site 004, 12–16.9 m, 52°25.638′S 59°07.460′W	7. East Sealion, 15–18 m, 52°26.628′S 58°53.221′W	8. Sealion Easterly, 12–17 m, 52°27.237′S 58°54.114′W	9. Brandy Island, 10–14 m, 52°26.909′S 58°59.911′W	10. Beauchêne Island Site 001, 16–22 m, 52°54.665′S 59°11.096′W	11. Beauchêne Island Site 002, 20–25 m, 52°53.994′S 59°10.706′W	12. Beauchêne Island Site 003, 15–17.5 m, 52°54.433′S 59°11.557′W	13. Beauchêne Island Site 004, 15–22 m, 52°53.691′S 59°10.617′W	14. Beauchêne Island Site 005, 15–21.1, 52°55.089′S 59°11.304′W	15. Beauchêne Island Site 006, 15–22.8, 52°54.416′S 59°10.907′W
Oscarella sp.					○										
Stelletta sp.							•		•			•	•	•	
Cliona sp.											•				
Sphaerotylus sp.	•											•			•
Iophon roseum sp. nov.										•	•				
Iophon pictoni Goodwin, Jones, Neely & Brickle, 2011	•			•	•				•	•			•	•	•
Clathria (*Microciona*) *tenebrosa* sp. nov.				•											
Clathria (*Microciona*) *cheeki* sp. nov.		•		•							•			•	
Hymedesmia (*Hymedesmia*) *laptikhovskyi* sp. nov.					•										
Hymedesmia (*Hymedesmia*) *croftsae* sp. nov.														•	
Phorbas ferrugineus Goodwin, Jones, Neely & Brickle, 2011										•		•	•		
Phorbas shackletoni Goodwin, Jones, Neely & Brickle, 2011	○	○			○	○	○		•	○	○	•		○	○
Myxilla (*Ectyomyxilla*) *beauchênensis* sp. nov.										•	•				
Myxilla (*Styloptilon*) *acanthotornota* Goodwin, Jones, Neely & Brickle, 2011					•					•			•	•	•
Tedania (*Tedania*) *livida* sp. nov.										•		•			
Tedania (*Tedania*) *mucosa* Thiele, 1905										•				○	
Amphilectus fimbriatus sp. nov										•			•		
Amphilectus fleecei Goodwin, Jones, Neely & Brickle, 2011	○		•							•					•
Isodictya cutisanserina sp nov.										•	•	•			
Mycale (Aegogropila) nodulosa Goodwin, Jones, Neely & Brickle, 2011												•			
Scopalina erubescens Goodwin, Jones, Neely & Brickle, 2011					○		○			○	○	○	○	○	○
Scopalina bunkeri Goodwin, Jones, Neely & Brickle, 2011					○										
Halichondria (Eumastia) attenuata (Topsent, 1915)				○	○		•	•	○	○	○	•		•	○
Siphonochalina fortis Ridley, 1881	○		•			•		•	•						
Amphimedon marsei (Sarà, 1978)										•	•	•			
Aplysilla sp.			○	•				○	○	○			○	○	○
Halisarca sp.					○						○	○		○	○

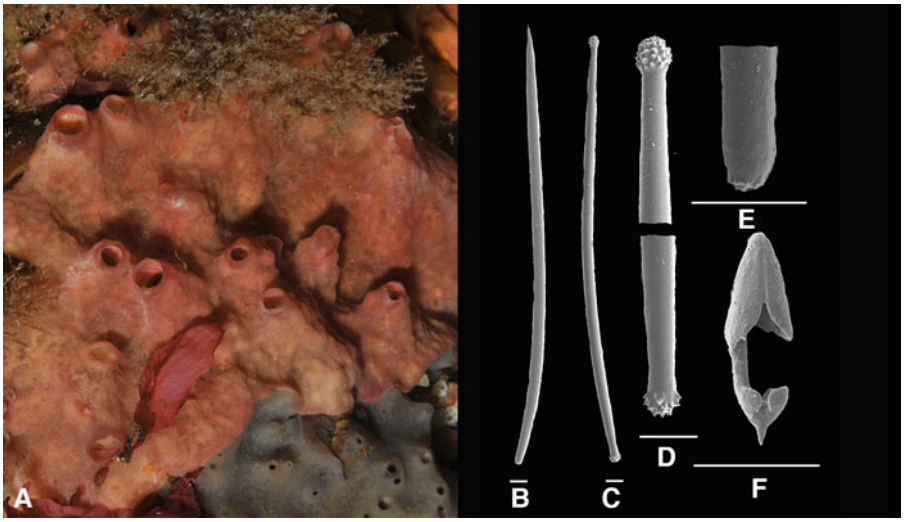

Fig. 2. *Iophon roseum* sp. nov. (A) *In situ* appearance Paratype [BELUM.Mc6325], Spicules Holotype [BELUM.Mc7606], (B) style, (C) ectosomal tylote, (D) ectosomal tylote ends, (E) style head, (F) anisochelae. All scale bars 10 μm.

smaller of these are 'contracted as in fear', the origin of its name. *Iophon timidum* also differs in appearance, being described as a massive spherical to oval sponge which is beige to dark brown when living.

Iophon pictoni Goodwin, Jones, Neely & Brickle, 2011

SPECIMENS

Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6265] and [BELUM.Mc6269] Sea Lion Island Site 001; [BELUM.Mc6275] and [BELUM.Mc6358] Beauchêne Island Site 001; [BELUM.Mc6370] Beauchêne Island Site 005; [BELUM.Mc6377] Beauchêne Island Site 006; [BELUM.Mc6392], [BELUM.Mc6402] and [BELUM.Mc6403] Brandy Island; [BELUM.Mc6431] The Mott, Motley Island.

Iophon cf. *pictoni*

[BELUM.Mc6256] Sea Lion Island Site 001; [BELUM.Mc6282] Sea Lion Island Site 002; [BELUM.Mc6385] Sea Lion Island Site 004; [BELUM.Mc6394] Brandy Island.

Comparative material examined

Iophon pictoni Holotype BELUM.Mc4819; Paratype BELUM.Mc4822.

Remarks

The spiculation of the majority of these specimens is a good match for the type specimen (Table 2; Goodwin *et al.*, 2011). The holotype and paratype from the Jason Islands (NW Falkland) were both bright custard yellow encrusting sponges. Our specimens are all encrusting and yellow but vary from bright custard yellow to a paler lemon yellow.

Very rare bipocilli (7.5–9.5 μm) were present in specimens Mc6256, Mc6282, Mc6358 and Mc6394. We did not find these on re-examining the type or in the other specimens. In view of the similarity of the other spicules and the external appearance we have identified these as *Iophon* cf. *pictoni*, which could be revised as further specimens are collected and the variation of *Iophon* species in this region is more completely understood. Bipocilli do seem to be very rare or absent in specimens of some species (e.g. see discussion on *I. proximum* in Desqueyroux-Faúndez & Van Soest, 1996).

Family MICROCIONIDAE Carter, 1875
Subfamily MICROCIONINAE Carter, 1875
Genus *Clathria* Schmidt, 1862
Subgenus *Clathria* (*Microciona*) Bowerbank, 1862
Clathria (*Microciona*) *tenebrosa* sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6259] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Sea Lion Island Site 001, Falkland Islands (52°26.090′S 59°02.754′W; water depth sampled: 10–11.4 m), Collected by C. Goodwin and J. Jones, 19 December 2009.

Paratypes: Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6260] and [BELUM.Mc6255] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Sea Lion Island Site 001, Falkland Islands (52°26.090′S 59°02.754′W; water depth sampled: 10–11.4 m), Collected by C. Goodwin and J. Jones, 19 December 2009.

Other specimens: [BELUM.Mc6261], Sea Lion Island Site 001.

Etymology

From the latin *tenebrosum* dark or gloomy. Named for its dark chocolate brown to black colour.

External morphology (*Figure 3A*)

In situ: Chocolate brown to black encrusting species forming patches up to 20 cm in diameter and 5 mm thick on bedrock. Prominent large oscules scattered over patch surfaces, surface in-between with visible ostia. Preserved in alcohol: firm fawn choanosome with smooth, clearly distinct but not easily detachable, dark grey, ectosome.

Skeleton (*Figure 12B*)

Choanosome: Columns of between two and 10 primary styles heavily echinated by both the spined echinating acanthostyles

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Table 2. Iophon species from the southern Atlantic and Antarctic.

Species	Choanosomal megascleres (μm)	Echinating acanthostyles (μm)	Ectosomal spicules (μm) (tylotes unless specified)	Chelae	Bipocilli	External appearance/Distribution/Notes
Iophon pictoni Goodwin, Jones, Neely & Brickle, 2011	Acanthostyles 132–150	n/a	135–150	17	n/a*	Bright yellow thick crust. Type locality Falkland Islands
Iophon proximum (Ridley, 1881)	Acanthostyles 106–272	83–157	109–252	10–35	6–16 (rare)	Encrusting (on *Zygochlamys patagonica*), irregular and massive forms. Chile, Argentina and Falkland Islands
Iophon proximum reticulare Hentschel, 1914	Acanthostyles 104–152	n/a	120–160, ends spined	18–24	None	Type from Kerguelen, Antarctica
Iophon gaussi Hentschel, 1914	Oxeote, smooth 465–560, 480–620	n/a	**288–360**, 225–290, ends spined	**16**, 9–19	**11**, 10–13 c shaped, spined shafts	Antarctic. Originally *I. spatulatus var. gaussi*. Measurements in bold Hentschel (1914), normal font from Rios (2006) measurements from other Antarctic specimens
Iophon terranovae Calcinai & Pansini, 2000	Oxeote, smooth 200–580, also juvenile thin styles 375–540 single spine on head	n/a	265–275	51–64	9–15	Massive/sub cylindrical. Antarctic, type locality Terra Nova Bay and Faraglione, Ross Sea
Iophon tubiforme Desqueyroux–Faúndez & van Soest, 1996	Oxeote, smooth 150–272	n/a	141–243, ends spined	8–19	6–19 (rare)	Sponge in form of several joined tubes. Chile
Iophon aceratum Hentschel, 1914	Oxeote, smooth 592–640	n/a	320–408, ends spined	20–24	12–13	Type massive, 2.5 cm long. Antarctic
Iophon flabellodigitum Kirkpatrick, 1907	Oxeote, smooth with mucron on head 590 by 25	n/a	344 by 12.5, ends spined	35, 17.5	5.5–11	Large digitate growth in one plane with oscules along edge. Type locality Winter Quarters, Antarctic
Iophon flabellodigitatum var. gaussi Hentschel, 1914	Style 344–376	n/a	208–272	17–20	15–16	Massive 6 cm long. Type Kerguelen, Antarctic. Hentschel doesn't mention if styles are oxeote/mucronate and terms them 'styles' (he uses 'Amphioxe' for oxeote spicules)
Iophon unicorne Topsent, 1907	Oxeote styles with mucronate ends/short pointed oxeas **435–470**, 370–575	n/a	**240**, 270–390 unequal tornotes, style like with spined ends	**18–20**, 22.5–25	**None**, 13–20 abundant	Massive yellow attached to algae. Antarctic, Falkland Islands (Burton, 1934). Bold font Topsent's original sizes. Normal font from Rios (2006) schizotype measurements. Topsent described no bipocoelles in type but Rios (2006) found them to be present. Rios (2006) considers this a synonym of *Iophon flabello–digitatus* Kirkpatrick, 1907, revising (Ríos *et al.*, 2004)
Iophon spatulatum Kirkpatrick, 1907	Oxeote 462 by 25	n/a	225 by 12.5, spined ends	18.7	13.6, rare	Slender, cylindrical, branched. Currently regarded as a synonym of *I. unicorne* (Koltun, 1964; Desqueyroux-Faúndez & van Soest, 1996)

Iophon unicorne Topsent, 1907 Mc7636	Oxeote 314–394 by 12–21		204–246 by 8–13	17–20	13–18 elongate	Type is massive specimen (7 × 4 cm) attached to algae, our specimens are thick yellow encrustations. Type locality Île Anvers, 25 m. Widely distributed in the Antarctic
Iophon chilense Desqueyroux-Faúndez & van Soest, 1996	Styles – microspined shaft but some only spined at base. 257–308	n/a	207–259, spined ends	18–29, 10–16	10–16	Chile. Occurs on calcareous polychaete tubes and shells
Iophon hesperidesi Rios, Cristobo and Urgorri, 2004	Styles – smooth shaft, sparse spines at base 345–410	n/a	207–285, spined ends	19–35	9–11	Encrusting on seaweed. Type locality Livingstone Island, Antarctic. Rare acanthostyles but shaped like tylotes and could be modified versions. Bipocelles spoon shaped with one end with numerous teeth and one with 10–12 spines
Iophon timidum Desqueyroux-Faúndez & van Soest, 1996	Styles – smooth shaft, sparse spines at base 186–259	n/a	150–250	10–16, 5–10	n/a	Massive spherical to oval sponge. Chile. Small chelae incurved contracted 'as in fear'
Iophon abnormalis (Ridley and Dendy, 1887)	Styles, almost smooth 390–500		235–300	30–49, 7.5–15	5–10	Massive cylindrical. Antarctic. Spicule measurements taken from (Rios, 2006)
Iophon pluricorne Topsent, 1907	Styles, almost smooth 400	n/a	280 tylotes, spined at ends but some spined all length	26–30, 14	11	Thinly encrusting. Type locality Île Booth-Wandel, Antarctic
Iophon radiatum Topsent, 1901	Styles, almost smooth 460–580	n/a	280–390, spined ends	14–17, 53–70 Largest in rosettes	6–16	The holotype is small fragment attached onto a branching coral,the paratype is a small crust. Type locality Antarctic also recorded Chile, Falkland Islands (Burton, 1934) and South Georgia (Burton, 1940)
Iophon pluricorne var. trulliferum Hentschel, 1914	Styles, almost smooth spined base 368–456	n/a	248–328, spined ends	14–29	6.5–7	Type locality, Antarctic
Iophon husvikense Goodwin, Brewin & Brickle, 2012	Styles, smooth 320–370 by 10–20	n/a	195–238 by 8–15, spined ends	12–20	8–13	Yellow encrusting species, type locality South Georgia
Iophon roseum sp. nov.	Styles, almost smooth 243–285 by 7–12	n/a	203–262 by 5–11, spined ends	15–17	None	Pink to pale red. Massively encrusting, surface with large mounds bearing terminal oscules. Type locality Falkland Islands

*Although not present in the type or paratype very rare bipocoelles (7.5–9.5 μm) were present in specimens BELUM Mc6256, Mc6282, Mc6358 and Mc6394 and these have been tentatively assigned to this species

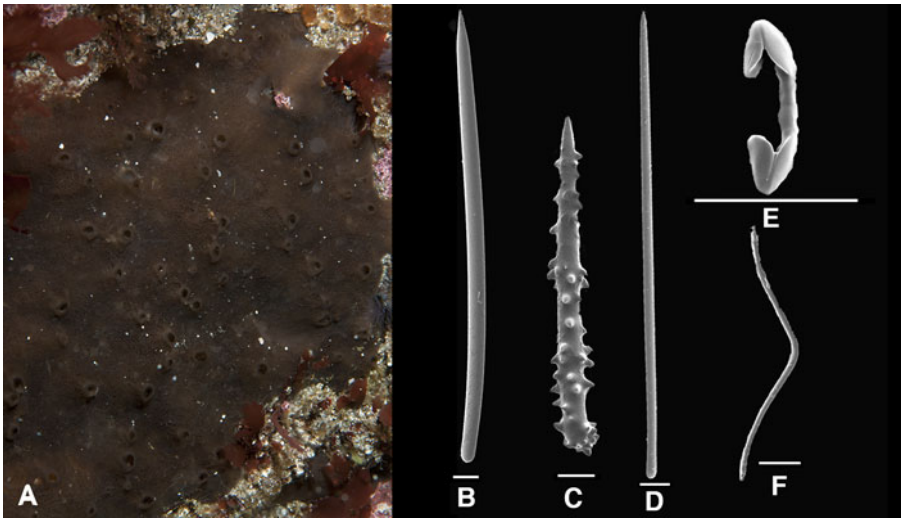

Fig. 3. *Clathria* (*Microciona*) *tenebrosa* sp. nov. (A) *In situ* appearance Holotype [BELUM.Mc6259], scale bar 10 cm, Spicules Holotype [BELUM.Mc6259], (B) primary acanthostyle, (C) echinating acanthostyle, (D) ectosomal style, (E) chelae, (F) toxa. All scale bars 10 μm, apart from chelae 5 μm.

and additional primary styles. Toxa and chelae are liberally dispersed throughout the tissue. Ectosome: Palisade of styles. The ectosomal tissue is heavily pigmented and appears dark chocolate brown on our Canada balsam mounted slides.

Spicules

(1) Primary styles: fat, slightly curved, smooth, styles which come to an abrupt point. Some of them have very slightly tylote heads (Figure 3B). [BELUM.Mc6259] 129(176)204 by 4.2(7.2)10.0 μm; [BELUM.Mc6255] 170(205)262 by 5.4(7.6)9.0 μm; [BELUM.Mc6260] 158(188)225 by 5.9(7.5)8.8 μm.
(2) Echinating acanthostyles: abruptly pointed, heads not tylote, entirely spined with large spines; those on the shaft have their tips curved down towards the shaft but the ones on the head are largely straight or curved upwards (Figure 3C). [BELUM.Mc6259] 64(89)107 by 5.9(9.9)15.3 μm; [BELUM.Mc6255] 75(85)98 by 6.2(7.8) 10.9 μm; [BELUM.Mc6260] 77(86)94 by 6.0(8.4) 10.2 μm.
(3) Ectosomal styles: abruptly pointed smooth styles with microspined heads. (Figure 3D) [BELUM.Mc6259] 103(130)160 by 3.2(4.4) 6.2 μm; [BELUM.Mc6255] 122(158)184 by 3.6(4.8)6.3 μm; [BELUM.Mc6260] 151(177)204 by 2.8(4.5)6.2 μm.
(4) Chelae: typical microcionid palmate isochelae (Figure 3E). [BELUM.Mc6259] 7.5(10.0)13.3 μm; [BELUM.Mc6255] 7.4(8.6)10.1 μm; [BELUM.MC6260] 7.5(10.0)12.2 μm.
(5) Toxa: gently curved, coathanger-shaped toxas, with heavily spined ends (Figure 3F). [BELUM.Mc6259] 64(91)119 μm; [BELUM.Mc6255] 46.0(60.7)76.3; [BELUM.Mc6260] 43(67)100 by 0.9(1.8)2.4 μm.

Diagnosis

We have assigned these specimens to the subgenus *Clathria* (*Microciona*) on the basis of their encrusting growth form and plumose skeletal architecture (Hooper, 2002). Very few *Clathria* (*Microciona*) species have been recorded from the Antarctic and South Atlantic region, probably because of a lack of sampling of encrusting species. There are several species of *Clathria* (*Thalysias*) Duchassaing & Michelotti, 1864 and one species of *Clathria* (*Dendrocia*) Hallman, 1920 present in the region (Table 3). *Clathria* (*Thalysias*) can be distinguished by the presence of two categories of ectosomal styles and *Clathria* (*Dendrocia*) by the lack of a specialized class of ectosomal styles. However, given the paucity of the original descriptions and the fluidity of taxonomy these have been considered. All existing species apart from *C. matthewsi* Goodwin, Brewin & Brickle, 2012, *C. mytilifila* Hajdu, Desqueyroux-Faúndez, Carvalho, Lôbo-Hajdu & Willenz, 2013, *C. cheeki* sp. nov., *C.* (*T.*) *lissocladus* (Burton, 1934), and *C.* (*T.*) *membranacea* (Thiele, 1905) lack chelae (Table 3). *Clathria mytilifila* possesses a second category of large toxa, *C. matthewsi* and *C. cheeki* sp. nov. have much larger acanthostyles and ectosomal styles, and both species of *Clathria* (*Thalysias*) have two categories of ectosomal styles.

Clathria (*Microciona*) *cheeki* sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6262] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Sea Lion Island Site 001, Falkland Islands (52°26.090′S 59°02.754′W; water depth sampled: 10–11.4 m), Collected by C. Goodwin and J. Jones, 19 December 2009.

Paratypes: Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6257] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Sea Lion Island Site 001, Falkland Islands (52°26.090′S 59°02.754′W; water depth sampled: 10–11.4 m), Collected by C. Goodwin and J. Jones, 19 December 2009.

[BELUM.Mc6440] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Green Island, Falkland Islands (51°57.826′S 58°30.932′W; water depth sampled: 5–8 m), Collected by C. Goodwin and J. Jones, 28 December 2009.

Other specimens:[BELUM.Mc6267] Sea Lion Island Site 001; [BELUM.Mc6312] Beauchêne Island Site 002; [BELUM.

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Table 3. Clathria (Microciona) and Clathria (Thalysias) species from the southern Atlantic and Antarctic. Information on Clathria (Thalysias) largely from Hajdu *et al.* (2013).

Species	Primary styles (μm)	Echinating acanthostyles (μm)	Ectosomal styles (μm)	Toxa (μm)	Chelae (μm)	External appearance/Distribution/Notes
C. antarctica (Topsent, 1917)	430–570 by 17–20	170–250 by 8	400–800 by 11	40–90, 100–200	None	Originally *Anchinoe toxifera* but name preoccupied so reassigned by Hooper (1996). Type locality Île Gough and the Antarctic (70–92 m)
C. basispinosa (Burton, 1934)	350–700 by 12	100–250 by 5–10	240–600	28	None	Currently synonomized with *C. antarctica* (Koltun, 1976)
C. tuberculata (Burton, 1934)	270–410	90–180	Same as large acanthostyles	35	None	Synonomized with *C. antarctica* (Koltun, 1976, Hooper, 1996). Reassigned to *Clathria (Dendrocia)* by Goodwin *et al.*, 2011
C. sigmoidea (Cuartas, 1992)	180–200	100–120	260–300	60	None but sigmas 40–70 present	Type locality Argentina
C. matthewsi Goodwin, Brewin & Brickle, 2012	244–432 by 16–25	85–196 by 9–21	168–254 by 8–12	59–121	9–11, very abundant	Lemon to custard yellow, thinly encrusting. Type locality South Georgia
Clathria (Microciona) mytilifila Hajdu, Desqueyroux-Faúndez, Carvalho, Lôbo-Hajd & Willenz, 2013	138–225 by 5–6, basally microspined	164–282 by 9–10 paucicanthose on apical third 87–171 by 10–20, heavily spined	105–195 by 2.5	148–307, 36–60	7.5–10.5	Thin yellow-beige crust. Only known from type locality. Epibiotic on *Mytilus chilensis*, the 'chorito', and some barnacles in Comau Fjord, Chile, 5–6 m depth
C. tenebrosa sp. nov.	129–204 by 4–10	64–107 by 6–15	103–160 by 3–6	64–119	8–13	Black- chocolate brown, thickly encrusting with prominent oscules. Type locality Sealion Island, SW Falkland Islands
C. cheeki sp. nov.	191–308 by 8–17	91–150 by 7–13	152–267 by 3–7	47–94	6–10	Yellow, thinly encrusting
C. (*T.*) *amabilis* (Thiele, 1905) (originally described as *Stylotellopsis*)	300 by 7	150–160 by 10	270 by 10	Absent	Absent	Pink-red, firm and solid. Punta Arenas, SW. Atl. (Tierra del Fuego, Falklands/Malvinas), Antarctic
C. (*T.*) *koltuni* Hooper, in Hooper & Wiedenmayer, 1994 (sensu Hooper, 1996, uncertain subgenus allocation)	400–750 by 26–36 (basally acanthose)	100–260 by 10–14	430–630 by 8–12	Absent	Absent	Red, thin crust. Antarctic – 610–860 m depth
C. (*T.*) *lissocladus* (Burton, 1934) (orig. described as *Rhaphidophlus*)	240 by 12	40–120 by 7	240 by 4, 180 by 3	Absent	12	Erect, flabello-digitate. Falkland Islands
C. (*T.*) *membranacea* (Thiele, 1905) (orig. descr.)	406–465 by 7–10	Absent	127–384 by 2–4, 127–264 by 6–7	46–125	17–19	Thin crust, 0.7 mm. Juan Fernandez Islands, Falklands, Uruaguay. Measurements from re-measurement of holotype by Hajdu *et al.* (2013)
C. (*T.*) *membranacea* (Thiele, 1905) (sensu Desqueyroux, 1972, as *Ophlitaspongia membranacea*)	360–510 by 13–28	Absent	240–300 by 3–6 (no second category)	42–79 (sometimes terminally spined)	9–21	Encrusting. Chile

Continued

Table 3. Continued

Species	Primary styles (µm)	Echinating acanthostyles (µm)	Ectosomal styles (µm)	Toxa (µm)	Chelae (µm)	External appearance/Distribution/Notes
C. (*T.*) *paucispicula* (Burton, 1932) (sensu Hooper, 1996, as *C.* (*C.*) *paucispicula*	535–754 by 18–31	Absent	255–402 by 6–14 2nd category possibly present	Absent	Absent	Flabellate-digitate. Mar del Plata, Falklands, Tierra del Fuego, Antarctic: 74–198 m
C. (*Dendrocia*) *tuberculata*	**270–140**, 215–416 by 6.7–11.5, lightly spined on head	**90–180**, 70–155 by 7.3–13.5	Absent	**35**, 28–43	Absent	Pale yellow thick crust with lobed surface. Falkland Islands. Measurements in bold from re-measurement of type specimen and other measurements from additional specimens from Goodwin *et al.* 2011. Hajdu *et al.* (2013) ascribe this to (*Thalysias*) but without examination of type

Mc6351] Beauchêne Island Site 004; [BELUM.Mc6374] Beauchêne Island Site 005; [BELUM.Mc6441] Green Island.

Comparative material examined
[BELUM.Mc7606] Holotype *Clathria* (*Microciona*) *matthewsi*

Etymology
Named after Falkland politician and businessman the late John Cheek (1939–1996), whose memorial trust supported this work.

External morphology (*Figure 4A*)
In situ: Thinly encrusting (up to 3 mm thick) pale to lemon yellow species forming patches up to 15 cm in diameter on bedrock. Most specimens have prominent oscules surrounded by stellate grooves. Preserved in alcohol: firm, cream choanosome with smooth, shiny, but not readily detachable ectosomal layer.

Skeleton (*Figure 12C*)
Choanosomal columns of three to four primary acanthostyles heavily echinated by echinating acanthostyles. The ectosomal styles fan out in bushes from the ends of these and form a dense ectosomal layer. Toxa and chelae are very abundant throughout the tissue.

Spicules
(1) Primary acanthostyles: head not tylote and shaft often slightly curved. Head spined sparsely and spination becomes progressively more sparse up the shaft. Several spicules appear at first to be smooth for part of their length but on closer examination do have small spines (Figure 4B). [BELUM.Mc6262] 191(228)308 by 8.2(10.6)17.2 µm; [BELUM.Mc6257] 160(243)327 by 10.2(10.8)14.4 µm; [BELUM.Mc6440] 218(294)370 by 6.6(9.3)11.0 µm.
(2) Echinating acanthostyles: entirely and densely spined with small spines, the majority of which are curved down towards the head. Slightly curved. Head not tylote (Figure 4C). [BELUM.Mc6262] 91(107)150 by 6.7(8.4) 13.0 µm; [BELUM.6257 84(123)157 by 5.8(8.3)9.8 µm; [BELUM.6440] 79(107)148 by 5.4(9.4)13.8 µm.
(3) Ectosomal styles: thin styles with very small spines on their heads. (Figure 4D, E). [BELUM.Mc6262] 152(194)267 by 2.8(4.5)6.9 µm; [BELUM.6257] 157(213)321 by 3.2(5.4) 7.6 µm; [BELUM.6440] 152(225)262 by 3.2(4.7)6.2 µm.
(4) Chelae: small palmate isochelae (Figure 4F). [BELUM.Mc6262] 6.1(8.3)10.3 µm; [BELUM.6257] 7.3(9.1)10.2 µm; [BELUM.6440] 6.5(7.7)9.5 µm. (5) Toxa: coathanger shaped with microspined ends (Figure 4G, H). [BELUM.Mc6262] 47(64)94 by 0.6(1.9) 3.6 µm; [BELUM.6257] 46(75)100 by 0.6(1.3)1.9 µm; [BELUM.Mc6440] 29(47)69 by 0.6(1.2)1.7 µm.

Diagnosis
We have assigned these specimens to the subgenus *Clathria* (*Microciona*) on the basis of their encrusting growth form and plumose skeletal architecture (Hooper, 2002). The majority of species from this region do not possess chelae (Table 3). *Clathria tenebrosa* sp. nov. can be distinguished by its dark colour, more thickly encrusting form and smaller spicules.

The external appearance of this species is similar to *C. matthewsi* Goodwin, Brewin & Brickle, 2012, which was recently described from South Georgia. However, *C. matthewsi* has

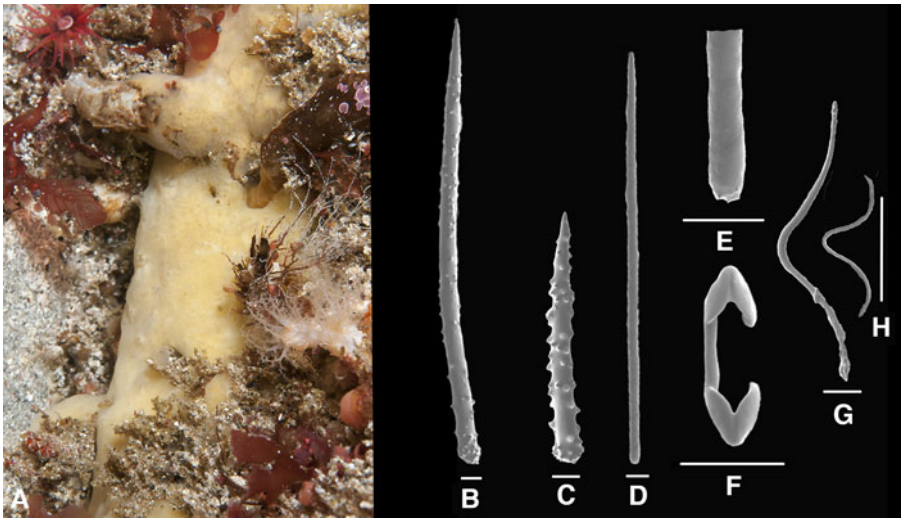

Fig. 4. *Clathria* (*Microciona*) *cheeki* sp. nov. (A) *In situ* appearance specimen Holotype [BELUM.Mc6262], Spicules Holotype [BELUM.Mc6262], (B) primary acanthostyle, (C) echinating acanthostyle, (D) ectosomal style, (E) ectosomal spicule end, (F) chela, (G) large toxa, (H) small toxa. All scale bars 10 μm, apart from small toxa and chelae 5 μm.

larger and significantly thicker primary and echinating acanthostyles and the spines on the echinating acanthostyles are large and fairly sparse, compared with the dense small spines found in this species.

Family HYMEDESMIIDAE Topsent, 1928
Genus *Hymedesmia* Bowerbank, 1864
Sub-genus *Hymedesmia* (*Hymedesmia*) Bowerbank, 1864
Hymedesmia (*Hymedesmia*) *laptikhovskyi* sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6277] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Sea Lion Island Site 002, Falkland Islands (52°26.731′S 59°06.402′W; water depth sampled: 12–16 m), Collected by C. Goodwin and J. Jones, 19 December 2009.

Etymology

Named after Dr Vladimir Laptikhovsky, fisheries scientist for the Falkland Islands Government and member of the Shallow Marine Surveys Group 'Southern Islands' expedition team.

External morphology (*Figure 5A*)

In situ: Bright yellow encrusting species forming thin (<3 mm thick) patch on bedrock 15 cm in diameter. Pore sieves have very elevated rims giving them a funnel-like appearance. Preserved in alcohol: white, thin crust with small fragments of choanosomal tissue attached to smooth, shiny, ectosomal layer; on the ectosomal layer the pore sieves are visible as raised tags.

Skeleton

Basal layer of primary and secondary acanthostyles and thick ascending columns of anisostrongyles (up to 15 spicules and 120 μm wide). Chelae extremely numerous throughout tissue.

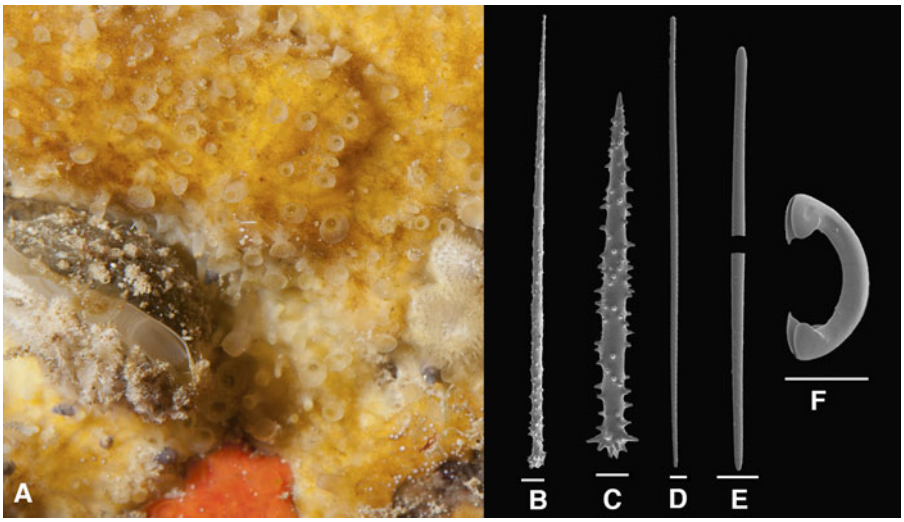

Fig. 5. *Hymedesmia* (*Hymedesmia*) *laptikhovskyi* sp. nov. (A) *In situ* appearance Holotype [BELUM.Mc6277], Spicules Holotype [BELUM.Mc6277], (B) large acanthostyle, (C) small acanthostyle, (D) ectosomal strongyle, (E) ectosomal strongyle ends, (F) chela. All scale bars 10 μm.

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Spicules

(1) Primary acanthostyles (Figure 5B). 175(212)250 by 5.0(7.7)10.0 μm (from measurements of five spicules). Long acanthostyles with a slightly tylote head. Entirely spined with small spines. Very rare.
(2) Secondary acanthostyles (Figure 5C). 92(102)109 by 8.5(10.6)13.3 μm. Fusiform acanthostyles without a tylote head. Their tips come to an abrupt point. Entirely spined with conical spines which are larger on the head.
(3) Ectosomal fusiform anisostrongyles (Figure 5D, E). 256(280)310 by 3.4(5.9)9.0 μm.
(4) Chelae (Figure 5F): 20(24)28 μm. Have broad shaft and comparatively small alae.

Diagnosis

Of the Antarctic and South Atlantic *Hymedesmia* species which possess strongyle ectosomal spicules this species can be distinguished from *H. leptochela* Hentschel, 1914 and *H. lundbecki* Dendy, 1924 by their much larger acanthostyles, and from *H. decepta* (Kirkpatrick, 1907) and *H. laevis* Thiele, 1905 as they possess other microsclere categories (Table 4). *Hymedesmia gaussiana* Hentschel, 1914 has larger acanthostyles (256–312 μm) and strongyles (344–392 μm) and substantially larger chelae (30–37 μm). *Hymedesmia laptikhovskyi* can be distinguished from *H. croftsae* sp. nov. as it has curved rather than straight primary and secondary acanthostyles, obviously thinner and shorter anisostrongyles and chelae with a more curved shaft.

Hymedesmia (*Hymedesmia*) *croftsae* sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6369] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 005, Falkland Islands (52°55.089′S 59°11.304′W; water depth sampled: 15–21.1 m), Collected by C. Goodwin and J. Jones, 23 December 2009.

Etymology

Named after Sarah Crofts, researcher at Falklands Conservation and member of the Shallow Marine Surveys Group 'Southern Islands' expedition team.

External morphology (*Figure 6A*)

In situ: Bright yellow sponge forming thinly encrusting (<2 mm thick) patches on bedrock. Prominent pore sieves and veins. Specimen measured roughly 20 cm maximum diameter. Preserved in alcohol: thin, pale peach crust with pore sieves visible on ectosome as small dots.

Skeleton

Basal layer of acanthostyles and ascending columns of aniso-strongyles up to 15 spicules (100 μm) thick. Chelae scattered throughout tissue and forming a continuous layer at the surface of the ectosome.

Spicules

(1) Primary acanthostyles: 202(251)295 by 6.3(10.2)14.7 μm (Figure 6B), strongly curved with a slightly tylote head. The majority are entirely spined with small spines, but in some specimens the apical quarter to eighth is sparsely spined or lacks spines entirely.
(2) Secondary acanthostyles: 99(113)139 by 8.5(10.1)14.8 μm (Figure 6C). The spicules are often slightly curved. They do not have a tylote head but it is usually more robustly spined than the rest of the shaft. The whole spicule is entirely spined with large spines which are mainly curved back towards the shaft.
(3) Ectosomal fusiform aniso-strongyles: 175(197)211 by 3.8(5.0)6.9 μm (Figure 6D).
(4) Chelae: 18(21)27 μm (Figure 6E). Shaft almost semi-circular in most, however, some specimens have a less pronounced curvature. Alae comparatively small.

Diagnosis

Very similar in spicule size and form to *H. laptikhovskyi* sp. nov. and can be separated from other *Hymedesmia* species using the same characteristics (see above, Table 4). Can be distinguished from *H. laptikhovskyi* sp. nov. as it has straight, fusiform rather than curved primary and secondary acanthostyles, obviously longer and thicker anisostrongyles and chelae without such broadly curved shafts.

Genus *Phorbas* Duchassaing & Michelotti, 1864

Phorbas ferrugineus Goodwin, Jones, Neely & Brickle, 2011

SPECIMENS

Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6302] Beauchêne Island Site 001; [BELUM.Mc6328], [Mc6331] and [Mc6343] Beauchêne Island Site 003; [BELUM.Mc6352] Beauchêne Island Site 004.

Comparative material examined: *Phorbas ferrugineus* Goodwin, Jones, Neely & Brickle, 2011 slide of Holotype [BELUM.Mc4794].

Remarks

Phorbas ferrugineus is a thinly encrusting rust coloured sponge with dense, high rimmed, pore sieves. It possesses large, partially spined, acanthostyles (225(266)293 by 9.6(12.0)17 μm in the type specimen), entirely spined echinating acanthostyles ((121(141)158 by 5.5(8.2)12.3 μm in type), ectosomal tornotes ((245(289)316 by 3.7(6.0)8.4 μm in type) and chelae with a palmate appearance (20(22)24 μm in type). Our specimens were a good match for the holotype in terms of spicules and external appearance. The type locality is from Steeple Jason in the Jason Islands, NW of the main Falkland Islands. These records demonstrate its presence in the extreme south-east of the Falkland Islands and indicate it is likely to occur throughout the Falkland Islands.

Phorbas shackletoni Goodwin, Jones, Neely & Brickle, 2011

SPECIMENS

Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6348] Beauchêne Island Site 003; [BELUM.Mc6400] Brandy Island.

Comparative material examined: *Phorbas shackletoni* Goodwin, Jones, Neely & Brickle, 2011 slide of Holotype [BELUM.Mc4794].

Remarks

This is a distinctive encrusting sponge which has a characteristic peach colour with closely spaced, irregular pore sieves. It has primary acanthostyles which are spined only on their head (284(322)353 by 7.0(8.9)12.1 μm in the holotype), echinating

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Table 4. Hymedesmia (Hymedesmia) species from the southern Atlantic and Antarctic.

Species	Primary acanthostyles (μm)	Secondary acanthostyles (μm)	Ectosomal spicules (μm)	Chelae	External appearance/Distribution/Notes
H. anisostrongyleoxea Bergquist & Fromont, 1988	190–315 by 6–8	95–125 by 5–7.5	Anisotornotes 235–320 by 3–6.5	24–33	Encrusting. Orange to orange–brown. New Zealand. Authors termed tornotes 'anisostrongyloxea'
H. antarctica Boury–Esnault & Van Beveren, 1982	320–525 smooth at tip	109–186, entirely spined	Tornotes 422–593	22–36	Type locality Antarctic. Boury–Esnault & Van Beveren (1982) raised Hentschel's variety *H. simillima var. antarctica* to species status. Recorded South Georgia by Burton (1932)
H. decepta (Kirkpatrick, 1907)	468 by 23.5	None	Strongyles 238 by 4.6 with pointed mucro at one end	19.5, 15.3	Originally described as *Myxilla decepta*. Reddish-brown encrusting. Type locality Winter Quarters, Antarctica. Currently classified as *Hymedesmia* (Van Soest *et al.*, 2012) but may require revision. Larger chelae arcuate, smaller unguiferate, also possesses 'chelate bipocoella' 8 μm)
H. simillima var, antarctica Hentschel, 1914 (synonym of *H. antarctica*)	184–472, 1 category	None	Tornotes 400–488	30–38	From Hentschel (1914)
H. gaussiana Hentschel, 1914	256–312 entirely spined	132–152	Strongyles 344–392	30–37	Type locality Antarctic, 350 m depth
H. laevis Thiele, 1905	240	120	Strongyles 160	30	Also has sigmas 25 μm. Type locality Calbuco, Chile. Recorded Falkland Islands Burton (1932) but specimen has mucronate rather than strongylote tornotes so unlikely to be same species
H. leptochela Hentschel, 1914	312–512 spined on basal 1/2 only	128–192 entirely spined	Polytylote strongyles 312–364	26–30	Type locality Antarctic
H. lundbecki Dendy, 1924	250–470 by 12 tylote head. Spined head only	None	Polytylote strongyles. 600 by 12	60 strongly curved	Encrusting on bryozoan. New Zealand
H. mariondufresni Boury-Esnault & Van Beveren, 1982	243–512, smooth at tip	121–211, entirely spined	Tornotes 205–397	23–36	Differs from *H. antarctica* in that tornotes shorter than acanthostyles. Type locality Kerguelen
H. microstrongyla Bergquist & Fromont, 1988	118–260 by 5–11	53–113 by 5.4–7	Strongyloxea 103–145 by 3–5	18–30	Orange–brown, thin. Auckland, New Zealand
H. tenuissima Thiele, 1905	260	100	Oxeas 200	30	Also has sigmas 45. Type locality Calbuco, Chile
H. unguifera Burton, 1929	540 spined base only	162 entirely spined, tylote head	Tylotes 235	24, 12	Thin encrustation on algae. Type locality McMurdo Sound, Antarctic. Smaller chelae are unguiferate
H. barnesi Goodwin, Brewin & Brickle, 2012	272–392 by 22–39 spined base only	102–161 by 9–25, entirely spined	Styles/tornotes 188–276 by 5–10	24–31	Bright orange encrusting species with prominent pore sieves. Type locality South Georgia
H. croftsae sp. nov.	202–295 by 6–15 end of shaft may be smooth	99–139 by 9–15 Entirely spined	Fusiform aniso-strongyles 175–211 by 4–7	18–27	Bright yellow encrusting species with prominent pore sieves and veins. Type locality Sealion Island, Falkland Islands
H. laptikhovskyi sp. nov.	175–250 by 5–10	92–109 by 9–13, entirely spined	Fusiform aniso-strongyles 256–310 by 3–9	20–28	Bright yellow encrusting species. Pore sieves have very elevated rims giving them a funnel-like appearance. Type locality Beauchêne Island, Falkland Islands

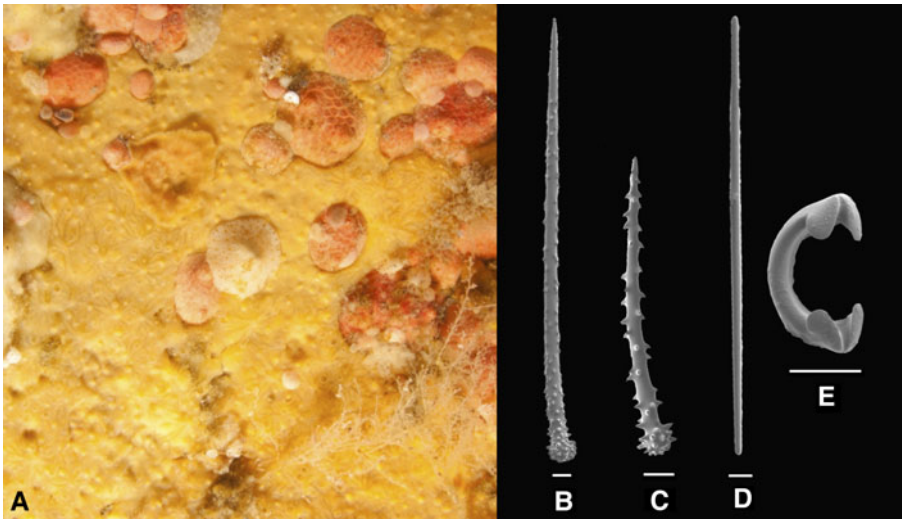

Fig. 6. *Hymedesmia* (*Hymedesmia*) *croftsae* sp. nov. (A) *In situ* appearance Holotype [BELUM.Mc6277], Spicules Holotype [BELUM.Mc6277], (B) large acanthostyle, (C) small acanthostyle, (D) ectosomal strongyle, (E) chelae. All scale bars 10 μm.

acanthostyles which are entirely spined with large spines (147(163)182 by 7.7(11.8)15.3 μm in the holotype) and fusiform anisostrongyles (240(290)388 by 4.8(6.0)7.3 μm in the holotype). It does not possess microscleres.

The specimens from this survey were a good match for the holotype in terms of spicules and external appearance. The type locality is Gypsy Cove near Stanley on East Falkland, and Goodwin *et al.* (2011) found it to be common in this area and in the Jason Islands to the north-west of the Falkland Islands. We found it to be present at the majority of our sampling sites (Table 1), indicating that it is common throughout the Falkland Islands.

Family MYXILLIDAE Dendy, 1922
Genus *Myxilla* Schmidt, 1862
Subgenus *Myxilla* (*Ectyomyxilla*) Hentschel, 1914
Myxilla (*Ectyomyxilla*) *beauchênensis* sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6319] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 002, Falkland Islands (52°53.994′S 59°10.706′W; water depth sampled: 20–25 m), Collected by C. Goodwin and J. Jones, 20 December 2009.

Paratype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6307] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 001, Falkland Islands (52°54.665′S 59°11.096′W; water depth sampled: 16–22 m), Collected by C. Goodwin and J. Jones, 20 December 2009.

Etymology

Meaning from Beauchêne Island, the type locality. The island is named after Jacques Gouin de Beauchêne (1652–1730), the French explorer who discovered the island in 1701.

External morphology (*Figure 7A*)

In situ: The holotype is a massive bright yellow, lobed sponge with sparse large oscules forming a patch up to 15 cm in diameter which was growing over a kelp holdfast. The paratype is a thickly encrusting yellow sponge with prominent oscules – again encrusting over bedrock around a kelp holdfast. Preserved in alcohol: firm, cream, massive sponge with many spaces visible in the choanosome. The ectosome is shiny and slightly bumpy on the outer surface but not visible as a distinct layer.

Skeleton (*Figure 12D*)

Choanosome: An isodictyal reticulation of bundles of up to three acanthostyles. Ectosome: Bundles of ectosomal tornotes fanning out; the ends of these bundles are covered in a tangential layer of acanthostyles. Microscleres scattered throughout choanosome and ectosome.

Spicules

(1) Choanosomal acanthostyles: straight or slightly curved acanthostyles which come to an abrupt smooth point. The rest of the spicule is spined with dense, robust spines (Figure 7B). [BELUM.Mc6319] 184 (201)228 by 8.8(10.6)14.0 μm; [BELUM. Mc6307] 171(190)211 by 8.5(9.6)11.2 μm.
(2) Ectosomal acanthostyles: same in form as the choanosomal acanthostyles, only distinguished by size (Figure 7C). [BELUM.Mc6319] 137(146)161 by 5.8(7.7)8.8 μm; [BELUM.Mc6307] 115(133)148 by 6.3(7.4)8.5 μm.
(3) Tornotes: slightly sinuous. Sometimes one end is rounded and slightly tylote, sometimes both ends sharply pointed (Figure 7D). [BELUM.Mc6319] 195(205)222 by 5.8(7.3)9.5 μm; [BELUM.Mc6307] 171(187)208 by 3.7(5.6)8.2 μm.
(4) Chelae: typical Myxillid tridentate anchorate chelae. (Figure 7E). [BELUM.Mc6319] 11(15)17 μm; [BELUM.Mc6307] 12.8(15.4)18.2 μm.
(5) Sigmas: slightly twisted so the hooked ends are not in the same plane (Figure 7F). [BELUM.Mc6319] 39(45)53 μm; [BELUM.6307] 34.0(42.3)48.0 μm.

Diagnosis

The sub-genus *Myxilla* (*Ectyomyxilla*) Hentschel, 1914 is defined as a *Myxilla* species with a second category of acanthostyles which may form a surface pallisade as found in

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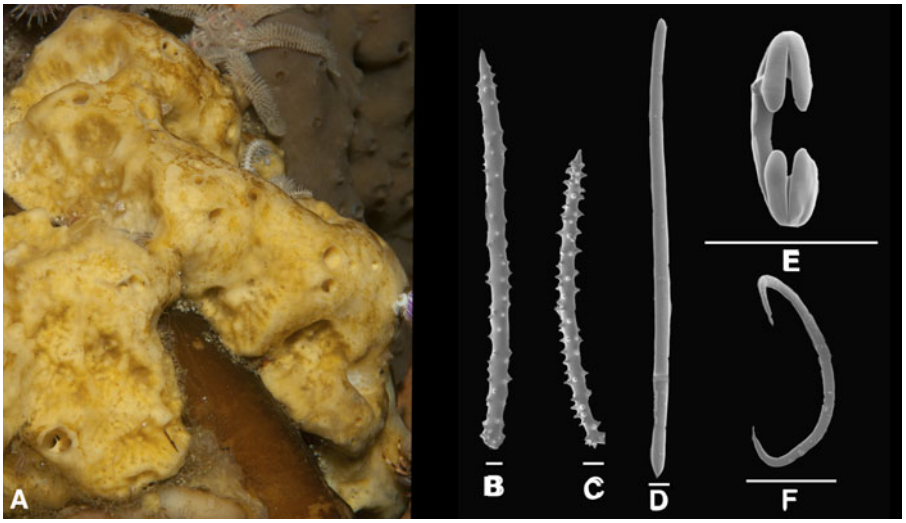

Fig. 7. *Myxilla* (*Ectomyxilla*) *beauchênensis* sp. nov. (A) *In situ* appearance Holotype [BELUM.Mc6319], Spicules Holotype [BELUM.Mc6319], (B) choanosomal acanthostyle, (C) ectosomal acanthostyle, (D) tornote, (E) chelae, (F) sigma. All scale bars 10 μm.

this species (Van Soest, 2002a). Of the six species found in the Antarctic and South Atlantic (Table 5) the majority have much larger primary acanthostyles. There are two species with similar size acanthostyles, *M. kerguelensis* (Hentschel, 1914) and *M. chilensis* Thiele, 1905. *Myxilla kerguelensis* (Hentschel, 1914) can be distinguished by its smaller sigmas and ectosomal acanthostyles. *Myxilla chilensis* has similar sized spicules and is described as a massive yellow sponge with numerous oscules (Desqueyroux-Faúndez & Van Soest, 1996); it has been described from the Falklands previously by Burton (1932, 1934). Burton (1934) and Koltun (1964) considered *M. chilensis* as a synonym of *M. kerguelensis,* but this is not currently regarded as valid (Van Soest *et al.*, 2013). *Myxilla chilensis* has similar sized acanthostyles and tornotes (Table 5). However, it possesses two distinct categories of chelae (12–15 and 20–35 μm) rather than the one present in our species. Additionally the larger chelae are much bigger than those found in our specimens. The comparatively small size of the chelae and sigmas also distinguish *M. beauchênensis* from *Myxilla* (*Myxilla*) species found in the region.

Subgenus *Myxilla* (*Styloptilon*) Cabioch, 1968
Myxilla (*Styloptilon*) *acanthotornota* Goodwin, Jones, Neely & Brickle, 2011

SPECIMENS

Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6279] Sea Lion Island Site 002; [BELUM.Mc6292] and [BELUM.Mc6303] Beauchêne Island Site 001; [BELUM.Mc6355] Beauchêne Island Site 004; [BELUM.Mc6366], [BELUM.Mc6368] and [BELUM.Mc6373] Beauchêne Island Site 005; [BELUM.Mc6375] Beauchêne Island Site 006.

Comparative material examined: *Myxilla* (*Styloptilon*) *acanthotornota* Goodwin, Jones, Neely & Brickle, 2011, slide of Holotype [BELUM.Mc4778].

Remarks

This species is a thinly encrusting pale yellow sponge which characteristically produces a lot of slime when collected. Its spicule complement includes entirely spined large (217(254)287 by 11.1(13.2)16.0 μm in the holotype) and small (107(125)147 by 7.4(10.2)14.1 μm in the holotype) acanthostyles, very distinctive spined tornotes (176(199)221 by 5.8(7.3)9.0 μm in the holotype), anchorate cheale of two sizes (14(17)21 and 24(29)33 μm in the holotype) and sigmas (33(46)59 μm in the holotype).

Our specimens were a good match for the holotype in terms of spicules and external appearance. The type locality is the Jason Islands to the north-west of the main Falkland Islands. We recorded this species from Sea Lion Island and Beauchêne Island indicating that it may be present throughout the Falklands archipelago. Only three other species are currently assigned to this sub-genus (Van Soest *et al.*, 2013): *Myxilla* (*Styloptilon*) *ancoratum* (Cabioch, 1968), *Myxilla* (*Styloptilon*) *anchoratum* (Bergquist & Fromont, 1988) and *Myxilla* (*Styloptilon*) *canepai* Schejter, Bertolino, Calcinai, Cerrano & Bremec, 2011 recently described from the Argentine Sea. However, *Hymenancora laevis* (Thiele, 1905) and *Hymenancora tenuissima* (Thiele, 1905) should probably also be included (see Goodwin *et al.*, 2011 for discussion). This species can be distinguished from others in the sub-genus by its spined tornotes.

Family TEDANIIDAE Ridley & Dendy, 1886
Genus *Tedania* Gray, 1867
Subgenus *Tedania* (*Tedania*) Gray, 1867
Tedania (*Tedania*) *livida* sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6294] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 001, Falkland Islands (52°54.665′S 59°11.096′W; water depth sampled: 16–22 m), Collected by C. Goodwin and J. Jones, 20 December 2009 and 22 December 2009.

Paratypes: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6308] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands

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Table 5. Myxilla (Ectyomyxilla) species from the south Atlantic and Antarctic.

	Primary acanthostyles (μm)	Ectosomal acanthostyles (μm)	Ectosomal diactinal spicules (μm)	Chelae (μm)	Sigmas (μm)	External appearance/Distribution/Notes
Myxilla (*Ectomyxilla*) *beauchênensis* sp. nov.	171–228 by 8.5–14	137–161 by 5.8–8.8	Tornotes 171–222 by 3.7–9.5	11–18.2	34–53	Bright yellow thickly encrusting sponge with prominent oscules. Beauchêne Island, Falkland Islands
Myxilla (*Ectomyxilla*) *hentscheli* Burton, 1929	520–728 spined or smooth at base	200–256	Tylotes or strongyles 344–400	47–52; 25–26	48–64, 31–33	Massive encrusting or cylindrical. Antarctic 7–1098 m. New name given by Burton to Hentschel's specimens of *Myxilla spongiosa sens ampl* as these have echinating acanthostyles rather than just the one category found in the type species
Myxilla (*Ectyomyxilla*) *chilensis* Thiele, 1905	170–200 by 10–12	Not mentioned	Tornotes 170–190 by 6–7	12–15; 25–35	45–47	Massive sponge with numerous oscules. Yellow to Orange when living (Desqueyroux-Faundez & van Soest, 1996). Calbuco, Chile. Kerguelen Boury-Esnault & Van Beveren (1982), Falkland Islands (Burton, 1934) (? – possibly incorrect synonym). Measurements from re-measurements of type in Desqueyroux-Faúndez & Van Soest (1996)
Myxilla (*Ectyomyxilla*) *kerguelensis* (Hentschel, 1914)	176–225 μm	56–75	Tornotes 152–184	12.5–19	17–22	Bulky with a rounded shape. Covered with algal growth usually. Largest piece of types 11.5 by 7 cm.Type locality Kerguelen. 380 m. One of the most abundant species on the Kerguelen peninsula found on rock from 5–315 m (Boury-Esnault & Van Beveren, 1982). South Africa (Lévi, 1963)
Myxilla (*Ectyomyxilla*) *mariana var. tylacantha* Hentschel, 1914	488–536	200–256	Tylotes 304–344	31–47	56–68	Type very small piece on bryozoan. Not much more visible than spicules. 92–385 m. Antarctic
Myxilla (*Ectyomyxilla*) *mariana* Ridley & Dendy, 1886	420 by 16 μm Spines most obvious at base	160 by 12 μm	Tylotes 300 by 9	40	57	Massive (largest 25 by 12 mm). Surface furrowed by meandering grooves. Off Marion Island. 91–137 m
Myxilla (*Ectyomyxilla*) *massa* Ridley & Dendy, 1886	420 by 10	140 by 6.5	Tylotes 280 by 4.5	37	56	Massive globular sponge. Pores large and exceedingly numerous, oscula small and scattered. South-west coast of Patagonia, Chile. Also has raphides 35 μm in length (possibly foreign)

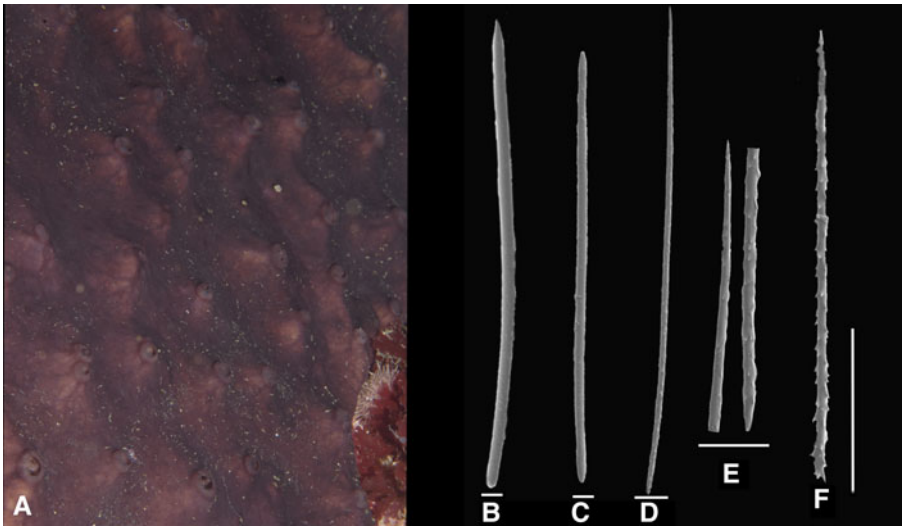

Fig. 8. *Tedania* (*Tedania*) *livida* sp. nov. (A) *In situ* appearance specimen Holotype [BELUM.Mc6294], Spicules Holotype [BELUM.Mc6294], (B) style, (C) ectosomal tornote, (D) large onychaete, (E) large onychaete ends, (F) small onychaete. All scale bars 10 μm.

Cruise, Beauchêne Island Site 001, Falkland Islands (52°54.665′S 59°11.096′W; water depth sampled: 16–22 m), Collected by C. Goodwin and J. Jones, 20 December 2009 and 22 December 2009. [BELUM.Mc6336] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 003, Falkland Islands (52°54.433′S 59°11.557′W; water depth sampled: 15–17.5 m), Collected by C. Goodwin and J. Jones, 21 December 2009.

Comparative material examined

Tedania murdochi Topsent, 1915 [NMS 2.1921.143.1410] tissue section and spicule preparation slides from the type specimen.

Etymology

From the latin *lividus*, meaning bruised. Named on account of its mottled, purplish colour.

External morphology (Figure 8A)

In situ: Thickly encrusting (up to 5 cm) purplish black, mottled sponge with mounded surface, forming large patches (up to 20 cm in diameter) on bedrock. Prominent oscules are situated on the tops of individual mounds or in lines along ridges. When cut the interior of the sponge is yellow. Preserved in alcohol: thin crust with white, firm, but compressible choanosome and a clearly distinct black, smooth, shiny ectosome.

Skeleton (Figure 12E)

Wide anastomizing columns of styles 10–20 spicules thick joined by thinner, shorter columns of 1–2 spicules. Columns reinforced by onychaetes. Onychaetes are also present scattered in the choanosome. Ectosomal skeleton projecting bundles of tornotes and onychaetes, fanning out from the end of the choanosomal columns. Surface layer visible as dense black pigmented layer on slide.

Spicules

(1) Choanosomal styles: smooth with an abrupt point (Figure 8B). [BELUM.Mc6294] 227(246)276 by 6.2(7.8)9.8 μm; [BELUM.Mc6308] 230(240)257 by 6.2(7.4)9.2 μm; [BELUM. Mc6336] 198(225)258 by 5.4(7.2)8.9 μm.
(2) Ectosomal tornotes: bluntly pointed at both ends (Figure 8C). [BELUM.Mc6294] 189(214)233 by 4.0(5.4)7.4 μm; [BELUM.Mc6308] 194(214)235 by 4.2(5.0)6.3 μm; [BELUM. Mc6336] 183(204)219 by 4.6(5.8)7.0 μm.
(3) Onychaetes: two categories: large (Figure 8D, E) and small (Figure 8F). [BELUM.Mc6294] 131(142)160 and 38(44)54 by 1.1(1.5)2.0 μm; [BELUM.Mc6308] 129(146)170 and 41(49)56 and by 0.6(1.3)2.2 μm; [BELUM.Mc6336] 126(133)140 and 32(42)56 by 0.7(1.6)2.5 μm.

Diagnosis

Desqueyroux-Faúndez & Van Soest (1996) reassessed the genera *Tedania* and *Trachytedania* and reclassified the species present into three sub-genera: *Tedania* (*Tedaniopsis*) with long styles 300–700 μm, *Tedania* (*Tedania*) with short styles 150–300 μm and mucronate tornotes, and *Tedania* (*Trachytedania*) with smooth or spined short styles 150–300 μm and oxeote or mucronate tornotes (see also Van Soest, 2002b). The redescription of *Tedania* (*Trachytedania*) was based on the fact that no basal acanthostyles, the characterizing feature of the genus, could be found in the type species. *Trachytedania* has since been re-established as a valid genus by Cristobo & Urgorri (2001) who re-examined the type and located basal acanthostyles. This species conforms to the current definition of *Tedania* (*Tedania*) as it possesses styles shorter than 300 μm (Desqueyroux-Faúndez & Van Soest, 1996).

This species can be distinguished from most in the region by its comparatively short styles and tornotes (Table 6). However, its spicules are similar in size to two species which are found in the Falkland Islands: *T. mucosa* and *T. murdochi*. *Tedania mucosa* Thiele, 1905 has similar size tornotes but larger styles and onychaetes, and also differs in external appearance and colour; Falkland Islands specimens of *T. mucosa* are beige coloured whereas those reported recently

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Table 6. Tedania (Tedania) species from the southern Atlantic and Antarctic.

Species	Styles (μm)	Tornotes/tylotes (μm)	Onychaetes (μm)	External appearance/Distribution/Notes
Tedania (*Tedania*) *battershilli* **Bergquist & Fromont, 1988**	200–320 by 4–6.5	160–310 by 3.5–5 – tylotes	105–163, 30–70	Bright orange thinly encrusting sponge. New Zealand
Tedania (*Tedania*) *lanceta* **Koltun, 1964**	400–480 lanceote tips	360–400	270–320, 50–92	Globular. Antarctic. Presumably should be reclassified as *Tedania* (*Tedaniopsis*) as styles >350 μm
Tedania (*Tedania*) *murdochi* **Topsent, 1915** – type specimen	225–250 **(200–230)**	200–240 by 4.5–6 (198–205) **– tornotes**	40–175, 3 groups (short and thin, long and fat, med and large) **(125–150, 40–45)**	Beige mound, brown in alcohol. Mammiform processes. Falkland Islands (type locality), Antarctic. Measurements in bold are taken from our measurements of the type specimen
Tedania (*Tedania*) *murdochi* **Topsent, 1915**. Specimen BELUM.Mc4740 from Falkland Islands	190–225	200 – tornotes	150–165, 50	Massive beige mound with oscules on mound ends
Tedania (*Tedania*) *mucosa* **Thiele, 1905**	280–310	190–210 – tornotes	26–99, 99–235	5–10 mm thick. Chile, Falkland Islands, Argentina, Patagonia gulfs, Patagonian shelf. Classified by **Desqueyroux-Faúndez & Van Soest (1996)** as *Tedania* (*Trachytedania*) but the genus *Trachytedania* has been re-erected by **Cristobo &Urgorri (2001)** to include only those species with basal acanthostyles
Tedania (*Tedania*) *mucosa* **Thiele, 1905**. BELUM Mc4814, 4800, and 4808 from Falkland Islands	270–300	200–255 – tornotes	200–214.70–110	Very thick beige crust with surface formed into low mounds and ridges
Tedania (Tedania) mucosa Thiele, 1905 sensu Willenz *et al.*, 2009	220–350 by 5–19	169–230 by 3–8, tornotes, terminal mucrons	135–295, 43–104	Massive with short lobate (~1 cm) digitate projections which usually bear large apical oscula. Yellow, red or beige
Tedania (*Tedania*) *placentaeformis* Brøndsted, 1924	400 by 12	400 by 12, strongyles	50–300	Flattened, roundish shape 35 mm wide (max) and 10 mm thick. New Zealand
Tedania (*Tedania*) *purpurescens* Bergquist & Fromont, 1988	230–500 by 4–6.5	270–300 by 3–5 tylote	110–133, 45–55	Thinly encrusting dark purple sponge. New Zealand
Tedania (*Tedania*) *scotiae* Stephens, 1915	280–375	220–300 – tylotes	125–150, 150–175 (this category with swelling at one end)	Rounded, cushion-like. Saldanha Bay, South Africa
Trachytedania spinata (Ridley, 1881) redescription from Cristobo & Urgorri (2001)	170–200	140–170	130–150	Styles with short spines at base. Chile, Argentina, Falkland Islands, Kerguelen Islands
Tedania (*Tedania*) *spinostylota* **Bergquist & Fromont, 1988**	190–260 by 4–6.5 (spined at base)	169–220 by 2–4 (choanosome)230–280 by 3.5–6 (ectosome)	115–143, 35–72	Mayor Island, New Zealand, intertidal. A red, flat, encrusting sponge. Presumably should be reclassified as *Tedania* (*Trachytedania*) in view of spination of styles
Tedania (*Tedania*) *stylonychaeta* **Lévi, 1963**	600–700 by 20–22 or 400–500 by 25–28	450–500 by 10–11 or 325–375 by 9–11, tylotes	200–250, 70–80	Grey-yellow, rose tinted massive sponge (65 by 45 by 20 mm). South Africa. Also has 'stylonychaetes' 70–85 by 5–6 μm. Presumably should be reclassified as *Tedania* (*Tedaniopsis*) as styles >350 μm

Tedania (*Tedania*) *tubulifera* **Lévi, 1963**	450–500 by 15–30	225–250 by 4–6	150–300 by 1–2, 50–65 by 0.5	Yellow, little massive sponge, basal mass 7 mm topped with 5 mm chimneys. South Africa. Presumably should be reclassified as *Tedania* (*Tedaniopsis*) as styles >350 µm
Tedania (*Tedania*) *livida* sp. nov.	227–276 by 6–10	189–233 by 4–7	131–160 by 1–2	Thickly encrusting (up to 5 cm) purpleish black sponge with mounded surface, forming large patches (up to 20 cm in diameter) on bedrock. Beauchêne Island, Falkland Islands

from Chile are beige, yellow or red (Willenz *et al.*, 2009). *Tedania murdochi* Topsent, 1915 differs in external appearance, being a massive beige mound. It has thinner and slightly shorter styles, thinner columns of styles in the choanosome, and in the ectosome the pallisade of tornotes is rather confused and unpigmented whereas in *T. livida* sp. nov. the tornotes fan neatly out in brushes from the end of the columns of styles and the layer is heavily pigmented, clearly visible as a darker layer on the microscope preparation.

Tedania (*Tedania*) *mucosa* Thiele, 1905

SPECIMENS

All samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6293], [BELUM.Mc6304] and [BELUM.Mc6309] Beauchêne Island Site 001.

Remarks

These specimens are a good match in terms of spiculation and external form to those from this area classified as *Tedania* (*Tedania*) *mucosa* Thiele, 1905 by Goodwin *et al.* (2011). These specimens, recorded from the Jason Islands to the north-west of the Falklands, were thickly encrusting, beige sponges with large oscules on low mounds or ridges. The species is characterized by the possession of comparatively small styles, tornotes and two categories of onychaetes (Table 6).

The type locality of *T. mucosa* is Calbuco on the west coast of Chile. The species has also been recorded from deep water off the Argentine coast (Burton, 1934, 1940; Cuartas, 1986, 1992; Desqueyroux-Faúndez & Van Soest, 1996), the Strait of Magellan (Sarà *et al.*, 1992), the Chilean coast and the Falkland Islands (Desqueyroux, 1972), and Chilean Patagonia (Willenz *et al.*, 2009). Differences in spiculation of *Tedania* species from this region can be very small (Table 6) and in the future, external appearance may be of use in distinguishing species. Our specimens are pale beige-grey, lobose and encrusting in contrast to the digitate yellow, red or beige forms reported by Willenz *et al.* (2009). This could indicate that the current definition encompasses a complex of closely related species.

Suborder MYCALINA Hajdu, Van Soest & Hooper, 1994
Family ESPERIOPSIDAE Hentschel, 1923
Genus *Amphilectus* Vosmaer, 1880
Amphilectus fimbriatus sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6357] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 004, Falkland Islands (52°53.691′S 59°10.617′W; water depth sampled: 12–15 m), Collected by C. Goodwin and J. Jones, 21 December 2009.

Paratypes: Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6291] and [BELUM.Mc6305] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 001, Falkland Islands (52°54.665′S 59°11.096′W; water depth sampled: 16–22 m), Collected by C. Goodwin and J. Jones, 20 December 2009 and 22 December 2009.

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Comparative material examined
Amphilectus fleeci Goodwin, Jones, Neely & Brickle, 2011 Holotype [BELUM.Mc4715] section and spicule preparation.

Etymology
From the latin *fimbriatus* meaning fringed.

External morphology (*Figure 9A, B*)
In situ: White to pale yellow massively encrusting sponge in the form of circular lobe (Mc6291, Mc6305) or ridge (Mc6357). Encrusting in patches up to 15 cm in maximum diameter on bedrock. The ends of skeletal columns protrude through the surface giving the sponge a delicately hispid appearance (Figure 9B). Large oscules are present at the centre of lobe or ridge.

Preserved in alcohol: cream coloured, firm but compressible, massive sponge with many spaces in choanosome. No distinct ectosomal layer, but surface is very hispid from projecting columns of spicules that are clearly visible to naked eye.

Skeleton (*Figure 12F*)
Anastomizing ascending columns of styles 6–10 spicules thick. The ends of these bundles project through the sponge surface, giving the sponge its hispid appearance. Chelae are scattered throughout tissue.

Spicules
(1) Styles: gently curved styles which come to an abrupt point (Figure 9C). [BELUM.Mc6357] 303(379)436 by 6.3(10.1)13.9 μm; [BELUM.Mc6291] 352(384)419 by 10.4(12.5)16.6 μm; [BELUM.Mc6305] 350(406)461 by 7.8(10.7)14.4 μm.
(2) Palmate isochelae (Figure 9D): [BELUM.Mc6357] 26(33)38 μm; [BELUM.Mc6291] 21.9(28.5)34.1 μm; [BELUM.Mc6305] 25.0(30.0)34.5 μm.

Diagnosis
Amphilectus Vosmaer, 1880 is currently defined as an Esperiopsidae with a ladder-like skeleton of ascending and interconnecting spicule tracts. Usually the microscleres are only small palmate microchelae and no sigmas are present, the megascleres being small styles under 400 μm. *Esperiopsis* is used in the sense of Burton (1929) for species conforming to *Esperia villosa*; these have an anastomizing plumoreticulate skeleton of thick spicule tracts of large mycalostyles. Microscleres can include up to three categories of palmate isochelae and two categories of sigmas. The genus *Amphilectus* is considered by many authors to be a synonym of *Esperiopsis*, and species within these genera require thorough revision (Van Soest & Hajdu, 2002). We have tentatively defined this species as *Amphilectus* on the basis of its small style size and the presence of only one small category of isochelae.

This species can be distinguished from most other species of *Amphilectus* or *Esperiopsis* present in the South Atlantic and Antarctic by its distinctive surface (Table 7). *Esperiopsis heardi* Boury-Esnault & Van Beveren, 1982 does have a similar surface appearance but possesses much larger spicules (styles 778–972 μm).

Ulosa is currently defined as an Esperiopsidae with a skeleton of polyspicular fibres in a rectangular or polygonal reticulation. No specialized external skeleton is present but the surface is hispid due to the projection of spicule tracts. However, the spicules are styles only with no microscleres (Van Soest & Hajdu, 2002), thus distinguishing all *Ulosa* species from our specimen. Our specimens are very similar in appearance to the well characterized European species *Ulosa stuposa* (Esper, 1794) which also has a surface with small hispidations or branches. It would seem logical that as in other Esperiopsidae genera chelae microscleres could be present, and revision of this family would be useful. The majority of the 15 valid *Ulosa* species are from Europe (Van Soest *et al.*, 2013) although two species have been recorded from the Falklands or biogeographically related areas (Table 7); *Ulosa incrustans* (Burton, 1930) (as *Axinosia incrustans*) from Campbell Island, New Zealand sub-Antarctic and *Ulosa plana* Cuartas, 1995 from Argentina. *Ulosa incrustans* is a thinly encrusting minutely hispid species with styles 260 by 7 μm and *U. plana* is a thickly encrusting species with styles 180–250 by 5–7 μm.

Amphilectus fleecei Goodwin, Jones, Neely & Brickle, 2011

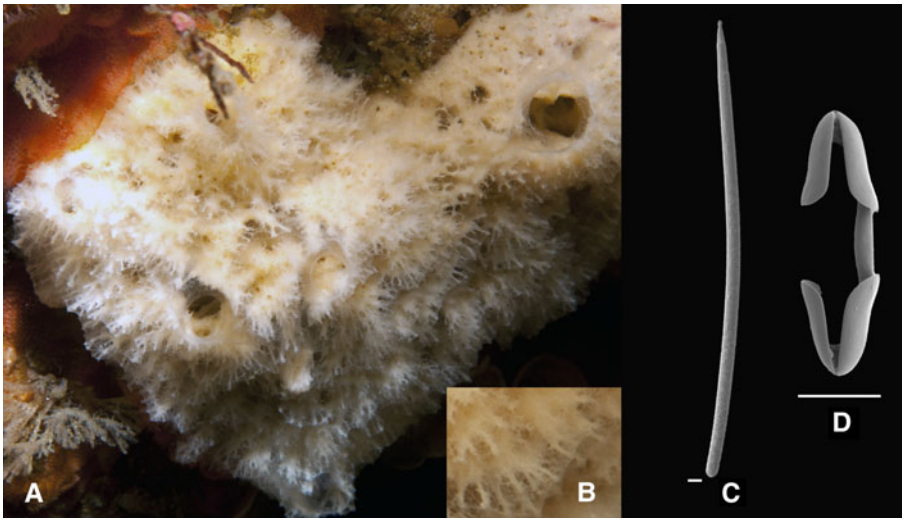

Fig. 9. *Amphilectus fimbriatus* sp. nov. (A) *In situ* appearance Holotype [BELUM.Mc6357], (B) close-up of surface hispidation, Spicules Holotype [BELUM.Mc6357], (C) style, (D) chela. All scale bars 10 μm.

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Table 7. Amphilectus and Ulosa species from the southern Atlantic and Antarctic.

Species	Styles (μm)	Chelae (μm)	External appearance/Distribution/Notes
Amphilectus fimbriatus sp. nov.	303–436 by 6–14	26–38	Thickly encrusting with pronounced surface hispidation. Falkland Islands
Amphilectus americanus (Ridley & Dendy, 1887)	330 by 13, **246–359 by 6–13**	30, **25–38**	Massive sponge in the form of a pyramidal column. Skeleton with distinct primary fibres running towards the surface. Type location east of the Strait of Magellan. Bold measurements from Willenz *et al.* (2009) – recorded as a variable morphology erect, tubular, or branched beige sponge occurring on steep bedrock 10–100 m
Amphilectus dactylus Goodwin, Jones, Neely & Brickle, 2011	186–237	19–27	Pale orange branching sponge. Falkland Islands
Amphilectus fleecei Goodwin, Jones, Neely & Brickle, 2011	215–275	20–24	Pale orange lump with tasselled surface and darker orange interior. Falkland Islands
Amphilectus flabellatus Burton, 1932	285 by 9	15–24	Massively flabellate, erect (12 cm high, 14 cm across, 2 cm wide), surface minutely connulose. Type locality Falkland Islands 96–127 m
Amphilectus fucorum (Esper, 1794) Thiele (1905) samples	225–260 by 10	22	Measurements from Burton (1932). Taken from Falkland Island specimens. Van Soest *et al.* (2013) regard assignation to *A. fucorum* as not valid
Amphilectus fucorum (Esper, 1794) Burton (1932) samples	270–480	21–28	Specimens differed in form: one encrusting, one massive with branching processes and five large and massive. Samples from Tristan da Cunha, South Georgia. Shag Rocks and Falkland Islands. Van Soest *et al.* (2013) regard assignation to *A. fucorum* as not valid
Amphilectus fucorum (Esper, 1794) Ackers *et al.* (1993) description – UK specimens	170–500 by 10–19, more often 150–200 by 3–5	14–28	Intense reddish orange colour. Sponge very variable in form ranging from thin crusts to tasselled volcano-like growths. Widespread on Atlantic coasts of Europe from Norway to the Mediterranean
Esperiopsis heardi Boury-Esnault & Van Beveren, 1982	778–972	36–41	Small mass 3.3 cm high. Ends of fibres protrude giving the sponge a hispid surface. Heard Island, Antarctic, 790 m
Esperiopsis rugosa Thiele, 1905	430 by 15, **278–493 by 11–13**	36, **26–35**	Encrusting with a finely hispid surface like velvet. Type locality Chile. Recorded from Kerguelen (measurements in bold) by Boury–Esnault & Van Beveren (1982)
Esperiopsis scotiae Topsent, 1915	750–1250, by 13–20	29–35	Ficiform. Type location Antarctic
Esperiopsis varia Sarà, 1978	120–250	10	Massively encrusting. Chile
Ulosa incrustans (Burton, 1930)	260 by 7	None	Thinly encrusting minutely hispid. Campbell Island, New Zealand sub-Antarctic. 42 m.
Ulosa plana Cuartas, 1995	180–250 by 5–7	None	Thickly encrusting. Argentina

SPECIMENS

All samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6295] and [BELUM.Mc6360] Beauchêne Island Site 001; [BELUM.Mc6379] Beauchêne Island Site 006; [BELUM.Mc6428] Triste Island.

Remarks

This sponge was described from numerous specimens collected around Stanley on East Falkland and the Jason Islands (north-west Falklands). It is described as a thickly encrusting creamy-yellow cushion which bears prominent oscules on the tips of raised projections. It has styles (215(237)275 by 7.9(10.4)13.2 μm in the holotype) and palmate isochelae (20(22)24 μm in the holotype). These specimens are a good match for the type in terms of spicules and external form, however, they were pale peach rather than yellow in colour. Reviewing images of the paratypes of *A. fleecei* shows that there is some variation in colour with specimens ranging from creamy-yellow to peach in colour. These records extend the known range of this species, which was first recorded from Stanley and the Jason Islands in the Falklands. It appears to be widespread and common in the Falkland Islands.

Suborder MYCALINA Hajdu, Van Soest & Hooper, 1994
Family ISODICTYIDAE Dendy, 1924
Genus *Isodictya* Bowerbank, 1864
Isodictya cutisanserina sp. nov.

TYPE MATERIAL

Holotype: Sample in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6298] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 001, Falkland Islands (52°54.665′S 59°11.096′W; water depth sampled: 16–22 m), Collected by C. Goodwin and J. Jones, 20 December 2009 and 22 December 2009.

Paratypes: Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6301] Shallow Marine Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 001, Falkland Islands (52°54.665′S 59°11.096′W; water depth sampled: 16–22 m), Collected by C. Goodwin and J. Jones, 20 December 2009 and 22 December 2009; [BELUM.Mc6313] Shallow Marine

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Surveys Group Beauchêne and Sea Lion Islands Cruise, Beauchêne Island Site 002, Falkland Islands (52°53.994′S 59°10.706′W; water depth sampled: 20–25 m), Collected by C. Goodwin and J. Jones, 20 December 2009.

Other specimens: [BELUM.Mc6320] Beauchêne Island Site 002; [BELUM.Mc6334] Beauchêne Island Site 003.

Etymology

From the medical term *cutis anserina* (literally translated: goose flesh), commonly known as goose bumps. The small papillae on the surface of the sponge resemble this.

Comparative material examined

Alcohol-preserved specimen *Isodictya kerguelensis* [BMNH 28.2.15.439 RN XXVI XI], Station WS 79. Tissue section on slide.

External morphology (Figure 10A)

Bright yellow sponge with papillate surface. May take the form of a thick crust or lobes with prominent oscules. In lobed specimens, such as the type specimen, the oscules are placed on the tops of the lobes and may form lines. Preserved in alcohol: pale brown massive sponge, pale brown, compressible choanosome with many spaces and slightly darker brown, shiny, hispid, ectosomal layer. Hair-like columns of spicules which project from the ectosome are visible to naked eye.

Skeleton

Fat columns of oxea (~20 spicules) in a loose reticulation (Figure 10D). The ends of fibres protrude through the surface (Figure 10E). There are many loose oxea between the fibres: some of these have a much thinner diameter and are shorter in length than the main oxea, and can be curved or flexuous.

Spicules (Figure 10B, C)

(1) Fat oxeas: often slightly bent with abrupt points: [BELUM.Mc6298] 240(272)292 by 6.8(10.2)12.9 μm; [BELUM.Mc6301] 285(295)301 by 10.8(11.8)13.9 μm; [BELUM.Mc6313] 272(293)319 by 6.4(8.4)10.1 μm.

(2) Thin oxeas: same form as fat oxeas but much narrower. [BELUM.Mc6298] 201(226)255 by 3.2(4.7)6.0 μm; [BELUM.Mc6301] 203(235)261 by 1.9(3.6)6.7 μm; [BELUM.Mc6313] 178(219)292 by 1.3(2.8)5.1 μm.

(3) Chelae: palmate isochelae (Figure 10C): [BELUM.Mc6298] 23(27)31 μm; [BELUM.Mc6301] 20.7(24.1)28.5 μm; [BELUM.Mc6313] 21.9(24.2)26.4 μm.

Diagnosis

Nineteen valid species of *Isodictya* are present in the Antarctic and South Atlantic and several have been recorded from the Falkland Islands, although usually in deeper offshore waters (Burton, 1932) (Table 8). This species may be distinguished from most by its much smaller spicules. *Isodictya delicata* (Thiele, 1905) has oxea which are only slightly larger (350 μm). However, this species has smaller chelae ('almost' 20 μm) and is small and soft textured with 'rather weak' skeletal fibres whereas our specimens are robust with thick skeletal fibres. *Isodictya kerguelensis* (Ridley & Dendy, 1886) has a similar appearance and similar length spicules (styles 350 μm, chelae 19–27 μm noted in the type description). However, comparison with the type revealed that the spicules of *I. kerguelensis* are significantly longer and more robust.

Family MYCALIDAE Lundbeck, 1905
Genus *Mycale* Gray, 1867
Subgenus *Mycale* (*Aegogropila*) Gray, 1867
Mycale (*Aegogropila*) *nodulosa* Goodwin, Jones, Neely & Brickle, 2011

SPECIMENS

Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6329] [BELUM.Mc6333] [BELUM.Mc6337] and [BELUM.Mc6344] Beauchêne Island Site 003.

Remarks

The type specimen is a massive, pale cream sponge with a mounded surface. The sponge surface bears distinctive, small, lumpy projections. The overall appearance of the sponge is very distinctive and we provisionally identified these specimens from photographs – this was confirmed with microscopic examination. These specimens are a good match for the type specimen in terms of spicules although some of their mycalostyles were faintly polytylote. This sponge was only previously known from the type location: Doctor's Point in Stanley. This extends the known distribution of this species significantly to the south.

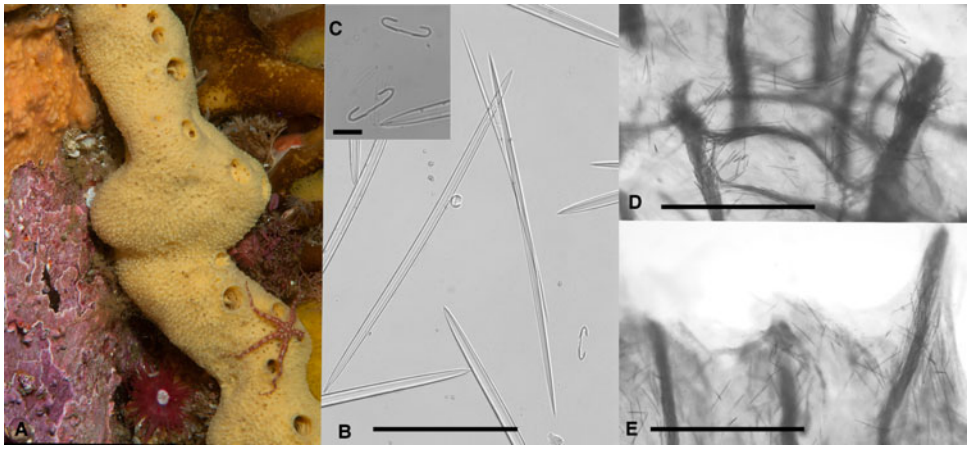

Fig. 10. *Isodictya cutisanserina* sp. nov. Holotype [BELUM.Mc6298] (A) *In situ* appearance, (B) spicules (scale bar 100 μm), (C) chelae (scale bar 10 μm), (D) choanosomal skeleton (scale bar 1000 μm), (E) ectosomal connule formed by protruding end of skeletal fibre (scale bar 1000 μm).

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Table 8. Isodictya species from the southern Atlantic and Antarctic.

Species	Oxea	Chelae	External appearance/Distribution/Notes
Isodictya cutisanserina sp. nov.	240–292 by 7–13, 201–255 by 3–6.	30	Yellow hispid lump with prominent oscules. Falkland Islands
Isodictya alata (Stephens, 1915)	300–425 by10–15	16	Lump with finely hispid surface. Saldanha Bay, South Africa
Isodictya bentarti Rios *et al.*, 2004	185–535	35–80	The holotype is a straight, tongue-shaped sponge with large oscules. South Shetland Islands
Isodictya cavicornuta Dendy, 1924	650 by 32	64	Cup shaped/funnel shaped – tubular-cylindrical, slightly curved. Three Kings Islands, New Zealand
Isodictya delicata (Thiele, 1905)	350*12	'almost' 20	Finger shaped. Two type specimens one 4.5 cm long by 1.2 thick and 7 × 2.5 × 1.25 cm. Light grey and soft in alcohol. Type location Admiralty Sound, Chile 19 m. Recorded from Falklands Islands (Burton, 1932). Skeletal fibres noted by Thiele as 'rather weak'
Isodictya delicata var. *megachela* Burton, 1934	Not given	Up to 70	Regularly flabellate and stipitate with an even but coarsely hispid surface. Seymour Island, Graham Land
Isodictya doryphora (Brønsted, 1927)	700–800	60	Sausage shaped, somewhat curved, 2 × 6 cm. Surface projections up to 2 cm in length. Discovery Inlet, Antarctica
Isodictya dufresni Boury-Esnault & Van Beveren, 1982	217–416	19–32	Cup shaped with a stalk. Kerguelen, Antarctica
Isodictya echinata Thomas & Mathew, 1986	450–750 by 8–33 μm	42–63	Sponge erect composed of loosely interwoven fibres bearing long filiform conules from the outermost arms of the axial network. Queen Maud Land Antarctica. Megascleres 'stylote or strongylote'
Isodictya erinacea (Topsent, 1916)	**400–860**, 800–880	**40–68**, 54–56	Yellow with many hispid digitate processes. Measurements of type from Rios (2006) in bold. Recorded from Burdwood Bank (Burton, 1934). Topsent also noted abundant trichodragmata 65–80 μm
Isodictya kerguelensis (Ridley & Dendy, 1886)	350 by 19, **130–650 by 1.25–30**	19–27, **15–25** very rare	Lobate or digitate. Surface woolly-looking and minutely hispid. Skeleton very loose and ill defined. Recorded from Falklands (Burton, 1932). Measurements in bold from Rios (2006)
Isodictya lankesteri (Kirkpatrick, 1907)	315–485, 452	58–67*, 45	Elongated, slender, fusiform. Thin fan shaped (Rios, 2006)
Isodictya microchela (Topsent, 1915)	400 by 13	17–18 very abundant	White 10.5 cm high, 10 mm wide – enlarged from base of 7 mm. Oscules 1–2 m in diameter. Surface hispid. Antarctic. Recorded from Burdwood Bank (Burton, 1932)
Isodictya multiformis (Stephens, 1915)	177–255 by 13 max	32–40	Stalked, lobed. Sometimes joined at the base to form bundle of lobes. Saldanha Bay, South Africa
Isodictya obliquidens (Hentschel, 1914)	528–672	38–55	Cylindrical 2.9 cm long. Hispid. Antarctic
Isodictya setifera (Topsent, 1901)	288–920	30–97.5	Massive globular/tubular sponges. Measurements from Rios (2006). Antarctic. Recorded from Falkland Islands (Burton, 1932)
Isodictya spinigera (Kirkpatrick, 1907)	731 by 26	24–64	Knob-like with surface coarsely spinuose. Pale red. Dermal membrane spread out between spines like a net. Antarctic
Isodictya toxophila Burton, 1932	290–760	50–82.5	Hispid yellow. Also toxa 180–305. Measurements from Rios (2006). South Georgia and South Shetland Islands
Isodictya trigona (Topsent, 1917)	675 by 27–29, 920 by 230–270	80–90	Cylindrical, yellowish brown. 45 mm. 4–5 mm long spicule fibres ends on surface. Antarctic
Isodictya verrucosa (Topsent, 1913)	520, **520–670***	27–37, **20–30***	Hispid yellow cup on stalk. Measurements in bold from Rios (2006) from type specimen. Type locality Burdwood Bank, Falkland Islands

*Larger chelae are an odd elliptical form. Antarctic

Order HALICHONDRIDA Gray, 1867
Family DICTYONELLIDAE Van Soest, Diaz & Pomponi, 1990
Genus *Scopalina* Schmidt, 1862

Scopalina bunkeri Goodwin, Jones, Neely & Brickle, 2011

Remarks

This sponge is a thinly encrusting species with a distinctive rusty red colour and spiky surface. Consequently, it is possible to recognize *in situ* as no other local species share these characteristics. The type locality of this species is the Jason Islands, north-west of West Falkland. We recorded it from Sea Lion Island (photographic record) indicating that it is widespread but not very common in the Falkland Islands.

Scopalina erubescens Goodwin, Jones, Neely & Brickle, 2011

Remarks

This sponge is an encrusting species with a distinctive peach colour and connulose surface, it is possible to recognize *in situ* as no other local species share these characteristics. The type locality of this species is Stanley, East Falkland and the Jason Islands, north-west of West Falkland. It was recorded at two sites on Sea Lion Island and five out of the six sites at Beauchêne Island

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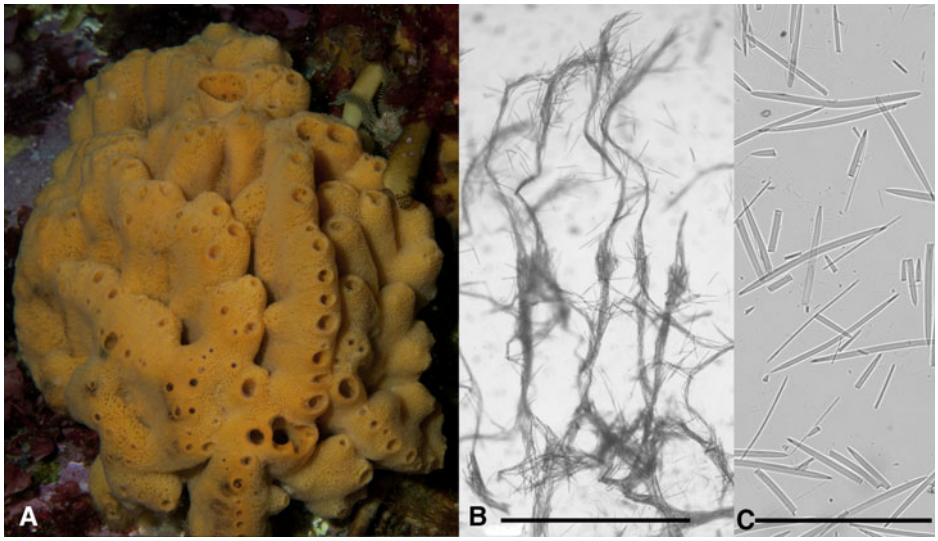

Fig. 11. *Amphimedon maresi* (Sarà, 1978). [BELUM.Mc6335]. (A) *In situ* appearance, (B) skeleton (scale bar 1000 μm), (C) spicules (scale bar 200 μm).

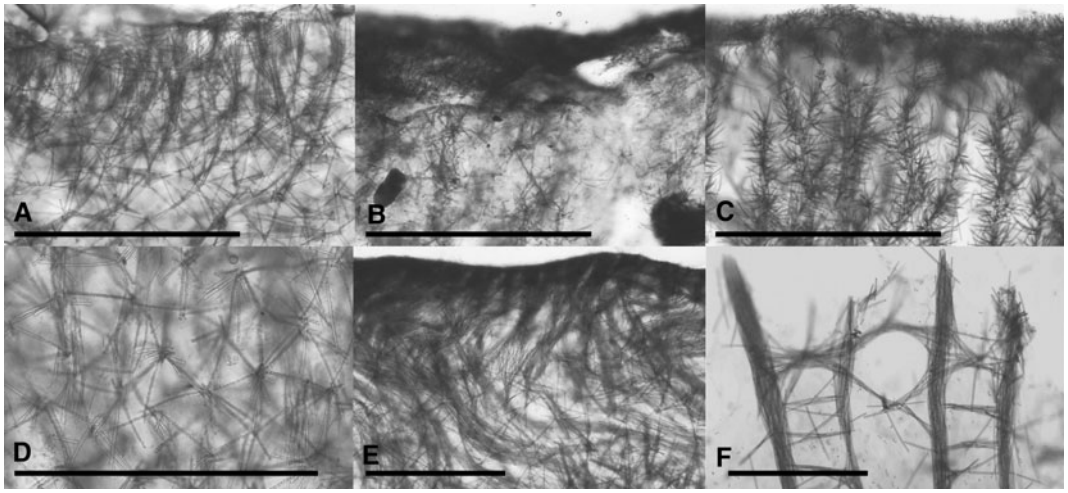

Fig. 12. Light microscope images of skeleton of holotypes, ectosome to top (scale bars 1000 μm). (A) *Iophon roseum* sp. nov., (B) *Clathria* (*Microciona*) *tenebrosa* sp. nov., (C) *Clathria* (*Microciona*) *cheeki* sp. nov., (D) *Myxilla* (*Ectomyxilla*) *beauchênensis* sp. nov. (choanosoame only), (E) *Tedania* (*Tedania*) *livida* sp. nov., (F) *Amphilectus fimbriatus* sp. nov.

(from photographic records). It is a large conspicuous species and can dominate the seabed in some areas. These new records indicate it is widespread and common in the Falkland Islands.

Family HALICHONDRIIDAE Gray, 1867
Genus *Halichondria* Fleming, 1828
Subgenus *Halichondria* (*Eumastia*) Schmidt, 1870
Halichondria (*Eumastia*) *attenuata* Topsent, 1915

SPECIMENS

All samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6327] and [BELUM.Mc6346] Beauchêne Island Site 003; [BELUM.Mc6371] Beauchêne Island Site 005; [BELUM.Mc6387] Sealion Easterly; [BELUM.Mc6415] East Sea Lion.

Remarks

Halichondria (*Eumastia*) *attenuata* is a large conspicuous sponge easily recognized *in situ* by its pale lemon colour and well-developed papillae. However, preserved specimens may be more difficult to recognize as the species only possesses oxea spicules. This species seems to be fairly widespread and common in the Falkland Islands with records from the Jason Islands to the north-west of West Falkland (Goodwin *et al.*, 2011); Berkeley Sound and Port Louis, from depths of 0–16 m, on East Falkland (Burton (1932, 1934) and Beauchêne Island and the Sea Lion Islands (this survey).

There are additional records of this species from South Georgia Island (Burton, 1934) and Bransfield Strait, Antarctica (Campos *et al.*, 2007). However, the Bransfield Strait specimen does not possess the well-developed papillae and specialized ectosomal skeleton characteristic of *Halichondria* (*Eumastia*). Additionally, although the spicule size range is similar, the form of the oxeas differs in that they taper smoothly to conical points rather than being abruptly pointed, and they are straight rather than bent. Therefore these specimens are likely to be a different species. Little information is given on the specimens from

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South Georgia (Burton, 1934). However, a recent survey of the shallow water sponge fauna (Goodwin *et al.*, 2012) did not find *H. attenuata* or any other Falkland species, indicating that the islands' faunas are likely to be distinct; therefore it is possible that Burton, having few characters to go on, also misidentified his specimens. If this is the case the known range of *H. attenuata* is currently restricted to the Falkland Islands.

Order HAPLOSCLERIDA Topsent, 1928
Suborder HAPLOSCLERINA Topsent, 1928
Family CALLYSPONGIIDAE de Laubenfels, 1936
Genus *Siphonochalina* Schmidt, 1868
Siphonochalina fortis Ridley, 1881

SPECIMENS

All samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6386] Sea Lion Island Site 004; [BELUM.Mc6391] Sealion Easterly; [BELUM.Mc6393] Brandy Island; [BELUM.Mc6425] Triste Island.

Remarks

This species is a white to pale purple branching sponge with branches formed of hollow tubes bearing terminal oscules. The sponge has a distinctive hard, fibrous texture, abundant sponging in fibre meshwork, and small oxea spicules (47–71 by 2–8.1 μm) reported from previous Falkland specimens (Goodwin *et al.*, 2011). The species was originally described from Portland Bay, near Madre-de-Dios Island, Chile (Ridley, 1881), and has also been recorded from the coast of Argentina (Burton, 1940; Cuartas, 1991, 2004) and in the Falkland Islands (Port William, Port Albemarle and William Scoresby stations 72 (NE East Falkland), 83 (west of George Island, East Falkland), 84 (west of Sea Lion Island) and 86 (south of Falkland Islands) (Burton, 1932, 1934)). Recent records are from the Jason Islands and Stanley in the Falkland Islands (Goodwin *et al.*, 2011). Depth range of previous Falkland records are from 17–147 m. This species seems to be quite common in the main Falkland Islands group but interestingly was not recorded at Beauchêne Island.

Family NIPHATIDAE Van Soest, 1980
Genus *Amphimedon* Duchassaing & Michelotti, 1864
Amphimedon maresi (Sarà, 1978)

SPECIMENS

Samples in 95% ethanol, tissue section and spicule preparation on slides. [BELUM.Mc6299] Beauchêne Island Site 001; [BELUM.Mc6311] Beauchêne Island Site 002; [BELUM.Mc6335] Beauchêne Island Site 003.

External morphology (*Figure 11A*)

In situ: Pale orange sponge composed of lobes with terminal oscules with a slightly bumpy surface. In the smaller specimens groups of 2–3 lobes join to form flattened branches. In the larger specimen (BELUM.Mc6335) some of these have coalesced to form a more solid mass. Preserved in alcohol: pale cream massive sponge. Choanosome very soft, composed of network of spicule fibres with very little tissue in between. Ectosome slightly shiny, smooth but porous with several large oscules with smooth, slightly raised rims.

Skeleton (*Figure 11B*)

Regular reticulate skeleton with columns of oxeas 7–8 spicules thick. Thinner oxeas are present in the choanosome between the spicule tracts.

Spicules (*Figure 11C*)

Oxea: Sharply pointed oxea, often with one or more angular bends along their length. Very variable in width. [BELUM.Mc6299] 162(195)227 by 3.8(7.8)12.4 μm; [BELUM.Mc6311] 163(185)217 by 3.2(5.2)7.8 μm; [BELUM.Mc6335]143(192)216 by 5.4(8.0)9.6 μm.

Remarks

Amphimedon maresi (Sarà, 1978) was first described as *Pachychalina maresi* from Isla de los Estados, on the tip of Argentina. The type specimen is a massive sponge (9 × 3 × 4 cm) consisting of several fused lobes with oxea 160–200 by 2–6 μm and a reticulate skeleton of primary fibres 40–100 μm in diameter and secondary 10–40 μm. This species has been recorded by Willenz *et al.* (2009) from the SE Pacific Chilean coasts and the Straits of Magellan from 0–20 m. Willenz *et al.* (2009) record spicule dimensions as 150–265 by 3–8 μm. They note that the oscules are sometimes formed into large trumpet-like structures, but we did not find these in our specimens. The specimens figured are otherwise similar in form but are a slightly brighter orange in colour. This is the first record for the Falkland Islands.

DISCUSSION

Nine sponge species new to science were identified by this study, and the range of one was notably expanded. Worldwide, Porifera remain a historically understudied group and the potential for discovery of new species is high; although only 8553 valid recent sponge species are currently recognized, at current discovery rates, this is predicted to increase to around 12 000 by the end of the current century (Van Soest *et al.*, 2012). Knowledge of the Porifera of the south-west Atlantic is particularly fragmentary, with large areas having never been previously sampled (Lopez & Landoni, 2005). Although the Falkland Islands are comparatively well sampled for this region, sampling has been largely from deep water, and the shallow water sponge fauna remains poorly known. Other studies have indicated that many of the encrusting sponges of shallow bedrock habitats remain undescribed, even in intensively studied areas (Picton & Goodwin, 2007; Goodwin & Picton, 2009). Many of the species described here were encrusting on bedrock, a habitat unlikely to have been sampled effectively by the previous surveys which sampled by dredging and trawling.

Of the 21 species recorded in this survey, nine are new species, 11 have been found in other regions of the Falklands, and four have been found regionally in the South Atlantic. A comparison between this study and that using identical methodology in South Georgia (Goodwin *et al.*, 2012) demonstrated zero overlap in sponge fauna. Confirmation of biogeographic patterns requires further sampling, both around the archipelago and throughout the region.

The degree of affinity of Antarctic and sub-Antarctic marine flora and fauna is a subject of debate. For most groups, the regions are regarded as distinct, with the

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Antarctic Polar Front, detectable as deep as 1000 m, forming a natural barrier (Griffiths, 2010; Campos *et al.*, 2011). For Porifera, Sarà *et al.* (1992) reported a high degree of affinity between regions attributed to the faunal exchanges along the Scotia Arc, whereas Rios (2006) viewed the Magellanic region as a distinct biogeographic entity. Burton (1932, 1934) reports many sponge species from both the Antarctic and sub-Antarctic and the Falkland Islands, and analysis by Downey *et al.* (2012), including Burton's data, also revealed a strong faunistic link between the South American and Antarctic biogeographic regions, with South Georgia and the Shag Rocks (SE of Falkland Islands) representing a region of overlap. However, no Antarctic species were reported from this study, and we suspect that the species found here that have also been recorded below the Polar Frontal Zone (*Halichondria* (*Eumastia*) *attenuata* from South Georgia (Burton, 1934) and Bransfield Strait in Antarctica (Campos *et al.*, 2007), and *Haliclona* (*Soestella*) *chilensis* from the South Shetland Islands (Campos *et al.*, 2007)), may have been misidentified in those studies.

Whilst it was previously supposed that many southern Atlantic and Antarctic sponges were eurybathic, Downey *et al.* (2012) demonstrated that only 19% have been shown to have a depth range of over 500 m. Given their restricted larval distribution (Maldonado & Young, 1996; Maldonado & Bergquist, 2002), this would probably prevent dispersal of shallow water species across the bathyal depths separating the Falkland Islands from the Antarctic, but allow movement between the Falkland Islands and continental South America across the shallower Argentine shelf. Deeper water or eurybathic species would be able to cross bathyal depths, and therefore the deep-water sponge faunas of the Falklands and South America may be more closely related to that of the Antarctic: studies of a deep water canyon (360 m) off Argentina have found a sponge fauna differing significantly from the shallow water habitats adjacent to it, including Antarctic species not known from the region (Bertolino *et al.*, 2007).

Within the Falklands, some sponge species appear to be widespread while others are more locally endemic. Several recently described species from the north-west of the Falklands (Goodwin *et al.*, 2011) were recorded in the southern islands, indicating that many of these are widely distributed in the Falkland Islands. However, the nine new species, some of which were conspicuous and common, had not been recorded from the Jason Islands or Stanley (Goodwin *et al.*, 2011), and several species known from the Jason Islands and Stanley (e.g. *Halichondria* (*Eumastia*) *herinacea* Goodwin *et al.*, 2011, *Lissodendoryx* (*Ectyodoryx*) *aurantiaca* Goodwin *et al.*, 2011, and *Lissodendoryx* (*Ectyodoryx*) *jasonensis* Goodwin *et al.*, 2011) were not found. The sub-Antarctic waters which influence the south-eastern Falkland Islands are distinct from the temperate influences on the north-west (Arkhipkin *et al.*, 2013). Biogeographic differences between the regions have been demonstrated for fish and squid (Arkhipkin *et al.*, 2013) with the south-east being associated with sub-Antarctic species. The sponge faunas could also thus be expected to differ. High levels of regional endemism in sponges have been shown in other areas, with oceanographic circulation and sea surface temperature demonstrated as important factors in shaping zoogeographic affinities (Xavier & van Soest, 2012).

The fact that some species with few spicule characters may have been misidentified in previous expeditions complicates our understanding of the true biogeographic ranges of South Atlantic sponge species. Many species are incorrectly regarded as widely distributed as a result of over-conservative systematic traditions (Xavier & van Soest, 2012). Use of *in situ* morphology and molecular tools as needed, along with broader local and regional surveying will aid in correct identification and improve our knowledge of species and regional biogeography.

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REFERENCES

Acha E.M., Mianzan H.W., Guerrero R.A., Favero M. and Bava J. (2004) Marine fronts at the continental shelves of austral South America: physical and ecological processes. *Journal of Marine Systems* 44, 83–105.

Arkhipkin A., Brickle P. and Laptikhovsky V. (2013) Links between marine fauna and oceanic fronts on the Patagonian Shelf and Slope. *Arquipelago. Life and Marine Sciences* 30, 19–37.

Bergquist P.R.and Fromont P.J. (1988) The marine fauna of New Zealand: Porifera, Demospongiae, Part 4 (Poecilosclerida). *New Zealand Oceanographic Institute Memoir* 96, 1–197.

Bertolino M., Schejter L., Calcinai B., Cerrano C. and Bremec C. (2007) Sponges from a submarine canyon of the Argentine. In Custódio M., Lôbo–Hajdu G., Hajdu E. and Muricy G. (eds) *Porifera research: biodiversity, innovation and sustainability*. Série Livros 28. Rio de Janeiro: Museu Nacional de Rio de Janeiro, pp. 189–201.

https://doi.org/10.1017/S0025315414001775 Published online by Cambridge University Press

Bianchi A., Massonneau M. and Olevera R.M. (1982) Analisis estadıstico de las caracterısticas T/S del sector austral de la plataforma continental argentina. *Acta Oceanografica Argentina* 3, 93–118.

BirdLife International (2014). Country profile: Falkland Islands (Malvinas). http://www.birdlife.org/datazone/country/falkland-islands-malvinas.

Boury-Esnault N. (1971) Spongiaires de la zone rocheuse de Banyuls-sur-Mer. 2. Systématique. *Vie et Milieu* 22, 287–350.

Boury-Esnault N. and Van Beveren M. (1982) Les démosponges du plateau continental de Kerguelen–Heard. *Comité National Français des Recherches Antarctiques* 30, 113–127.

Brøndsted H.V. (1924) Papers from Dr. Th. Mortensen's Pacific Expedition 1914–16. XV. Sponges from the Auckland and Campbell Islands. *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjøbenhavn* 75, 117–167.

Brøndsted H.V. (1927) Antarctic and subantarctic sponges collected by S. Wallin 1924. *Arkiv för Zoologi* 19A, 1–6.

Burton M. (1929) Porifera. Part II. Antarctic sponges. British Antarctic Terra Nova Expedition 1910. Natural History Report. *Zoology* 6, 393–458.

Burton M. (1930) Report on a collection of sponges from South Georgia and from Campbell Island, South Pacific, obtained by Dr. Kohl-Larsen. *Senckenbergiana* 12, 331–335.

Burton M. (1932) Sponges. *Discovery Reports* 6, 237–392.

Burton M. (1934) Sponges. *Further Zoological Results of the Swedish Antarctic Expedition 1901–1903* III, pp. 1–58.

Burton M. (1940) Las esponjas marinas del Museo Argentino de Ciencias Naturales. *Anales del Museo Argentino de Ciencias Naturales* XL, 95–121.

Calcinai B. and Pansini M. (2000) Four new demosponges from Terra Nova Bay (Ross Sea, Antarctica). *Zoosystema* 22, 369–381.

Campos L.S., Bassoi M., Nakayama C., Valentin Y.Y., Lavrado H.P., Menot L. and Sibuet M. (2011) Antarctic ~ South American interactions in the marine environment: a COMARGE and CAML effort through the South American Consortium on Antarctic Marine Biodiversity. *Oecologia Australis* 15, 5–22.

Campos M., Mothes B. and Veitenheimer Mendes I.L. (2007) Antarctic sponges (Porifera, Demospongiae) of the South Shetland Islands and vicinity. Part I. Spirophorida, Astrophorida, Hadromerida, Halichondrida and Haplosclerida. *Revista Brasileira de Zoologia* 24, 687–708.

Cristobo F.J. and Urgorri V. (2001) Revision of the genus *Trachytedania* (Porifera: Poecilosclerida) with a description of *Trachytedania ferrolensis* sp. nov from the north-east Atlantic. *Journal of the Marine Biological Association of the United Kingdom* 81, 569–579.

Cuartas E.I. (1986) Poriferos de la Campana del B/I 'Dr. E. Holmberg' (Demospongiae). *Neotropica* 32, 45–48.

Cuartas E.I. (1991) Demospongiae (Porifera) de Mar del Plata (Argentina), con la descripción de *Cliona lisa* sp.n. y *Plicatellopsis reptans* sp. n. *Neritica* 6, 43–63.

Cuartas E.I. (1992) Poriferos de la provincia biogeográfica Argentina. III. Poecilosclerida (Demospongiae) del littorale marplatense. *PHYSIS Sección A* 47, 73–88.

Cuartas E.I. (1995) Esponjas de Tierra del Fuego (Porifera). *Annali del Museo civico di storia naturale Giacomo Doria* 90, 349–379.

Cuartas E.I. (2004) Esponjas. In Boschi E.E. and Cousseau M.B. (eds) *La Vida Entre Mareas: Vegetales y animales de la Costas de Mar del Plata, Argentina*. Mar del Plata: Publicaciones Especiales INIDEP, pp. 87–92.

Dendy A. (1924) Porifera. Part I. Non-Antarctic sponges. *Natural History Report. British Antarctic (Terra Nova) Expedition, 1910 (Zoology)* 6, 269–392.

Desqueyroux R. (1972) Demospongiae (Porifera) de la Costa de Chile. *Gayana* 20, 3–71.

Desqueyroux–Faúndez R. and van Soest R.M.W. (1996) A review of the Iophonidae, Myxillidae and Tedaniidae occurring in the South East Pacific (Porifera: Poecilosclerida). *Revue Suisse de Zoologie* 103, 3–79.

Downey R.V., Griffiths H.J., Linse K. and Janussen D. (2012) Diversity and distribution patterns in high southern latitude sponges. *PLoS ONE* 7, e41672. Doi:10.1371/journal.pone.0041672.

Franco B.C., Piola A.R., Rivas A.L., Baldoni A. and Pisoni J.P. (2008) Multiple thermal fronts near the Patagonian shelf break. *Geophysical Research Letters* 35, Lo2607.

Goodwin C., Brewin P.E. and Brickle P. (2012) Sponge biodiversity of South Georgia island with descriptions of fifteen new species. *Zootaxa* 3542, 1–48.

Goodwin C., Jones J., Neely K. and Brickle P. (2011) Sponge biodiversity of the Jason Islands and Stanley, Falkland Islands with descriptions of twelve new species. *Journal of the Marine Biological Association of the United Kingdom* 91, 275–301.

Goodwin C.E. and Picton B.E. (2009) Demosponges of the genus *Hymedesmia* (Poecilosclerida: Hymedesmidae) from Rathlin Island, Northern Ireland, with a description of six new species. *Zoological Journal of the Linnean Society* 156, 896–912.

Griffiths H.J. (2010) Antarctic marine biodiversity – what do we know about the distribution of life in the Southern Ocean? *PloS ONE* 5, e11683.

Hajdu E., Desqueyroux-Faúndez R., de Souza Carvalho M., Lôbo-Hajdu G. and Willenz P. (2013) Tweleve new demospongiae (Porifera) from Chilean fjords, with remarks upon sponge-derived biogeographic components in the SE Pacific. *Zootaxa* 3744, 1–64.

Hentschel E. (1914) Monoaxone Kieselschwämme und Hornschwämme der deutschen Südpolar Expedition. *Deutsche Südpolar Expedition 1901–1903 Bd. 15* (Zoology) 7, 35–141.

Hooper J.N.A. (1996) Revision of Microcionidae (Porifera: Poecilosclerida: Demospongiae), with descriptions of Australian species. *Memoirs of the Queensland Museum*, 40.

Hooper J.N.A. (2002) Family Microcionidae Carter, 1875. In Hooper J.N.A. and Van Soest R.W.M. (eds) *Systema Porifera. Guide to the classification of sponges. 1*. New York, NY: Kluwer Academic/Plenum Publishers, pp. 432–468.

Kirkpatrick R. (1907) Preliminary report on the Monaxonellida of the National Antarctic Expedition. *Annals and Magazine of Natural History* 20, 271–291.

Koltun V.M. (1964) Sponges of the Antarctic. 1 Tetraxonida and Cornacuspongida. In Pavlovskii E.P., Andriyashev A.P. and Ushakov P.V. (eds) *Biological reports of the Soviet Antarctic expedition (1955–1958), Akademya Nauk SSSR*, pp. 6–133, 443–448 [English translation, 1966, Jerusalem: Israel Program for Scientific Translation].

Koltun V.M. (1976) Porifera – part 1: Antarctic sponges. Report B.A.N.Z. *Antarctic Research Expedition 1929–1931* (B, Zoology and Botany) 5, 153–198.

Lévi C. (1963). Spongiaires d'Afrique du Sud. (1) Poecilosclerides. *Transactions of the Royal Society of South Africa* 37, 1–43.

Lopez Gappa J. and Landoni N.A. (2005) Biodiversity of Porifera in the south-west Atlantic between 358S and 568S. *Revista del Museo Argentino de Ciencias NaturalesNueva Serie* 7, 191–219.

https://doi.org/10.1017/S0025315414001775 Published online by Cambridge University Press

Maldonado M. and Bergquist P.R. (2002) Phylum Porifera. In Young C.M., Sewell M.A. and Rice M.E. (eds) *Atlas of marine invertebrate larvae*. San Diego, CA: Academic Press, pp. 21–50.

Maldonado M. and Young C. (1996) Bathymetric patterns of sponge distribution on the Bahamian slope. *Deep Sea Research Part I: Oceanographic Research Papers* 43, 897–915.

Martos P. and Piccolo M. (1988) Hydrography of the Argentine Continental Shelf between 38°and 42°S. *Continental Shelf Research* 8, 1033–1056.

Pansini M. (1987) Littoral demosponges from the banks of the Strait of Sicily and the Alboran Sea. In Vacelet J.B. and Boury-Esnault N. (eds) *Taxonomy of Porifera from the northeast Atlantic and Mediterranean Sea*. Vol. 13. Berlin: Springer-Verlag, pp. 149–186.

Peterson R.G. and Whitworth T. III (1989) The sub-Antarctic and Polar fronts in relation to deep water masses through the south-western Atlantic. *Journal of Geophysical Research* 94, 10817–10838.

Picton B.E.P. and Goodwin C.E. (2007) Sponge biodiversity of Rathlin Island, Northern Ireland. *Journal of the Marine Biological Association of the United Kingdom* 87, 1441–1458.

Ridley S.O. (1881) Account of the Zoological Collections made during the Survey of H.M.S. 'Alert' in the Straits of Magellan and on the Coast of Patagonia. Spongida. *Proceedings of the Zoological Society of London* 1881, 107–139, 140–141.

Ridley S.O. and Dendy A. (1886) Preliminary report on the Monoaxonida collected by H.M.S. Challenger. Part II. *Annals and Magazine of Natural History* 18, 470–496.

Ríos P., Cristobo F.J. and Urgorri V. (2004) Poecilosclerida (Porifera, Demospongiae) collected by the Spanish Antarctic expedition BENTART-94. *Cahiers Biologie Marine* 45, 97–119.

Rios P.L. (2006) *Esponjas del orden poecilosclerida de las campañas de bentos antártico*. PhD thesis. University of Santiago de Compostela, Santiago de Compostela, Spain.

Sarà M. (1978) Demospongie di acque superficiali della Terra del Fuoco. *Bollettino dei Musei e degli Istituti biologici dell'Università di Genova* 46, 7–117.

Sarà M., Balduzzi A., Barbieri M., Bavestrello G. and Burlando B. (1992) Biogeographic traits and checklist of Antarctic demosponges. *Polar Biology* 12, 559–585.

Sarà M., Barbieri M., Bavestrello G. and Burlando B. (1992) Biogeographic traits and checklist of Antarctic desmosponges. *Polar Biology* 12, 559–585.

Schejter L., Bertolino M., Calcinai B., Cerrano C. and Bremec C. (2011) Epibiotic sponges on the hairy triton *Fusitriton magellanicus* in the SW Atlantic Ocean, with the description of *Myxilla (Styloptilon) canepai* sp. nov. *Aquatic Biology* 14, 9–20.

Shallow Marine Surveys Group (2009) Expedition Report, Southern Islands, December 2009, 17 pp.

Stephens J. (1915) Atlantic sponges collected by the Scottish National Antarctic Expedition. *Transactions of the Royal Society of Edinburgh* 50, 423–467.

Thiele J. (1905) Die Kiesel- und Hornschwamme der Sammlung Plate. *Zoologische Jahrbücher* 6, 407–495.

Thomas P.A. and Mathew K.J. (1986) Sponges collected during the Third Indian Antarctic Research Expedition with description of *Isodictya echinata* sp nov. *Scientific Report of Third Indian Expedition to Antarctica*, Technical Publication No. 3, pp. 109–116.

Topsent E. (1901) *Spongiaires. Résultats du voyage du S.Y. Belgica (1897–1899) sous le commandement de A. de Gerlache de Gomery*. Anvers: J.E. Buschmann.

Topsent E. (1907) Pocilosclérides novelles recueillies par le 'Française' dans l'Antarctique. *Bulletin du Muséum d'Histoire Naturelle, Paris* 13, 69–76.

Topsent E. (1913) Spongiaires de l'Expédition Antarctique Nationale Ecossaise. *Transactions of the Royal Society of Edinburgh* 49, 579–643.

Topsent E. (1915) Spongiaires recueillis par la 'Scotia' dans l'Antarctique (1903–1904). *Transactions of the Royal Society of Edinburgh* 51, 35–43.

Topsent E. (1916) Diagnoses d'éponges recueillies dans l'Antarctique par le Pourquoi-Pas? *Bulletin du Muséum national d'histoire naturelle* 22, 163–172.

Topsent E. (1917) *Spongiaires. Deuxième Expédition Antarctique Française (1908–1910) commandée par le Dr Jean Charcot*. Sciences naturelles documents scientifiques. Paris: Masson et Cie.

Vacelet J. and Perez T. (1998) Two new genera and species of sponges (Porifera, Demospongiae) without skeleton from a Mediterranean cave. *Zoosystema* 20, 5–22.

Van Soest R.W.M. (2002a) Family Myxillidae Dendy, 1922. In Hooper J.N.A. and Van Soest R.W.M. (eds) *Systema Porifera. Guide to the classification of sponges. 1*. New York, NY: Kluwer Academic/Plenum Publishers, pp. 602–620.

Van Soest R.W.M. (2002b) Family Tedaniidae Ridley & Dendy, 1886. In Hooper J.N.A. and Van Soest R.W.M. (eds) *Systema Porifera. Guide to the classification of sponges. 1*. New York, NY: Kluwer Academic/Plenum Publishers, pp. 625–632.

Van Soest R.W.M., Boury-Esnault N., Hooper J.N.A., Rützler K., de Voogd N.J., Alvarez de Glasby B., Hajdu E., Pisera A.B., Manconi R., Schoenberg C., Janussen D., Tabachnick K.R., Klautau M., Picton B., Kelly M., Vacelet J., Dohrmann M. and Cristina Díaz M. (2013) World Porifera database. http://www.marinespecies.org/porifera.

Van Soest R.W.M., Boury-Esnault N., Vacelet J., Dohrmann M., Erpenbeck D., De Voogd N.J., Santodomingo N., Vanhoorne B., Kelly M. & Hooper J.N.A. (2012) Global diversity of sponges. *PLoS ONE* 7, 1–23.

Van Soest R.W.M. and Hajdu E. (2002) Family Esperiopsidae Hentschel, 1923. In Hooper J.N.A. and Van Soest R.W.M. (eds) *Systema Porifera. Guide to the classification of sponges. 1*. New York, NY: Kluwer Academic/Plenum Publishers, pp. 656–664.

Wiedenmayer F. (1977) *Shallow-water sponges of the western Bahamas*. Experientia Supplementarum 28. Basel: Birkhaüser Verlag, 331 pp.

Willenz P., Hajdu E., Desqueyroux-Faúndez R., Lôbo-Hajdu G. and de Souza Carvalho M. (2009) Class Demospongiae. In Häussermann V. and Försterra G. (eds) *Marine Benthic Fauna of Chilean Patagonia*. Puerto Montt: Nature in Focus, pp. 94–170.

and

Xavier J.R. and van Soest R.W.M. (2012) Diversity patterns and zoogeography of the Northeast Atlantic and Mediterranean shallow-water sponge fauna. *Hydrobiologia* 1, 107–125.

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