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Sea Pens (Cnidaria: Pennatulacea) from Argentine waters: new distributional records and first report of associated anemones

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Abstract: In the present study, we report recent findings of the sea pens *Anthoptilum grandiflorum*, *Pennatula inflata* and *Halipteris africana* in order to update their distributional information in areas under Argentine jurisdiction. In this sense, we update the southern distributional limit of the species in Argentina to the Burdwood Bank. We also report the association of *A. grandiflorum* and *H. africana* with the sea anemone *Hormathia pectinata*. The kind of relation between both associates is discussed. This represents the first record of an association between sea pens and anemones for the South Atlantic Ocean and the second report in the world.

Key Words: Octocorallia, Burdwood Bank, synonymy, distribution patterns, association, SW Atlantic Ocean

Resumen. Plumas de mar (Cnidaria: Pennatulacea) en aguas argentinas: nuevos registros y primer reporte de anémonas asociadas. En el presente estudio, reportamos los hallazgos recientes de las plumas de mar *Anthoptilum grandiflorum*, *Pennatula inflata* y *Halipteris africana* con el fin de actualizar los datos sobre distribución de estas especies en áreas bajo jurisdicción argentina. En este sentido, se actualizó el límite austral de dos de estas especies hasta el Banco Burdwood. También se reporta por primera vez la asociación entre *A. grandiflorum* y *H. africana* con la anémona *Hormathia pectinata*. Se discute asimismo, el tipo de relación existente entre ambas partes. Este tipo de asociación (entre pennatuláceos y anémonas de mar) constituye el segundo reporte a nivel mundial y el primero para el Océano Atlántico Sudoccidental.

Palabras clave: Octocorallia, Burdwood Bank, sinonimia, patrones de distribución, asociaciones, Océano Atlántico Sudoccidental

Introduction

Sea pens are a particular group of octocorals belonging to the Order Pennatulacea. They can be found in all the world´s oceans, from tropical to polar regions and from intertidal to more than 6100 m depths (Williams 2011). In deep seas, pennatulaceans are found patchily distributed in moderately high energy environments, mostly seamounts, slopes and along bases of ridges (Williams 1992). In these environments, they usually colonize soft bottoms, in which may form dense burrowing megafaunal communities, called "sea pen stands", one of the known animal forests habitats constituted by cold-water corals (Buhl-Mortensen *et al.* 2017). Sea pens have been identified as vulnerable species, as the habitats which they form are physically and functionally fragile, considered as Vulnerable Marine Ecosystems (VME) (FAO 2009). The Northwest Atlantic Fisheries Organization (NAFO) closed several areas to bottom-contact fishing gear to protect the sea pens and, in Canada, sea pen stands are referred as Ecological and/or Biological Significant Areas that require special management consideration (Murillo *et al.* 2018).

Thirty seven extant genera of Pennatulacea are currently recognized (Pérez *et al.* 2016), although a major systematic revision is needed, considering the recent discrepancies between traditional (morphological) and molecular classifications (Dolan *et al.* 2013). In Argentina, 15 species of sea pens have been recorded so far (Table I), while *Pennatula argentina* Acuña & Zamponi, 1992 described for Buenos Aires coast, is considered a junior synonym of *Anthoptilum grandiflorum* (Verril, 1879) (Pérez & Silva 2003). Only few studies regarding sea pens were developed in Argentinean waters. Recently, from a series of Spanish Expeditions performed between 2007 and 2010, del Río *et al.* (2012) reported sea pens in catches ranging from 1.69 to 44.7 kg per 0.5 hour of trawling at about 200 miles off the Argentinean coast, between 42° and 48°S. In the same region, these octocorals were also found to be the most abundant benthic cnidarians in deep (1001–1500 m) substrata (Portela *et al.* 2012, 2015). In the latter study, *Anthoptilum grandiflorum* and *Halipteris* sp. were the dominant species, although other species such as *Funniculina quadrangularis* (Pallas, 1766), *Pennatula* spp., *Virgularia* sp. and *Distichoptilum gracile* Verrill, 1882 were also reported in the previous study by del Río *et al.* (2012). All these evidences highlight the importance of pennatulaceans as indicators of the VME detected at the Argentinean continental shelf and slope (Durán Muñoz *et al.* 2012).

Compared to other cnidarians, there have been relatively few records of species associated with sea pens (Buhl-Mortensen *et al.* 2017). Some of the known associates are obligate (e.g. parasitic copepods) (Humes 1985) and others can be facultative symbionts (e.g. ophiuroids, sea anemones) (De Clippele *et al.* 2015, Baillon *et al.* 2014). Fish and crustacean larvae can also be found in association with sea pens, which emphasizes the role of these cnidarians as nurseries or essential fish habitats (Baillon *et al.* 2012). Off the Norwegian coast, twelve taxa were recorded associated with four sea pen species (*Kophobelemnon stelliferum* (Müller, 1776), *Virgularia mirabilis* (Müller, 1776), *Funiculina quadrangularis* and *Pennatula phosphorea* Linnaeus, 1758), but only 5% of the studied colonies hosted associated fauna (mainly shrimps and ophiuroids) (De Clippele *et al.* 2015). In the Northwest Atlantic, fourteen species (some free living) were closely associated with two sea pen species (*A. grandiflorum* and *H. finmarchica* (Sars, 1851)), whereas the most common associates were endosymbiotic copepods (prevalence 72%) (Baillon *et al.* 2014).

In the present study, we report recent findings of the sea pens *Anthoptilum grandiflorum*, *Pennatula inflata* Kükenthal, 1910 and *Halipteris africana* (Studer, 1878) in order to update their distributional information in areas under Argentine jurisdiction. Additionally, we report for the first time the association between pennatulaceans with the sea anemone *Hormathia pectinata* (Hertwig, 1882).

Material and Methods

Burdwood Bank: Specimens of *Anthoptilum grandiflorum* and *Halipteris africana* were collected in five sites during two research cruises carried out in 2016 and 2017 onboard the RV "Puerto Deseado" using trawl nets (Fig. 1). The cruises aimed to characterize and provide a complete faunistic inventory of the Namuncurá Marine Protected Area, Burdwood Bank (created in 2013 by the Argentine National Law 26.875), including the slope and neighboring areas, after the first preliminary and baseline data provided by Schejter *et al.* (2016, 2017a) and Bremec *et al.* (2017). Sampling was performed using bottom trawls. Sorting of the catch was developed onboard and specimens of *A. grandiflorum* and *H. africana* were separated from the total catch and photographed. Few available specimens were also preserved (frozen) for taxonomic purposes. They were transported to the Benthos Laboratory, Instituto Nacional de Investigación y Desarrollo Pesquero, Argentina. Complementary taxonomic studies were performed at GPA-Anthozoan Research Group, Centro Académico de Vitória, Universidade Federal de Pernambuco, Brazil. Associated sea anemones were counted and fixed in formaldehyde after the initial

Table I. Pennatulacean species recorded in Argentine waters. * endemic

TAXA	RECORDED LOCATIONS	DEPTH RANGE (m)	REFERENCES
Anthoptilum grandiflorum (Verril, 1879)	Buenos Aires coast (38°-41°S-57°-55°W), Malvinas Is., 52°12'S - 56°51'W, 200 miles off the Patagonian coast (42-48°S, 59°-61°W)	200-1105	Acuña & Zamponi 1992; Pasternak 1975; Pérez & Silva 2003; del Río *et al*. 2012
Distichoptilum gracile Verrill, 1882	200 miles off the Patagonian coast (42-48°S 59°-61°W)		del Río *et al*. 2012
Funniculina quadrangularis (Pallas, 1766)	200 miles off the Patagonian coast (42-48°S 59°-61°W)		del Río *et al*. 2012
Halipteris sp.	San Antonio Cape (Buenos Aires coast) (as *Balticina* sp.) (38°06´S 55°13´W); 200 miles off the Patagonian coast (42-48°S 59°-61°W)	440-480	Barreira e Castro 1990; del Río *et al*. 2012; Portela *et al*. 2015
Pennatula inflata Kükenthal, 1910	Buenos Aires coast (41° 30´S 57° 20´W)	439	Acuña & Zamponi 1992
Renilla muelleri Kölliker, 1872	External sector of Río de la Plata (35°08'S 52°35'W); Mar del Plata (Buenos Aires) (36°21'S 56°33'W)	9-150	Studer 1878; Zamponi & Pérez 1995
R. musaica Zamponi & Pérez, 1995	Off Mar del Plata, Buenos Aires coast (39°59'S 56°16'W)	100-200	Zamponi & Pérez 1995
R. octodentata Zamponi & Pérez, 1995	Camarones Bay (44°48'S 65°30'W;) and San Jorge Gulf (46°39'S 66°00'W; 46°51'S 66°25'W), (Patagonian coast)	25-91	Zamponi & Pérez 1995
R. reniformis (Pallas, 1766)	Strait of Magellan; Patagonian Coast (41°35'S 57°53'W); 45°59'S 59°57'W; 50°42's 67°54'W); Malvinas Island (50°46'S 56°01'W; 53°26'S 61°33'W); Staten Island (54°34'S 61°59'W); Burdwood Bank (; 53°26'S 61°33'W; 54°18'S 56°10'W)	80-900	May 1899; Zamponi & Pérez 1995
Stylatula antillarum Kölliker, 1872	Monte Hermoso (39°00'S 61°10'W) (Buenos Aires coast); San Matías Gulf (41°16'S 63°20'W), Punta Medanosa (48°15'S 66°00'W) (Patagonian coast)	38	Zamponi & Pérez 1996
S. darwini Kölliker, 1870 *	Bahía Blanca, Puerto Quequén (38°43'S 58°15'W); off Buenos Aires coast (39°10'S 56°20'W), Punta Pardelas (42°32'S 64°15'W) (Patagonian coast)	-	Kölliker 1870; Zamponi & Pérez 1996
S. polyzoidea Zamponi and Pérez, 1996 *	Bahía San Blas (40°45'S 62°15'W); Puerto Quequén (38°30'S 58°40'W), Isla de los Pájaros (42°27'S 64°30'W) (Patagonian coast)	57	Zamponi & Pérez 1996
Virgularia kophameli May, 1899	Coy Inlet, Santa Cruz (50°56' S 69°14´W) (Patagonian coast)	190	Deichmann 1936
Virgularia mirabilis (Linnaeus, 1758)	Buenos Aires coast, Mar del Plata (38°58'S 55°39'W)	127	Zamponi & Pérez 1996

relaxation using magnesium chloride. They were afterwards transported to LABIC (Laboratorio de Biología de Cnidarios), Universidad Nacional de Mar del Plata and Instituto de Investigaciones Marinas y Costeras (IIMyC), Argentina, for taxonomic purposes.

Argentinean slope: Additional samples of Pennatulacea were obtained from the shelf-break region, off Buenos Aires province. Sea pens were recorded in 3 hauls during a Patagonian scallop stock assessment cruise, onboard the FV "Atlantic Surf III" in 2011, using a commercial bottom trawl

(Fig. 1). These samples were collected in neighboring areas of the fishing grounds of *Zygochlamys patagonica* (King, 1832), but at deeper waters in the slope (Schejter *et al.* 2017b).

Results

Sea pens recorded: Three species of Pennatulacea were recorded in eight stations surveyed in waters of the Argentinean bathyal region (Table II, Figs. 1, 2, 3). *Anthoptilum grandiflorum* was the most frequent and abundant sea pen taxon recorded. This widespread species (238-2500 m depth) is characterized by the presence of non-retractile polyps arranged in oblique rows with the adjacent polyps fused at base (see Williams 1990, 2011; López-González *et al.* 2001). The second recorded species, *Halipteris africana* is an amphi-Atlantic species (459-659 m depth) with autozooids arranged in several oblique rows (3–7 per row), which may form basal ridges by fusion of proximal regions of autozooids (see Williams 1990; Acuña & Zamponi, 1992 -as *Halipteris heptazooidea*- and López-González *et al.* 2001). These two species were both recorded at Burdwood Bank and at the slope off Buenos Aires province. The third species, *Pennatula inflata*, was only recorded at site 3, at the slope off Buenos Aires province (one specimen). A complete description of the species is provided by Williams (1990) and by López-González *et al.* (2001). In general, few sea pens were recorded in all sites, except for sites 3 and 8 (Figs. 1, 2), where pennatulaceans were important components of the catch (reaching about 26% and 62% of the total catch, respectively, in wet weight), particularly *A. grandiflorum*.

Pennatulacea- sea anemone association: A pennatulacea- sea anemone association was recorded in three sites of the present study: at site 3 (cruise 2011, epibiotic on *Halipteris africana*), at site 4 (cruise 2016, epibiotic on *Halipteris africana* and *A. grandiflorum*) and at site 8 (cruise 2017, epibiotic on *A. grandiflorum*) (Fig. 3).

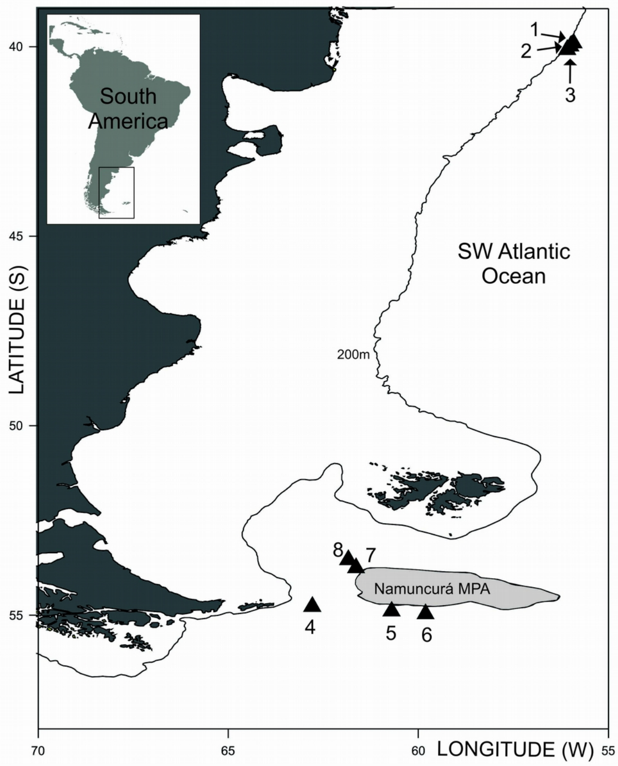

Figure 1. Sampling sites of the present study in reference to the Namuncurá MPA, Burdwood Bank, SW Atlantic Ocean.

Table II. Sampling sites of the present study, and recorded taxa of Pennatulacea.

SITE	Cruise code	Station code	Latitude (S)	Longitude (W)	Depth (m)	Sea pen taxa recorded
1	ASIII 2011	L6	39°50'	55°55'	399	*Anthoptilum grandiflorum*, *Halipteris africana*
2	ASIII 2011	L7	39°55'	56°00'	429	*Anthoptilum grandiflorum*
3	ASIII 2011	L35	40°00'	56°05'	403	*Anthoptilum grandiflorum*, *Pennatula inflata*, *Halipteris africana*
4	BBB ABR 16	EG13 L175, L172	54°41,79'	62°47,20'	681-701	*Anthoptilum grandiflorum*, *Halipteris africana*
5	BBB ABR 16	EG18 L266	54°49,26'	60°42,21'	607-611	*Anthoptilum grandiflorum*
6	BBB ABR 16	EG21 L245	54°53,43'	59°48,59'	767-1055	*Anthoptilum grandiflorum*
7	PD BB ABR 17	EG31 L269	53°40,35'	61°38,25'	642-641	*Anthoptilum grandiflorum*, *Halipteris africana*
8	PD BB ABR 17	EG33 L256	53°27,70'	61°50,49'	595-599	*Anthoptilum grandiflorum*

Figure 2. View of the catches with Pennatulacea as an important component. a. Site 3; b. Site 8.

The sea anemones were identified as *Hormathia pectinata*, a species already reported for Burdwood Bank by Riemann-Zürneck (1986). The identification of this well-known sea anemone was performed by examination of the external anatomy: the colour is white or light orange in living specimens (Fig. 3) while preserved specimens became whitish. The actinopharynx is brown to brown-red; column tough divided into scapus and scapulus. Scapus with brown cuticle, sometimes partially lost. Scapulus with tubercles with brown chitinous cuticle and with longitudinal ridges ending in larger coronal tubercles. Mouth opening prominent with thick lips. Numerous brown-red tentacles. The examined specimens fit very well the descriptions provided by Riemann-Zürneck (1973) and Haussermann and Försterra (2009).

In general, the sea anemones were attached to the axis of the colony. Particularly, on *Halipteris africana* the sea anemone *H. pectinata* was found firmly attached to the axis of an area lacking soft tissue (Fig. 3d). This situation was also recorded in one specimen at site 3, but in the latter case, the sea anemone was attached on a naked region in the middle of the axis, in which the lack of soft tissue was apparently caused by the sea anemone. In the case of *A. grandiflorum*, sea anemones were usually attached to an area of the raquis having soft tissue. Some small-sized specimens (basal diameter <1cm) were found on the dorsal part of the rachis (free of polyps) (Fig. 2c). In few cases, when the sea anemone was attached to the top end of the colony, the attachment was observed on the naked axis (e.g. Fig. 3a, b). We observed no preference for attachment to a particular region of the sea pen (top, middle or low). None epibionts were recorded at the peduncle, as expected.

At site 4 (EG 13, L175), it was possible to recover and inspect from the total catch and for the purposes of this study a total of 39 colonies of *Anthoptilum grandiflorum*. Ten colonies (25.64% of the total number of sea pen specimens) were found to bear epibiotic anemones on the central axis. Six (6) *A. grandiflorum* colonies were found with one epibiotic anemone each; two (2) other colonies with two anemones (Fig. 2a, b); one (1) with three anemones, and one (1) with four attached anemones. Additionally, from the same location, one colony of *Halipteris africana* was recorded with one *H. pectinata* epibiotic at the top end (Fig. 3d). Examination of a series of specimens showed different sizes of *H. pectinata* on the sea pens. For different circumstances, this was the only site in which a carefully inspection of all the sea pens from the catch was possible.

Sea anemones of the species *H. pectinata* were recorded at sites 3, 4, 5, 6, 7 and 8 (Table II), although it was not possible to detect the employed substrate in all the cases.

Discussion

Distribution patterns and taxonomical considerations: Based on data from recent cruises, in the present study, we report the presence of three species of sea pens in Argentinean deep waters. *Anthoptilum grandiflorum* was the most frequent and abundant species recorded and Burdwood bank represents the most austral location reported for this species in Argentina. Previously, Pasternak (1975) had established its austral limit at Malvinas Islands (~52°S). Considering our findings of the species from off Buenos Aires (~39°S) to Burdwood Bank (~54°S), and the several records reported by del Río *et al.* (2012) and Portela *et al.* (2015) between 42° and 48°S, it is evident that *A. grandiflorum* has a continuous distribution along all the Argentine continental slope, occurring in dense aggregations. The second reported species, *Pennatula inflata*, had

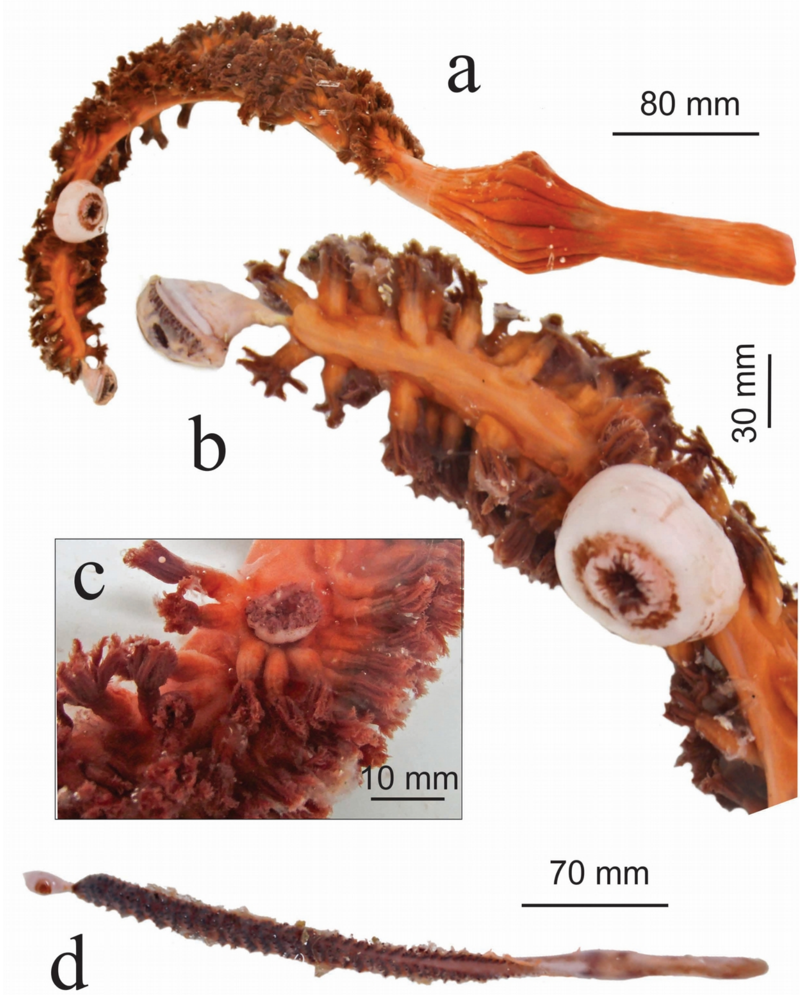

Figure 3. Association between the sea pen *Anthoptilum grandiflorum* with the sea anemone *Hormathia pectinata*. a. Sea pen with two epibiotic *H. pectinata*; b. Detail of the sea anemones and their fixation on the raquis of the sea pen; c. A young specimen of *H. pectinata* attached on soft tissue of the raquis of the sea pen between several polyps; d. Specimen of *Halipteris africana* with an epibiotic *H. pectinata* attached at the top end.

only one previous record in Argentina (Acuña & Zamponi 1992), from the slope nearby areas of sites 1–3. The present finding constitutes the second record of the species for this region.

The third species recorded, *Halipteris africana*, was previously reported from nearby sites 1–3 as *H. heptazooidea*. Acuña & Zamponi (1992) described *H. heptazooidea* for the coast off Buenos Aires, Argentina, but their description fits within *H. africana*. They mentioned that *H. heptazooidea* was close to *H. africana* and that the first had seven autozoids per row, round axis in cross section and distinct sclerites lengths. However, the description of *H. africana* (see Williams 1990) stated that it may have three to seven autozoids per row, and axis round to rounded-quadrangular. In relation to the size of the sclerites, we have already found great variations in descriptions of *H. africana*, for example: polypar sclerites (0.08-0.16 mm in López-González *et al.* 2001 and 0.10-0.15 mm in Williams 1990), calyx (0.38-1.04 mm in López-González *et al.* 2001 and 0.12-0.6 mm in Williams 1990) or peduncle (0.04-0.10 mm in López-González *et al.* 2001 and 0.04-0.07 mm in Williams 1990). *Halipteris heptazooidea* presented sclerites in the polyps of 0.05-0.30 mm long and 0.059-0.072 mm in the peduncle. The distinctiveness based only on sclerite sizes is rather fragile to establish a new taxon; in addition Baillon *et al.* (2015) have noticed in *Halipteris finmarchica* that the size of sclerites varies with depth; the specimens studied by López-González *et al.* (2001) were from 295-1112 m, Williams' specimens were from 459-659 m and Acuña & Zamponi´s specimens, from 439 m, which may explain differences in sclerite sizes. This taxonomic uncertainty was already mentioned by Bayer (1996) in a note referring to the publication of Acuña & Zamponi (1992): "The photographs of the new spp. are so indistinct and the drawings are so crude that not definitive conclusions can be drawn… *Halipteris heptazooidea* is unrecognizable". Thus, we consider *H. heptazooidea* as a junior synonym of *H. africana*, as all distinctive characters mentioned by Acuña & Zamponi (1992) (axis morphology, number of autozooids and sclerite size) are within the range of the Eastern Atlantic *H. africana* (see Williams 1990). In this sense, the latter species also has an amphi-Atlantic distribution along with *Pennatula inflata.*

Conservation: Anthoptilum and *Halipteris* are circumglobal and deep-sea genera, reaching in some cases high densities (Williams 2011; del Río *et al.* 2012). They are considered to act as biogenic habitats constituting sea pen stands (Baillon *et al*. 2012; Buhl-Mortensen *et al*. 2017). Based on the results from the Spanish expeditions, the importance of the sea pens recorded between 42° and 48° beyond 200 m depth was highlighted as components of VME in the SW Atlantic Ocean (Portela *et al.* 2012, 2015).

Anthoptilum grandiflorum is a gonochoric broadcast spawner, a successful reproductive strategy in deep-sea coral habitat forming species (Dahl *et al.* 2012; Baillon *et al.* 2014). In contrast to its congener *Anthoptilum murrayi*, which has a likely continuous reproductive cycle (Pires *et al.* 2009), *A. grandiflorum* has an annual reproductive cycle. In the present study *A. grandiflorum* represented 62% of the total catch at site 8, suggesting the presence of dense meadows at the NW slope of Burdwood Bank that may fall within the habitats considered VME. According to the present findings, some of the studied sites should be also taken into account for conservation purposes.

Associated species and ecological considerations: Many sea anemones were recorded as epibionts on molluscs and crustaceans in Argentina. In this sense, *Antholoba achates* (Drayton, 1846) was recorded on the spider crab *Libinia spinosa* Milne-Edwards, 1834 in coastal waters of Buenos Aires (Acuña *et al.* 2003), on the volutid gastropods *Adelomelon brasiliana* (Lamarck, 1811) also in Buenos Aires coastal waters by Luzzatto & Pastorino (2006) and on *Adelomelon ancilla* (Lightfoot, 1786) living specimens and dead empty shells at the shelf break of Argentina (Schejter & Escolar 2013). Pastorino (1993) also described the phoretic association between the gastropod *Buccinanops cochlidium* (Dillwyn, 1817) and *A. achates* (referred to as *Phlyctenanthus australis* Carlgren, 1949) from Patagonian coastal waters. Another common sea anemone, *Isotealia antarctica* (Carlgreen, 1899), was also reported by Schejter & Escolar (2013) as a frequent epibiont on the volutids *Adelomelon ancilla* and *Odontocymbiola magellanica* (Gmelin, 1791). *Isotealia antarctica* was also found attached to the gastropod *Coronium acanthodes* (Watson, 1882), to the hairy snail *Fusitriton magellanicus* (Röding, 1798), to the scallop *Zygochlamys patagonica*, to the brachiopod *Magellania venosa* (Dixon, 1789) and on empty tubes of the polychaete *Chaetopterus variopedatus* Renier, 1804 in the shelf break frontal area at the Patagonian scallop fishing grounds (Schejter & Bremec 2009 and author´s personal observations). The sea anemone *Isosicyonis alba* (Studer, 1879) was always reported attached to the volutid *Provocator* sp. (probably *P. corderoi*) in deep waters of Argentina (and Antarctica) (Fautin, 1984). Unidentified anemones were also recorded as epibionts on *Z. patagonica* (Schejter & Bremec 2007). Particularily, *Hormathia pectinata* has been reported in several localities of the Argentinean Sea on different hard substrata such as stones, polychaete tubes and *Dentalium* shells (Riemann-Zürneck, 1973), and epibiotic on molluscs (on *Buccinanops cochlidium*, Deserti *et al.* 2012; on unidentified bivalves, Mc Murrich 1893). The finding of this sea anemone living epibiotic on the colonies of *Anthoptilum grandiflorum* and *Halipteris africana* represents a new association not recorded until present.

Regarding the characteristics of the reported association, it was evidenced in the present study that a large number of *A. grandiflorum* (about 25%) was found associated with individuals of *Hormathia pectinata* settled on the rachis. In some cases, anemones were settled on the soft tissue, whereas few adult specimens of *H. pectinata* were also found strongly attached to the axis of the octocorals. Few records of octocoral tissue degradation by sea anemones are known (Watling *et al.* 2011; Peck & Brockington 2013), but all on scleraxonian and calcaxonian octocorals. Baillon *et al.* (2004, see figure 4 B) suggested two ways to explain the association between octocorals and the sea anemones: 1) the larval stage of sea anemone settle on naked zone of axis rod of the sea pen, supporting a commensalism relationship, or 2) the initial settlement of the sea anemone larva occurred on a small naked portion of the axis and further growing to the living tissues, configuring a parasitism. Both hypotheses could be plausible in the case of the sea pens recorded in the present study with *H. pectinata*. Excoffon *et al.* (2009) also reported a possible case of parasitism of the actiniarian *Nemanthus californicus* Carlgren, 1940 on the antipatharian *Myriopathes panamensis* (Verrill, 1869). In this association some colonies of the black coral had entire sections that were alive and anemone-free, while other sections had anemones and the coral tissue was dead underneath.

In this kind of associations, the sea anemones are benefited with hard surface to attach in a muddy seafloor and could also obtain food by consuming the octocoral tissues, as was also observed in *Dactylanthus antarcticus* (Clubb, 1908) over *Primnoella scotiae* Thomson & Ritchie, 1906 by Peck & Brockington (2013). On the other hand, there are not apparent benefits for the sea pens, instead, a possible loss of soft tissue in the colony. Moreover, the stability of the colony could be affected by the presence of several sea anemones. In consequence, this association could be defined as commensalism and, eventually, could configure a parasitism in extreme cases.

In conclusion and to the best of our knowledge, no other sea anemone-pennatulacean associations were reported for Argentina or other countries, with the only exception of the anemone *Stephanauge nexilis* (Verrill, 1883) that was reported on the sea pen *Halipteris finmarchica* in deep waters of the eastern Canada (Baillon *et al.* 2014). The associations reported herein represent the second report in the world and the first for the South Atlantic Ocean of a sea anemone with a pennatulacean. Based on the evidence discussed above, this association should be further investigated to assess it as parasitic.

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