

## **Ascidiacea (Chordata, Tunicata) from Uruguay (SW Atlantic): checklist and zoogeographic considerations**

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**Abstract:** The diversity of ascidians from the Southwestern Atlantic between 30°S and 40°S (southern Brazil, Uruguay and northern Argentina) remains as one of the poorest known of the West Atlantic. The objective of this work is to compile, analyze and discuss all published records of ascidians from Uruguay. They show the historical relevance of the studies performed by Herdman, Monniot F. and Monniot C. on ascidians collected at deep-sea stations by the HMS Challenger and the RV Atlantis II in the Argentine Basin. Total literature records include 38 ascidian species which are enumerated here for the first time. On the basis of the current knowledge, the ascidian fauna of Uruguayan waters encompasses: a) shallow-water species with temperate distribution (3 spp.); b) shelf and deep-sea species with Antarctic and Sub-Antarctic distribution (13 spp.); c) deep-sea species until now only collected off Río de La Plata (11 spp.); d) deep-sea species displaying a wide distribution (11 spp.). Only nine species have been recorded for the continental shelf; the remaining species were collected either from the slope (21) or the abyssal plain (5) or both deep-sea zones (3). Future research should be directed to record coastline and shelf species, assess the presence of exotic elements, and re-describe enigmatic species first described by Herdman (1882, 1886).

**Key words:** Diversity, deep-sea, Argentine Basin, taxonomy, biogeography

**Resumen: Ascidiacea (Chordata, Tunicata) de Uruguay (Atlántico SO): checklist y consideraciones zoogeográficas.** La diversidad de ascidias del Atlántico Sudoccidental entre 30°S y 40°S (sur de Brasil, Uruguay y norte de Argentina) sigue siendo una de las más escasamente conocidas del Atlántico occidental. El objetivo de este trabajo es compilar, analizar y discutir todos los registros publicados de ascidias de Uruguay. Muestran la relevancia histórica de los estudios realizados por Herdman, Monniot F. y Monniot C. sobre las ascidias recogidas por el HMS Challenger y el RV Atlantis II en la Cuenca Argentina. Los registros de la literatura incluyen 38 especies de ascidias que se enumeran aquí por primera vez. Sobre la base de los conocimientos actuales, la fauna de ascidias de aguas uruguayas comprende: a) especies de aguas someras con distribución templada (3 especies); b) especies de plataforma y de aguas profundas con distribución Antártica y Sub-Antártica (13 especies); c) especies de aguas profundas hasta ahora sólo se recolectaron en la desembocadura del Río de La Plata (11 especies); d) especies de aguas profundas que muestran una amplia distribución (11 especies). Sólo se han registrado nueve especies para la plataforma continental; las especies restantes se recolectaron en el talud (21), en la planicie abisal (5) o en ambas zonas de aguas profundas (3). Las investigaciones futuras deben orientarse a registrar las especies costeras y de plataforma, evaluar la presencia de especies exóticas y volver a describir especies enigmáticas descritas por primera vez por Herdman (1882, 1886).

**Palabras clave:** Diversidad, ambientes marinos profundos, Cuenca Argentina, taxonomía, biogeografía

## INTRODUCTION

Ascidians (Chordata, Tunicata) represent diverse and abundant components of benthic communities. They are present in all kinds of marine environments, with wide geographic and bathymetric distributions. Shenkar & Swalla (2011) estimated the global ascidian richness in about 3000 species, stressing the necessity of studies in areas still understudied and undersampled, such as the SW Atlantic. Investigations performed in the area in recent years have yielded new species (Lagger & Tatián 2013; Rocha *et al.* 2015) and further new data from redescrptions of poorly known ones (*e.g.* Maggioni *et al.* 2016). In the SW Atlantic, reports of invasive and cryptogenic species have also increased (Tatián *et al.* 2010; Schwindt *et al.* 2014; Skinner *et al.* 2016).

Ascidian diversity studies in this region have been mainly performed in the Patagonian shelf, South Argentina (*e.g.* Van Name 1945; Diehl 1977; Lagger & Tatián 2013; Taverna *et al.* 2018), and Brazil (*e.g.* Rocha & Costa 2005; Bonnet & Rocha 2011; Moreno *et al.* 2014). Rocha *et al.* (2012) presented a list of 461 species from shallow waters comprising the entire Atlantic Ocean. Despite these studies, the diversity of ascidians from the SW Atlantic coast between 30°S and 40°S (southern Brazil, Uruguay and northern Argentina) still remains comparatively less described, being the poorest known area in the region (Moreno *et al.* 2014).

In particular, faunistic knowledge of ascidians from Uruguayan waters mainly comes from the works of Herdman (1880; 1881a; 1881b; 1882; 1886), Monniot C. & Monniot F. (1985a) and Monniot F. & Monniot C. (1976), who respectively reported the material collected by the HMS Challenger (1872-1876) and RV Atlantis II (1971) in the Argentine Basin. Therefore, most of these species come from the deep-sea; inner shelf ascidians from Uruguay have been poorly recorded. In fact, all six references summarized by Scarabino (2006) (*i.e.*, Millar 1969; Juanicó & Rodríguez-Moyano 1976; Milstein *et al.* 1976; Cachés 1980; Obenat *et al.* 2001; Orensanz *et al.* 2002) for the inner shelf ascidian fauna correspond to unidentified or poorly documented records. Thus, as a first step for further knowledge of the scarcely known ascidian fauna of Uruguay, the aim of this work is to compile, analyze and discuss all the published records of ascidians from Uruguay as a basis for future research. The latter includes the analysis of ascidian aragonitic spicules as potential paleoecological indicators in

the Uruguayan shelf (see *e.g.* Toledo *et al.* 2007; Sagular 2009; Shenkar & Swalla 2011; Sagular *et al.* 2017).

## MATERIALS AND METHODS

Ascidian records come from the Uruguayan coast and the Uruguayan Exclusive Economic Zone (URY EEZ, Figure 1), including shallow coastal areas, outer shelf, slope and abyssal plain. The last two mentioned areas belong to the Argentine Basin. A complex oceanographic system develops in the area, involving the confluence of warm and cold marine currents and the freshwater input of La Plata River. A general oceanographic, geomorphological and sedimentological outline of the zone can be found in Scarabino *et al.* (2016) and Hanebuth *et al.* (2018).

An inventory of species was compiled from papers, books chapters, meeting abstracts and theses.

The current status of the all species was verified through literature and the World Register of Marine Species webpage ([www.marinespecies.org](http://www.marinespecies.org)). The order of the species list followed the criteria adopted by the latter resource (Shenkar *et al.* 2018a).

For each species the following information is provided: 1) original combination and reference eventually followed by references on the synonymy (when extensive), 2) geographic distribution, 3) references and bathymetric distribution in Uruguayan waters and 4) observations, that may include the reference(s) that cited the species in its current combination, comments and/or discussions on the status of the species or the Uruguayan records.

References regarding the geographic distribution of littoral species include: a) general/major revisions containing comprehensive treatment of these and/or b) works extending considerably (*i.e.* thousands of km) the range of a given species. In the case of deep-sea species, we considered all available references.

Only one record (station 242 of the cruise 60 of the RV Atlantis II) that is located some miles off this zone is included here considering the imminent enlargement of the UEEZ. Station 320 of the HMS Challenger falls exactly on the maritime boundary between Argentina and Uruguay and, therefore, such species are considered as part of the faunistic inventory of both countries. On the other hand, one species recorded as collected "off Montevideo" (*i.e.* *Styela schmitti* Van Name, 1945,

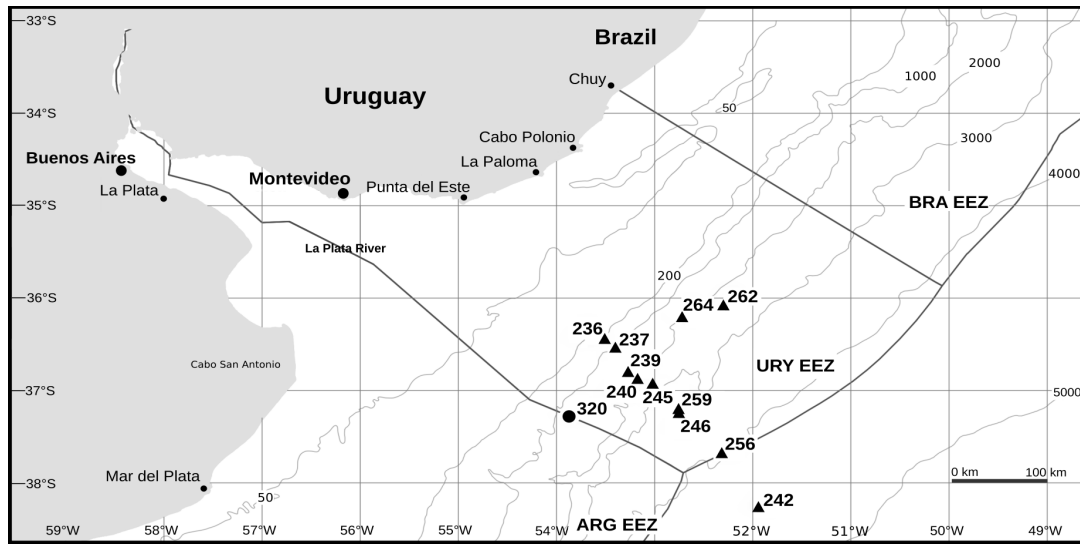


Fig. 1. Uruguayan Exclusive Economic Zone (URY EEZ), indicating the position of the stations of HMS Challenger (circles) and RV Atlantis II (triangles).

see also Millar 1960 and Monniot C. & Monniot F. 1983 who also indicated “off Montevideo” or “off Uruguay”) was actually collected in shallow waters (at ca. 20 m) off Cabo San Antonio, Buenos Aires Province, Argentina (36°42'S, 53°23'W) and therefore it is not included here. In fact, that is also the type locality of *Molgula platana* Van Name, 1945 (Albatross station 2764), which was never referred from Uruguay. Full data and mapping of the stations of HMS Challenger and RV Atlantis II from Uruguayan waters are provided (Table 1, Figure 1).

The bathymetric zonation is considered as follows: shelf (0-200 m), upper slope (200-1500 m), lower slope (1500-3000 m) and abyssal plain (3000-5500 m).

## RESULTS

Literature records totalized 38 ascidian species distributed throughout the assessed area (Table 2). Species belong to 29 genera distributed in 13 families, with three families being most speciose: Polyclinidae (5 species), Styelidae (11) and Molgulidae (7).

Order **APLOUSOBRANCHIA** Lahille, 1886

Family **POLYCLINIDAE** Milne Edwards, 1841

Genus *Aplidium* Savigny, 1816

*Aplidium effrenatum* (Herdman, 1886)

*Psammaplidium effrenatum* Herdman, 1886: 241, pl. 32, figs. 6-7.

Geographic distribution: only known from the type locality: Argentine Basin (Uruguay-Argentina).

References and bathymetric distribution in Uruguayan waters: Herdman (1886: 241): 1097 m (HMS Challenger, st. 320).

Observations: Hartmeyer (1907-1911) and Van Name (1945) included this species in the genus *Aplidium*.

*Aplidium fuegiense* Cunningham, 1871

*Aplidium fuegiense* Cunningham, 1871: 66.

For synonymy see Van Name (1945: 43) and Monniot C. & Monniot F. (1983: 16).

Geographic distribution: Antarctic and Sub-Antarctic regions (Kerguelen, Crozet, South Georgia; Antarctic Peninsula); SE Pacific up to 27°S; SW Pacific (Auckland Island)?; Magellan Strait; Patagonian shelf (Millar 1960; Kott 1969; Kott 1971; Monniot C. & Monniot F. 1983; Sanamyan

& Schories 2003; Varela 2007; Lagger *et al.* 2009; Sanamyan *et al.* 2010).

References and bathymetric distribution in Uruguayan waters: Barranguet (1988): not detailed, between 37-110 m; Varela (2007); 134 m (73 fathoms). Records not yet substantiated (mentioned in abstract and thesis).

***Aplidium variabile*** (Herdman, 1886)

*Amaroucium variabile* Herdman, 1886: 216, pl. 29, figs. 7-12

Geographic distribution: Sub-Antarctic islands (Kerguelen and South Georgia); SW Pacific (New Zealand); SE Pacific; Magellan Strait, Patagonian Shelf (Millar 1960; Kott 1969; 1971 and references therein; Monniot C. & Monniot F. 1983 and references therein; Sanamyan & Schories 2003; Varela 2007; Lagger *et al.* 2009).

References and bathymetric distribution in Uruguayan waters: Barranguet (1988): not detailed, between 37-110 m. Record not yet substantiated (mentioned in abstract).

***Aplidium flavum* (Herdman, 1886) *nomen dubium***

*Psammaplidium flavum* Herdman, 1886: 249: pl. 32, fig. 11-13.

Geographic distribution: only known from the type locality: Argentine Basin (Uruguay-Argentina).

References and bathymetric distribution in Uruguayan waters: Herdman (1886: 249-250): 1097 m (HMS Challenger, st. 320).

Observations: Van Name (1945: 445) indicates that the original description of this species is incomplete and thus fails to permit a correct classification. Rocha and Lambert (*pers. com.* 2013) agree with Van Name's comments and indicate this species as a *nomen dubium* until the type and especially topotypic material is re/described. This is not *Aplidium flavum* Huitfeldt-Kaas, 1896, a synonym of *Aplidium glabrum* (Verrill, 1871) (Shenkar *et al.* 2018b).

***Aplidium* sp.**

Observations: Monniot F. & Monniot C. (1976:

630-631) and Monniot C. & Monniot F. (1985a: 8) recorded undeterminable material (much contracted isolated individuals, not colonies) of *Aplidium* sp. from RV Atlantis II, cruise 60, sts. 237, 245, 246 and 259 collected between 993 and 3343 m. We did not include this record in the total count for the area nor in Table 1 because it is impossible to assess whether it corresponds to one of the previous *Aplidium* species or to a different one.

Genus ***Synoicum*** Phipps, 1774

***Synoicum molle*** (Herdman, 1886)

*Polyclinum molle* Herdman, 1886: 194, pl. 25, fig. 7-9, not Rocha and Costa 2005: 59, figs. 2-4. *Synoicum molle* Van Name 1945: 84, fig. 20, Maggioni *et al.* 2016: 181-185, fig. 2-4.

Geographic distribution: Argentine Basin (Uruguay-Argentina), off Río de La Plata and Buenos Aires Province (Argentina).

References and bathymetric distribution in the area: Herdman (1886: 194-195): 1097 m.

Observations: collected at HMS Challenger st. 320, which is the type locality of this species (Herdman 1886: 194-195) and recently found and redescribed off Mar del Plata at 308 m depth, *i.e.*, relatively close to the type locality (Maggioni *et al.* 2016: 181-185). Van Name (1945) included this species tentatively in the genus *Synoicum*, a denomination that Maggioni *et al.* (2016) confirmed.

*Aplidium incrustans* Herdman 1886, also described from material of the HMS Challenger st. 320, has been referred by Van Name (1945) as a possible junior synonym of *S. molle* although stating that both species are poorly characterized. Maggioni *et al.* (2016) rejected this synonymy based on a detailed comparison of branchial sacs. They propose to maintain both entities as separate species. This is not *Psammaplidium incrustans* Herdman 1891 with type locality in Port Stephens, New South Wales, Australia, a junior synonym of *Aplidium solidum* (Herdman 1891) (Kott 2005).

Rocha & Costa (2005) described *Polyclinum molle* n. sp. from shallow-waters of Brazil but this name is preoccupied by *Polyclinum molle* Herdman, 1886. Hence, the former is not valid.

Table 1. Stations of the HMS Challenger and RV Atlantis II mentioned in the text.

Station	Latitude; Longitude	Depth (m)
<b>HMS Challenger (February 1876)</b>		
Station 320	37°17'S; 53°52'W	1097
<b>RV Atlantis, cruise 60 (March 1971)</b>		
Station 236	36°27'S; 53°31'W – 36°28.1'S; 53°32.3'W	497-518
Station 237	36°32.6'S; 53°23.0'W	993-1011
Station 239	36°49'S; 53°15.4'W	1661-1679
Station 240	36°53.4'S; 53°10.2'W	2195-2323
Station 242	38°16.9'S; 51°56.1'W	4382
Station 245	36°55.7'S; 53°01.4'W	2707
Station 246	37°15.1'S; 52°45'W	3343
Station 256	37°40.9'S; 52°19.3'W	3906-3917
Station 259	37°13.3'S; 52°45'W	3305
Station 262	36°05.2'S; 52°17.9'W	2440
Station 264	36°12.7'S; 52°42.7'W	2041-2048

Family **HOLOZOIDAE** Berrill, 1950Genus *Distaplia* Della Valle, 1881*Distaplia cylindrica* (Lesson, 1830)*Holozoa cylindrica* Lesson, 1830: 439.

For synonymy see Kott (1969: 29) and Monniot C. &amp; Monniot F. (1983: 36).

Geographic distribution: circumpolar; Magellanic area and Patagonian Shelf (Kott 1969; 1971 and references therein; Monniot C. & Monniot F. 1983 and references therein; Sanamyan & Schories 2003; Monniot *et al.* 2011).

References and bathymetric distribution in Uruguayan waters: Barranguet (1988): not detailed, between 37-110 m. Record not yet substantiated (mentioned in abstract).

Genus *Sycozoa* Lesson, 1830*Sycozoa sigillinoides* Lesson, 1830*Sycozoa sigillinoides* Lesson 1830: 436.

For synonymy see Kott (1969: 26).

Geographic distribution: circumpolar and Sub-Antarctic distribution up to 34°S in Southwestern Atlantic (Van Name 1945; Millar 1960; 1970; Kott 1969; 1971; Monniot C. & Monniot F. 1983; Tatián *et al.* 1998; Kott 2006; Monniot *et al.* 2011). Isolated heads in plankton samples collected in the tropical Atlantic (Michaelsen 1907) and Pacific Ocean (Michaelsen 1924).

References and bathymetric distribution in Uruguayan waters: Juanicó & Rodríguez-Moyano (1976, as *Sycozoa umbellata*): 35-50 m; Millar (1970): 70 m.

Observations: Barranguet (1988) mentioned "some heads of *Sycozoa*, probably *S. sigillinoides*" for the Uruguayan shelf (depth not detailed, between 37 and 110 m).

Table 2. Summary of the species of Ascidiacea recorded at Uruguayan waters. WD: widely distributed deep-sea species; RDLP: only off Río de La Plata deep-sea species; ANT-SANT: Antarctic and Sub-Antarctic shelf and deep-sea species; TEMP: temperate-distribution species; ABY: abyssal plain; LOW SLOPE: lower slope (1500-3000 m); UPPER SLOPE: upper slope (200-1500 m); SHELF: shelf; \*: poorly recorded in Uruguay; \*\*: poorly known species.

SPECIES	SHELF	UPPER SLOPE	LOW SLOPE	ABY	TEMP	ANT-SANT	RDLP	WD
<i>Aplidium effrenatum</i> **		x					x	
<i>Aplidium fuegiense</i> *	x					x		
<i>Aplidium variabile</i> *	x					x		
<i>Aplidium flavum</i> **		x					x	
<i>Synoicum molle</i>		x					x	
<i>Distaplia cylindrica</i> *	x					x		
<i>Sycozoa sigillinoides</i>	x					x		
<i>Didemnum studeri</i>	x					x		
<i>Didemnum tenue</i> **		x					x	
<i>Coelocormus huxleyi</i> **		x					x	
<i>Pseudodiazona abyssa</i>		x						x
<i>Araneum sigma</i>			x					x
<i>Agnezia celtica</i>				x				x
<i>Adagnesia charcoti</i>			x					x
<i>Caenagnesia complementa</i>			x				x	
<i>Ascidia meridionalis</i>		x				x		
<i>Corella sp.</i> * **	x				x			
<i>Hypobythius moseleyi</i> **		x					x	
<i>Octacnemus ingolfi</i>			x					x
<i>Styela chaini</i>			x					x
<i>Styela flava</i> **		x					x	
<i>Styela glans</i>		x				x		
<i>Styela plicata</i> *	x				x			
<i>Styela squamosa</i>		x				x		
<i>Dicarpa spinifera</i>				x			x	
<i>Polycarpa aspera</i>		x					x	
<i>Polycarpa pseudoalbatrossi</i>			x	x				x
<i>Bathystyeloides enderbyanus</i>			x					x
<i>Cnemidocarpa bathyphila</i>			x					x
<i>Botryllus schlosseri</i> *	x				x			
<i>Culeolus anonymus</i>				x		x		
<i>Minipera tacita</i>				x			x	
<i>Protomolgula bythia</i>			x	x				x
<i>Molguloides cyclocarpa</i>			x			x		
<i>Molgula pyriformis</i>		x				x		
<i>Fungulus perlucidus</i>				x		x		
<i>Paramolgula gregaria</i> *	x					x		
<i>Asajirus indicus</i>			x	x				x



Family **DIDEMNIDAE** Giard, 1872Genus *Didemnum* Savigny, 1816*Didemnum studeri* Hartmeyer, 1911

*Didemnum studeri* Hartmeyer, 1911: 538.

Geographic distribution: Antarctic and Sub-Antarctic waters including Tasmania, SE Pacific up to 27°S and Patagonian Shelf, South Georgia Island (Van Name 1945; Kott 1969; 1971; Millar 1970; Monniot C. & Monniot F. 1983 and references therein; Varela 2007; Sanamyan *et al.* 2010).

References and bathymetric distribution in Uruguayan waters: Barranguet (1988): not detailed, between 37-110 m. Record not yet substantiated (mentioned in abstract).

*Didemnum tenue* (Herdman, 1886)

*Leptoclinum tenue* Herdman, 1886: 281, pl. 39, figs. 8-11 and pl. 40, figs. 3-5.

For synonymy see Van Name (1945: 82-83, 86, 90-81) and Marks (1996: 368).

Geographic distribution: SE Pacific, Magellanic Province, Patagonian Shelf up to off Río de La Plata; South Georgia Island (Herdman 1886; Kott 1969; Monniot C. & Monniot F. 1983 and references therein).

References and bathymetric distribution in Uruguayan waters: Herdman (1886: 281-282): 1097 m (HMS Challenger, st. 320).

Observations: Hartmeyer (1907-1911) included this species in the genus *Didemnum*.

Genus *Coelocormus* Herdman, 1886*Coelocormus huxleyi* Herdman, 1886

*Coelocormus huxleyi* Herdman, 1886: 318, pl. 37, figs. 1-8 and pl. 38, figs. 1-4.

Geographic distribution: only known from the type locality: Argentine Basin (Uruguay-Argentina).

References and bathymetric distribution in Uruguayan waters: Herdman (1886: 318-319): 1097 m (HMS Challenger, st. 320).

Family **DIAZONIDAE** Garstang, 1891Genus *Pseudodiazona* Millar, 1963*Pseudodiazona abyssa* Monniot C. & Monniot F., 1974

*Pseudodiazona abyssa* Monniot C. & Monniot F., 1974: 733, fig. 4.

Geographic distribution: N Atlantic; Mediterranean Sea; SE Atlantic; W Indian Ocean?; Guyana-Suriname Basin; Argentine Basin (Monniot C. & Monniot F. 1974; 1976a; 1976b; 1977b; 1984; 1985a; 1985b; 1987; 1988; Monniot F. & Monniot C. 1976).

References and bathymetric distribution in Uruguayan waters: Monniot C. & Monniot F. (1985a: 18): 993-1011 m (collected at RV Atlantis II, cruise 60, st. 237).

Order **PHLEBOBRANCHIA** Lahille, 1886Family **CIONIDAE** Lahille, 1887Genus *Araneum* Monniot C. & Monniot F., 1973*Araneum sigma* Monniot C. & Monniot F., 1973

*Araneum sigma* Monniot C. & Monniot F., 1973: 398, figs. 4-5, 18B.

Geographic distribution: N Atlantic; Argentine Basin (Monniot C. & Monniot F. 1973; 1976a; 1977b; 1979; 1984; 1985a; Monniot F. & Monniot C. 1976).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630; 632): 2440-2480 m (RV Atlantis II, cruise 60, st. 262).

Family **AGNEZIIDAE** Monniot C. & Monniot F., 1991Genus *Agnezia* Monniot C. & Monniot F., 1991

Observations: *Agnesia* Michaelsen, 1898 is a pre-occupied name; therefore, Agnesiidae Huntsman 1912 is not valid. Monniot C. & Monniot F. (1991) suggested the new names *Agnezia* and Agnezidae as replacement names.

***Agnezia celtica*** (Monniot C. & Monniot F., 1974)

*Agnesia celtica* Monniot C. & Monniot F., 1974: 743, fig. 8.

Geographic distribution: N Atlantic; SE Atlantic; W Indian Ocean; Brazil Basin; Argentine Basin (Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1974; 1977b; 1984; 1985a; 1985b; 1985c; Monniot C. 1994).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630; 633): 3906-3917 m (RV Atlantis II, cruise 60, st. 256).

Genus ***Adagnesia*** Kott, 1963

***Adagnesia charcoti*** Monniot C. & Monniot F., 1973

*Adagnesia charcoti* Monniot C. & Monniot F., 1973: 424, figs. 16-17, 18D.

Geographic distribution: N Atlantic; Indian Ocean; Southern Ocean (South Shetland Islands and Macquarie Island); Guyana-Suriname Basin; Argentine Basin (Millar 1978; 1982a; Monniot C. & Monniot F. 1973; 1974; 1976a; 1977b; 1984; 1985a; 1985c; Monniot F. & Monniot C. 1976; Monniot C. 1994; Sanamyan K.E. & Sanamyan N.P. 1999; 2002).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630 –as *Adagnesia* sp.-; 634; 1985a: 8, 23): 1661-2323 m, collected at RV Atlantis II, cruise 60, sts. 239 and 240.

Observations: As already noted by Sanamyan K.E. & Sanamyan N.P. (2002), the material collected in the Argentine Basin mentioned by Monniot F. & Monniot C. (1976, Table 1) as *Adagnesia* sp. also belongs to *A. charcoti* as stated by the authors in the same work (1976). The shallow water (22 m) record of this species for the Southwest Pacific (Bass Strait) (Kott 1985; 2005) has been questioned by Sanamyan K.E. & Sanamyan N.P. (1999).

Genus ***Caenagnesia*** Ärnäck-Christie-Linde, 1938

***Caenagnesia complementa*** Monniot C. &

Monniot F., 1976

*Caenagnesia complementa* Monniot F. & Monniot C., 1976: 636, fig. 4.

Geographic distribution: only known from the type locality: Argentine Basin (Uruguay).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630; 639): 1661-1679 m (RV Atlantis II, cruise 60, st. 239).

Family **ASCIDIIDAE** Herdman, 1882

Genus ***Ascidia*** Linnaeus, 1767

***Ascidia meridionalis*** Herdman, 1880

*Ascidia meridionalis* Herdman, 1880: 465, Herdman 1882: 207, pl. 31, figs. 4-8.

*Ascidia tenera* Herdman 1880: 467, Herdman 1882: 213, pl. 32, figs. 7-10.

For synonymy see Monniot C. & Monniot F. (1983: 60-66).

Geographic distribution: Antarctic and Sub-Antarctic areas, up to off Río de La Plata in the SW Atlantic (Van Name 1945; Kott 1969; 1971; Monniot C. 1970; Monniot C. & Monniot F. 1983; Tatián *et al.* 2005; Monniot *et al.* 2011).

References and bathymetric distribution in Uruguayan waters: Herdman (1880: 465, 467-468; 1882: 207-209): 1097 m.

Observations: collected at HMS Challenger st. 320, which is the type locality of this species and its synonym *Ascidia tenera* (Herdman 1880; 1882; Kott 1969; Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1983).

Family **CORELLIDAE** Lahille, 1887

Genus ***Corella*** Alder and Hancock, 1870 (*in* Hancock, 1870)

***Corella*** sp.

References and bathymetric distribution in Uruguayan waters: Obenat *et al.* (2001): 11-12 m, outer Río de La Plata estuary.

Observations: specimens found within clumps of the polychaete *Phyllochaetopterus socialis*



(Claparède 2001) were listed in a benthic study without description allowing verification of the record. *Corella eumyota* Traustedt, 1882 was originally described from Valparaiso, Chile, and it is considered as native to the Southern Hemisphere. The species was observed in France for the first time in 2002, probably introduced by anthropogenic transport (Lambert 2004), and thus considered as highly invasive. Using specimens collected at five locations of Chile, Argentina and the South Shetland Islands, Alurralde *et al.* (2013) distinguished two different species, a concept also supported by Monniot F. (2013). The variability observed defined discrete clusters that were also separated geographically, corresponding to two species of the same genus: *Corella eumyota* from South America and *Corella antarctica* Sluiter, 1905 from Antarctica. The latter was even considered until recently as a junior synonym of the former.

Family **HYPOBYTHIIDAE** Sluiter, 1895

Genus *Hypobythius* Moseley, 1879

*Hypobythius moseleyi* Herdman, 1882

*Hypobythius moseleyi* Herdman, 1882: 231, pl. 37, figs. 6-9.

Geographic distribution: only known from the type locality: Argentine Basin (Uruguay-Argentina).

References and bathymetric distribution in Uruguayan waters: Herdman (1882: 231-232): 1097 m (HMS Challenger, st. 320).

Observations: According to Monniot F. & Monniot C. (1976) this is a very poorly described species that probably belongs to *Dicopia* Sluiter, 1905 or *Situla* Vinogradova, 1969 (Octacnemidae). We support Bonnet (2016) in considering *H. moseleyi* as belonging to *Hypobythius* (type species *H. calycodes* Moseley, 1877) included in a different family (Hypobythiidae), although a redescription of that species based on topotypes is clearly needed.

Family **OCTACNEMIDAE** Herdman, 1888

Genus *Octacnemus* Moseley, 1877

*Octacnemus ingolfi* Madsen, 1947

*Octacnemus ingolfi* Madsen, 1947: 31, 2 a-e, pl. 1.

For synonymy see Sanamyan K.E. & Sanamyan N.P. (2002: 324).

Geographic distribution: N Atlantic; Indian Ocean; SW Pacific; Guyana-Suriname Basin; Argentine Basin (Madsen 1947; Monniot C. & Monniot F. 1973; 1977b; 1984; 1985a; 1985b; 1985c; 1991; Monniot F. & Monniot C. 1976).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630, 633): 2041-2048 m (RV Atlantis II, cruise 60, st. 264).

Order **STOLIDOBRANCHIA** Lahille, 1886

Family **STYELIDAE** Sluiter, 1895

Genus *Styela* Fleming, 1822

*Styela chaini* Monniot C. & Monniot F., 1970

*Styela chaini* Monniot C. & Monniot F. 1970: 321, fig. 4.

Geographic distribution: N Atlantic; Argentine Basin (Monniot C. & Monniot F. 1970; 1973; 1974; 1977b; 1984; 1985a; Monniot F. & Monniot C. 1976; Millar 1982a).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976) and Monniot C. & Monniot F. (1985a): 1661-2707 m (RV Atlantis II, cruise 60, sts. 239, 240, 245, 262 and 264).

*Styela flava* Herdman, 1881 *nomen dubium*

*Styela flava* Herdman, 1881a: 64; 1882: 160, pl. 20, figs. 1-6.

Geographic distribution: only known from the type locality: Argentine Basin (Uruguay-Argentina).

References and bathymetric distribution in Uruguayan waters: Herdman (1881a; 1882: 160-161): 1097 m (HMS Challenger, sta. 320).

Observations: Shenkar *et al.* (2018c) considered *S. flava* as a synonym of *S. squamosa* based not only on the concept that the latter is a senior subjective synonym of *S. oblonga* (see discussion

below under *S. squamosa*) but also Van Name (1945) suggested a possible synonymy between *S. flava* and *S. oblonga* (Sanamyan K. pers. comm.). However, due to the lack of information about the gonads, Van Name (1945) considered *S. flava* as an “insufficiently described form”.

Rodrigues (1966), admitting he analyzed only one specimen, established:

“There are many similarities between *S. flava* and my specimens of *S. glans*. The most characteristic are: the arrangement of the tentacles, the dorsal tubercle, the undulated dorsal lamina and the uncommon endostyle. Considering these similarities and absence of information about the gonads of *S. flava*, we conclude that it would be possible to consider this species identical as well as to *oblonga* as to *glans*. Therefore *S. flava* remains as a dubious species and therefore we consider it as a *nomen dubium*”.

Synonymy of *S. flava* with *Styela nordenskjoldi* Michaelsen, 1898 (see above comments under *S. squamosa*) proposed by Kott (1969; 1971) was rejected by Monniot F. & Monniot C. (1976), who maintained this species as a different one.

#### ***Styela glans* Herdman, 1881**

*Styela glans* Herdman, 1881a: 65; Herdman 1882: 162-163, pl. 20, figs. 10-13; Hartmeyer 1927: 183.

Geographic distribution: Antarctic and Sub-Antarctic regions including Kerguelen Islands (?), Ross Sea, Weddell Sea, Antarctic Peninsula; Argentine Basin off Río de La Plata (Herdman 1881a; 1882; Monniot C. 1978; Monniot C. & Monniot F. 1980; 1983; 1994).

References and bathymetric distribution in Uruguayan waters: Herdman (1881a: 65-66; 1882: 162-163): 1097 m (HMS Challenger, st. 320), Monniot F. & Monniot C. (1976: 630, 643): 1661-1679 m (RV Atlantis II, cruise 60, st. 239).

Observations: The record of *S. glans* of Rodrigues (1966) from the Brazilian coast (São Paulo's coast, ca. 24°S, 140 m) has been questioned by Monniot F. & Monniot C. (1976) on the basis of differences in the oviducts, tentacles and peripharyngeal band (“sillon pericoronar”). According to Monniot F. & Monniot C. (1976), *S. glans* has been confused with several others by Kott

(1969), using the name *Styela nordenskjoldi*, and thus they rejected the synonymy proposed by that latter author for all the three species of *Styela* described by Herdman from off Río de La Plata.

#### ***Styela plicata* (Lesuer, 1823)**

*Ascidia plicata* Lesuer, 1823: 5.

For synonyms see Van Name (1945: 295).

Geographic distribution: worldwide in temperate zones (Barros *et al.* 2009).

References and bathymetric distribution in Uruguayan waters: Montevideo (Traustedt 1882): failed introduction; Port of La Paloma, Rocha: established population, shallower subtidal (Orensanz *et al.* 2002; Demicheli & Scarabino 2006; Tatián, Schwindt & Scarabino pers. obs.).

Observations: the record of Traustedt (1882), which forms the basis of the record of the species of Van Name (1945) for Uruguay, is most probably based on a failed introduction, likely the hull of a ship. Although *S. plicata* has some resistance to estuarine conditions (Barros *et al.* 2009), Montevideo harbor lies within an estuarine zone unsuitable for ascidians without any further record of this or any other ascidian species. This species should be carefully observed/monitored, since it was dispersed worldwide by vessels, as it holds many of the different features to become invasive (Barros *et al.* 2009; Pineda *et al.* 2013).

#### ***Styela squamosa* Herdman, 1881**

*Styela squamosa* Herdman, 1881a: 66-67.

*Styela oblonga* Herdman 1881a: 65; 1882: 159, pl. 20, figs. 7-9, Hartmeyer 1927: 183.

For synonymy see Monniot C. & Monniot F. (1982), Monniot C. (1993: 356-358) and Sanamyan K.E. & Sanamyan N.P. (2006: 321-325).

Geographic distribution: Antarctic and Sub-Antarctic areas (Ross Sea, South Georgia and South Orkeys Islands); W Pacific (Sea of Japan; Sea of Okhotsk, Arafura Sea); N Pacific (Aleutian Islands); E Pacific; SE Atlantic; Argentine Basin off Río de La Plata (Herdman 1881a; Millar 1964; 1982b; 1988; Monniot C. & Monniot F. 1982; 1983; Monniot C. 1993; Sanamyan K.E. & Sanamyan N.P. 2006; 2012).

References and bathymetric distribution in Uru-

guayan waters: Herdman (1881a; 1882: 159-160, as *S. oblonga*): 1097 m.

Observations: collected at HMS Challenger st. 320, which is the type locality of *S. oblonga* (Herdman 1881a; 1882: 159-160). The synonymy of *S. oblonga* with "*Styela nordenskjoldi*" (*sensu* Kott 1969 and 1971, which includes several species according to Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1982; 1983) was rejected by Monniot F. & Monniot C. (1976). These authors (1982; 1983) established that most probably (but still with some doubts), *S. oblonga* is a synonym of *S. squamosa*, choosing the latter although *S. oblonga* has page precedence. C. Monniot (1993) and Sanamyan K.E. & Sanamyan N.P. (2006) confirmed the synonymy between these two species.

Genus *Dicarpa* Millar, 1955

*Dicarpa spinifera* Monniot C. & Monniot F., 1976

*Dicarpa spinifera* Monniot F. & Monniot C., 1976: 641, fig. 7.

Geographic distribution: only known from the abyssal plain of the Argentine Basin (Uruguay).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630, 641); Monniot C. & Monniot F. (1985a: 8, 26): 3305-3343 m (RV Atlantis II, cruise 60, st. 246 and 259, the latter being the type locality).

Genus *Polycarpa* Heller, 1877

*Polycarpa aspera* Herdman, 1886

*Polycarpa aspera* Herdman, 1886: 415, pl. 47, figs. 3-5.

Geographic distribution: only known from the type locality: Argentine Basin (Uruguay-Argentina).

References and bathymetric distribution in Uruguayan waters: Herdman (1886: 415): 1097 m (HMS Challenger, st. 320).

*Polycarpa pseudoalbatrossi* Monniot C. & Monniot F., 1968

*Polycarpa pseudoalbatrossi* Monniot C. & Monniot F., 1968: 14, figs. 3A, 6-7.

Geographic distribution: N Atlantic; SE Atlantic; Argentine Basin (Millar 1982a; Monniot C. & Monniot F. 1968; 1973; 1974; 1976b; 1977b; 1984; 1985a; Monniot F. & Monniot C. 1976).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630, 641), Monniot C. & Monniot F. (1985a: 8, 26-27): 2707-3343 m (RV Atlantis II, cruise 60, sts. 245, 246 and 259).

Genus *Bathystyeloides* Seeliger, 1906

*Bathystyeloides enderbyanus* (Michaelson, 1904)

*Bathyoncus enderbyanus* Michaelson, 1904: 226.

For synonyms see Monniot C. & Monniot F. (1974: 756) and Sanamyan K.E. & Sanamyan N.P. (2006: 310).

Geographic distribution: N Atlantic; SE Atlantic; Indian Ocean; Southern Ocean; Guyana-Suriname Basin; Brazil Basin; Argentine Basin (Kott 1969; 1971; Millar 1955; 1970; Monniot C. & Monniot F. 1973; 1974; 1976a; 1976b; 1977a; 1977b; 1984; 1985a; 1994; Sanamyan K.E. & Sanamyan N.P. 2002; 2006).

References and bathymetric distribution in Uruguayan waters: Monniot C. & Monniot F. (1985a: 8, 29-30): 2195-2323 m (RV Atlantis II, cruise 60, st. 240).

Genus *Cnemidocarpa* Huntsman, 1912

*Cnemidocarpa bathyphila* Millar, 1955

*Cnemidocarpa bathyphila* Millar, 1955: 228, fig. 4.

For synonymy see Monniot *et al.* (1976: 1190) and Sanamyan K.E. & Sanamyan N.P. (2002: 339).

Geographic distribution: N Atlantic; NW Indian; SW Pacific; Southern Ocean; Argentine Basin (Monniot C. & Monniot F. 1970; 1973; 1984; 1985a; Millar 1955; 1959; Kott 1971; Monniot *et al.* 1976; Sanamyan K.E. & Sanamyan N.P. 2002).

References and bathymetric distribution in Uruguayan waters: Monniot C. & Monniot F. (1985a: 8, 28): 2195-2323 m (RV Atlantis II, cruise 60, st. 240).

Genus **Botryllus** Gaertner, 1774

**Botryllus schlosseri** (Pallas, 1766)  
For synonymy see Van Name (1945: 220).

Geographic distribution: N Atlantic, North Sea, Mediterranean Sea, SE Pacific, SW Atlantic (Argentina) (e.g. Ruiz *et al.* 2000; Orensanz *et al.* 2002; Hewitt *et al.* 2004; López-Legentil *et al.* 2006; Ben-Shlomo *et al.* 2010; Mead *et al.* 2011; Turon *et al.* 2016).

References and bathymetric distribution in Uruguayan waters: Scarabino *et al.* (2014): Port of La Paloma, Rocha, shallower subtidal (Tatián, Schwindt & Scarabino pers. obs.).

Observations: Rocha *et al.* (2012) listed a total of five *Botryllus* species for the Atlantic Ocean, being *B. schlosseri* until now absent in Brazil but present in Argentina (Amor 1964; Orensanz *et al.* 2002; Schwindt *et al.* 2014). *Botryllus schlosseri* is a “species complex” consisting of five genetically divergent clades (named from A to E) that should correspond to five distinct cryptic species (Bock *et al.* 2012; Yund *et al.* 2015). Clade A is globally widespread, while clade E has been identified only along the European coasts. The remaining clades B-D are geographically restricted to few European localities.

Clade A, the most common and widespread species, experiences recurrent long-distance dispersion (probably human-mediated) and is highly invasive (Bock *et al.* 2012). Recently, Brunetti *et al.* (2017) redescribed clade A in detail based on morphological data and associated it with a “DNA barcode”.

Populations of *B. schlosseri* from South America display high gene diversity. A limited number of genotypes probably founded the Pacific Chilean populations, while the Atlantic Argentinean population was repeatedly colonized by new genotypes. The South and North American populations of *B. schlosseri* showed extensive dissimilarities, suggesting two distinct clades. All clades were supported by COI and 18S (Ben-Shlomo *et al.* 2010).

Family **PYURIDAE** Hartmeyer, 1908

Genus **Culeolus** Herdman, 1881

**Culeolus anonymus** Monniot C. & Monniot F., 1976

*Culeolus anonymus* Monniot F. & Monniot C., 1976: 645, fig. 9.

For synonymy see Sanamyan K.E. & Sanamyan N.P. (2002: 344).

Geographic distribution: Southern Ocean (Weddell Sea); SW Pacific (Kermadec Trench and Macquarie Island); Argentine Basin (Millar 1970; Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1982; 1985a; Sanamyan K.E. & Sanamyan N.P. 1999; 2002).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630, 645): 4382-5223 m (RV Atlantis II, cruise 60, sts. 242, the type locality of this species, and 247).

Observations: Monniot F. & Monniot C. (1976) accurately stated that *Culeolus* is one of the most poorly described genus of Ascidiacea due to the lack of recorded specimens and to the almost exclusive consideration of the external aspect, while the anatomy is much more useful. Moreover, the evaluation of incoming material has revealed the existence of intraspecific variability in characters such as the position of the gonads and the structure of the postero-ventral crest (Sanamyan K.E. & Sanamyan N.P. 2002; postero-ventral arc, according to Kott 1969). In this way, *C. anonymus* was originally described as two distinct populations (Monniot F. & Monniot C. 1976) based on its crest: one group with a continuous crest and the other with a crest consisting of separate papillae. Subsequent sampling, however, evidenced the existence of intermediate forms (Monniot C. & Monniot F. 1982). Monniot F. & Monniot C. (1976) also used the position of the gonads in relation to each other and to the gut loop, and the shape of the anus, to establish differences with *Culeolus suhmi*, the other related species cited for the South Atlantic area. Sanamyan K.E. & Sanamyan N.P. (2002) finally excluded these as valid comparative characters based on the study of new material. They concluded that the only feature stable enough to distinguish *C. anonymus* from *C. suhmi* is the general shape of the crest. Additional records of this species from adjacent waters have been reported by Monniot C. & Monniot F. (1985a) (ca. 38° 30' S; 50° 10' W, 4435 m) as well as by Sanamyan K.E. & Sanamyan N.P. (2002) (ca. 38° 40' S; 48° 10' W, 5225 m) who also described *Culeolus likae* Sanamyan K.E. & Sanamyan N.P. 2002 from such station.

Family **MOLGULIDAE** Lacaze-Duthiers, 1877

Genus **Minipera** Monniot C. & Monniot F., 1974

**Minipera tacita** Monniot C. & Monniot F., 1985

*Minipera* sp. Monniot F. & Monniot C., 1976: 630, 650, fig. 10A.

*Minipera tacita* Monniot C. & Monniot F. 1985a: 32.

Geographic distribution: only known from the Argentine Basin (Uruguay, abyssal plain).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630, 650), Monniot C. & Monniot F. (1985a: 8, 32): 3305-3343 m.

Observations: *Minipera tacita* was first recorded as *Minipera* sp. from RV Atlantis II, cruise 60, st. 259 (Monniot F. & Monniot C. 1976) and later described as new species and recorded for RV Atlantis II, cruise 60, st. 246 (Monniot C. & Monniot F. 1985a). Both stations were performed along a small area around ca. 37°15'S-52°45'W.

Genus **Protomolgula** Monniot, 1971

**Protomolgula bythia** Monniot, 1971

*Protomolgula bythia* Monniot F., 1971: 467, fig. 6 A, B.

Geographic distribution: NE Atlantic; SE Atlantic; Guyana-Surinam Basin; Brazil Basin; Argentine Basin (Monniot F. 1971; Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1976a; 1977b; 1984; 1985a).

References for the area: Monniot F. & Monniot C. (1976: 630, 651); Monniot C. & Monniot F. (1985a: 8, 33): 2707-3343 m (RV Atlantis II, cruise 60, sts. 245, 246 and 259).

Genus **Molguloides** Huntsman, 1922

**Molguloides cyclocarpa** Monniot C. & Monniot F., 1982

*Molguloides* sp. Monniot F. & Monniot C., 1976: 652, figs. 10 D and 10 E.

*Molguloides cyclocarpa* Monniot C. & Monniot F.

1982: 127, figs. 36 and 37, pl. 5 B.

Geographic distribution: SE Atlantic; Southern Ocean (Scotia Sea); Argentine Basin (Uruguay, lower continental slope) (Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1982; 1985a; Sanamyan K.E. & Sanamyan N.P. 2002).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630, 652): 2408-2480 m.

Observations: the first description of this species was based on young specimens obtained at RV Atlantis II, cruise 60, st. 262 and therefore specific identification was not possible at the time (Monniot F. & Monniot C. 1976). However, the same authors further assigned these and new adult individuals obtained from the Southern Ocean to their new species *Molguloides cyclocarpa* (see Monniot C. & Monniot F. 1982). Sanamyan K.E. & Sanamyan N.P. (2002), noting the similarity of some internal characters of *M. cyclocarpa* with *Molguloides translucidus* Monniot C. & Monniot F. 1991, proposed that these may be conspecific, although maintained them as separate species. Their individual status is currently accepted until additional material is revised (Sanamyan K.E. & Sanamyan N.P. 2002).

Genus **Molgula** Forbes, 1848

**Molgula pyriformis** Herdman, 1881

*Molgula pyriformis* Herdman, 1881b: 236; Herdman 1882: 79: pl. 6, figs. 1-3.

For synonymy see Monniot C. & Monniot F. (1983: 101).

Geographic distribution: off Río de La Plata to Tierra del Fuego and South Georgia Islands (Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1983).

References and bathymetric distribution in Uruguayan waters: Herdman (1881b: 236-237; 1882: 79-80): 1097 m (HMS Challenger, st. 320), Monniot F. & Monniot C. (1976: 630; 652-655): 497-1011 m (RV Atlantis II, cruise 60, sts. 236 and 237).

Observations: Monniot F. & Monniot C. (1976: 630; 652-655) did not agree with the identification of Kott (1969) who recorded this species from the Drake Passage. They supported the more bio-



geographically anomalous record of Rodrigues (1966), as *M. piriformis* (*sic*) from Brazilian coast (São Paulo's coast, ca. 24°S, 140 m). Lately, Monniot C. & Monniot F. (1983) and Monniot C. & Andrade (1983) stated that the correspondence of this species with the record of Rodrigues (1966) is uncertain as they noted differences in gonads, stomach and stigmata. Monniot C. & Monniot F. (1983) included in other species of *Molgula* several records of *M. pyriformis* performed in the Magellanic area for other authors (Michaelsen 1900; Kott 1969).

Genus ***Fungulus*** Herdman, 1882

***Fungulus perlucidus*** (Herdman, 1881)

*Culeolus perlucidus* Herdman, 1881a: 86; 1882: 111, pl. 11, figs. 10-14; pl. 12, figs. 8-12.

Geographic distribution: Southern Ocean (north of Ross Sea) and Sub-Antarctic Islands (Scotia Sea, South Sandwich Trench, Kerguelen Islands and Macquarie Island); W Indian Ocean; Argentine Basin (Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1977a; 1985c; Sanamyan K.E. & Sanamyan N.P. 1999; 2002).

References for the area: Monniot F. & Monniot C. (1976: 630; 655): 4382-4402 m (RV Atlantis II, cruise 60, st. 242).

Observations: Monniot F. & Monniot C. (1976) reclassified this species as *Fungulus* Herdman, 1882, a concept shared by Sanamyan K.E. & Sanamyan N.P. (1999). The latter, however, considered *Culeolus parvus* Millar, 1970 (as *F. parvus*) as a probably different species and not a synonym of *F. perlucidus* as stated by Monniot F. & Monniot C. (1976) based on differences in the branchial sac and musculature. Sanamyan K.E. & Sanamyan N.P. (2002) reported this species in a locality adjacent to the area here referred (ca. 38° 40' S; 48° 10' W) at 5225 m.

Genus ***Paramolgula*** Traustedt, 1835

***Paramolgula gregaria*** (Lesson, 1830)

*Cynthia gregaria* Lesson, 1830: 157, pl. 52, fig. 3.

For synonymy see Van Name (1945: 428) and Kott (1969: 164).

Geographic distribution: Sub-Antarctic Islands

(South Georgia Islands); SE Pacific; Magellan Strait; Tierra del Fuego, Patagonian Shelf (Kott 1969; 1971; Monniot C. 1970; Diehl 1977; Lagger *et al.* 2009).

References and bathymetric distribution in Uruguayan waters: Barranguet (1988): not detailed, between 37-110 m. Record not yet substantiated (mentioned in abstract).

Observations: the taxonomy of this genus is in particular need of a revision (Turon *et al.* 2016).

Genus ***Asajirus*** Kott, 1989

***Asajirus indicus*** (Oka, 1913)

*Hexacrobylus indicus* Oka, 1913: 6.

*Hexacrobylus eunuchus* Monniot F. & Monniot C. 1976: 658, figs. 12 E and 14.

For synonymy see Kott (1992) and Sanamyan K.E. & Sanamyan N.P. (2006: 342).

Geographic distribution: N Atlantic; Argentine Basin; S Indian Ocean; Pacific (Monniot F. & Monniot C. 1976; Monniot C. & Monniot F. 1988; 1990; Kott 1989; 1992; 2005; Sanamyan K.E. & Sanamyan N.P. 2006).

References and bathymetric distribution in Uruguayan waters: Monniot F. & Monniot C. (1976: 630; 658; Monniot C. & Monniot F. 1985a; 33): 2195-3317 m (RV Atlantis II, cruise 60, sts. 245, 259, 262 and 264).

Observations: the type locality of *H. eunuchus* was not recorded in the original description (Kott 2005). Monniot F. & Monniot C. (1976) described *Hexacrobylus eunuchus* as a new species from the Argentine Basin but latter (Monniot C. & Monniot F. 1985a) synonymized it with *Hexacrobylus indicus* Oka, 1913, a concept shared with Kott (1989) who also referred the latter to as the type species of her new genus *Asajirus*. Monniot C. & Monniot F. (1990) described several new species of this group and resurrected *H. eunuchus*, including it in their new genus *Hexadactylus*, which is an objective synonym of *Asajirus*. Kott (1992; 2005) still considered *A. eunuchus* as a synonym of *A. indicus*. Finally, Sanamyan K.E. & Sanamyan N.P. (2006) discussed the characters used by Monniot C. & Monniot F. (1990) to separate several species (including *A. eunuchus* and *A. indicus*) and recognized, as Kott (1992; 2005) did, only one species within the genus *Asajirus*.



A phylogenetic analysis based on 18S rDNA sequences showed that the former Sorberacea/Hexacrobylidae are in fact highly modified carnivorous Molgulidae (Tatián et al. 2011).

## DISCUSSION

Thirty-eight ascidian species have been recorded until now from Uruguayan waters. Only nine were recorded for the continental shelf; the rest were collected from the slope (21), the abyssal plain (5) or even both deep-sea zones (3). These records show the historical relevance of the determinations of Herdman, Monniot F. and Monniot C., who described the ascidians collected from deep-sea stations by the HMS Challenger and the RV Atlantis II in the Argentine Basin.

The present ascidian list reveals the following distribution patterns for the known species: *Shallow water species with temperate distribution*. Only two species of this group, *Styela plicata* and *Botryllus schlosseri*, have been identified as exotic, although many others are still unreported (Tatián & Scarabino pers. obs.).

*Shelf and deep-sea species with Antarctic/Sub-Antarctic distribution*. This well-known pattern represents the northernmost distribution boundary of the species following the northern flow of several water masses belonging to the cold Malvinas Current (see figure 2). This group consists of 11 species (Table 1), some of them occurring deeper than their Sub-Antarctic areas (e.g. Kott 1969; 1971; Monniot C. & Monniot F. 1983; Carranza et al. 2007; 2008; Scarabino et al. 2016). Monniot C. & Monniot F. (1978) and Monniot F. (1979) had already noted the affinity of the Argentine Basin deep-sea ascidian fauna (mostly based on the records here listed) with the Southern Ocean. Biogeographic studies (Ramos-Esplá et al. 2005; Tatián et al. 2005; Primo & Vázquez 2007) support the idea of the Scotia Arc functioning as a bridge between the Magellan region and the Antarctic.

*Deep-sea species only known off Río de La Plata*. Eleven species belong to this group, including both solitary and colonial forms. However, it mainly contains species living on the upper slope (Table 1). In fact, only two abyssal species (*Dicarpa spinifera* and *Minipera tacita*) are at this moment considered as endemic from off Río de La Plata. At least one species may be synonymous with an Antarctic one (*Styela flava*) and several others described by Herdman are actually poorly described. Similarly, a high percentage of endemic deep-sea protobranch bivalves have

already been reported from off Río de La Plata by Allen & Sanders (1997), although this has to be additionally assessed (Scarabino et al. 2016).

*Deep-sea species having wide distributions*. Twelve species belong to this group, consisting almost entirely of solitary species. Most of them have been recorded only from the lower slope but some of them extend to the abyssal plain (Table 1). The wide distribution of deep-sea benthic species is a well documented pattern (e.g. McClain & Hardy 2010 and references therein), although many of these may represent species-complexes (e.g. Brandt et al. 2012; Havermans et al. 2013). *Bathystyeloides enderbyanus* and *Cnemidocarpa bathyphila* are two of the most widespread species of deep-sea ascidians (Sanamyan K.E. & Sanamyan N.P. 2002; 2006). The eventual role of the North Atlantic Deep Water circulation in maintaining the connectivity among at least Atlantic deep-sea populations must be addressed in the future.

Research on the Uruguayan ascidian fauna should be further directed to record coastline and shelf species in order to detect the presence of exotic ones, as well as to redescribe some enigmatic bathyal species first described by Herdman (1882; 1886). Furthermore, it must be stressed the complete lack of molecular analysis for the deep-sea species recorded from the Argentine Basin currently recognized as world-wide distributed.

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