

Geographic ranges of ascidians from Antarctica and the southeastern Pacific

Dirk Schories^{1*}, Karen Sanamyan², Nadja Sanamyan², María José Díaz¹, Ignacio Garrido¹, Thomas Heran¹, Jorge Holtheuer¹ & Gesche Kohlberg³

¹ Instituto de Ciencias Marinas y Limnológicas, Facultad de Ciencias, Universidad Austral de Chile, Valdivia, Chile;

² Kamchatka Branch of the Pacific Institute of Geography, Far-Eastern Branch of the Russian Academy of Sciences, Partizanskaya 6, Petropavlovsk-Kamchatsky, 683000, Russia;

³ Institute of Biological Sciences, University of Rostock, Albert-Einstein-Str. 3, 18051 Rostock, Germany

Received 18 August 2014; accepted 10 November 2014

Abstract Historical and novel data on the geographic and bathymetric distribution of ascidians from Antarctic, Magellan and Chilean waters are compiled, and an inventory of taxa comprising 162 species reported over a 150 year period from the Antarctic region South Polar Province (SPP) compiled. The ascidian fauna from the South Shetland Islands (SSI) is compared with that of the Magellan region, Patagonia and the Chilean coast. We collected 46 ascidian species along the Chilean coast, and during four expeditions to King George Island (SSI) by SCUBA between 2003–2012. About 15% of King George Island (SSI) species are observed to occur also in shallow waters of southern Chile (SCL). Few species known from warm temperate southeastern Pacific (Northern Chile, NCL) waters are absent from the Chilean part of the Magellan Province (SCL). With most data contributed from the Chilean coast coming from the SCL, and with limited sampling having been undertaken at depths exceeding 100 m in the NCL, apparent differences in species richness along the Chilean coast could be attributed to differential sampling effort. We detail 12 species from our Antarctic and Chilean collections in detail, including one, *Diplosoma listerianum*, not previously reported from Chilean waters, and the genus *Botryllus*, previously known from them on the basis of a single record.

Keywords Antarctica, Ascidiacea, *Botryllus*, Chile, *Diplosoma*, tunicata, zoogeography

Citation: Schories D, Sanamyan K, Sanamyan N, et al. Geographic ranges of ascidians from Antarctica and the southeastern Pacific. Adv Polar Sci, 2015, 26: 8-23, doi: 10.13679/j.advps.2015.1.00008

1 Introduction

Given its geographic and hydrographic isolation, and presumed novelty, the Antarctic marine fauna has been the subject of considerable taxonomic interest. The South American continent lies closest to the Antarctic shelf, through which faunal bridges may exist via the South Shetland Islands. Unsurprisingly, the relationship between

the Magellan and Antarctic faunas has been the subject of intensive research, particularly over the last 20 years^[1-2], but from the second half of the nineteenth century^[3-4] when nearly 50 species were recorded^[5]. Over the century that followed many additional taxa were recognized, culminating in 136 species being reported from it by Primo and Vázquez^[6]. We report 163 species from the same region, of which at least 106 have been collected from depths shallower than 1 000 m^[7], though it is important to note that differences in the number of taxa recognized from this region not only reflect an increased knowledge of ascidians from this area, but also differences in what borders have been used to subdivide

* Corresponding author (email: dirkschories@uach.cl)

Antarctic regions^[8].

Relationships between ascidian faunas of the Antarctic, subantarctic and South American biogeographic regions have been only recently studied by Ramos-Esplá et al.^[8] and Primo and Vázquez^[6], wherein relationships between the ascidian faunas of the Antarctic continent, Antarctic peninsula and South Orkney Archipelago have been evaluated^[8]. Since the work of Ramos-Esplá et al.^[8], new taxa and distribution records have been described from Antarctic, Magellan and Chilean waters, and further earlier records having been critiqued^[9-14]. More recently Primo and Vázquez^[7] compared the marine species composition within different Antarctic sectors, demonstrating the Antarctic ascidian fauna to be homogeneous with a high level of endemism.

Although the Magellan and Chilean Patagonian ascidian faunas have been studied intensively over recent decades (Appendix 1), only one inventory of the Chilean fauna^[15] and one checklist have been compiled^[16]. We present an updated species list for the Chilean fauna as defined by its exclusive economic zone (EEZ), dividing it into the Patagonian region south of about 40°S, a transition zone between 40°S and 30°S, and the Peruvian Province up to 13°S, and provide taxonomic notes on 12 species that occur within it.

Whereas Primo and Vázquez^[6] focused on evaluating relationships between faunas of Antarctica and neighboring regions, our research followed a geographic gradient extending from the South Shetland Islands to the Magellan region, then along the Chilean coast to 13°S, to determine at what point(s) ascidian faunal discontinuities became apparent to define ecoregion boundaries. Additionally, in contrast to the account of Primo and Vázquez^[7], we do not limit our data to taxa reported to 1 000 m, but included all known species from each region with their maximum depth distribution records. Some of these species were known from the Antarctic deep-sea only^[14].

2 Material and methods

2.1 Study area

The biogeographic boundary used for the Antarctic or South Polar Province (SPP) is that proposed by Briggs^[18], and Primo and Vázquez^[6] (Figure 1). Apart from the Antarctic continent it includes the South Shetlands (60°30'S, 60°W), South Orkney (60°30'S, 45°W) and South Sandwich (59°S, 27°W) Islands, South Georgia, Province (54°30'S, 36°W) and Bouvetøya Province (55°S, 3°30'E). For other regions we mainly follow the ecoregion concept of Knox^[19], and Spalding et al.^[20], where the South Shetland Islands are considered a separate ecoregion within the South Polar Province. For the Magellan region we include two of four ecoregions proposed by Spalding et al.^[20] (Figure 2).

The EEZ of Chile is geo-political boundary as opposed to biogeographic boundary, and is included purely to compiling an inventory of taxa from Chilean waters. The coastline of Chile extends almost 36 degrees in latitude,

from about 18°30'S to 55°S. As former investigations revealed changes in faunal composition cannot be described by splitting these waters into Magellanic and Peruvian provinces^[21], we divide them into (1) its Southern Province (SCL), (2) the Transition Zone (TCL), and (3) the Peruvian Province (NCL) following Knox^[19]. SCL is also a part of the Magellan Province (MAG), which also includes waters of neighboring southern Argentina.

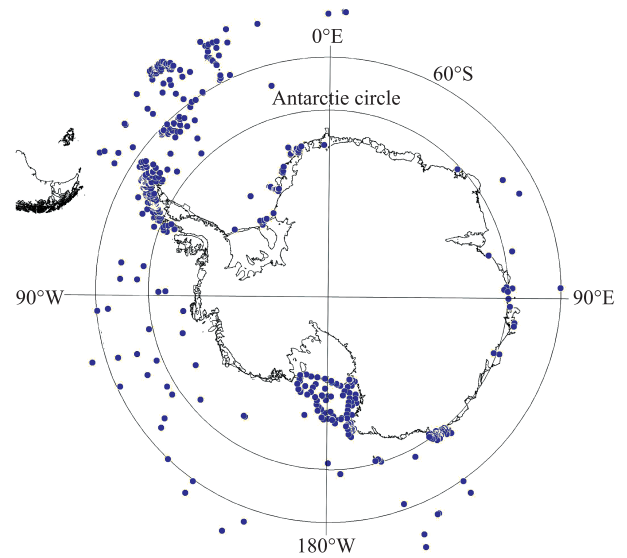


Figure 1 Ascidians collected between 1866 and 2013 in the South Polar Province; boundaries according to Briggs^[18], Primo and Vázquez^[6].

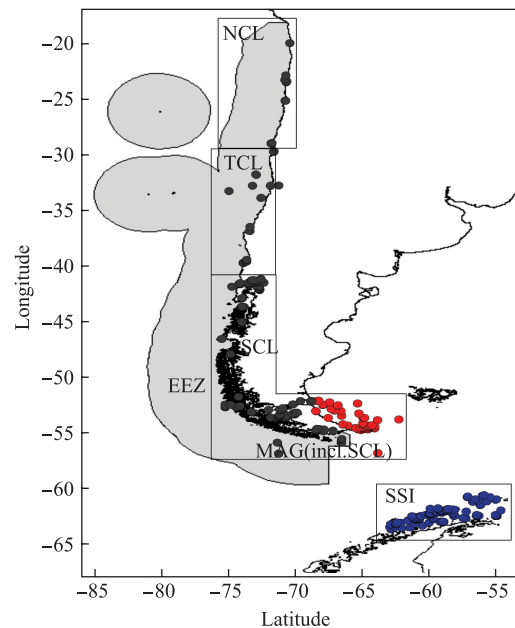


Figure 2 Ascidians collected between 1866 and 2013 in four different sectors: northern Chile (NCL, southern limit < 30°S); Transition Zone between 30°S and 40°S (TCL); Magellan Province, with stations inside the South Chilean EEZ (SCL; gray dots) and outside (red dots); and South Shetlands and surroundings (SSI). Only stations north of the Antarctic Peninsula are shown; the gray area represents the Chilean EEZ.

2.2 Data collection

Our material was collected from the intertidal or by SCUBA to 40 m depth. Most colonies or specimens were photographed in vivo to document colony form, habitat and substratum type. SCUBA collections from (1) King George Island, Admiralty Bay and Maxwell Bay (King George Island) and (2) along the Chilean coast were made between 2003 and 2012. Material from Chile was taken between 53°S and 25°S, mostly between 2007 and 2011. Upon collection samples were bagged and labelled, fixed in 4% formalin-seawater, and deposited in the collection of Kamchatka Branch of the Pacific Institute of Geography. Copies of images taken from living specimens are available on request.

An inventory of taxa (presence/absence matrix) reported from each region was compiled from records contained within 53 publications (Appendix 1) and two databases, the Australian government's 'Atlas of living Australia', and the Smithsonian Institute 'Antarctic Invertebrate'. These data sources, augmented by our own data, comprise in excess of 6 000 records. On the basis of these data, 163 species are recognized from this region, and their geographic and bathymetric distributions throughout the Southern Ocean region are described. Records lacking specific geographic information were excluded from analyses unless a general location of collection was provided, as was typically the case in the oldest literature.

3 Results

3.1 Geographic distribution

About 45% (75 species) of the 163 ascidian species recognized from the South Polar Province (SPP) occurred around the South Shetland Islands (SSI). The MAG shared 54 species with the SPP and 36 species with the SSI. The SCL contained only 74% (67 species) of those taxa known from it. North of 41°S ten species were present in the Chilean EEZ and SPP: *Didemnum studeri*, *Lissoclinum caulleryi*, *Aplidium falklandicum*, *A. fuegiense*, *Corella eumyota*, *Molgula pedunculata*, *Molguloides immunda*, *Paramolgula gregaria*, *Pyura chilensis* and *Polyzoa opuntia*.

Within the SPP stolidobranch ascidians were most abundant (44%, 72 species), followed by aplousobranch (38%, 60 species) and phlebobranch ascidians (18%, 30 species). The most species-rich families within the SPP, the MAG, and along the Chilean coast, were Polyclinidae, Molgulidae and Styelidae (Table 1).

Species identified for the first time from Admiralty Bay and Maxwell Bay, King George Island, were *Aplidium imbutum*, *A. loricaum*, *Synoicum georgianum* and *Didemnum* spp., though all have been previously reported from the SSI.

A total of 90 species are known from the MAG, whereas only 67 species were found in the SCL. The reduced species richness is due to the fact that southern Chile forms only a

part of the Magellan Province (Figure 2).

Table 1 Species richness in ascidian families in the: South Polar Province (Antarctic waters; SPP), South Shetland Islands (SSI), Magellan Region (MAG), southern Chile (SCL), Chilean Transition Zone (TCL), northern Chile (NCL), and Chile (CHL)

| Order/Family | SPP | SSI | MAG | SCL | TCL | NCL | CHL |
|-----------------|-----|-----|-----|-----|-----|-----|-----|
| Aplousobranchia | 60 | 32 | 40 | 28 | 8 | 7 | 32 |
| Didemnidae | 8 | 3 | 10 | 9 | 2 | 2 | 9 |
| Holozoidae | 9 | 7 | 6 | 6 | 1 | 1 | 6 |
| Placentelidae | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Polycitoridae | 3 | 3 | 2 | 1 | 0 | 1 | 2 |
| Polyclinidae | 36 | 18 | 22 | 12 | 5 | 3 | 15 |
| Ritterellidae | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| Phlebobranchia | 30 | 12 | 10 | 7 | 1 | 2 | 7 |
| Agneziidae | 9 | 5 | 3 | 1 | 0 | 0 | 1 |
| Asciidae | 4 | 3 | 3 | 2 | 0 | 0 | 2 |
| Cionidae | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| Corellidae | 7 | 3 | 2 | 2 | 1 | 1 | 2 |
| Diazonidae | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| Dimeatidae | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Octacnemidae | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stolidobranchia | 72 | 30 | 40 | 32 | 9 | 10 | 39 |
| Molgulidae | 27 | 12 | 15 | 10 | 4 | 3 | 13 |
| Styelidae | 27 | 11 | 18 | 15 | 4 | 4 | 17 |
| Pyuridae | 18 | 7 | 7 | 7 | 1 | 3 | 9 |
| Sum of species | 162 | 74 | 90 | 67 | 18 | 19 | 78 |

Along the Chilean coast, only four species (*Aplidium peruvianum*, *Eudistoma clivosum*, *Aplidiopsis chilensis* and *Pyura praeputialis*) occurring within the NCL do not occur in SCL, whereas all species from TCL occur within SCL. None of these species has been found south of 30°S, three of them have been only recently described^[11, 22] and one is introduced^[23]; all four species are known from the intertidal to depths of 23 m.

Diplosoma listerianum and *Botryllus* sp. have not been previously reported from the Chilean coast, and have never been reported from Antarctic waters. *Diplosoma listerianum* has been found frequently overgrowing algae, other ascidians and mussels in SCL. It is very common on the long lines of mussel farms on the Island of Chiloe, but also occurs further south in areas with minimum or without apparent human impact. An unidentified species of *Botryllus* was found once only, attached to a salmon cage at about 0.5 m in Chiquihue, Puerto Montt.

Species richness within TCL and NCL was low in comparison to SCL, though collection effort in these regions is not comparable to that within SCL, and available samples are largely shallow water intertidal or SCUBA collected (Appendix 1).

3.2 Depth distribution

Limited collections exist from depths greater than 500 m along the Chilean coast. Only two species, *Oligotrema lyra* and *Styela brevigaster*, are known exclusively from depths greater than 500 m, and nine other species from depths greater than 100 m. All other species occur in shallower waters, with 15 of these (19%) known only from the intertidal to a maximum depth of 50 m (Table 2). In contrast, 44 species (27%) are known only from depths greater than 500 m in the SPP, and 43% of species were unknown from depths shallower than 100 m. About 40% of species occur in waters more shallow than 50 m, but these species also extend to 500 m or more. Only three species were limited to depths more shallow than 50 m: *Aplidium annulatum*, *Corella antarctica* and *Pyura stubenrauchii*. The reported depth distribution of *Corella antarctica* is questionable as this species has been historically confused with *C. eumyota*, and may be confused with other taxa, and the other two species are known from single depth records.

Table 2 Species richness according to depth ranges: South Polar Province (Antarctic waters; SPP), South Shetlands Islands (SSI), Magellan Region (MAG), southern Chile (SCL), Chilean Transition Zone (TCL), northern Chile (NCL), and Chile (CHL). Each species is represented only in one depth category per region

| Depth/m | SPP | SSI | MAG | SCL | TCL | NCL | CHL |
|----------|-----|-----|-----|-----|-----|-----|-----|
| 0–50 | 1 | 3 | 10 | 9 | 5 | 7 | 14 |
| 0–100 | 1 | 0 | 3 | 2 | 0 | 1 | 2 |
| 0–500 | 27 | 14 | 19 | 15 | 1 | 0 | 15 |
| 0–>500 | 40 | 33 | 27 | 22 | 7 | 7 | 22 |
| 50–500 | 13 | 5 | 11 | 8 | 0 | 1 | 9 |
| 50–>500 | 8 | 7 | 3 | 3 | 0 | 0 | 3 |
| 100–500 | 16 | 4 | 8 | 2 | 1 | 0 | 3 |
| 100–>500 | 10 | 5 | 4 | 3 | 3 | 2 | 6 |
| >500 | 44 | 2 | 1 | 1 | 1 | 0 | 2 |
| unknown | 2 | 0 | 4 | 2 | 0 | 1 | 2 |
| Sum | 162 | 73 | 90 | 67 | 18 | 19 | 78 |

3.3 Systematics

Didemnum biglans (Sluiter, 1906) (Figure 3a)

This species forms thin (about 3 mm or less) colonies that encrust hard substrata, such as stones, algae, shells of living or dead molluscs, and even other ascidians. The common test is colorless, though calcareous spicules render the colony white to dirty white in life and when preserved. Kott^[24] reported white, pinkish or pale buff-gray colonies, though the latter two were not represented amongst our material. Spicules are burr-like, usually not more than 25 µm diameter, densely packed in the upper colony layer, and sparse within the lower layer. Preserved zooids are 1.5–2 mm in length, with short 6-lobed branchial siphons with wide atrial openings and small atrial languets. Zooids lack a retractor

muscle. The sperm duct turns 4 or 5 times around the testis, which may be represented by a single or double follicle.

Species of the genus *Didemnum* are difficult to identify. Though *D. biglans* appears rather common in Antarctic waters, with several detailed descriptions of it available^[12, 24–27], identification can be difficult as characters cited as to differentiate taxa are sometimes difficult to follow. For example, Kott^[24] distinguished *D. biglans* from *D. studeri* (which is said to be a mostly subantarctic species) by several features including the size, shape and distribution of the spicules (mainly in superficial layers of the test in *D. biglans* and evenly distributed in the test of *D. studeri*). Spicule distribution in our colonies was somewhat transitional, in that they were more abundant in superficial layers, but also distributed throughout the colony. Given Monniot et al.^[12] obtained highly divergent COI partial cytochrome oxidase I sequences for specimens referred to *D. biglans* from Antarctic waters, this species may actually comprise several cryptic species.

Didemnum studeri Hartmeyer, 1911 (Figure 3b)

Our colonies were thin, encrusting, and white colored, whereas those of Kott^[24] were white, pinkish, or pale buff-gray. The surface of preserved colonies was smooth. In life common cloacal canals were small, sparsely distributed, inflated and somewhat raised from the surface of the colony, with several short common cloacal canals merging to common cloacal openings. Calcareous spicules were stellate, with 8–12 short blunt rays in optical section^[24], 40–45 µm diameter, and densely distributed throughout the colony test. Individual zooids have narrow branchial sacs, with 5 or 6 stigmata per row; the large atrial opening lacks an atrial languet. The retractor muscle is usually present. The sperm

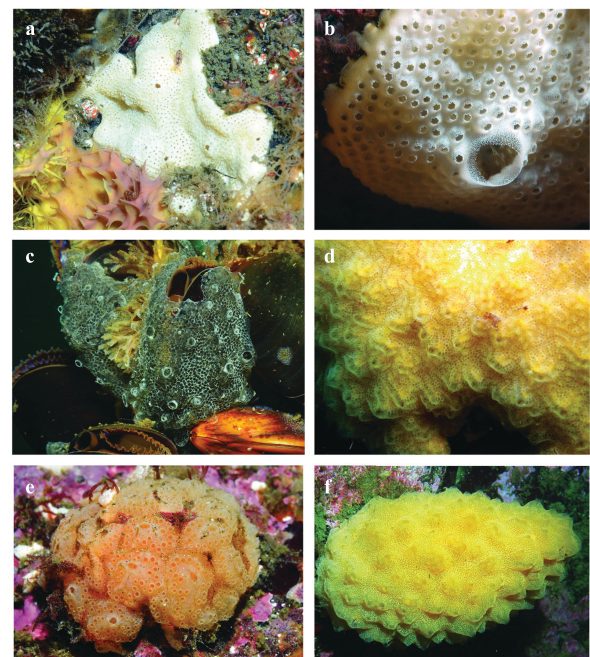


Figure 3 In vivo images of Antarctic and subantarctic ascidians. a, *Didemnum biglans*; b, *Didemnum studeri*; c, *Diplosoma listerianum*; d, *Diastaplia colligans*; e, *Aplidium falklandicum*; f, *Aplidium fuegiense*.

duct turns 6 times around the testis.

Like the preceding species, identification of *D. studei* can also be problematic, with purportedly species-specific characters proving to be expressed in a number of taxa. For example Sanamyan et al.^[11] reported colonies that agreed in most respects to this species, but in which spicules were distributed mainly in the test superficial layers (as in *D. biglans*). It is possible that *D. studei* also comprises several sibling species.

Diplosoma listerianum (Milne-Edwards, 1841) (Figure 3c)

Chilean colonies form extensive sheets, the size of which is difficult to determine for they are very soft and shapeless in preservative; the largest we have reaches ~10 cm greatest dimension, though it has obviously contracted at collection and shrunk in preservative. Colonies consist of a thin solid basal sheet and an upper sheet, separated by an extensive cloacal cavity. The basal and upper sheets are connected by numerous thin vertical strands of the test, each branching at their upper end, into which the zooids are embedded just below the surface layer of colony; each zooid is located in its own branch of the strand and isolated from other zooids. The test is transparent, with dark-gray freshly preserved colonies fading to brown with a purple tint after several years in preservative.

Contracted zooids are typically 1.0–1.2 mm in length. The abdomina and in part thoraces of freshly preserved material were black, but only some retained pigmentation after having been preserved for several months. Stigmata are arranged in four rows of nine (counted in less-contracted zooids), comparable to Australian specimens (8–10 stigmata per row)^[28]. The testis consists of two follicles with a straight sperm duct. Larvae of several ages and ova are simultaneously present, crowded in the basal layers of the test and parts of the vertical test strands in the cloacal cavity; the larval trunk is nearly round, about 0.5–0.6 mm diameter, with a tail that winds 3/4 the way around it.

The species is regarded as one of the few “truly cosmopolitan” ascidians^[28], being known from many parts of the world in both cold and warm waters.

Distaplia colligans Sluiter, 1932 (Figure 3d)

This species forms thin colonies encrusting stones, rock or other hard substrata. Live colonies are bright yellow, though formalin and alcohol-fixed colonies are invariably dark brown or almost black. The species is easy to identify—its zooids are small, no more than several millimeters length, and the body is divided into thorax with branchial sac (with four rows of stigmata) and abdomen with gut loop and gonads. The branchial siphon of each zooid opens directly on the colony surface, whereas atrial siphons open into a common cloacal cavity which opens separately to the exterior by a cloacal opening (though this is difficult to see in both preserved specimens and on the basis of live-colony photographs). No other *Distaplia* species with thin encrusting colonies are known from the region.

Aplidium fuegiense Cunningham, 1871 (Figure 3f)

The genus *Aplidium* is the most species rich of

Ascidacea, comprising about 250 taxa distributed worldwide. Species are distinguished on the basis of zooid anatomy, especially the numbers of the rows of stigmata in the branchial sac and the longitudinal folds of the stomach, and structures of larvae and colony shape. Zooid structure is readily discerned in most well-preserved colonies, though mature larvae are not always present, at times precluding accurate identification.

The taxonomic value of colony structure was underestimated for a long time. Although details of the structure of colony and organization of cloacal systems are difficult to determine on preserved colonies, they can be easily determined from macro images of in vivo specimens.

Aplidium fuegiense belongs to a group of species for which colony and zooid shape are considered variable, and as a species it has a complex synonymy. Millar^[26] considered *A. variabile*, at the time synonymized with it, distinct, and rediagnosed it with 10-or-more stomach folds, compared with the five folds for *A. fuegiense*. However, several Antarctic and subantarctic species have five folds, some of which presently can be distinguished only if mature larvae are present in the colony (e.g. *A. falklandicum*), whereas others are too imperfectly described to enable accurate identification.

Details of colony structure may assist with identification of species of *Aplidium*, but for most Antarctic species insufficient details are known (Figure 3e, 3f).

Although colonies of *A. fuegiense* are described as extremely variable and irregular, and indeed all preserved colonies are thick irregular masses without recognizable systems, our in vivo images reveal a characteristic colony shape, the surface of which is raised into several-to-numerous large conical lobes with a single cloacal siphon atop each, with zooids opening on the sides of these lobes arranged along rather-wide anastomosing cloacal canals that converge at the top^[11]. Occasionally crowded dark rounded opaque granules are apparent in the outer layer of the test of some colonies.

Synoiicum georgianum Sluiter, 1932 (Figure 4a)

The genus *Synoiicum* includes about 70 colonial species differentiated from *Aplidium* by the absence of longitudinal stomach folds. Consequently the zooids of many *Synoiicum* species are uniform in their structure, with many taxa being presently separable on the basis of shape and colony structure only. Van Name^[25] treated this species and several others as synonyms of *S. adareanum*, a common large Antarctic species. Although zooids of the two species are similar, with a body divided into thorax (containing the branchial sac), abdomen (with gut loop) and postabdomen (with gonads), Millar^[26] differentiated *S. georgianum* from *S. adareanum* on the basis of the number of rows of stigmata (13–15, and 18–20 respectively) and stomach shape, pear-shaped in *S. adareanum* but not in *S. georgianum*. Fully developed colonies of *S. georgianum* comprise many small heads arising on usually rather slender stalks from a basal mass of root-like processes, with each head containing one to several systems of zooids, whereas those of *S. adareanum* form massive heads, sometimes on short, thick stalks, each containing

numerous zooid systems, though these differences are less apparent in preserved material with small colonies or heads separated from each other.

Agnezia biscoei Monniot & Monniot, 1983 (Figure 4b)

Despite the relatively large size (for the genus *Agnezia*) of this solitary ascidian, 4 cm or more in greatest dimension, it can be difficult to find as it resembles a sandy oval-shaped potato-like mass, its body densely covered in sand or gravel. Its test, impregnated with sand, is also brittle and hard in touch, with the siphons usually withdrawn into it on collection. The branchial sac has spiral stigmata that coil up to 12 times, interrupted in vertical and horizontal axes. Infundibula are low and supported by diagonal parastigmatic vessels extending from the corners of each square spiral to the infundibulum summit. Each transverse row of stigmata is separated by transverse vessels with finger-like papillae, and the female genital aperture is turned back (in contrast to *A. glaciata* where it is directed upward), suggestive of peribranchial cavity egg incubation.

Kott^[24] synonymized many southern and several northern hemisphere *Agnezia* species with *A. glaciata*, the type species of the genus described from Tierra del Fuego, though Monniot and Monniot^[27] recognized *A. biscoei* to be distinct from it. This distribution of this species is limited to the Antarctic continental shelf^[29], known from the Weddell Sea and several locations on the Antarctic peninsula; ours is the first record from King George Island.

Corella eumyota Traustedt, 1882 (Figure 4c)

Our Chilean specimens are not large, usually 1–3 cm in greatest dimension. The ovoid body is laterally compressed. Branchial and atrial siphons are almost sessile, the branchial one situated terminally or slightly displaced dorsally, the atrial

mid-dorsally. The cartilaginous test is usually smooth and free of foreign matter, though occasional epibionts like bryozoans or hydroids may occur; in life the animal is colorless, with the visceral mass (gut loop and gonad) visible as a dull-rose opaque mass through the semitransparent test. In vivo images facilitate differentiation of this species from similarly looking ascidians (e.g. *Ascidia* or *Molgula*) by the position of the gut loop on the right side of the body. The body removed from the test is thin walled, with its muscles developed on the left side only. The branchial sac has regular spiral stigmata and internal longitudinal vessels, and the gonads of both sexes have sessile apertures located on the gonad itself, in the gut loop.

Monniot^[30] recognized this species to be widely distributed, with Chilean specimens (the type locality) conspecific with those from New Zealand, Amsterdam Island, South Africa and France.

Corella antarctica Sluiter, 1905 (Figure 4d)

Specimens from King George Islands resemble Chilean *C. eumyota*, from which this species has been only recently removed from synonymy. It has long gonoducts extending along the intestine, and distinct male and female genital apertures that open above the anus on long papillae. It is also generally larger than *C. eumyota*.

Monniot^[30] considered specimens of this species from various depths and locations from the Antarctic Peninsula and the Australian sector of the Antarctic to be variable and concluded more material was required to determine if all were conspecific.

Botryllus sp. (Figure 4e)

The single colony, about 1.5–2 cm in greatest dimension, was attached to thin branches of a hydrozoan. The preserved colony is soft, colorless, and translucent, with the zooid thoraces distinctly apparent through the test. The arrangement of the system is not discernible, though the zooids most probably are arranged in several circles. Zooids are 1.2–1.3 mm long, oval in outline with rather long atrial siphon and in general resemble those of *B. tuberatus*, though they have seven rows of stigmata (rather than four in *B. tuberatus*). The second row is incomplete. The gonads are not developed and we were not able to determine the structure of the stomach (an important species-specific feature in this genus).

Van Name^[15](p.10) identified *B. schlosseri* (Pallas, 1766) from Chile on the basis of “one very small colony, consisting of three small systems and a few apparently unattached zooids”. His material may be conspecific with ours, but there are no signs indicating that it was correctly identified—historically many taxa have been lumped as *B. schlosseri*. Given the immaturity of our material, and incompleteness in description we can proffer for it, we elect to identify it to genus only.

Alloeocarpa bacca Arnback, 1929

Our Chilean colonies were attached to smooth hard stones and shells. In general they resembled associations of separated zooids, connected by a thin, inconspicuous membrane that firmly adhered to the substratum. Individual

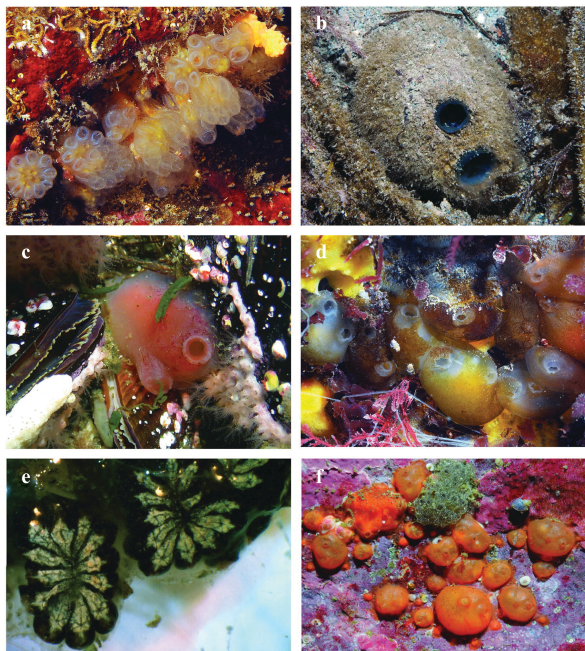


Figure 4 In vivo images of Antarctic and subantarctic ascidians. **a**, *Synoicum georgianum*; **b**, *Agnezia biscoei*; **c**, *Corella eumyota*; **d**, *Corella antarctica*; **e**, *Botryllus* sp.; **f**, *Polyzoa opuntia*.

zooids are irregularly spaced, never touch, and of variable size, the largest in preserved material about 5 mm diameter. In life, and especially in preservative, the zooid profile is rather low, almost flat or low dome-shaped, and a dirty gray with yellow tint in color. The branchial sac has six internal longitudinal vessels on the right side and five on the left. Male and female gonads are separate. Seven or nine small ovaries, each consisting of several variably sized eggs, lie in a row on the right side of the body running along and in close proximity to the endostyle. Two or three ovaries may occur on the anterior part of the left side of the body. The male gonad comprises three or four follicles which are ramified and coherent with each other to form an elongated mass just above the pole of the gut loop.

Two other *Alloeocarpa* species known from the region can be differentiated from *A. bacca* on the basis of zooid association and color^[31]: *A. incrustans* (Herdman, 1886) and *A. bridgesi* Michaelsen, 1900, both of which have coalescent zooids and red living zooids; *A. incrustans* also has more numerous longitudinal branchial vessels (10–18 on each side)^[24-25]. Within that material available to us is a colony from Chile with separate zooids similar to those of *A. bacca*, but with 10 branchial vessels on each side, exceeding the number reported for this species (no more than 7), but somewhat intermediate between *A. bacca* and *A. incrustans*. The gonads of this specimen were poorly preserved and it was not possible to clarify if other differences existed.

Alloeocarpa bridgesi is said to form red encrusting colonies with embedded zooids^[25] with almost the same number of internal branchial vessels as *A. bacca*. The only reported difference between these two species is the shape of the colony. Previous distribution records, especially those not accompanied with descriptions, should be treated with caution.

Polyzoa opuntia Lesson, 1830 (Figure 4f)

Chilean specimens form large colonies 10 cm or more in extent, comprising numerous zooids averaging about 10 mm height and 4 mm diameter. Zooids are typically cylindrical and connected by a basal test only (they are not immersed to a common test). Colonies are usually found on thin elongated objects, such as polychaete tubes or branches. In preservative the zooids are dull gray, the test is leathery and often wrinkled, and its surface is clean of foreign bodies. The body wall of zooids removed from their test is muscular and thick. The branchial sac lacks folds and has eight internal longitudinal vessels. Hermaphrodite gonads are profusely developed in some specimens, each with a large elongated male follicle, on the mesial surface of which is a small ovary comprising several eggs; up to about nine gonads were apparent on the left side of the body, lying in a single row along the endostyle from the pole of the gut loop to the anterior end of the body, and 20 gonads on the right side, lying in a wide arc along the entire ventral as well as dorsal sides of the body.

Present colonies agree closely with the description of *P. reticulata* (Herdman, 1866), the colonies of which are described with almost separate zooids, rather than *P. opuntia*,

whose colonies are described as pedunculated heads with zooids almost completely immersed to a common test^[24-25]. These two species have been synonymized by Monniot and Monniot^[27], with whose opinion we follow.

4 Discussion

We will likely never know how many ascidian species exist in the SPP, because differences in ascidian species morphology are often slight, whereas other characteristics like COI sequences appear to be more divergent^[12], indicating the existence of sibling taxa. Whereas about 50 taxa were recognized from this region at the beginning of the 20th century^[5], 136 taxa were known from it nearly 100 years later by Primo and Vázquez^[6], and it is highly likely that additional taxa will be reported from it with additional multidisciplinary systematic research.

Our updated species inventory excludes synonyms, and accesses more data sets than historically possible. Despite this, it has its shortcomings. Because of the definition of the SPP used by Primo and Vázquez^[6], some species of the Magellan and Peruvian Provinces, such as *Pyura chilensis* and *Polyzoa opuntia*, have been included within the SPP, despite material never having been sampled at latitudes greater than 60°S. The systematic status of several other taxa is also in need of revision (e.g., *Didemnum* and *Corella*).

With the exceptions of *Pyura chilensis*, *Didemnum studeri* and *Corella eumyota*, few species are common to both the TCL and NCL. Although *Molguloides immunda* was found in the Antarctic between 128 and 183 m depth, it was known from the Chilean EEZ at 5 929 m^[32], though this difference is not really surprising given the known overlap between Antarctic and deep-sea faunas^[33-34].

The extensive geographic distributions of *Aplidium falklandicum* and *A. fuegiense* should be treated with caution, as several species of *Aplidium* occur in the SPP and MAG, and distribution records of some taxa when uncritically accepting literature could be based on misidentifications. Genetic evaluation of taxa that have been identified using traditional morphological criteria might assist resolution of any species complexes, should they exist.

Significant differences in sampling hamper detailed comparison of the Antarctic ascidian fauna with that of the MAG and continental Chile (Figure 1). Most Antarctic samples were collected by research vessels from depths exceeding 100 m, and only over the last few decades has material been collected by divers in shallow water^[35-37], whereas this situation is reversed for collections of specimens from Chilean waters^[11,15,38-40].

Of the 163 species now recognized from the SPP, two rare species occur exclusively within shallow water: *Aplidium annulatum* and *Pyura stubenrauchii*. Several Chilean species are known only from shallow water. Most collections were made in deeper waters of the SCL, especially from the Strait of Magellan, or they were collected further south, taken on cruises to the Antarctic. Of the 78 known species from

Chile's EEZ, 67 are distributed in SCL, whereas only 11 are known exclusively from TCL and NCL (*Eudistoma clivusum*, *Aplidiopsis chilensis*, *Aplidium longum*, *A. peruvianum*, *Molgula diaguia*, *M. ficus*, *Molguloides immunda*, *Pyura praeputialis*, *P. stolonifera*, *Styela brevigaster* and *S. change*), though *A. longum* and *M. immunda* are known also from the SPP. The shallow water species of TCL and NCL likely have extended geographic ranges within the Peruvian Province, as has been demonstrated for *A. peruvianum*^[11,22], though more northern distribution records are unknown.

One species is reported from Chilean waters for the first time, and a second taxon is reported for the second time only (*Diplosoma listerianum* and *Botryllus* sp. respectively), both associated with aquaculture nets and, in the case of *D. listerianum*, mussel long lines. *Botryllus* was encountered once only within an aquaculture facility, though *D. listerianum* frequently overgrew algae and other epibenthic organisms along the southern Chilean coast. Because *D. listerianum* was not recorded in a former intensive study^[15] we assume it to have only recently invaded Chilean waters.

Differential sampling effort limits our understanding of the distribution of ascidians along a geographic gradient extending from Antarctic waters to northern Chile. Those few shallow water species known from the SPP and TCL or NCL belong to taxa of variable morphological characteristics, and additional systematic research would benefit from a more multidisciplinary approach, including sequencing data, to resolve true species richness within any. Finally, we believe the number of taxa that occur within the Chilean EEZ is greater than we recognize, given restricted sampling effort in the north and at depths exceeding 100 m.

Acknowledgments This work was supported by the International Bureau, Bonn, FRG (Grant no. CHL07/007), the Direction of Investigation and Development of the University Austral de Chile, Valdivia, UACH, Chile (Grant no. S-2008-14), and the Chilean Antarctic Institute, INACH (Grant no. T_21-09).

References

- Arntz W E, Ríos C. Magellan–Antarctic: ecosystems that drifted apart. *Sci Mar*, 1998, 63 (Suppl. 1)
- Arntz W E, Lovrich G A, Thatje S. The Magellan–Antarctic connection: Links and frontiers at high Southern latitudes. *Sci Mar*, 2005, 69 (Suppl. 2)
- Cunningham R O. Notes on the reptiles, amphibia, fishes mollusca and crustacea obtained during the voyage of H. M. S: 'Nassau' in the years 1866–69. *Trans Linn Soc*, 1871, 27: 465–502 (Tunicata 488–490)
- Sluiter C P. Tuniciers. *Expédition Antarctique Française (1903–1905)*. 1906, 1–48 (45 plates)
- Hartmeyer R. Die Ascidien der Deutschen Südpolar-Expedition 1901–1903. Georg Reimer. Berlin. 1911
- Primo C, Vázquez E. Zoogeography of the Antarctic ascidian fauna in relation to the sub-Antarctic and South America. *Antarct Sci*, 2007, 19: 321–336
- Primo C, Vázquez E. Antarctic ascidians: an isolated and homogeneous fauna. *Polar Res*, 2009, 28: 403–414
- Ramos-Esplá A A, Cárcel J A, Varela M. Zoogeographical relationships of the littoral ascidiofauna at the Antarctic Peninsula, in the Scotia Arc and in the Magellan region. *Sci Mar*, 2005, 69: 215–223
- Varela M, Ramos-Esplá A A. *Didemnum bentarti* (Chordata: Tunicata) a new species from the Bellingshausen Sea, Antarctica. *Polar Biol*, 2008, 31: 209–213
- Tatián M, Schwindt E, Lager C, et al. Colonization of Patagonian harbours (SW Atlantic) by an invasive sea squirt. *Spixiana*, 2010, 33: 111–117
- Sanamyan K, Schories D, Sanamyan N. New records of aplousobranch ascidians from Central Chile. *Zootaxa*, 2010, 2537: 58–68
- Monniot F, Dettai A, Eleaume M, et al. Antarctic Ascidians (Tunicata) of the French–Australian survey CEAMARC in Terre Adélie. *Zootaxa*, 2011, 2817: 1–54
- Alurralde G, Torre L, Schwindt E, et al. A re-evaluation of morphological characters of the invasive ascidian *Corella eumyota* reveals two different species at the tip of South America and in the South Shetland Islands, Antarctica. *Polar Biol*, 2013, 36: 957–968
- Monniot C, Monniot F. Some Antarctic deep-sea tunicates in the Smithsonian collections. *American Geophysical Union*, 1981
- Van Name W G. Ascidians (Ascidacea). Reports of the Lund University Chile Expedition 1948–1949. *Lunds Univ Arsskrift NF Avd 2*, 1954, 50: 1–20
- Lee M R, Castilla J C, Fernandez M, et al. Free-living benthic marine invertebrates in Chile. *Rev Chil Hist Nat*, 2008, 81: 51–67
- Molina G I. Saggio sulla storia naturale del Chili (in Italian). Bologna, 1782
- Briggs J C. *Global Biogeography*. Amsterdam: Elsevier, 1995
- Knox G A. Littoral ecology and biogeography of the Southern oceans. *Proc Roy Soc B*, 1960, 152: 577–624
- Spalding M D, Fox H E, Allen G R, et al. Marine ecoregions of the world: a bioregionalization of coastal and shelf areas. *Bioscience*, 2007, 57: 573–583
- Woodward S P. *A manual of the Mollusca*. London. 1851–56
- Sanamyan K, Schories D. Ascidians from Peru. *Spixiana*, 2004, 27: 193–197
- Castilla J C, Collins A G, Meyer C P, et al. Recent introduction of the dominant tunicate, *Pyura praeputialis* (Urochordata, Pyuridae) to Antofagasta, Chile. *Mol Ecol*, 2002, 11: 1579–1584
- Kott P. *Antarct Res Ser*. American Geophysical Union, Washington, DC, 1969, 13: 1–239
- Van Name W G. The North and South American Ascidians. *Bull Am Mus Nat Hist*, 1945, 84: 1–476
- Millar R H. *Ascidacea*. Cambridge University Press, 1960
- Monniot C, Monniot F. *Ascidies antarctiques et subantarctiques: morphologie et biogéographie*. Éditions du Muséum, 1983
- Kott P. The Australian Ascidacea Part 4, Aplousobranchia (3), Didemnidae. *Mem Queensl Mus*, 2001, 47: 1–407
- Monniot C, Monniot F. Ascidians collected in the Weddell Sea by the RV "Polarstern" (EPOS cruise leg 3). *Bulletin du Muséum National d'Histoire Naturelle*, Paris, 1994, 16: 13–37
- Monniot F. The genus *Corella* (Ascidacea, Phlebobranchia, Corellidae) in the Southern Hemisphere with description of a new species. *Zootaxa*, 2013, 3702: 135–149
- Ärnback C. Chilean tunicates. Ascidians from the Guaitecas Islands. *Arkiv för Zoologi*, 1929, 21: 1–27
- Lemaitre R, Harasewych M G. ANTIZ v 1.07: A database of Antarctic and subantarctic marine invertebrates
- Menzies R J, George R Y, Rowe G T. Abyssal environment and

- ecology of the World Oceans. Wiley-Interscience, New York, 1973
- 34 Hansen B. Systematics and biology of the deep-sea holothurians, Part 1. Elaspoda. *Galathea Rep*, 1975, 13: 5-262
 - 35 Tatian M, Sahade R J, Doucet M E, et al. Ascidiaceae of Potter Cove, South Shetland Islands, Antarctica. *Antarct Sci*, 1998, 10(2): 147-152
 - 36 Tatian M, Sahade R, Marcelo E, et al. Title of paper (adding) // Wiencke C, Ferreyra G, Arntz W E, et al. The Potter Cove coastal ecosystem, Antarctica. 1998, 299
 - 37 Kühne S. Solitäre Asciden in der Potter Cove (King George Island, Antarktis). Ihre ökologische Bedeutung und Populationsdynamik. *Ber Polar- Meeresforsch*, 1997, 252
 - 38 Sanamyan K, Schories D. Ascidiaceae from the Strait of Magellan. *aqua, Journal of Ichthyology and Aquatic Biology*, 2003, 7: 89-96
 - 39 Sanamyan K, Schories D. Redescription of *Eudistoma magalhaensis* (Michaelsen, 1907) (Ascidiaceae) from Guaitecas Islands, Chile. *Zootaxa*, 2007, 65-68
 - 40 Lager C, Häussermann V, Försterra G, et al. Ascidiaceae from the southern Chilean Comau Fjord (Chordata, Ascidiaceae). *Spixiana*, 2009, 32: 173-185
 - 41 Michaelsen W. Die holosomen Asciden des magalhaensisch-südgeorgischen Gebietes. *Zoologica*. 1900, 12: 1-146 (146 plates)
 - 42 Michaelsen W. in *Ergebnisse der Hamburger Magalhaensischen Sammelreise, 1892–1893*. Naturhistorisches Museum zu Hamburg, Hamburg, 1907, 8: 1-84 (83 plates)
 - 43 Monniot C, Monniot F. Ascidiées de la XXII^e expedition Antarctique Chilienne. *Bol. Soc. Biol. de Concepción*, 1974, 48: 365-383
 - 44 Varela M M, Ramos-Esplá, A. *Didemnum bentarti* (Chordata: Tunicata) a new species from the Bellingshausen Sea, Antarctica. *Polar Biol*, 2007, 31, 209-213
 - 45 Koplavitz G, McClintock J B, Amsler C D, et al. Palatability and chemical anti-predatory defenses in common ascidians from the Antarctic Peninsula. *Aquat Biol*, 2009, 7: 81-92
 - 46 Kott P. Antarctic Ascidiaceae II. *Antarct Res Ser*, 1971, 17: 11-82
 - 47 Millar R H. Ascidiaceae collected during 1928-1930 by the Norwegian Antarctic expeditions. Universitetsforlaget, Oslo. 1968
 - 48 Whitbread G. Atlas of Living Australia (database). <http://www.biodiversity.org.au> (2014-03-15). 2013
 - 49 Hartmeyer R. in *Natural History of Juan Fernandez and Easter Island*, ed. C. Skottsberg, Uppsala, 1920, vol. 3
 - 50 Tatián M, Antacli J C, Sahade R. Ascidiaceae (Tunicata, Ascidiaceae): species distribution along the Scotia Arc. *Sci Mar*, 2005, 69: 205-214
 - 51 Sahade R, Tatian M, Kowalke J, et al. Benthic faunal associations on soft substrates at Potter Cove, King George Island, Antarctica. *Polar Biol*, 1998, 19: 85-91
 - 52 Tatian M, Sahade R J, Doucet M E, et al. Ascidiaceae (Tunicata, Ascidiaceae) of Potter Cove, South Shetland Islands, Antarctica. *Antarct Sci*, 1998, 10: 147-152
 - 53 Sanamyan K E, Sanamyan N P. Deep-water ascidians from the south-western Atlantic (RV Dmitry Mendeleev, cruise 43 and Academic Kurchatov, cruise 11). *J Nat Hist*, 2002, 36: 305-359
 - 54 Cunningham R O. Notes on the natural history of the Strait of Magellan and west coast of Patagonia. Edmonston & Douglas. Edinburgh. 1871
 - 55 Michaelsen W. Vorläufige Mittheilung über einige Tunicaten aus dem Magalhaensischen Gebiet, sowie von Süd-Georgien. *Zool Anz*, 1898, 21: 363-371
 - 56 Primo C, Vazquez E. Ascidiaceae collected during the Spanish Antarctic expedition CIEMAR 99/00 in the Bransfield and Gerlache Straits. *J Nat Hist*, 2007, 41: 1775-1810
 - 57 Tatián M, Sahade R, Mercuri G, et al. Feeding ecology of benthic filter-feeders at Potter Cove, an Antarctic coastal ecosystem. *Polar Biol*, 2008, 31: 509-517
 - 58 Demarchi M, Chiappero M B, Tatián M, et al. Population genetic structure of the Antarctic ascidian *Aplidium falklandicum* from Scotia Arc and South Shetland Islands. *Polar Biol*, 2010, 33: 1567-1576
 - 59 Nuñez-Pons L, Carbone M, Vázquez J, et al. Natural products from Antarctic colonial ascidians of the genera *Aplidium* and *Synoicum*: variability and defensive role. *Mar Drugs*, 2012, 10: 1741-1764
 - 60 Kowalke J. Filtration in antarctic ascidians—striking a balance. *J Exp Mar Biol Ecol*, 1999, 242: 233-244
 - 61 Kowalke J, Arntz W, Tatián M, et al. Production and respiration of Antarctic ascidians. *Polar Biol*, 2001, 24: 663-669
 - 62 Torre L, Servetto N, Eöry M L, et al. Respiratory responses of three Antarctic ascidians and a sea pen to increased sediment concentrations. *Polar Biol*, 2012, 35: 1743-1748
 - 63 Herdman W A. Report on the Tunicata collected during the voyage of H.M.S. Challenger during the years 1873-76—Ascidiea Simplicia. London, 1882
 - 64 Clarke M, Castilla J C. Two new records of ascidians (Tunicata : Ascidiaceae) for the continental coast of Chile. *Rev Chil Hist Nat*, 2000, 73: 503-510
 - 65 Millar R H. Ascidiaceae collected during the South-east Pacific Biological Oceanographic Program (SEPBO). *J Nat Hist*, 1988, 22: 225-240
 - 66 Sanamyan K E. Dimeatidae, a new family of the Ascidiaceae, with description of a new species of the genus *Dimeatus*. *Zoosystematica Rossica*, 2001, 9: 37-41
 - 67 Monniot C, Andrade H. Ascidiaceae arquibénticas de Chile Central. *Revista de Biología Marina (Valparaíso)*, 1983, 19: 133-141
 - 68 Bowden D A, Clarke A, Peck L S, et al. Antarctic sessile marine benthos: colonisation and growth on artificial substrata over three years. *Mar Ecol Prog Ser*, 2006, 316: 1-16
 - 69 Michaelsen W. Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia", 1898-1899. C Chun, Gustav Fischer Verlag, Jena, 1904, 7: 181-260
 - 70 Sanamyan K E, Sanamyan N P. Some benthic Tunicata from the southern Indo-Pacific Ocean. *J Nat Hist*, 1999, 33: 1835-1876
 - 71 Astorga M, Guinez R, Ortiz J C, et al. Phenotypic and genetic variation in tunicate *Pyura praeputialis* (Heller, 1878) in the northern bay of the Antofagasta Bay. *Rev Chil Hist Nat*, 2002, 75: 515-526
 - 72 Pacheco C J, Castilla J C. Foraging behavior of the American oystercatcher *Haematopus palliatus pitanay* (Murphy 1925) on the intertidal ascidian *Pyura praeputialis* (Heller 1878) in the Bay of Antofagasta, Chile. *J Ethol*. 2001, 19: 23-26
 - 73 Tatián M, Sahade R, Kowalke J, et al. Food availability and gut contents in the ascidian *Cnemidocarpa verrucosa* at Potter Cove, Antarctica. *Polar Biol*, 2002, 25: 58-64
 - 74 Tatian M, Sahade R, Esnal G B. Diet components in the food of Antarctic ascidians living at low levels of primary production. *Antarct Sci*, 2004, 16: 123-128

Appendix 1 Ascidian species of the South Polar Province (Antarctic waters; SPP), South Shetland Islands (SSI), Magellan Region (MAG), southern Chile (SCL), Chilean Transition Zone (TCL), northern Chile (NCL), and Chile (CHL). Species marked with an asterisk (*) were found by the authors between 2001 and 2013.

| Taxon | Region | Depth/m | Latitude/(°S) | Reference(s) |
|--|---|-------------|---------------|--|
| <u>Aplousobranchia</u> | | | | |
| Didemnidae | | | | |
| <i>Didemnum bentarti</i> Varela & Ramos-Esplá 2008 | SPP / ___ / ___ / ___ / ___ / ___ | 426 | 71 | 44 |
| * <i>D. biglans</i> (Sluiter, 1906) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 2–3 495 | 53–78 | 4, 5, 12, 24, 32, 45–47 |
| <i>D. chilense</i> Ärnäck, 1929 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 0–91 | 41 | 15, 31 |
| <i>D. psammotode</i> (Sluiter, 1895) | SPP / ___ / ___ / ___ / ___ / ___ | 659–686 | 55 | 32 |
| * <i>D. studeri</i> Hartmeyer, 1911 | SPP / ___ / MAG / SCL / TCL / NCL / CHL | 3–4 804 | 30–62 | 5, 11, 24, 32, 38, 40, 46 |
| <i>Diplosoma antarcticum</i> Kott, 1969 | SPP / ___ / ___ / ___ / ___ / ___ | 100–150 | 65–66 | 32 |
| * <i>D. listerianum</i> (Milne-Edwards, 1841) | ___ / ___ / MAG / SCL / TCL / ___ / CHL | 0.5–10 | 39–43 | |
| <i>D. longinquum</i> (Sluiter, 1912) | SPP / ___ / ___ / ___ / ___ / ___ | 62–357 | 43–65 | 32 |
| <i>Leptoclinides rufus</i> (Sluiter, 1909) | ___ / ___ / MAG / ___ / ___ / ___ | 51–115 | 22–54 | 32, 46, 48 |
| <i>Lissoclinum aff. caulleryi</i> (Ritter & Forsyth, 1917) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | ? | 42 | 40 |
| <i>L. caulleryi</i> (Ritter & Forsyth, 1917) | ___ / ___ / MAG / SCL / ___ / NCL / CHL | ? | 20–60 | 15, 49 |
| <i>Polysyncraton chondrilla</i> (Michaelsen, 1924) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 55–1 120 | 54–78 | 24, 32, 46 |
| <i>P. trivolutum</i> (Millar, 1960) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 13–677 | 54–78 | 12, 29, 32, 50 |
| * <i>Trididemnum auriculatum</i> Michaelsen, 1919 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 5–2 023 | 41–54 | 31, 38 |
| Holozoidae | | | | |
| * <i>Distaplia arnbackae</i> Sanamyan, Schories, Sanamyan 2010 | ___ / ___ / MAG / SCL / TCL / NCL / CHL | 0–35 | 29–43 | 11, 15, 31 |
| * <i>D. colligans</i> Sluiter, 1932 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 2–428 | 42–77 | 12, 24, 32, 38, 40, 45, 47 |
| * <i>D. cylindrica</i> (Lesson, 1830) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 7–695 | 51–78 | 5, 12, 24, 32, 35, 37, 38, 43, 45–48, 50–52 |
| <i>D. megathorax</i> Monniot & Monniot, 1982 | SPP / ___ / ___ / ___ / ___ / ___ | 1 565–1 674 | 71 | 32 |
| <i>Hypsistozoa fasmeriana</i> (Michaelsen, 1924) | SPP / ___ / ___ / ___ / ___ / ___ | 55–146 | 45–67 | 32, 48 |
| <i>Protoholozoa pedunculata</i> Kott, 1969 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 374–5 340 | 49–66 | 14, 24, 32, 46, 50, 53 |
| <i>Sigillina moebiusi</i> (Hartmeyer, 1905) | SPP / SSI / ___ / ___ / ___ / ___ | 240 | 61 | 24 |
| * <i>Sycozoa gaimardi</i> (Herdman, 1886) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 5–238 | 44–65 | 32, 35, 37, 38, 43, 45, 51, 52 |
| * <i>S. georgiana</i> (Michaelsen, 1907) | SPP / SSI / ___ / ___ / ___ / ___ | 30–400 | 62–72 | 24, 32, 43, 47 |
| * <i>S. sigillinoides</i> Lesson, 1830 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 15–769 | 35–76 | 4, 5, 12, 24, 31, 32, 35, 46, 48, 52, 54, 55 |
| Placentelidae | | | | |
| <i>Placentela translucida</i> Kott, 1969 | SPP / ___ / ___ / ___ / ___ / ___ | 370–375 | 66 | 24, 32 |
| Polycitoridae | | | | |
| * <i>Cystodytes antarcticus</i> Sluiter, 1912 | SPP / SSI / ___ / ___ / ___ / ___ | 10–306 | 62–67 | 12, 24, 32, 46, 47, 50 |

| Taxon | Region | Depth/m | Latitude/(°S) | Reference(s) |
|--|---|-------------|---------------|--|
| * <i>Eudistoma clivosum</i> Sanamyan, K., Schories & Sanamyan, N. 2010 | ___ / ___ / ___ / ___ / ___ / NCL / CHL | 15–23 | 25–29 | 11 |
| * <i>E. magalhaensis</i> (Michaelsen, 1907) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 5–8 | 44–53 | 39, 42 |
| <i>Polycitor glareosus</i> (Sluiter, 1906) | SPP / ___ / MAG / ___ / ___ / ___ / ___ | 30–272 | 54–65 | 4, 32, 50 |
| <i>Tetrazona ciemari</i> Primo & Vazquez, 2007 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 138–142 | 63 | 56 |
| Polyclinidae | | | | |
| * <i>Aplidiopsis chilensis</i> Sanamyan, Schories & Sanamyan, 2010 | ___ / ___ / ___ / ___ / ___ / NCL / CHL | 20 | 29 | 11 |
| <i>A. discoveryi</i> Millar, 1960 | SPP / ___ / MAG / ___ / ___ / ___ / ___ | 40–112 | 52–65 | 24, 32 |
| <i>Aplidium abyssum</i> Kott, 1969 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 2 513–3 694 | 8–56 | 24, 46 |
| <i>A. annulatum</i> (Sluiter, 1906) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 30 | 64 | 4 |
| <i>A. aurorae</i> (Harant & Vernières, 1938) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 238–329 | 66 | 32 |
| <i>A. balleniae</i> Monniot & Monniot, 1983 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 55–622 | 62–76 | 32, 56, 57 |
| <i>A. bilinguae</i> Monniot & Monniot, 1983 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 57–238 | 54–66 | 32 |
| * <i>A. circumvolutum</i> (Sluiter, 1900) | SPP / SSI / MAG / ___ / ___ / ___ / ___ | 21–1 120 | 43–63 | 24, 32, 43, 46–48 |
| <i>A. cyaneum</i> Monniot & Monniot, 1983 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 55–1 674 | 54–74 | 4, 5, 14, 24, 29, 32, 46, 47, 56 |
| * <i>A. falklandicum</i> Millar, 1960 | SPP / SSI / MAG / SCL / TCL / NCL / CHL | 25–799 | 29–71 | 11, 12, 32, 50, 58, 59 |
| * <i>A. fuegiense</i> (Cunningham, 1871) | SPP / SSI / MAG / SCL / TCL / ___ / CHL | 0–598 | 29–72 | 3, 4, 11, 15, 24, 32, 38, 40, 46, 54, 59 |
| <i>A. globosum</i> (Herdman, 1886) | SPP / SSI / MAG / ___ / ___ / ___ / ___ | 106–642 | 54–63 | 32, 50 |
| <i>A. gracile</i> Monniot & Monniot, 1983 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 73–115 | 51–55 | 32 |
| * <i>A. imbutum</i> Monniot & Monniot, 1983 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 38–870 | 54–73 | 32 |
| <i>A. irregulare</i> (Herdman, 1886) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 31–439 | 44–63 | 24, 32, 46 |
| <i>A. longum</i> Monniot, 1970 | SPP / ___ / ___ / ___ / TCL / ___ / CHL | 106–110 | 33–65 | 32 |
| * <i>A. lorcatum</i> (Harant & Vernières, 1938) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 20–357 | 60–72 | 24, 32, 56 |
| * <i>A. magellanicum</i> Sanamyan & Schories, 2003 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 5–21 | 42–54 | 38, 40 |
| <i>A. meridianum</i> (Sluiter, 1906) | SPP / SSI / MAG / ___ / ___ / ___ / ___ | 2–1 674 | 47–77 | 10, 12, 14, 29, 32, 56, 59 |
| <i>A. millari</i> Monniot & Monniot, 1994 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 96–309 | 63–75 | 29, 56, 59 |
| <i>A. miripartum</i> Monniot & Monniot, 1983 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 31–310 | 63–66 | 32, 56 |
| <i>A. novaezealandiae</i> Brewin, 1952 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | ? | 55 | 32 |
| <i>A. ordinatum</i> (Sluiter, 1906) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 22–329 | 64–66 | 4, 32 |
| <i>A. ovum</i> Monniot & Gaill, 1978 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 84–353 | 55 | 32 |
| <i>A. pellucidum</i> (Leidy, 1855) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 92–101 | 53 | 46 |
| <i>A. pererratum</i> (Sluiter, 1912) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 55–302 | 57–67 | 32 |
| * <i>A. peruvianum</i> Sanamyan & Schories, 2004 | ___ / ___ / ___ / ___ / TCL / NCL / CHL | 5–17 | 14–30 | 11, 22 |
| <i>A. polarsterni</i> Tatian, Antacli & Sahade, 2005 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 272 | 54 | 50 |
| * <i>A. radiatum</i> (Sluiter, 1906) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 15–412 | 61–78 | 4, 24, 32, 35, 37, 46, 48, 51–53, 56 |
| <i>A. recumbens</i> (Herdman, 1886) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 86–586 | 53–62 | 24, 32, 46 |
| <i>A. siderum</i> Monniot & Monniot, 1983 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 32–167 | 65–66 | 12, 32 |

| Taxon | Region | Depth/m | Latitude/(°S) | Reference(s) |
|---|---|-------------|---------------|--|
| <i>A. stanleyi</i> Millar, 1960 | SPP / ___ / ___ / ___ / ___ / ___ | 62–320 | 55–65 | 32, 46 |
| <i>A. triplex</i> (Sluiter, 1906) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 60–310 | 54–65 | 4, 32 |
| <i>A. undulatum</i> , Monniot & Gaill, 1978 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 40–247 | 53–54 | 32 |
| <i>A. vanhoeffeni</i> Hartmeyer, 1911 | SPP / ___ / ___ / ___ / ___ / ___ | 380–385 | 60 | 5 |
| * <i>A. variabile</i> (Herdman, 1886) | SPP / ___ / MAG / SCL / TCL / ___ / CHL | 5–494 | 38–56 | 5, 24, 32, 38, 40, 46 |
| <i>A. vastum</i> (Sluiter, 1912) | SPP / ___ / ___ / ___ / ___ / ___ | 75–134 | 65–72 | 32 |
| * <i>Synoicum adareanum</i> (Herdman, 1902) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 15–867 | 53–78 | 4, 5, 12, 24, 29, 32, 35, 37, 43, 45–47, 50, 52, 56, 59 |
| * <i>S. georgianum</i> Sluiter, 1932 | SPP / SSI / MAG / ___ / ___ / ___ / ___ | 6–552 | 54–66 | 24, 32 |
| <i>S. giardi</i> (Herdman, 1886) | SPP / ___ / MAG / ___ / ___ / ___ / ___ | 46–108 | 49–55 | 5, 32 |
| <i>S. kuranui</i> Brewin, 1950 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 73–293 | 18–69 | 24, 32, 48 |
| <i>S. ostentor</i> Monniot & Monniot, 1983 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 30–867 | 60–67 | 12, 32, 56 |
| <i>S. polygyna</i> Monniot & Monniot, 1980 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 142 | 63 | 56 |
| <i>S. ramulosum</i> Kott, 1969 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 183–2 827 | 59–65 | 14, 24, 32 |
| <i>S. stewartense</i> (Michaelsen, 1924) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 97–115 | 54–56 | 24, 32, 46 |
| <i>S. tentaculatum</i> Kott, 1969 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 2 800 | 58 | 32 |
| Ritterellidae | | | | |
| <i>Pharyngodictyon mirabile</i> Herdman, 1886 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 1 226–5 631 | 56–61 | 24, 32, 53 |
| <i>Ritterella chetvergovi</i> Sanamyan & Sanamyan, 2002 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 4 664–5 631 | 56 | 53 |
| <i>R. mirifica</i> Monniot & Monniot, 1983 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 142–568 | 63–66 | 12, 32, 56 |
| Phlebobranchia | | | | |
| Agneziidae | | | | |
| <i>Adagnesia antarctica</i> Kott, 1969 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 3–101 | 54–70 | 24, 32 |
| <i>A. charcoti</i> Monniot and Monniot, 1973 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 5 110–5 120 | 62 | 53 |
| <i>A. henriquei</i> Monniot & Monniot, 1983 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 119–123 | 53 | 32 |
| <i>A. weddelli</i> Monniot & Monniot, 1994 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 462–1 223 | 28 | 29 |
| <i>Agnezia abyssa</i> Sanamyan & Sanamyan, 2002 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 7 694–8 116 | 55 | 53 |
| * <i>A. biscoei</i> (Monniot & Monniot, 1983) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 30–187 | 63–71 | 29, 32 |
| <i>A. glaciata</i> Michaelsen, 1898 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 37–184 | 55–69 | 24, 32, 43, 47, 55 |
| <i>A. tenue</i> (Monniot & Monniot, 1983) | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 18 | 55 | 32 |
| <i>Caenagnesia bocki</i> Ärnäck-Christie-Linde, 1938 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 16–1 253 | 61–78 | 24, 29, 32, 46, 47, 50 |
| <i>C. schmitti</i> Kott, 1969 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 45–1 120 | 62–75 | 24, 32, 43 |
| <i>Proagnesia depressa</i> (Millar, 1955) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 3 160–5 120 | 17–62 | 53 |
| Asciidiidae | | | | |
| * <i>Ascidia challengerii</i> Herdman, 1882 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 16–4 512 | 44–78 | 4, 5, 12, 14, 24, 29, 32, 35, 37, 46–48, 51, 52, 56, 60–62 |
| <i>A. meridionalis</i> Herdman, 1880 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 13–583 | 43–67 | 12, 24, 32, 46, 50, 56, 63 |

| Taxon | Region | Depth/m | Latitude/(°S) | Reference(s) |
|---|---|-------------|---------------|---|
| <i>A. tenera</i> Herdman, 1880 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 70–448 | 52–62 | 43, 55, 63 |
| <i>A. translucida</i> Herdman, 1880 | SPP / ___ / ___ / ___ / ___ / ___ | ? | 65 | 32 |
| <i>Ascidiella aspersa</i> (Müller, 1776) | ___ / ___ / MAG / ___ / ___ / ___ | 2–55 | 35–48 | 48 |
| Cionidae | | | | |
| <i>Ciona antarctica</i> Hartmeyer, 1911 | SPP / ___ / ___ / ___ / ___ / ___ | 100–394 | 60–75 | 5, 12, 29, 32 |
| * <i>C. intestinalis</i> (Linnaeus, 1767) | ___ / ___ / MAG / SCL / ___ / NCL / CHL | 0–10 | 2343 | 15, 64 |
| Corellidae | | | | |
| * <i>Corella antarctica</i> Sluiter, 1905 | SPP / SSI / ___ / ___ / ___ / ___ | 5–525 | 62–67 | 4, 13, 30 5, 12, 15, 24, 29, 31, 32, |
| * <i>C. eumyota</i> Traustedt, 1882 | SPP / SSI / MAG / SCL / TCL / NCL / CHL | 0–1 105 | 30–78 | 35, 37, 40, 43, 45–48, 51, 52, 55, 56, 60, 61, 65 |
| <i>Corynascidia cubare</i> Monniot & Monniot, 1994 | SPP / ___ / ___ / ___ / ___ / ___ | 457–462 | 75 | 29 |
| <i>C. lambertae</i> Sanamyan & Sanamyan, 2002 | SPP / SSI / ___ / ___ / ___ / ___ | 1 256–1 376 | 62 | 53 |
| <i>C. mironovi</i> Sanamyan & Sanamyan, 2002 | SPP / ___ / ___ / ___ / ___ / ___ | 5 110–5 120 | 62 | 53 |
| <i>C. suhmi</i> Herdman, 1882 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 214–6 195 | 33–68 | 5, 12, 24, 29, 32, 46, 53 |
| <i>Mysterascidia symmetrica</i> Monniot & Monniot, 1984 | SPP / ___ / ___ / ___ / ___ / ___ | 3 459–3 492 | 66 | 14, 32 |
| Diazonidae | | | | |
| * <i>Tylobranchion speciosum</i> Herdman, 1886 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 15–2 897 | 54–78 | 12, 24, 29, 32, 35, 37, 43, 46, 47, 50–52, 56 |
| Dimeatidae | | | | |
| <i>Dimeatus attenuatus</i> Sanamyan, 2001 | SPP / ___ / ___ / ___ / ___ / ___ | 5 680–6 145 | 61 | 53, 66 |
| <i>D. mirus</i> Monniot & Monniot, 1981 | SPP / ___ / ___ / ___ / ___ / ___ | 4 978–5 043 | 60 | 14, 32 |
| Octacnemidae | | | | |
| <i>Cibacapsa gulosa</i> Monniot & Monniot, 1983 | SPP / ___ / ___ / ___ / ___ / ___ | 567–810 | 58–75 | 29, 32, 50 |
| <i>Kaikoja multitentaculata</i> (Vinogradova, 1975) | SPP / ___ / ___ / ___ / ___ / ___ | 4 485–4 520 | 70 | 53 |
| <i>Megalodicopia hians</i> Oka, 1918 | SPP / ___ / ___ / ___ / ___ / ___ | 146–174 | 43–78 | 32 |
| <i>M. rineharti</i> (Monniot and Monniot, 1989) | SPP / ___ / ___ / ___ / ___ / ___ | 3 700–3 970 | 60 | 53 |
| <i>Octacnemus kottae</i> Sanamyan & Sanamyan, 2002 | SPP / ___ / ___ / ___ / ___ / ___ | 3 700–3 910 | 55 | 53 |
| <i>Situla rebainsi</i> Vinogradova, 1975 | SPP / ___ / ___ / ___ / ___ / ___ | 3 700–3 970 | 61 | 53 |
| Stolidobranchia | | | | |
| Molgulidae | | | | |
| <i>Asajirus indicus</i> (Oka 1913) | SPP / ___ / ___ / ___ / ___ / ___ | 2 763–2 818 | 64 | 32 |
| <i>Eugyra greenwichensis</i> (Monniot & Monniot, 1974) | SPP / SSI / ___ / ___ / ___ / ___ | 61 | 62 | 43 |
| <i>E. kerguelensis</i> Herdman, 1881 | SPP / SSI / ___ / ___ / ___ / ___ | 21–845 | 45–68 | 24, 32, 46, 47, 63 |
| <i>E. polyducta</i> (Monniot & Monniot, 1983) | SPP / SSI / ___ / ___ / ___ / ___ | 44–574 | 57–75 | 29, 32, 50 |
| <i>Fungulus cinereus</i> Herdman, 1882 | SPP / ___ / ___ / ___ / ___ / ___ | 2 925–5 918 | 46–64 | 24, 32, 46, 63 |
| <i>F. perlucidus</i> (Herdman, 1881) | SPP / ___ / ___ / ___ / ___ / ___ | 4 664–5 225 | 38–56 | 53 |
| <i>Molgula diaguia</i> Monniot & Andrade, 1983 | ___ / ___ / ___ / ___ / TCL / NCL / CHL | 400–550 | 12–31 | 64, 65, 67 |
| * <i>M. enodis</i> (Sluiter, 1912) | SPP / SSI / MAG / ___ / ___ / ___ | 8–548 | 55–69 | 24, 32, 35, 37, 43, 52, 68 |
| <i>M. estadosi</i> Monniot & Monniot 1983 | ___ / ___ / MAG / ___ / ___ / ___ | | | |

| Taxon | Region | Depth/m | Latitude/(°S) | Reference(s) |
|---|---|-------------|---------------|--|
| <i>M. euplicata</i> Herdman, 1923 | SPP / SSI / MAG / ___ / ___ / ___ / ___ | 30–928 | 54–78 | 12, 24, 29, 32, 46 |
| <i>M. ficus</i> (Macdonald, 1859) | ___ / ___ / ___ / ___ / ___ / NCL / CHL | 2 | 23–27 | 64 |
| <i>M. hodgsoni</i> Herdman, 1910 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 19–604 | 53–76 | 29, 32, 50, 56 |
| <i>M. malvinensis</i> Ärnäck, 1938 | SPP / SSI / MAG / ___ / ___ / ___ / ___ | 3–494 | 3978 | 24, 32, 46, 48 |
| <i>M. marioni</i> Millar, 1960 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 49–330 | 53–65 | 32 |
| <i>M. millari</i> Kott, 1971 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 3 089–4 218 | 51–61 | 14, 32, 46, 53 |
| <i>M. mortenseni</i> (Michaelsen, 1922) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 64–115 | 38–54 | 32, 48 4, 5, 12, 29, 32, 35, 37, |
| * <i>M. pedunculata</i> Herdman, 1881 | SPP / SSI / MAG / SCL / TCL / NCL / CHL | 7–2 846 | 30–78 | 46–48, 50–52, 56, 60–64, 67, 69 |
| <i>M. pigafettae</i> Monniot & Monniot, 1983 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 119–124 | 54 | 32 |
| <i>M. pulchra</i> Michaelsen, 1900 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 13–358 | 43–66 | 24, 32, 46, 47 |
| <i>M. pyriformis</i> Herdman, 1881 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 13–1 080 | 37–55 | 5, 24, 32, 63 |
| <i>M. riddlei</i> F. Monniot, 2011 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 817 | 66 | 12 |
| <i>M. robini</i> , Monniot & Monniot, 1983 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 94–714 | 65–78 | 29, 32 |
| <i>M. setigera</i> Ärnäck, 1938 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 40–494 | 43–65 | 24, 32, 46 |
| <i>Molguloides coronatum</i> Monniot, 1978 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 301–531 | 71 | 29 |
| <i>M. cyclocarpa</i> Monniot & Monniot, 1982 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 3 138–6 070 | 56 | 14, 32, 53 |
| <i>M. immunda</i> (Hartmeyer, 1909) | SPP / SSI / ___ / ___ / TCL / ___ / CHL | 128–5 929 | 32–65 | 24, 32 |
| <i>M. vitrea</i> (Sluiter, 1904) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 3 788–3 944 | 58 | 32, 46 |
| <i>Oligotrema lyra</i> Monniot & Monniot, 1973 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 2 028–3 575 | 56–70 | 32 |
| <i>O. psammites</i> Bourne, 1903 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 2 672–5 340 | 14–61 | 24, 32, 46, 48 |
| <i>Paramolgula canioi</i> Monniot & Monniot, 1983 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 485 | 54 | 32 |
| <i>P. filholi</i> (Pizon, 1898) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 115 | 55 | 24 |
| * <i>P. gregaria</i> (Lesson, 1830) | SPP / SSI / MAG / SCL / TCL / ___ / CHL | 0–641 | 36–75 | 3, 10, 15, 24, 32, 40, 43, 46, 48, 54, 63 |
| <i>Pareugyrioides arnbackae</i> (Millar, 1960) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 31–1 890 | 53–77 | 14, 24, 29, 32, 43, 46, 47 |
| <i>P. galathea</i> (Millar, 1959) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 1 976–6 070 | 55–66 | 14, 24, 32, 46, 53 |
| Puridae | | | | |
| <i>Bathypora splendens</i> Michaelsen, 1904 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 55–46 436 | 56–78 | 5, 12, 14, 24, 29, 32, 46, 56, 69 |
| <i>Culeolus anonymus</i> Monniot & Monniot, 1976 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 3 386–5 801 | 38–65 | 14, 32, 53 |
| <i>C. antarcticus</i> Vinogradova, 1962 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 233–5 631 | 53–75 | 12, 14, 32, 53 |
| <i>C. likae</i> Sanamyan & Sanamyan, 2002 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 4 664–5 631 | 38–56 | 53 |
| <i>C. murrayi</i> Herdman, 1881 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 84–5 340 | 35–68 | 24, 32 14, 46, 63, 69 |
| <i>C. pinguis</i> Monniot & Monniot, 1982 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 2 818–2 846 | 65 | 32 |
| <i>C. wyvillethomsoni</i> Herdman, 1881 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 4 465–4 557 | 30–64 | 32, 63 4, 12, 14, 24, 29, 32, 35, |
| * <i>Pyura bouvetensis</i> (Michaelsen, 1904) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 21–2 350 | 50–79 | 46, 47, 50, 52, 53, 56, 69 |
| * <i>P. chilensis</i> Molina, 1782 | SPP / ___ / MAG / SCL / TCL / NCL / CHL | 0–3 144 | 20–57 | 15, 32, 40, 54, 64, 65 |
| <i>P. discoveryi</i> (Herdman, 1910) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 8–1 159 | 54–78 | 5, 12, 14, 29, 35, 37, 46, 48, 50, 52, 56, 68, 69 |

| Taxon | Region | Depth/m | Latitude/(°S) | Reference(s) |
|---|---|-------------|---------------|---|
| <i>P. gangelion</i> (Savigny, 1816) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 15-220 | 62–65 | 24, 32, 35, 37, 46, 52, 56 |
| <i>P. georgiana</i> (Michaelsen, 1898) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 2–5 223 | 44–78 | 24, 32, 37, 43, 45, 46, 48, 50, 55 |
| * <i>P. legumen</i> (Lesson, 1830) | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 5–124 | 42–65 | 3, 24, 32, 38, 46, 54, 55, 63 |
| <i>P. multiruga</i> Monniot & Monniot, 1982 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 2 273–2 800 | 65–71 | 14, 32, 70 |
| <i>P. paessleri</i> (Michaelsen, 1900) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 22–494 | 52–56 | 24, 32, 46 |
| <i>P. pilosa</i> Monniot & Monniot, 1974 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 30–110 | 54–55 | 32 |
| <i>P. praeputialis</i> (Heller, 1878) | ___ / ___ / ___ / ___ / ___ / NCL / CHL | 0 | 24 | 64, 71, 72 |
| * <i>P. setosa</i> (Sluiter, 1905) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 14–638 | 53–78 | 4, 24, 32, 35, 37, 45, 47, 48, 51, 52, 56, 57, 61, 68 |
| <i>P. squamata</i> Hartmeyer, 1911 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 17–2 060 | 40–78 | 32, 50 |
| <i>P. stolonifera</i> (Heller, 1878) | ___ / ___ / ___ / ___ / ___ / NCL / CHL | 0–100 | 2–35 | 65, 69, 71 |
| <i>P. stubenrauchi</i> (Michaelsen, 1900) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 13–92 | 42–62 | 15, 41, 43 |
| <i>P. tunica</i> Kott, 1969 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 184 | 65 | 24, 32 |
| Styelidae | | | | |
| <i>Alloeocarpa affinis</i> Bovien, 1921 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 104–115 | 54 | 32 |
| * <i>A. bacca</i> Årnbäck, 1929 | ___ / ___ / MAG / SCL / TCL / ___ / CHL | 6–45 | 29–41 | 15 |
| <i>A. bridgesi</i> Michaelsen, 1900 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 64–101 | 53–54 | 32, 46 |
| * <i>A. incrustans</i> (Herdman, 1886) | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 13–494 | 41–56 | 32, 40, 46 |
| * <i>Asterocarpa humilis</i> (Heller, 1878) | ___ / ___ / MAG / SCL / ___ / NCL / CHL | 2–8 | 23–43 | 64 |
| <i>Bathyoncus mirabilis</i> Herdman, 1882 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 300–5 631 | 46–75 | 14, 32, 46, 53, 63, 69, 70 |
| <i>Bathystyeloides enderbyanus</i> (Michaelsen, 1904) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 3 947–4 063 | 55 | 32 |
| * <i>Botryllus</i> sp. | ___ / ___ / MAG / SCL / TCL / ___ / CHL | 0–0.5 | 30 | 15 |
| <i>Cnemidocarpa acanthifera</i> F. Monniot, 2011 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 817 | 66 | 12 |
| <i>C. areolata</i> (Heller, 1878) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | ? | 18–64 | 32, 48 |
| <i>C. bathyphila</i> Millar, 1955 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 4 078–5 120 | 51–61 | 5, 32, 53 |
| <i>C. bythia</i> (Herdman, 1881) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 2 273–5 120 | 42–71 | 14, 32, 46, 53, 63 |
| <i>C. digonas</i> Monniot & Monniot, 1968 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 3 138–4 008 | 55–57 | 14, 32 |
| <i>C. drygalskii</i> (Hartmeyer, 1911) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 85–1 376 | 42–74 | 5, 12, 32, 48, 50, 53, 63 |
| <i>C. eposi</i> Monniot & Monniot, 1994 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 498 | 75 | 29 |
| * <i>C. nordenskjoldi</i> (Michaelsen, 1898) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 18–5 314 | 13–72 | 5, 12, 24, 32, 40, 46, 69 |
| <i>C. ohlini</i> (Michaelsen, 1898) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 80–320 | 70–72 | 32, 46, 55 |
| <i>C. pfefferi</i> (Michaelsen, 1898) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 15–771 | 54–77 | 12, 29, 32, 56 |
| <i>C. platybranchia</i> Millar, 1955 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 5 110–5 120 | 62 | 53 |
| <i>C. univesica</i> F. Monniot, 2011 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 817–1 096 | 66 | 12 |
| * <i>C. verrucosa</i> (Lesson, 1830) | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 2–5 845 | 45–78 | 3-5, 12, 24, 29, 32, 35, 37, 45-48, 50-52, 54-57, 60-63, 68, 73, 74 |
| <i>C. victoriae</i> Monniot & Monniot, 1983 | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 119–358 | 54–55 | 32 |
| <i>Dicarpa insinuosa</i> (Sluiter, 1912) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 15–605 | 54–57 | 4, 24, 29, 32, 35, 52, 56 |
| <i>D. misogyna</i> Monniot & Monniot, 1982 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 2 818–2 827 | 59 | 32 |
| <i>D. tricostata</i> (Millar, 1960) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 493 | 76 | 32 |

| Taxon | Region | Depth/m | Latitude/(°S) | Reference(s) |
|---|---|-----------|---------------|------------------------------------|
| <i>Monandrocarpa abyssa</i> Sanamyan & Sanamyan, 1999 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 2 800 | 65 | 70 |
| <i>Polyandrocarpa placenta</i> (Herdman, 1886) | ___ / ___ / MAG / ___ / ___ / ___ / ___ | 100–400 | 6–55 | 32, 69 |
| * <i>Polyzoa opuntia</i> Lesson, 1830 | SPP / ___ / MAG / SCL / ___ / NCL / CHL | 15–842 | 49–57 | 5, 24, 32, 47, 69 |
| <i>Styela brevigaster</i> Millar, 1988 | ___ / ___ / ___ / ___ / TCL / ___ / CHL | 730–2 514 | 7–34 | 32, 64, 65 |
| <i>S. canopus</i> (Savigny, 1816) | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 14–180 | 52–53 | 5, 55 |
| <i>S. changa</i> Monniot & Andrade, 1983 | ___ / ___ / ___ / ___ / TCL / NCL / CHL | 400–4 753 | 5–32 | 64, 65, 67 |
| <i>S. gelatinosa</i> (Traustedt, 1886) | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 588 | 61 | 69 |
| <i>S. glans</i> Herdman, 1881 | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 91–1 097 | 37–78 | 32, 63 |
| * <i>S. magalhaensis</i> Michaelsen, 1898 | SPP / SSI / MAG / SCL / TCL / NCL / CHL | 13–539 | 30–65 | 15, 31, 32, 47, 64, 67 |
| <i>S. materna</i> Monniot & Monniot, 1983 | SPP / ___ / ___ / ___ / ___ / ___ / ___ | 46–486 | 54–57 | 32 |
| <i>S. paessleri</i> Michaelsen, 1898 | ___ / ___ / MAG / SCL / ___ / ___ / CHL | 0–79 | 42–55 | 15, 32 |
| <i>S. schmitti</i> Van Name, 1945 | SPP / SSI / MAG / SCL / ___ / ___ / CHL | 21–240 | 37–61 | 24, 32 |
| <i>S. squamosa</i> Herdman, 1881 | SPP / ___ / MAG / SCL / ___ / ___ / CHL | 165–4 753 | 37–75 | 14, 29, 32, 63 |
| * <i>S. wandeli</i> (Sluiter, 1911) | SPP / SSI / ___ / ___ / ___ / ___ / ___ | 8–33 | 53–78 | 24, 32, 35, 37, 46, 50, 52, 56, 68 |