

## Ascidians from the Strait of Magellan

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### Abstract

In the Magellan region, Ascidiacea appear to be a dominant invertebrate group at depths from 5 - 20 m. Most of the present collection, made by scuba divers in the Strait of Magellan, have a geographic range limited to Patagonia, the Falkland Islands, South Georgia, the South Shetland Islands and north of the Antarctic Peninsula. The exceptions are two circumpolar species: *Distaplia cylindrica* (Lesson, 1830) and *Didemnum studeri* Hartmeyer, 1911. One new species is described.

### Zusammenfassung

In der Magellanregion scheint Ascidiacea (Seescheiden) die dominierende Wirbellosengruppe in Tiefen von 5 bis 20 Metern zu sein. Die meisten der gegenwärtigen Sammlungen, die von SCUBA-Tauchern in der Magellanstraße gemacht worden sind, haben eine geografische Verbreitung die sich auf Patagonien, den Falklandinseln, Südgeorgien, den südlichen Shetlandinseln und auf nördlich der antarktischen Halbinsel beschränkt. Die Ausnahmen sind zwei zirkumpolare Arten: *Distaplia cylindrica* (Lesson, 1830) und *Didemnum studeri* Hartmeyer, 1911. Eine neue Art wird beschrieben.

### Résumé

Dans la région du Déroit de Magellan, les Ascidiacea apparaissent comme un groupe dominant d'invertébrés à des profondeurs de 5 à 20 m. La majorité des présentes collectes, réalisées en plongée autonome dans le Déroit de Magellan, ont pour limites géographiques la Patagonie, les îles Falkland, la Géorgie du sud, les îles Shetland du sud et le nord de la péninsule antarctique. Deux espèces circumpo-

laires font exception: *Distaplia cylindrica* (Lesson, 1830) et *Didemnum studeri* Hartmeyer, 1911. Une nouvelle espèce est décrite.

### Sommario

Nella regione dello Stretto di Magellano, gli Ascidiacei rappresentano il gruppo di invertebrati dominante a profondità comprese tra i 5 e i 20 m. La maggior parte della collezione qui illustrata, frutto di immersioni nello stretto, comprende un'area geografica delimitata da Patagonia, Isole Falkland, South Georgia, Isole Shetland Meridionali e regione settentri-onale della Penisola Antartica. Le eccezioni sono rappresentate da due specie circumpolari, *Distaplia cylindrica* (Lesson, 1830) e *Didemnum studeri* Hartmeyer, 1911. Una specie viene descritta come nuova.

### Introduction

The paper describes ascidians collected in September 2002 in the Strait of Magellan in the vicinity of Punta Arenas, Puerto Del Hambre and Fuerte Bulnes (XII Region, Chile) during an expedition organized by Thetis IBN (Germany). The specimens were collected by scuba diving. Most species occurred at depths down to 20 m, and only *Distaplia cylindrica* (Lesson, 1830) was never collected at less than 20 m.

In the Magellan region, macroalgae, mussels, and barnacles tend to cover rocks down to 5 m. Between 5 and 20 m, ascidians appear to be the dominant group, because there are a lot of unused areas of rock suitable for them. *Distaplia colligans* Sluiter, 1932, *Aplidium* species and *Didemnidae* colonies (sometimes 1-3 m<sup>2</sup> in size) are very common in the locations sampled.

Only specimens initially fixed in formalin are described here. The morphology of other specimens photographed *in situ* was obscured by freezing after collection and these are not reported on in this work.

**Description of species**

***Aplidium fuegiense* Cunningham, 1871**

(Fig. 2a)

*Aplidium fuegiense* Cunningham, 1871: 66. Millar, 1960: 28; 1970:100. Monniot & Monniot, 1983: 16.

**Material examined**

Puerto del Hambre and Fuerte Bulnes, 13 colonies (KIE 1/1090 - 13/1102).

**Description**

The colonies are large and variable in shape, from wide, thick and irregular to compact, oval masses. The test may be hard and opaque or soft and translucent, probably depending on maturity: colonies with poorly-developed or partly-degenerated zooids are darker and harder. Such colonies often (but not always) have a thin, firm superficial layer containing

numerous small, oval reddish pigmented bodies. The colonies have only sparse sand grains in the basal test and otherwise are free from sand.

Zooids are strongly contracted and, in many colonies, degenerate. The atrial languet is usually divided into three but some zooids within the same colony may be undivided. The position of the atrial languet also varies, sometimes arising from the body wall slightly anterior to the small atrial aperture, or from the upper rim of the opening. The number of rows of stigmata is obscured by contraction but there appear to be from 14 to 18. The stomach has five folds.

**Remarks**

The seas around the southern end of South America contain several very similar *Aplidium* species that are readily distinguished only by larval morphology. The reported range of variation in the main distinguishing characters of many of these species is great, making identification difficult. Monniot & Monniot (1983) suggested that hybridisation is the cause of this variability, but there is no evidence that this occurs. Unfortunately, the quality of the present material does not allow us to resolve this problem. Reddish pigmented bodies in the surface layer of the test help to distinguish *A. fuegiense* when no larvae are present (see Millar, 1960, 1970).

The species is very common in the Magellan region, the Patagonian Shelf and the Falkland Islands.

***Aplidium magellanicum* n. sp.**

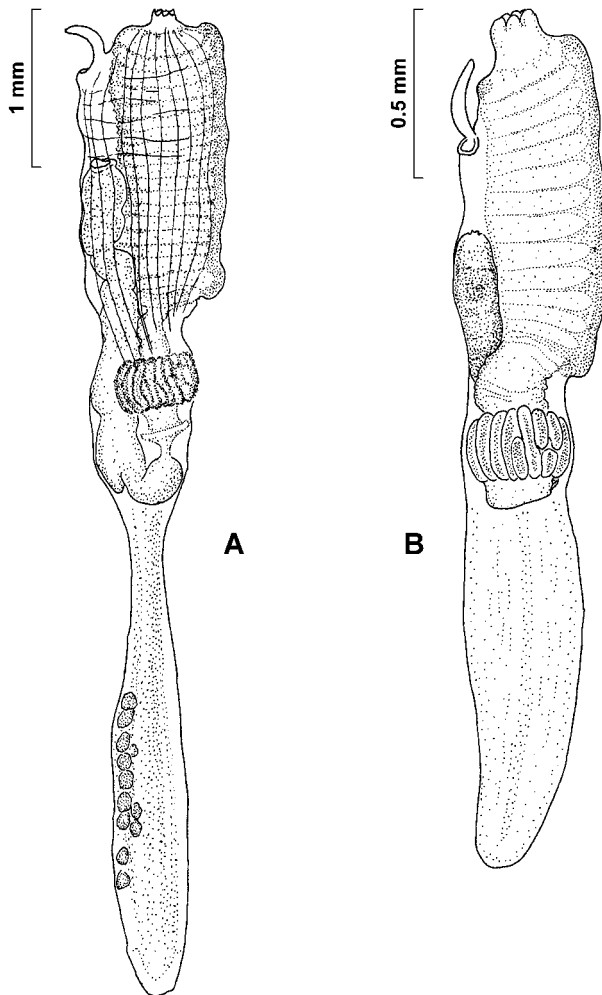
(Fig. 1a, 2b-d)

**Holotype:** KIE 1/1086 (Kamchatka Branch of the Pacific Institute of Geography), part of the colony collected at Fuerte Bulnes, XII Region, Chile, 06 September 2002

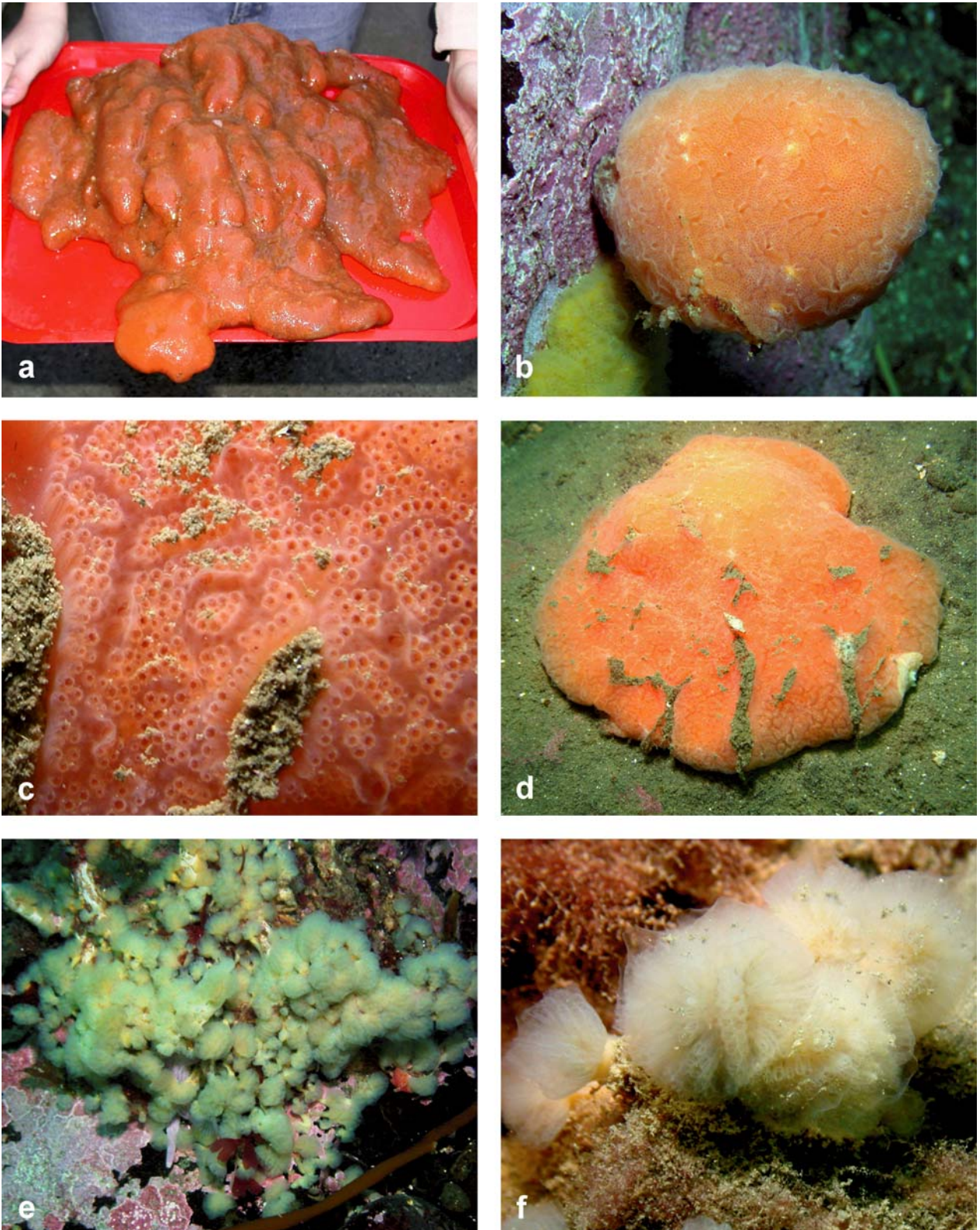
**Paratypes:** KIE 2/1087, Puerto del Hambre, XII Region, Chile, 05 September 2002; KIE 3/1088, Fuerte Bulnes, 03 September 2002; KIE 4/1089, Fuerte Bulnes, 02 September 2002.

**Description**

The colonies are cushions up to about 10 cm in diameter, with a wide attachment area (Fig. 2d) or are egg-shaped and attached by a relatively small basal area (Fig. 2b). The colour in life varies from red to orange or yellow-orange. Colonies preserved in formalin have an extremely soft, slimy, gelatinous, transparent, colourless test, sometimes disintegrating, with the zooids readily falling out. A small amount of sand is present near the attachment area and the surface and internal test are otherwise free from sand and other foreign matter. Living colonies have numerous plain-rimmed cloacal apertures protruding from the surface as short transparent siphons. In preserved specimens these completely disappear, and the sur-



**Fig. 1a-b.** (a) *Aplidium magellanicum* n. sp.; (b) *Aplidium variabile* (Herdman, 1886).



**Fig. 2a-f.** (a) *Aplidium fuegiense* (KIE 8/1097); (b - d); *Aplidium magellanicum* n. sp. (b - Holotype KIE 1/1086, c and d - Paratype KIE 3/1088); (e, f) *Aplidium variabile* (e - KIE 1/1085). Photos by D. Schories.

faces are smooth and even. The zooids are in complex, branched and often irregular systems (Fig. 2c).

The thorax of contracted zooids is the widest part and is about 2 mm in length; the abdomen is only about one half of the length of the thorax, and the post-abdomen is 5-7 mm long. The six-lobed branchial aperture is on a short siphon; the atrial aperture is small, with a short, simple atrial languet arising from its upper margin. There are about 14 or 15 thin, longitudinal and several transverse muscles on the thorax. Seventeen rows of about 14 stigmata were counted in the holotype. The small, symmetrical stomach is in the middle of the abdomen and bears 18-22 prominent, well-defined, somewhat irregular folds. These are often interrupted and oblique. The duodenum, mid-intestine and posterior stomach are also well-defined, and a pair of caecae are located at the proximal end of the rectum. In most zooids the post-abdomen is filled with parenchymal tissue, but occasionally a few male follicles in double rows are present in the middle.

Neither larvae nor embryos are present.

### Remarks

The main distinctive characters of this species are the numerous stomach folds and relatively large number of rows of stigmata. Only the present species and a few others have more than the 5 or 6 stomach folds seen in most of the *Aplidium* species known in this region. The other species are *Aplidium Stanleyi* Millar, 1960, from the Falkland Islands, which has similar zooids but different small colonies with a single system in each; *Aplidium variable* (Herdman, 1886), with 10-15 stomach folds and from nine to 15 rows of stigmata (see Millar, 1960 who examined many specimens of this species, including 13 colonies of Herdman's type material); *Aplidium loricatum* (Harant & Vernières, 1938) with a similar number of stomach folds and rows of stigmata, but larger zooids, and a thorax up to 7 mm long (Monniot & Monniot, 1983) and wider, with up to 30 stigmata in each row (Kott, 1969). Further, *Aplidium loricatum* is known only from the Antarctic. *Aplidium longum* Monniot, 1970 from Kerguelen and South Chile has similar stomachs but very different colonies and longer zooids.

### ***Aplidium variable* (Herdman, 1886)**

(Figs. 1b, 2e and f)

*Amaroucium variable* Herdman, 1886: 216.

*Aplidium variable*: Kott, 1969: 51. Millar, 1960: 32.

### Material examined

Fuerte Bulnes, several small colonies (KIE 1/1085).

### Description

The small colonies are about 1-2 cm high. Each has a short yellow peduncle and a colourless or bluish

yellow inverted cone-shaped zooid-bearing head. In life the inflated and terminally expanded heads are distinctly demarcated from the peduncles. In preservative they are contracted and of the same diameter as the peduncle. Fixed colonies become colourless, translucent cushions or small upright lobes. The test is smooth, soft and without sand. Zooids are parallel to each other and open on the upper surface of the head. Each colony has one to four systems, each with a large central common cloacal aperture on a short thin-walled siphon, a peripheral circle of zooids and others in a few short double rows converging on the cloacal opening.

In preservative, the strongly contracted zooids are short, 2.5 - 3 mm long and withdrawn to the bottom of the colony. The simple and relatively long atrial languet is on the upper rim of the small round atrial opening. The branchial sac has 13 rows of stigmata; the number per row obscured by contraction. The abdomen is much shorter than the thorax. The wide, symmetrical stomach has 14 or 15 deep, well-defined longitudinal folds, only few of them broken. The post-abdomen, up to 2 mm long, is usually half the zooid length, rarely longer. In most zooids it is filled with parenchyma. Rarely, a few male follicles are present in a double row in the middle and posterior part of the post-abdomen. Larvae are not present in the material examined.

### Remarks

*Aplidium variable* is widely distributed in Antarctic and sub-Antarctic waters.

The present specimens conform to existing descriptions of the species, especially in the structure of the zooid. However, although colonies of *A. variable* are reported to have short stalks, the form of the systems has not been definitely and clearly described. Millar (1960: 32) reports only that the zooids are sometimes "grouped into small, indistinct systems". The present specimens have characteristic systems resembling those of some warm-water species (*A. griseum* Kott, 1992 for example), and it is not known if the form of systems in the present colonies corresponds to those of *A. variable*. The identification of this material is therefore in doubt, since the larvae that might confirm it are not available.

### ***Trididemnum auriculatum* Michaelsen, 1919**

*Trididemnum auriculatum* Michaelsen, 1919: 38. Van Name, 1945: 105. Millar, 1960: 62. Kott, 1969: 80.

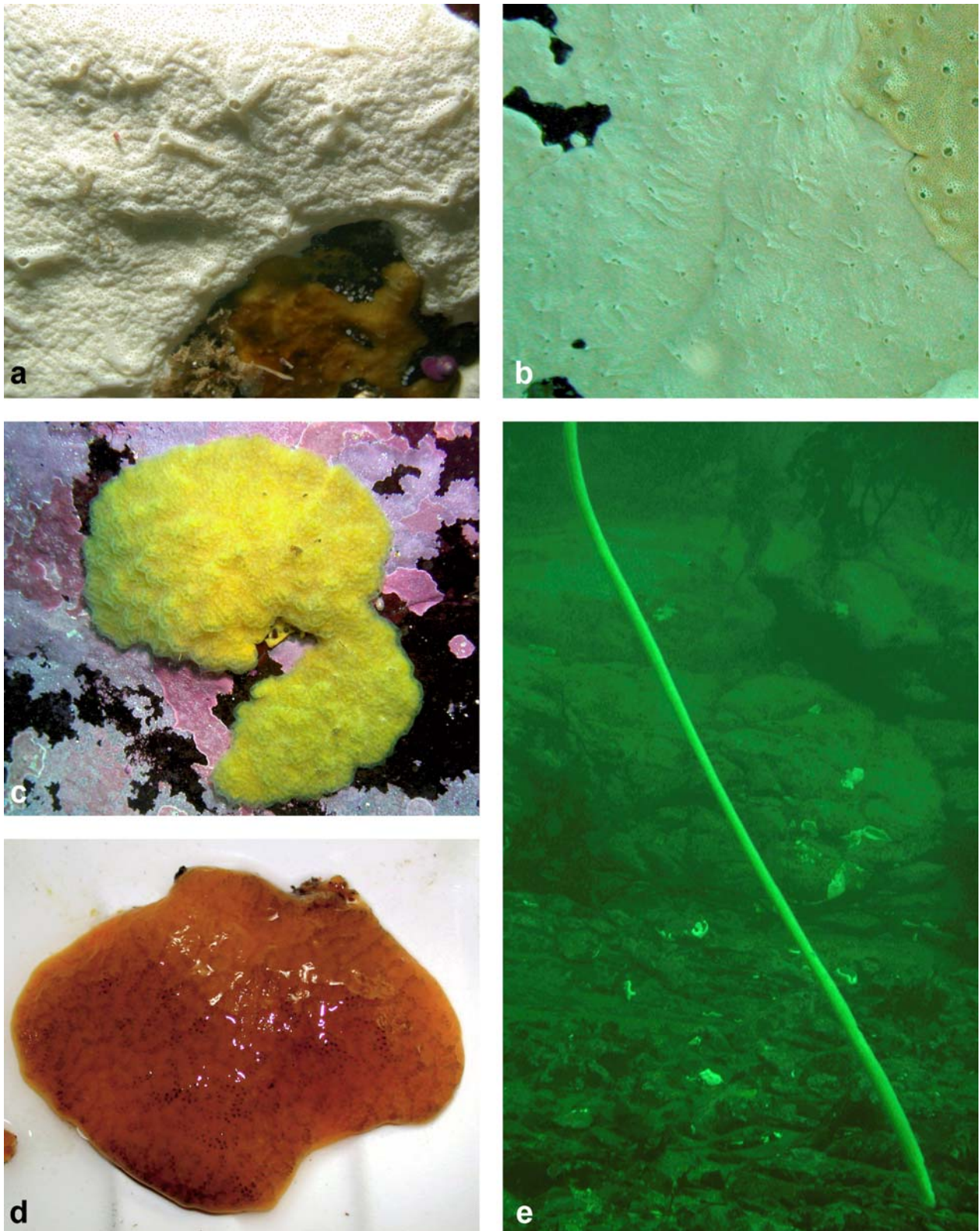
### Material examined

Fuerte Bulnes, part of a large colony (KIE 1/1105).

### Remarks

The zooids are in poor condition and have no





**Fig. 3a-e.** (a, b) *Didemnum studeri* (a - KIE 1/1104); (c, d) *Distaplia colligans* (c - KIE 2/1081, d -KIE 1/1080); (e) *Distaplia cylindrica* (KIE 1/1082). Photos by D. Schories.

gonads, and identification is provisional. The species was originally described from Punta Arenas, close to the locality of the present specimen. The distribution is limited to the Magellan-Falkland Islands region.

***Didemnum studeri* Hartmeyer, 1911**

(Fig. 3a and b)

*Didemnum studeri* Hartmeyer, 1911: 538. Van Name, 1945: 90. Monniot & Monniot, 1983: 43

**Material examined**

Puerto del Hambre and Fuerte Bulnes, two colonies (KIE 1/1104, 2/1103).

**Remarks**

The underwater photographs show large colonies with characteristic appearance (Fig. 4a and b): a generally smooth, white surface, with sparse, small cloacal openings, each with two to five short, cylindrical cloacal canals converging on them. However, as in the above species, the identification is only provisional, because the zooids in the newly-recorded specimens are in poor condition and lack gonads. The larvae resemble those shown in Monniot & Monniot 1983, (Pl.4, Fig. E).

The species has a circumpolar sub-Antarctic distribution and is common in the Magellan region.

***Distaplia colligans* Sluiter, 1932**

(Figs. 3c and d, 4)

*Distaplia colligans* Sluiter, 1932: 7. Millar, 1960: 77. Kott, 1969: 32 (synonymy).

**Material examined**

Fuerte Bulnes, two incomplete colonies (KIE 1/1080, 2/1081).

**Description**

The two pieces examined are flat sheets about 5 cm in diameter, one 0.5 cm thick, attached by the whole of the lower surface; the other, a flat lobe 1 cm thick has zooids opening on both surfaces and no apparent attachment area. Preserved specimens are dark-brown and quite smooth, though the colony is yellow in an underwater photograph of the living specimen. The test is soft, opaque and spongy. The zooids are slightly darker than the test and are indistinctly visible through it. Numerous small common cloacal apertures are scattered over surface of the colony. Zooids are in irregular short and sometimes branched double rows, but the actual form of the systems was not determined. The zooids are 2 - 2.5 mm long. The thorax bears about 10 fine longitudinal muscles. A transverse atrial aperture with a short, simple atrial languet is present at the level of the second row of stigmata. A thick parastigmatic vessel crosses each of the four

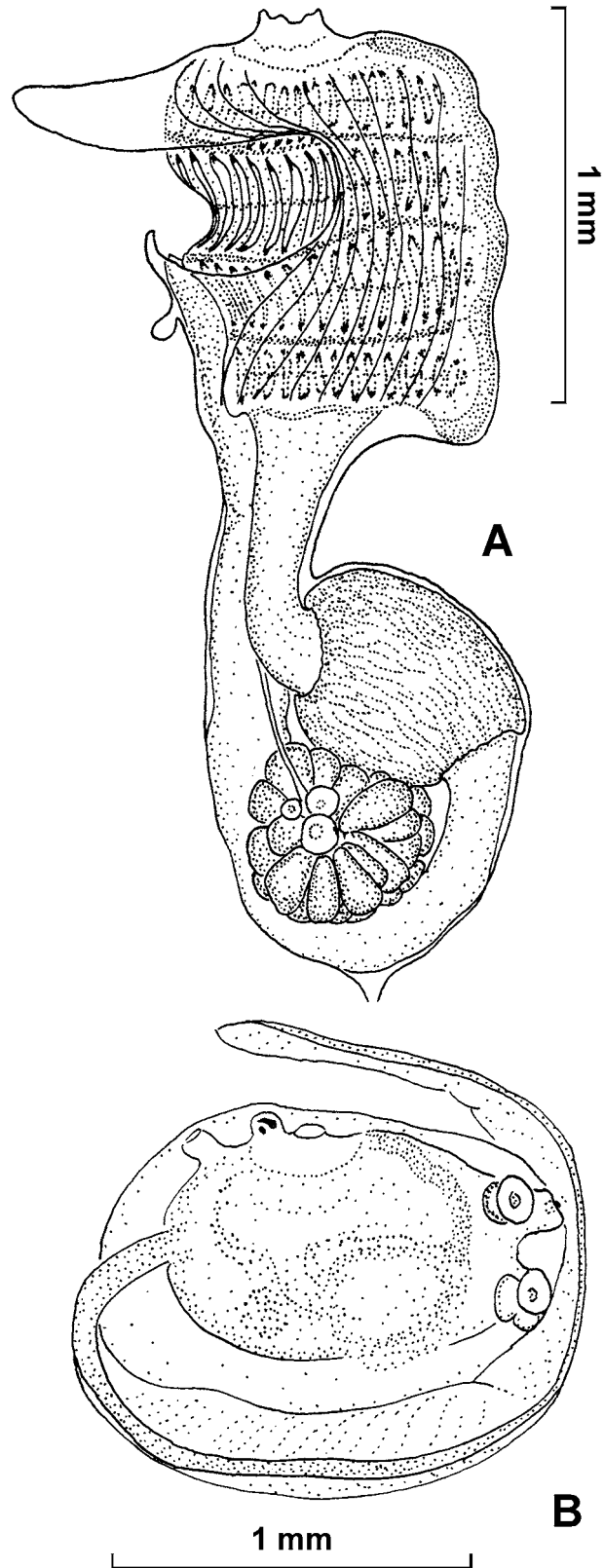


Fig. 4a-b. *Distaplia colligans* Sluiter, 1932: (a), zooid; (b), larva.



rows of about 15 or 16 long stigmata. The number of stigmata in a row could not be counted precisely. The relatively long oesophagus bends ventrally to enter an oblique, asymmetrical stomach. In most zooids the stomach wall has fine longitudinal folds, but is sometimes smooth. The gut loop encloses a compact spherical gonad comprising numerous large dark brown or nearly black male follicles and up to three small immature ova.

Several incubatory pouches, detached from the zooids and each containing one or two larvae, were found in the test. The larval trunk is 1.3 mm long.

#### Remarks

The specimens conform to the existing descriptions (see especially the detailed description by Millar, 1960). The species was previously recorded from South Georgia, the South Orkney Islands and the Antarctic Peninsula.

#### *Distaplia cylindrica* (Lesson, 1830)

(Fig. 3e)

*Holozoa cylindrica* Lesson, 1830: 439.

*Distaplia cylindrica*: Millar, 1960: 79. Kott, 1969: 29. Monniot & Monniot, 1983: 36 synonymy).

#### Material examined

Puerto del Hambre, small part of a colony (KIE 1/1082).

#### Remarks

This is probably the largest known ascidian species, with colonies up to 7 m long and 8 cm in diameter. This is the only species in the present material not found above 20 m. At King George Island we found the same species at depths of 32 to 45 m.

The distribution is completely circumpolar in the Antarctic and the species is common in the Magellan area.

#### *Sycozoa gaimardi* (Herdman, 1886)

(Fig. 5a)

*Colella gaimardi* Herdman, 1886: 103.

*Sycozoa gaimardi*: Van Name, 1945: 150 (synonymy). Kott, 1969: 28. Monniot & Monniot, 1974: 719; 1983: 37.

#### Material examined

Puerto del Hambre, many colonies (KIE 1/1084).

#### Remarks

The species has characteristic, readily identifiable colonies. As with other species reported here, it is present all the year round, often found on brown algae (*Lessonia trabeculata*) in summer (January), and also on pebbles.

*Sycozoa gaimardi* was recorded from the Strait of Magellan, Tierra del Fuego, the Falkland Islands, the South Shetland Islands, the Antarctic Peninsula, South Georgia, and possibly from Kerguelen Island (see Monniot & Monniot, 1974).

#### *Pyura legumen* (Lesson, 1830)

(Fig. 5b)

*Boltenia legumen* Lesson, 1830: 433.

*Pyura legumen*: Millar, 1960: 119. Kott, 1969: 133. Monniot & Monniot, 1983: 88 (synonymy).

#### Material examined

Puerto del Hambre, one specimen (KIE 1/1083).



Fig. 5a-b. (a) *Sycozoa gaimardi* (KIE 1/1084); (b) *Pyura legumen* (KIE 1/1083). Photos by D. Schories

### Remarks

*Pyura legumen* is not common in the area studied. This may be because its habitat appears to be restricted to the pebble fields between 10 and 25 m where they were collected. This well-known species is recorded from the Magellan region, the Patagonian shelf and the Falkland Islands.

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### References

- Cunningham, R.O.** 1871. Notes on the natural history of the Straits of Magellan and the west coast of Patagonia made during the voyage of H.M.S. *Nassau* in the years 1866-69. Edinburgh, 517 pp.
- Harant, H., & P. Vernières.** 1938. Ascidiæ composi-tæ. *Scientific Reports of Australasian Antarctic Expedition*, 1911-14, 3 (5): 1-13.
- Hartmeyer, R.** 1911. Die Ascidiën der deutschen Süd-polar-Expedition, 1901-1903. *Deutsche Südpolar-Expedition*, 12: 403-406.
- Herdman, W. A.** 1886. Report on the Tunicata collected during the voyage of H.M.S. *Challenger* during the years 1873-1876, part 2, Ascidiæ composi-tæ. *Report of the scientific results of the voyage of H.M.S. Challenger during the years 1873-76*. 14 (38): 1-399.
- Kott, P.** 1969. Antarctic Ascidiacea. A monographic account of the known species based on specimens collected under U.S. Government auspices 1947 to 1963. *Antarctic Research Series*, 13, 1-239.
- Lesson, R. P.** 1830. Zoologie, in *Voyage autour du monde sur 'La Coquille' pendant 1882-1825*, Paris 2(1): 1-471.
- Millar, R. H.** 1960. Ascidiacea. *Discovery Report*, 30: 159.
- Millar, R. H.** 1970. Ascidiens, including specimens from the deep sea, collected by R. V. 'Vema' and now in the American Museum of Natural History. *Zoological Journal of the Linnean Society*, 49: 99-159.
- Michaelsen, W.** 1919. Zur Kenntnis der Didemnidae. *Abhandlungen aus dem Gebiete der Natur-wissenschaften, herausgegeben vom Natur-wissenschaftlichen Verein in Hamburg*, 21 (1): 1-42.
- Monniot, F.** 1970. Ascidiens Aplousobranches des lies Kerguelen récoltées par P. Grua. *Bulletin du Muséum national d'Histoire naturelle*, Paris. 42 (2): 321-339.
- Monniot, C., & F. Monniot.** 1974. Ascidiens des Iles Kerguelen récoltées par P. M. Arnaud. *Tethys*. 5 (4), 715-734.
- Monniot, C., & F. Monniot.** 1983. Ascidiens antarctiques et subantarctiques: morphologie et biogéographie. *Mémoires du Muséum National d'Histoire Naturelle, Paris (A)*. 125: 1-168.
- Sluiter, C. P.** 1932. Die von Dr. L. Kohl-Larsen gesammelten Ascidiën von Süd-Georgien und der Stewart Insel. *Senckenbergiana*, 14: 1-19.
- Van Name, W. G.** 1945. The North and South American ascidiens. *Bulletin of the American Museum of Natural History*, 84: 1-476.