A striking colony morphotype of Aplidium proliferum (Milne Edwards, 1841) (Asciidiacea: Polyclinidae) from the Strait of Gibraltar.

RAMOS-ESPLA A. University of Alicante
OCAÑA O. Museo del Mar de Ceuta
http://dx.doi.org/10.12681/mms.1940

To cite this article:
A striking morphotype of *Aplidium proliferum* (Milne Edwards, 1841) (Ascidiae: Polyclinidae) from the Strait of Gibraltar

A. A. RAMOS-ESPLA1 and O. OCAÑA2

1 Marine Research Centre (CIMAR), University of Alicante, 03080 Alicante, Spain
2 Museo del Mar de Ceuta, Muelle España, s/n, 51001 Ceuta, Spain

Handling Editor: Xavier Turon

Received: 15 October 2016; Accepted: 16 December 2016; Published on line: 31 March 2017

Abstract

An unusual colonial ascidian with 1-2m in length, belonging to the genus *Aplidium* (Ascidiae: Polyclinidae), has been sampled from the Strait of Gibraltar (Ras Leona, Morocco). The characteristics of the colony, zooids and larvae point us to *A. proliferum*. The species seems common in the NE Atlantic from the Shetland Islands to Mediterranean Sea, but the length of colonies found in the Strait this area have not previously been observed. Probably, it is one of the longest ascidians reported worldwide.

Keywords: Keywords: Ascidiacea, Polyclinidae, *Aplidium*, colony size, Strait of Gibraltar, Mediterranean Sea.

Introduction

*Aplidium* is the genus with the greatest number of known species of the class Ascidiacea, with 280 spp. (Ascidiacea World Database: www.marinespecies.org/ascidiacea 2016). It is distributed worldwide from the poles to the tropics, in mainly littoral waters, although one species has been sampled at 4500m depth (*A. enigmaticum*; Monniot & Monniot, 1984). *Aplidium* colonies show high plasticity to physical (hydrodynamics and sedimentological), biological (competition) and anthropogenic environmental changes (Naranjo et al., 1996).

Within the *Aplidium* genus, *A. proliferum* is one of the commonest Polyclinidae species in the NE Atlantic (Berrill, 1950; Millar, 1966), although it is subject of discussion regarding synonymy with *A. nordmanni* (Thompson, 1934; Berrill, 1950, Kott, 1952; Millar, 1970). These two species are differentiated mainly by their zooid system and colony shape of the colony: regular systems (star-shaped) and flat-topped colonies in *A. nordmanni*, vs. irregular or non-conspicuous systems and a variety of colony shapes (stalked, massive, encrusting, etc., not flat-topped) in *A. proliferum*. Pending further studies to confirm the possible synonymy or not, we consider them two different species. Up to present, its length have never exceeded 10cm (Milne-Edwards, 1841; Harant & Vernières, 1933; Milnar, 1966, Fiala-Medioni, 1970), so the colonies (1-2m in length), founded at Ras Leona (Morocc), are very surprising.

*Aplidium proliferum* (Milne Edwards, 1841) (Figs. 1,2)


*M. papillosum* Alder, 1863 (sensu Berrill, 1950: 103):

*M. roseum* Della Valle, 1877 (sensu Lahille 1890: 223)

*A. commune + A. torquatum* Drasche, 1883 (sensu Lahille, 1890: 224)


*A. gelatinosum* Fiala-Medioni, 1970: 301; pl. VI.

*A. similans* Giard, 1872 (sensu Lahille, 1890: 222)

Material examined: The colonies were observed (03/06/2009) between 18 to 23m depth, in a coralligenous community (dominated by *Paramuricea clavata*, *Eunicella spp.*, *Astroides calycularis*) by SCUBA diving at Ras Leona (N35°54'56.46"- W05°23’51.26": Strait of Gibraltar, Morocco). One colony was sampled, aesthetised with menthol crystals and fixed with 10% formalin in seawater. Some zooids have been dissected, stained with Mason’s haemalum and mounted on permanent slides. The specimen is deposited at the Marine Research Centre of the University of Alicante (code: Apl-pro-Mr-01).
Colonies: Stalked and cylindrical in shape, cord- or rope-like, very long (1-2m in length and 15-25 mm in diameter), with 3-5 colonies/stalk (Fig. 1a,c). They are normally attached to the gorgonian Paramuricea clavata (Fig. 1b,c). Living colonies are cream or yellowish showing the red or orange spots of the zooids (Fig. 1d). The tunic is fleshy with a gelatinous consistence, without sand. Preserved colonies are light brown to pinkish with white spots (thorax of zooids). There are not conspicuous systems, although long channels appear between zooids.

Zooids: Mature zooids are 10-12mm in length; the post-abdomen is joined to abdomen without a distinct narrow stalk (Fig. 2a,b) and greater than or equal in length to the thorax + abdomen (T/A/P = 2/1/3-4). The oral siphon has 6 lobes (a few zooids with 8 lobes); the atrial aperture is short and slightly denticulate, situated at the level of the 2nd row of stigmata, and surmounted by a long simple atrial languet (Fig. 2a); oral tentacles are simple, short and curved, 10-12 in number. The branchial sac presents 12-13 rows of stigmata without papillae in the transverse vessels, and 19-20 stigmata per half row in the middle of the thorax (Fig. 2a). The gut begins with a wide and short oesophagus; the stomach is cylindrical with 20-22 pronounced interrupted vertical folds (Fig. 2c,d); the post-stomach is narrow and short, and the rectum ends at the level of the 8th row of stigmata row. The ovary is located near to the gut; and the testes are arranged in biserial row, posterior to the ovary (Fig. 2b).

Larvae: 0.7mm in trunk length (Fig. 2e). They have 3 adhesive papillae arranged vertically; 3 small epidermal conical ampullae between the papillae, surrounded by lateral epidermal vesicles with different sizes.

Distribution: Shallow-dwelling species from intertidal to 75m depth (Pérès, 1956) on different substrata (e.g. rock, gravel, macrophyta, gorgonians, solitary ascidians). The species is distributed (Fig. 3) from the NE-Atlantic Boreal (Thompson, 1934, Berrill, 1950; Millar, 1966) and Atlantic-Mediterranean regions, through the Lusitanian province (Milne-Edwards, 1841; Lahille, 1890; Kott, 1952; Harant & Vernières, 1933; Saldanha, 1972; Vázquez, 1993), to the Mediterranean Sea. In the Mediterranean, the species has been reported in the Strait of Gibraltar (Pérès, 1959; Naranjo, 1995); Alborán Sea (Ramos-Esplá, 1988; Sánchez-Tocino et al., 2009); Balearic Islands (Heiden, 1994; Pérès, 1959), Gulf of Lyon (Lahille, 1890; Daumézon, 1909; Harant & Vernières, 1933; Fiala-Médioni, 1970; Turon, 1987); and the Tyrrhenian (Della Valle, 1877; Salti, 1931), Ionian (Pérès, 1956; Tursi, 1976) and Adriatic Seas (Drasche, 1883; Mastrototaro & Tursi, 2010). It has not been observed in the Aegean and Levantine Seas.
Remarks

*A. proliferum* presents a wide polymorphism in shape, colour and consistency of the colony, zooids length, number of rows of stigmata and number of stomach folds (Table 1). This is seen in the large number of synonyms received by the species. However, they all have in common: i) irregular or non-conspicuous systems; ii) zooids with a simple pointed atrial languet; iii) numerous stomach folds, some of them interrupted or branched. Colony shape varies from encrusting to erect (cushion, pedunculated, pillow, etc) depending on their

Fig. 2: Zooids and larva of *Aplidium proliferum*: a) thorax and abdomen; b) postabdomen with ovary and testes; c) stomach with interrupted folds; d) transversal dissected stomach, showing the inner wall with folds; e) young larva. Bars: a, b = 500 µm; c,d,e = 250 µm.

Fig. 3: Distribution of *Aplidium proliferum* (from different authors).
physical and biological environment (hydrodynamism, sedimentation, competition, etc). However, due to this morphological diversity, A. proliferum could be a group of species that needs other complementary studies (such as molecular taxonomy). The morphotype of elongated cords is seen in some ascidian families such as Didermidae and Holozoidae (Millar, 1971; Monniot et al., 1991), in which it may constitute an asexual reproduction strategy. The most striking case is Distapia cylindrica from the Southern ocean, that can reach 7m in length (Kott, 1969), and whose colonies break and float away to colonise new substrates.

With regard to the development of colonies and zooids, Vázquez (1993) found developed gonads off the NW Iberian Peninsula between May to August. Pérès (1956) reported immature colonies in September in Ceu- rial Sea, that can reach 7m in length (Kott, 1969), and whose colonies break and float away to colonise new substrates.

Acknowledgements

The authors would like are grateful to Françoise Monniot and Xavier Turon for their comments and suggestions. The first observations (2009) were made thanks to a grant from the Spanish Agency for International Cooperation and Development (AECID: A-016248/08).

Table 1. Aplidium proliferum: Maximum size of colonies and some characteristics of the zooids from some authors. (OS) oral siphon; (+) present.

<table>
<thead>
<tr>
<th>Author</th>
<th>Max. size colonies (cm)</th>
<th>Lobes OS</th>
<th>Stigmata rows</th>
<th>N Stigmata/½ row</th>
<th>Stomach folds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milne Edwards, 1841</td>
<td>2.5</td>
<td>6</td>
<td>10-15</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Della Valle, 1877</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Lahille, 1890</td>
<td>-</td>
<td>6</td>
<td>10</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Drasche, 1893</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Heiden, 1894</td>
<td>8</td>
<td>6-8</td>
<td>10-18</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Alder &amp; Hancock, 1912</td>
<td>2,5</td>
<td>6</td>
<td>14</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Salfi, 1931</td>
<td>-</td>
<td>-</td>
<td>10-12</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Thompson, 1934</td>
<td>5</td>
<td>-</td>
<td>12-14</td>
<td>30-40</td>
<td></td>
</tr>
<tr>
<td>Berrill, 1950</td>
<td>5</td>
<td>-</td>
<td>12-14</td>
<td>30-40</td>
<td></td>
</tr>
<tr>
<td>Kott, 1952</td>
<td>-</td>
<td>-</td>
<td>8-11</td>
<td>10-16, 20-25</td>
<td></td>
</tr>
<tr>
<td>Pérès, 1956</td>
<td>-</td>
<td>6-8</td>
<td>10-17</td>
<td>-</td>
<td>&gt;20</td>
</tr>
<tr>
<td>Millar, 1966</td>
<td>5</td>
<td>-</td>
<td>12-14</td>
<td>30-40</td>
<td></td>
</tr>
<tr>
<td>Fiala-Medioni, 1970</td>
<td>10</td>
<td>6</td>
<td>10-18</td>
<td>-</td>
<td>&gt;20</td>
</tr>
<tr>
<td>Turon, 1987</td>
<td>5</td>
<td>-</td>
<td>15-18</td>
<td>15-17, 24-28</td>
<td></td>
</tr>
<tr>
<td>Ramos-Esplá, 1988</td>
<td>2</td>
<td>-</td>
<td>9-13</td>
<td>16</td>
<td>21-24</td>
</tr>
<tr>
<td>Vázquez, 1993</td>
<td>2</td>
<td>-</td>
<td>10-14</td>
<td>18</td>
<td>20-28</td>
</tr>
<tr>
<td>Naranjo, 1995</td>
<td>4</td>
<td>-</td>
<td>12-13</td>
<td>19-20, 20-22</td>
<td></td>
</tr>
<tr>
<td>Present work</td>
<td>200</td>
<td>6-8</td>
<td>12-13</td>
<td>19-20, 20-22</td>
<td></td>
</tr>
</tbody>
</table>

References


