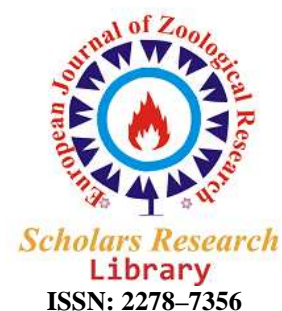




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### New records of two species of colonial ascidians - *Aplidium brevilarvacium* Kott, 1963 and *Aplidium distaplium* Kott, 1992 from Indian Waters

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#### ABSTRACT

From Indian waters only three genera - *Sidnyum*, *Polyclinum* and *Aplidium* of the family *Polyclinidae* has been reported by earlier workers. Two species - *Sidnyum indicum*, *S. pentatrema* of the genus *Sidnyum*, six species - *Polyclinum indicum*, *P. madrasensis*, *P. constellatum*, *P. fungosum*, *P. nudum* and *P. saturnium* of the genus *Polyclinum* and one species - *Aplidium multiplicatum* of the genus *Aplidium* has been recorded. In the present survey of ascidians along the Gulf of Mannar coast two more species - *Aplidium brevilarvacium* and *Aplidium distaplium* belonging to the genus *Aplidium* of the family *Polyclinidae* is being reported for the first time from Indian waters. Key to the species of genus *Aplidium* recorded from India is given with detailed descriptions of the new records.

**Key words:** Colonial ascidian, *Aplidium*, *A. brevilarvacium*, *A. distaplium*, Gulf of Mannar, India.

#### INTRODUCTION

From India only three genera - *Sidnyum* Savigny, 1816, *Polyclinum* Savigny, 1816 and *Aplidium* Savigny, 1816 of the family *Polyclinidae* Milne Edwards, 1841 has been so far reported. The genus *Sidnyum* includes two species – *Sidnyum pentatrema* Monniot, 1972 and *S. indicum* Renganathan and Monniot, 1984 collected from a depth of 10 meters from Tuticorin harbor waters [1,2]. *Polyclinum madrasensis* Sebastian, 1952, *P. indicum* Sebastian, 1954 and *P. constellatum* Savigny, 1816 of the genus *Polyclinum* has been first reported from Madras coast and later from different locations along the Gulf of Mannar [3,4,5]. Three more species *P. fungosum* Herdman, 1886, *P. nudum* Kott, 1992 and *P. saturnium* Savigny, 1816 were observed from the pearl oyster cages of Tuticorin coast [6]. *Aplidium multiplicatum* Sluiter, 1909 is the only species of the genus *Aplidium* that has so far been recorded from India [7]. The present study adds two more species of *Aplidium* as new records to Indian waters.

#### MATERIALS AND METHODS

For taxonomical study, collection, narcotisation, preservation and identification are important aspects. The methodology suggested by Dr. Patricia Kott, Queensland Museum, Australia was followed [8]. Collections were done from mussel landing centres, trawl, mussel and chank beds of Gulf of Mannar along the south east coast of India. Menthol crystals were used for narcotization and a mixture of 40% formaldehyde and sea water in the ratio 1:10 for fixation. The entire colony were observed with the help of dissecting microscope and accurately identified. Diagrams were drawn with the help of Camera Lucida to help in the interpretation of the results. Identification of the collected ascidians to the species level was carried out based on the key to identification of ascidians given by Meenakshi, 1997 [9].

**RESULTS AND DISCUSSION**

The genus *Aplidium* was recorded for the first time from India by Renganathan 1982 [10]. *A. multiplicatum* is the first species of this genus from Indian waters. The specimen were seen attached to the leaves of marine Phanerogam, to the rocks and strewn over the beach at Mandapam and Pamban in south India. In the present study two more species of the genus *Aplidium* - *A. brevilarvacium* Kott, 1963 and *A. distaplium* Kott, 1992 are described in detail.

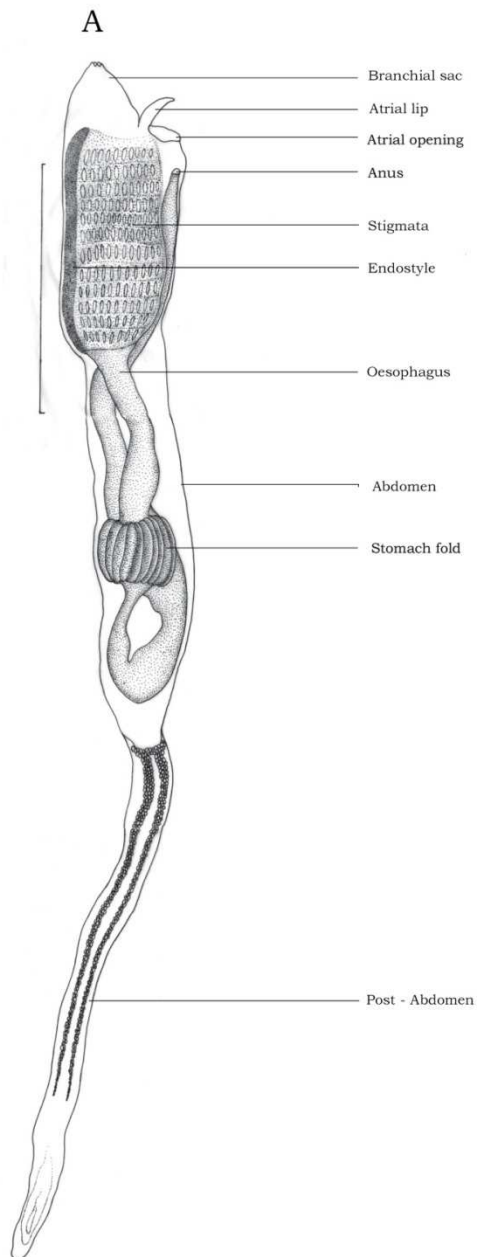
***Aplidium brevilarvacium* Kott, 1963 [11]**

Figure - 1 - *Aplidium brevilarvacium*. A - Zooid with thorax, abdomen and post - abdomen  
Scale : A - 1mm

*Aplidium brevilarvacium* Kott, 1963, p. 113 [11].

*Aplidium digitatum* Kott, 1975, p. 7 [12].

*Aplidium brevilarvacium* Kott, 1992, p. 527 [13].

**Occurrence:** This species was collected both from mussel and chank beds of Enayam, Kanniyakumari District and Vellapatti, Tuticorin District.

**Distribution:** Australia, India.

**External appearance:** Large investing sessile colonies 3.5 to 4 cm with numerous lobes attached by a flat thick sheet of test at the base to the shell surface of green mussels. Lobes have a stalk measuring 1 -1.5 cm and a rounded head having a diameter varying from 0.3 cm to 0.5 cm. Sand is present throughout the colony with a dense distribution on the surface of the head and lobes, reducing gradually towards the basal test mass. In the large dull colonies sand particles along with shell fragments give a mottled appearance. Systems are circular with a round (single) small common cloacal opening in the center of the head. In life the colony is transparent, glassy. Common cloacal opening is distinct having red pigments but on long time preservation the colour fades. The colony is tough. Branchial aperture can be seen around the pigmented common cloacal aperture. Test is transparent and there are about 6-8 zooids in a lobe. Surface of head and stalk are smooth without any wrinkles. Minute pigment cells have been observed inside the test in the lobes and basal test. Test is firm strengthened by sand. Algal cells are sparsely distributed in the lobes. Faecal pellets were not observed. Zooids are arranged parallel to one another in the anterior ½ of the lobes with their posterior end criss-crossing at the base of the lobes.

**Internal appearance:** Zooids are greenish yellow, long thread like measuring 4.35 mm with thorax 1 mm, abdomen 1.5 mm and post abdomen 1.85 mm. Algal cells were observed on the surface of zooids. Branchial aperture is terminal with 6 rounded lobes. Atrial aperture is small, sub terminal with a fleshy pointed short languet from the anterior rim. Both apertures are sessile without sphincters. No dorsal papilla. There are 12 rows with 10-13 relatively short and oval stigmata per row. The prebranchial space is wide. Atrial opening situated opposite to the fourth row of stigmata. Smooth anus is opposite to the second row of stigmata. Numerous longitudinal muscles present in the thorax which extend up to the post abdomen. Small branchial papillae present. Transverse muscles present between the rows of stigmata. No embryo was observed in the peribranchial cavity. The branchial sac is long and narrow. Stigmata are slightly broad in the centre and narrow towards the tip. Numerous simple branchial tentacles uniformly distributed at the base of branchial siphon. Peritubercular area is shallow with a cushion like neural gland and a slit like opening of dorsal tubercle. The dorsal lamina is straight with short languets. Endostyle extends the length of the thorax. Oesophagus and duodenum is long. Stomach is situated in the middle of the abdomen with 18 deep longitudinal folds. An oval post stomach is separated from the duodenum and rectum by a short intestine. Post abdomen is narrow and long with a rounded tip. Numerous male follicles are arranged in two rows with their size reducing towards the posterior end of post abdomen. The ovary was not developed. No larvae were observed in the single colony collected.

**Remarks:** The present species differs from *A. distaplum* in having more number of stigmata. *A. multiplicatum* which has been already reported from India has lesser number of stigmatal rows (6 - 8) and more number of interrupted stomach folds (20-30). The colony described from Indian water differs from Kott 1992 in having small heads and short stalks with zooids in circular system around single cloacal aperture. The zooids of the Australian colonies are very long with 14 rows of stigmata and only 10 stomach folds, compared to the short zooids having 12 rows of stigmata and more number (18) stomach folds in the Indian species. In all other respects the specimen studied resembles the description given by Kott, 1992. The minor difference noticed have been considered due to difference in geographical locations and hence identified as *Aplidium brevilarvacium*.

**Occurrence:** The colony was collected from the mussel landing centres of Melakurumpanai, Kanniyakumari District and trawl collection of Adanchery, Ramanathapuram District.

**Distribution:** South Australia, India.

**External appearance:** Colonies are massive, sessile, irregular, sandy platform measuring 8 cm X.5 cm. Sand is found throughout the colony uniformly. Zooids are arranged in circular system surrounding small, round common cloacal aperture scattered 1-2 cm apart. The branchial aperture and the common cloacal apertures are on small prominences marked by a heavy deposition of sand. The living colonies are blackish grey and the colour does not fade on preservation. They are hard and brittle being attached by the entire flat base to the surface of the shell of green mussel. Sparsely distributed large algal cells are present. Pigment cells and faecal pellets were not observed. Zooids are arranged parallel to each other with the abdomen and long post abdomen criss-crossing.

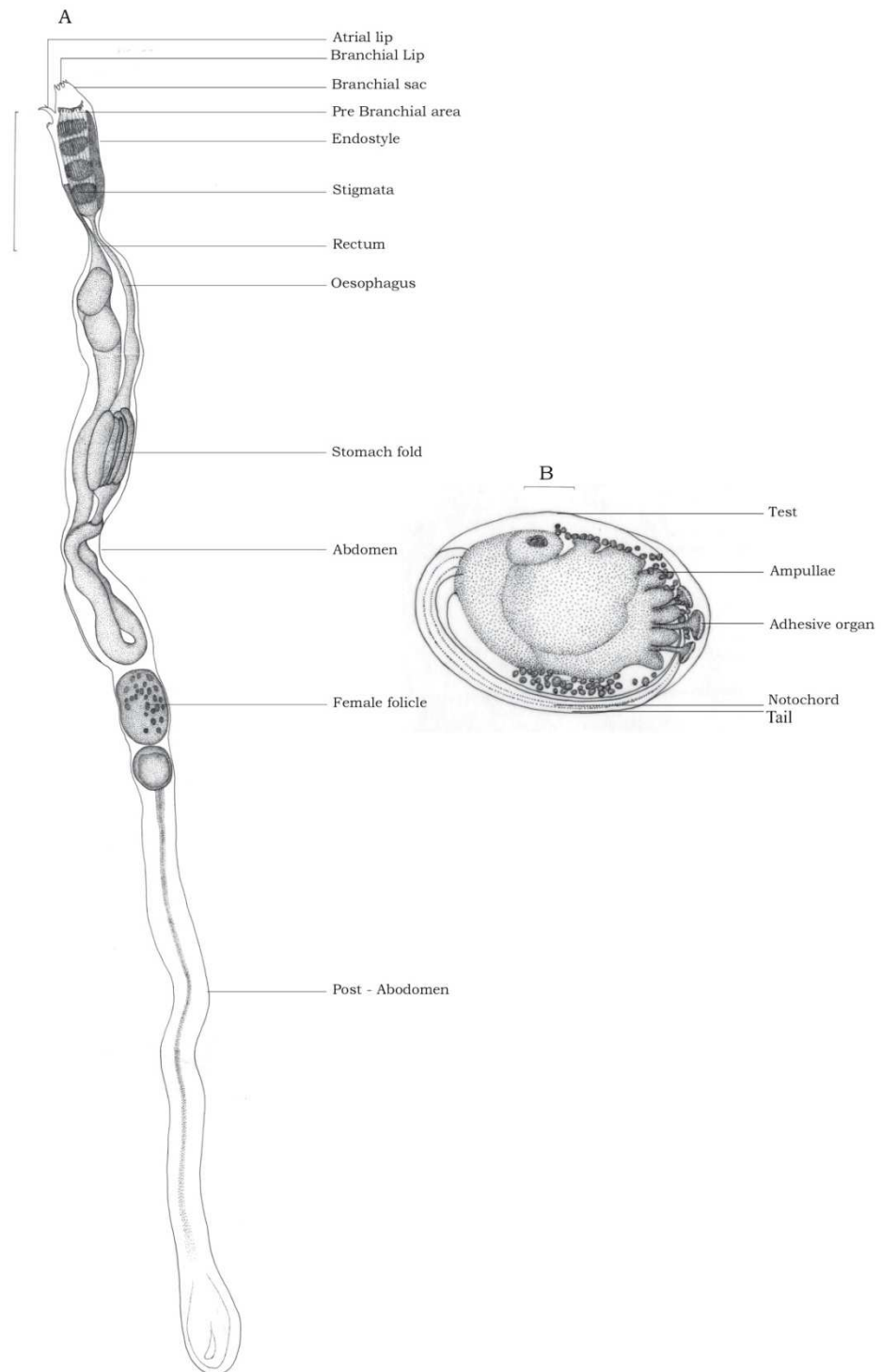


Figure - 2 *Aplidium distaplum* A - Zooid with thorax, abdomen and post abdomen, B - Larva  
Scale : A - 1mm, B - 0.07 mm

*Aplidium distaplum* Kott, 1992 [13]  
[Figure – 2]

*Aplidium distaplum* Kott, 1992, p. 540 [13].

**Internal appearance:** Zooids are 1 - 1.5 cm long when relaxed with a thorax measuring 1 mm, abdomen 4 mm and 7 mm post abdomen. They are light cream yellowish in colour without any pigments on the surface. The branchial aperture is terminal having 6 triangular branchial lobes on a short branchial siphon. Atrial aperture is small, situated a little from the anterior end opposite to the fourth row of stigmata. A small rim of spincture muscle is on the branchial and atrial siphon. A flat atrial tongue with an undivided or trilobed tip extends out from the upper rim. Prebranchial space is narrow. Simple branchial tentacles distributed uniformly. Shallow peritubercular area with a slit like opening of the dorsal tubercle. Endostyle extends to the anterior end to the posterior end of thorax. Simple straight dorsal lamina was present. About 11 longitudinal muscle bands extend from the thorax. Transverse muscles are present between the rows of stigmata. Dorsal papilla is absent. Branchial sac is wide and short. 4 rows of 11-13 long stigmata are present per row arranged in pairs. The posterior two rows of stigmata are longer than the two anterior rows. Smooth anal opening at the level opposite to third row of stigmata. The peribranchial cavity contains 2-3 embryos in different stages of development. Oesophagus is very long and tube like. An elongated stomach is in the posterior half of the abdomen with 7 deep longitudinal folds. A short duodenum and a posterior stomach are present. The posterior abdomen is long with paired male follicles and a few oocytes of varying size arranged in the upper part. The tip of the post abdomen is smooth and rounded. The larvae measure 7 mm. There are 3 adhesive organs between which are present large median conical ampullae with epidermal vesicles. Scattered epidermal vesicles occur on both sides of the trunk around the anterior half. The tail is wound half way around.

**Remarks:** This species differs from *A. multiplicatum* which has already been reported from India in the sandy nature and hard brittle colonies. The zooids of the present species are longer with only four rows of stigmata compared to 6 - 8 rows in *A. multiplicatum*. The number of stomach folds in *A. multiplicatum* is greater with interpretations whereas in *A. distaplium* the folds are fewer and deep. This species resembles *A. distaplium* Kott, 1992, in the presence of only 4 rows of stigmata, nature of the massive sandy colonies and atrial tongue but differs from it in having long robust zooids about 1 cm long and more number of stomach folds.

#### Key to the species of *Aplidium* recorded from India

- Sand embedded in test ..... 2  
 Sand not embedded in test ..... *A. multiplicatum*  
 Stigmata in 4 rows ..... *A. distaplium*  
 Stigmata in more than 4 rows ..... *A. brevilarvacium*

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