

# ATOPOZOA DEERATA (SLUITER): A DISCUSSION OF THE RELATIONSHIPS OF THE GENUS AND SPECIES

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## INTRODUCTION

The genus *Atopozoa* Brewin 1956 was established for the reception of *Atopozoa marshii* Brewin 1956. The present discussion of the genus and its relations with other genera of the family CLAVELINIDAE Forbes and Hanly is based on a study of larval form, adult colony and zooids of *Atopozoa deerata* (Sluiter), taken in the Gulf of Carpentaria, North Australia, by the C.S.I.R.O. Division of Fisheries and Oceanography while conducting a Prawn Survey in the area.

## DESCRIPTION

### ATOPOZOA DEERATA (Sluiter)

*Distoma deerata* Sluiter, 1895, p. 167; *Polycitor coalitus* Sluiter, 1909, p. 23; *Sigillina (Polycitor) coalita*, Michaelsen, 1930, p. 484; *Sigillina deerata*, Hastings, 1931, p. 87.

*Records*.—Thursday I., Torres Strait (Sluiter, 1895), Malaysia (Sluiter, 1909), Great Barrier Reef (Hastings).

*Material Examined*.—Gulf of Carpentaria (Prawn Survey St. 1121, C.S.I.R.O. portion only of one colony).

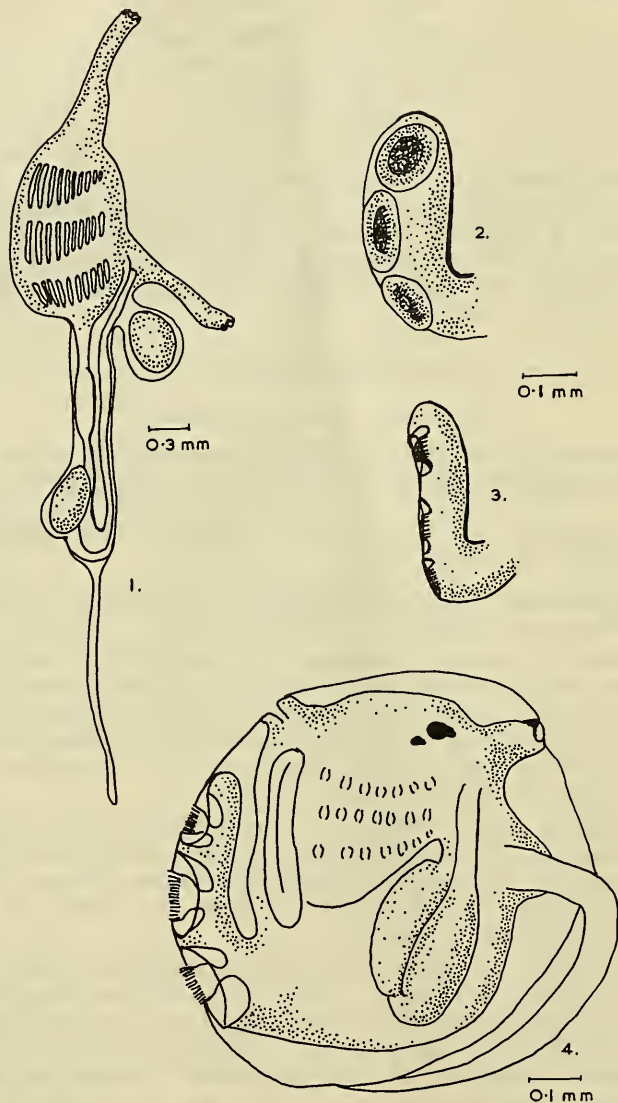
*Colony*.—Soft, gelatinous; maximum circumference 6 cm., height 8 cm. Surface of colony with furrows up to 1.0 cm. deep dividing surface into irregular areas, or shallow lobes about 4 cm. diameter. Two common cloacal openings observed near apex of colony in furrows protected by overhang of surface lobes. Zooids accumulated in oval-circular areas especially in surface of lobes but also present in base of clefts between lobes.

Common cloacal canals posterior to zooids opening into extensive cloacal spaces separating outer zooid bearing layer of test from central very soft test core. Zooids may be arranged in lines along either side of cloacal canals although this is rather obscure particularly from the surface due to excessive crowding and overlapping of zooids.

*Zooids*.—(Text-fig. 1). Small, 3 mm. long, excluding long terminal branchial siphon which is as long as thorax. Atrial siphon 6-lobed, long, from posterior third of thorax, directed posteriorly. Zooids arranged in test at angle to surface, with endostyle uppermost, atrial siphon opening into cloacal canals. Three rows of 10 stigmata, anterior row with progressively shorter stigmata dorsally.

Stomach small, spherical, half way down abdomen. A long vascular stolon present, with mesodermal septum. However, no muscles present here as suggested by Michaelsen (1930). Developing embryos at different levels up oviduct, eventually developing to maturity in oviducal pouch, stalked, posterior to atrial siphon; small diverticulum of oviduct in pouch of body wall in mature zooid for reception of embryo as in *Distaplia bermudiensis* (Berrill, 1948, *b*, Text-fig. 5).

*Larva*.—(Text-figs 2-4). Almost circular, 0.8 cm. long. Papillae carried in vertical line on frontal plate, connected to rest of body of larva by ventral stalk. Papillae unusual, consisting of central circle of adhesive cells depressed into a concavity in the frontal plate which concavity forms a cup like sucker around the adhesive cells. The adhesive cells themselves in mature larvae are carried forward on a stalk but the epidermal cup remains as a concavity in the frontal plate and is never stalked.



- 1.—Zooid.
- 2.—Frontal plate showing papillae developing.
- 3.—Lateral view of frontal plate showing papillae.
- 4.—Mature larva, papillae extruded.

#### DISCUSSION

The specimen differs from those of Hastings and Sluiter only in the number of common cloacal openings. The colony and zooids also resemble those of *Sigillina vasta* Millar 1962 (also Millar, 1963).

Although the colonies differ and the zooids open directly to the surface, lacking a long atrial siphon and common cloacal system, the zooids of the present species resemble those of :

*Atopozoa marshii* Brewin, 1956 ; *Eudistoma vitreus* (Sars) 1851 (see also Berrill, 1948, Millar, 1963*b*) ; *Eudistoma mobiysi* (Hartmeyer) 1905 (see also Hartmeyer, 1912, Millar, 1962) ; *Eudistoma fantasiana* Kott, 1957.

There has been some question on the number of rows of stigmata in *Eudistoma vitreus*, however Millar (1963*b*) has confirmed the presence of three rows of stigmata in the branchial sac. Berrill (1948) had indicated four rows of stigmata in the larval form, however from his figure it appears that the most anterior row may be from the other side of the branchial sac. All the other species mentioned above have three rows of stigmata. These species, all with three rows of stigmata are unique in the Polycitorinae by virtue of a brood pouch.

Larvae are known for all species except *E. mobiysi* and are all similar : the papillae are not stalked, or only barely stalked, the adhesive cells being accommodated in concavities in the frontal plate as described above for *E. deerata*. In the larvae of *E. vitreus* and *E. deerata* the adhesive cells are maintained in a circular area but in *S. vasta*, *E. fantasiana* and in *A. marshii* the adhesive area has been vertically elongated in a corresponding elongation of the ectodermal concavity and in the latter two species the number of papillae is reduced to two. In larvae of *E. vitreus* and *A. marshii* the frontal plate has not been described as stalked, however it is probable that in more mature larvae it does become so as in *Distaplia* spp. (see Berrill, 1948*b* for *Distaplia bermudiensis*, Text-figs 11, 12). In mature larvae of *S. vasta*, and *E. fantasiana* the papillae are always carried forward on a stalked frontal plate. The larvae of this group of species are therefore unique in the Polycitorinae due to the stalked frontal plate and sessile papillae.

There are variations in the colonies : *S. vasta* and *E. deerata* have colonial systems ; *E. vitreus*, *A. marshii* and some specimens of *E. mobiysi* (Hartmeyer, 1912) have similar colonies with the zooids arranged around a stalked head ; *E. fantasiana* and other colonies of *E. mobiysi* have unstalked investing or cushion-like colonies.

Despite these variations the close relationships of zooids and larvae indicate that these species belong in the same genus and the definition of the genus *Atopozoa* Brewin, has been amended to include this group of six closely related species, distinct from other Polycitorinae.

The genus has strong affinities with Holozoinid genera where the larval papillae are also carried forward on a stalked frontal plate, where the papillary stalk is short and thick, and where the larvae develop in a brood pouch. The present group of species differs from the Holozoinae in that they do not always form systems, zooids in many of the species opening to the exterior instead of into a common cloacal system : larval papillae are present in a vertical row and have lost a primitive triradiate arrangement ; they have three instead of four rows of stigmata ; the atrial siphon persists and has not been modified into a languet. Nevertheless these species demonstrate stronger affinities with the Holozoinae than with the Polycitorinae where they have been accommodated, due only to the presence of three rows of stigmata and an atrial siphon.

Budding in the Holozoinae is from an epicardial extension into the vascular process (Berrill, 1948*b*) from the posterior end of the abdomen. This enlarges when vegetative reproduction occurs. Hastings (1931) suggests this as the mechanism of budding in the present species which would be expected if the genus does belong with the Holozoinae ; rather than budding by the primitive abdominal strobilation of the Polycitorinae. This would explain the variations in the magnitude of the vascular appendage (Sluiter, 1909, p. 25) and suggests



the possibility that certain species of other genera of Polycitorinae, e.g. *Sigillina* and *Hyperiodistoma*, characterized by a well developed vascular stolon, may also belong in the Holozoinae.

It is considered that the genus *Atopozoa* as defined below, and as discussed above is closely related to species of the Holozoinae, and well accommodated in that subfamily. The definition of the subfamily Holozoinae, has been amended (below) to include the genus *Atopozoa*.

#### CLASSIFICATION

The definitions of the subfamily *Holozoinae* Berrill and genus *Atopozoa* Brewin are modified to accommodate the species as discussed above as follows :

##### Subfamily HOLOZOINAE Berrill, 1950

Budding from epicardial extension into posterior abdominal vascular extension ; larvae develop in stalked brood pouch ; larval papillae from stalked frontal plate ; zooids with or without atrial siphon ; common cloacal system present or zooids open directly to surface.

##### Genus ATOPOZOA Brewin, 1956

Atrial siphons present ; zooids open independently or into common cloacal system ; three rows of branchial stigmata ; larval papillae sessile.

*Type Species*—*Atopozoa marshii* Brewin, 1956

Unfortunately, in the absence of larvae and brood pouch there are no characters of the adult or colony (unless systems are formed) which can distinguish the species from Polycitorinae unless it can be shown that an enlarged vascular stolon indicates that budding always occurs from this area, and this can be correlated with the presence of typical larvae developing in a true brood pouch from the postero-dorsal corner of the thorax. In mature zooids a rudimentary brood pouch is present before it is occupied by the developing embryo.

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