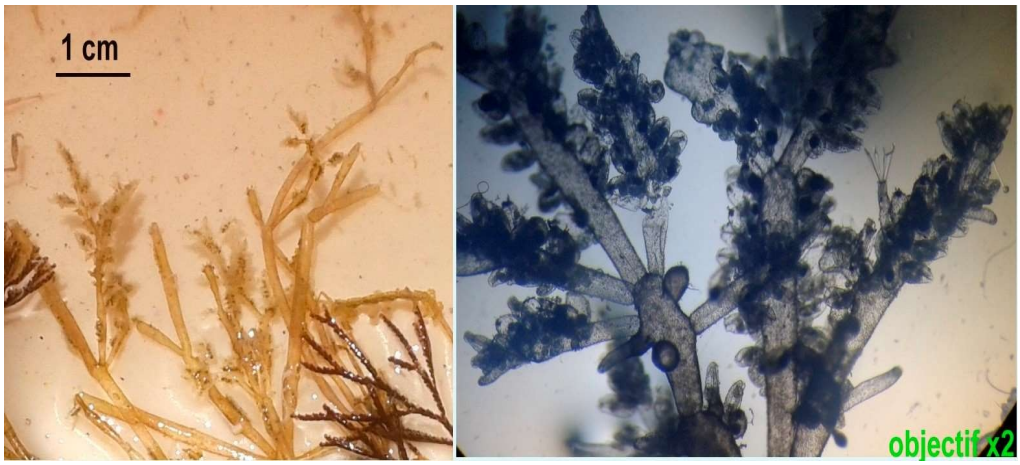
ZOOBOTRYON / *Amathia verticillata* « The spaghetti bryozoan »

by J.M. Cavanihac – France

There are several species of marine bryozoans (literally from the Greek Bryo: moss and Zoos animal); some of which have calcareous lodges containing individuals (or Zoïds) but the observation described here explores another species which does not have a solid structure, so remains soft and transparent enough to see the internal anatomy of specimens. (at least for the young individuals)

This is a cnenostome bryozoan: zoobotryon verticillatum (still from the Greek: zoos: animal and botryos: bunch of grapes). - other recommended name is now: Amathia verticillata - known by the nickname: spaghetti bryozoan because it looks quite similar to Asian vermicelli! Sample image below:

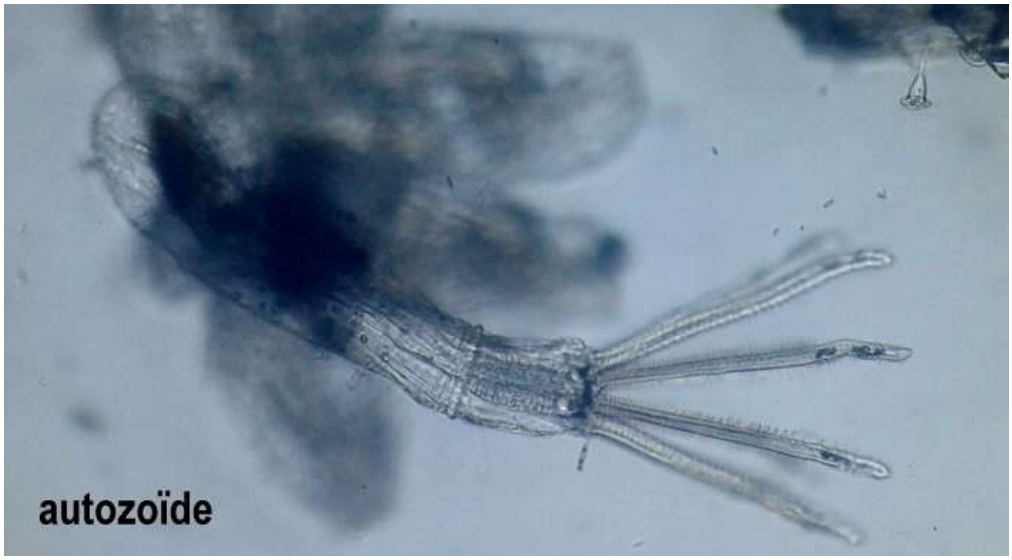


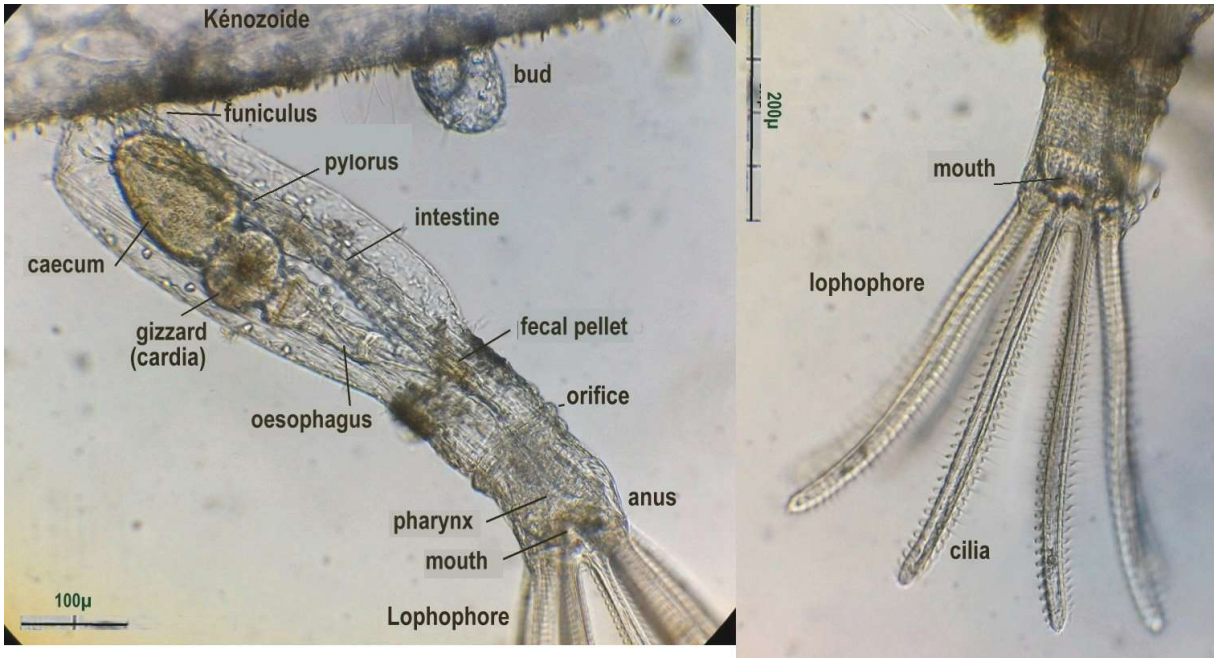
These specimens are easy to collect and can be kept for several days for their study.

The colonies can reach 30 cm in diameter or even 1 m and can cause damage in ports by developing on the water intakes of boats that they obstruct! It is an invasive species that proliferates rapidly when the sea water reaches between 18 and 22 degrees C, which occurs this year for several weeks in the Mediterranean sea.

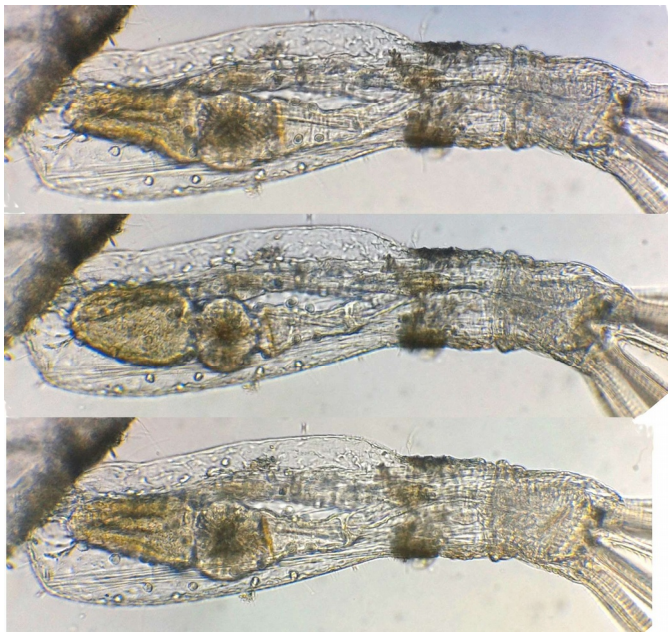
Place where young individuals were taken from a hull: Left side image and old specimens under a boat (right side image): the brownish color is caused by diatoms.

There are only two types of individuals: The autozoids for feeding the colony and the kenozoids which form stolons used as support for the autozoids.
Below detail of an autozoid: on the right picture detail of the lophophore with 8 branches covered with cilia which bring the nutritive particles towards the mouth located at the bottom of the cone formed by these branches.





We see on the image on the left, the digestive system which forms a "U" folding up at the bottom of the lodge (cystide) with the descending part from the mouth which includes the pharynx, the esophagus, and what takes the place of stomach: a gizzard capable of breaking the diatoms and the cardia which leads to the partly ascending intestine. This ends with the anus located outside the lophophore, which classifies them as ectoprocts. It is quite amusing to see the swallowing movement of the esophagus when a particle is ingested. Three images illustrates this process:

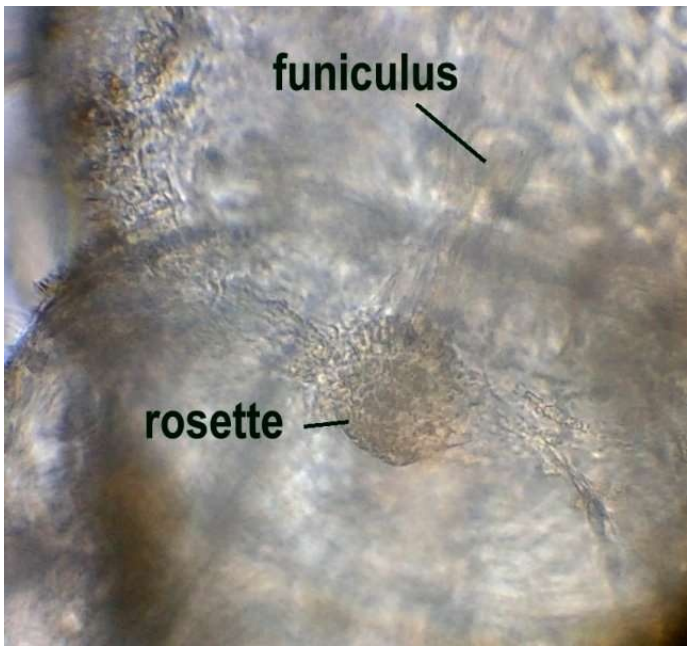


The lophophore can retract into the body of the individual through the orifice thanks to a muscle whose fibers can be seen attached to the bottom of the zoïd in these retracted individuals, (arrows on the image). The extension of the lophophore is done by contraction of circular muscles in the wall of the lodge, which eject it.

The second type of zoid is the kenozoid which constitutes the stolons and there is a central structure the funiculus (Latin: cord) which connects each kenozoid. The kenozoid is under pressure and if it is pierced, the structure becomes flabby.

In this image we see a network of cells connecting the funiculus to the bases of each zooid. Presumably this network serves to transport and partition nutrients.

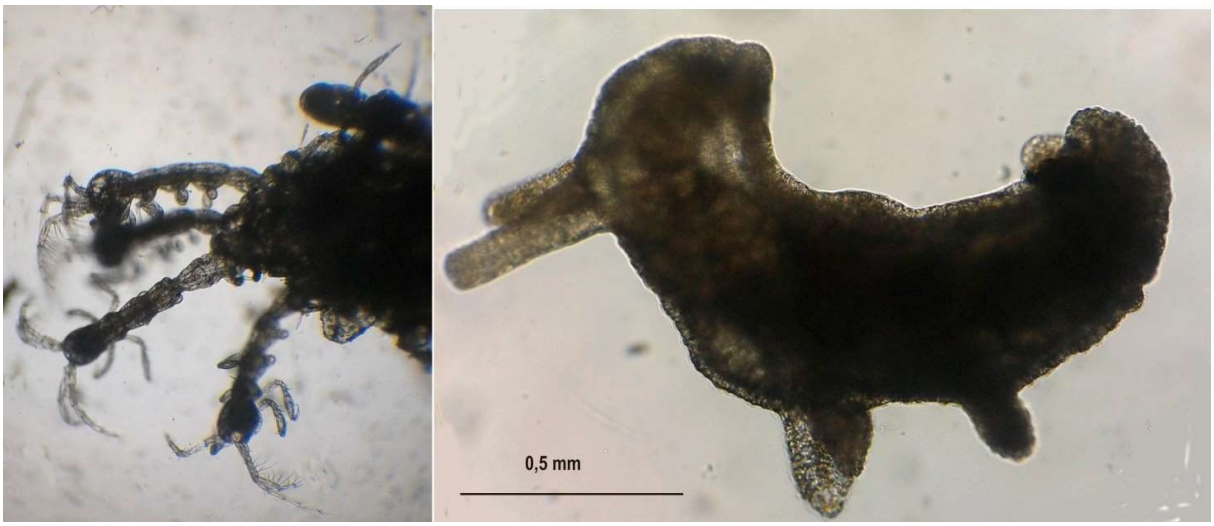
At the point (node) where two branches of kenozoids/stolons separate, we observe a so-called “rosette” structure connecting the funiculi of each of the branches, its role is poorly understood and it is difficult to observe: here is an attempt below!



The kenozoids carry buds which will become future autozoids For example here:

In addition to the problem caused by the volume of colonies, the filtration capacity of autozoids competes with filter-feeding molluscs for the capture of plankton, especially when it becomes scarce. Fortunately, the colonies do not resist to temperatures in winter.

On the positive side, however, the colonies also serve as shelter for juvenile fishes and carry other species such as caprellids (left) which cling to them or this small nudibranch found on the specimen, which grazes on the stolons:



Reproduction: There is no specialized zooid for reproduction. (see references below) I took a new sample of older specimens (they are less transparent). In the jar where these only specimens were, I was able to collect about ten ciliated larvae which have the characteristics of bryozoan larvae: here is a photo montage of some zoobotryon larvae: they move by turning on themselves and have in their anterior part, a sensory organ a group of some longer ciliae that can be seen better on the last image at the bottom right of a specimen compressed under a coverslip. (the two images with objective x 40). On the opposite side, there is a circular depression probably used as a fixing zone.

References:

A very complete anatomy lab study:
http://lanwebs.lander.edu/faculty/rsfox/invertebrates/zoobotryon.html

Pictures of adult specimens
https://doris.ffessm.fr/ref/specie/520
ANDRÉ Frédéric, HARMELIN Jean-Georges, PEAN Michel in: DORIS, 21/03/2021: Amathia verticillata (delle Chiaje, 1822),

Descriptive sheet:
https://platewatch.nisbase.org/pdfs/Amathia%20verticillata.pdf

Classification:
https://www.marinespecies.org/aphia.php?p=taxdetails&id=851581

Reproduction:
https://link.springer.com/article/10.1007/s00435-019-00438-4

Comments to the author J.M. Cavanihac are welcomed, email:
micromars1 AT orange DOT fr
Published in the October 2022 issue of Micscape magazine.
www.micscape.org