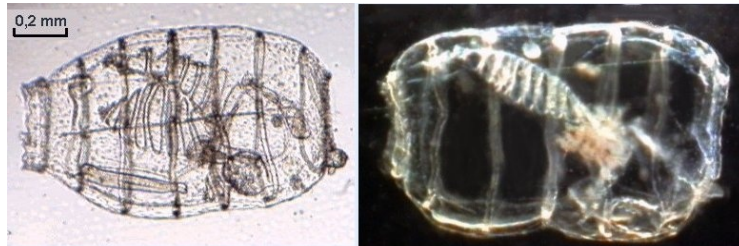


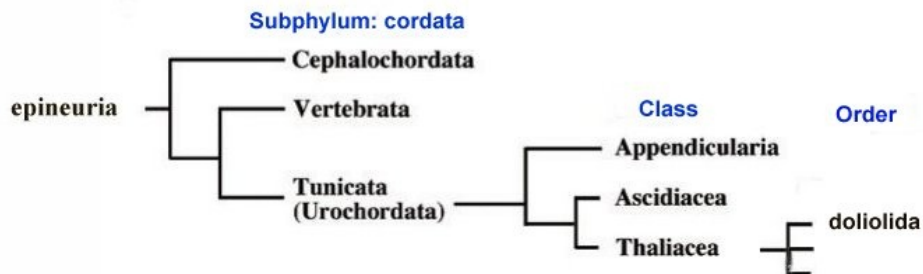
A specimen of Thaliaceae: Doliolid

J.M. Cavanilhac - France

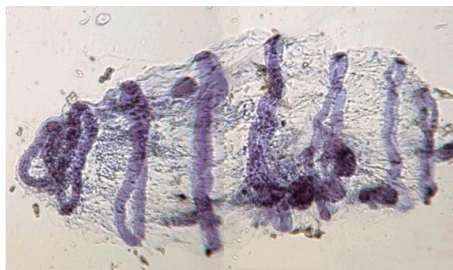
Doliolids, marine organisms of the phylum Chordata and class Thaliacea, (their name coming from Latin: *dolios* = barrel) have a ... barrel shape! Shape further reinforced by the presence of muscular bands similar to the metal strapping of barrels



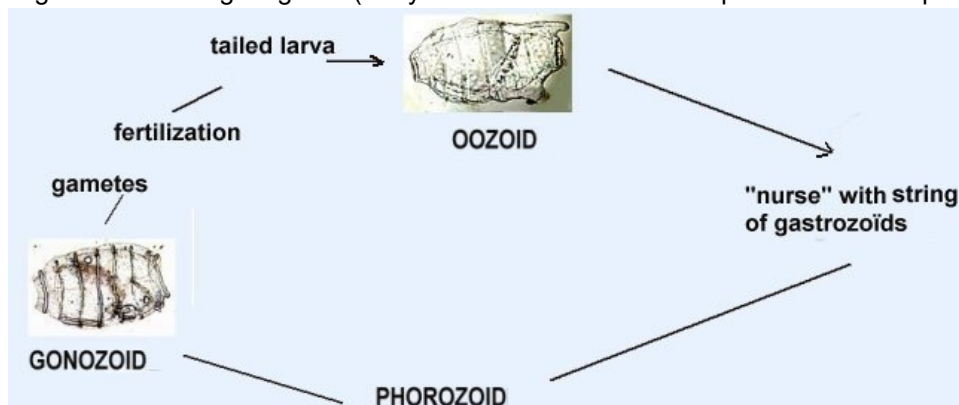
The phylum Chordata itself is subdivided as follows: we therefore see that the tunicates/tunicata of which the Thaliaceae are a part, are ... our distant cousins since they are equipped with a cord (at least at the larva stage) which is a rudiment of a spinal column.



The study of doliolids, which can proliferate very quickly depending on environmental conditions, is not easy, because it is difficult to keep them alive during sampling campaigns and their shape after fixation for their conservation is approximately this!



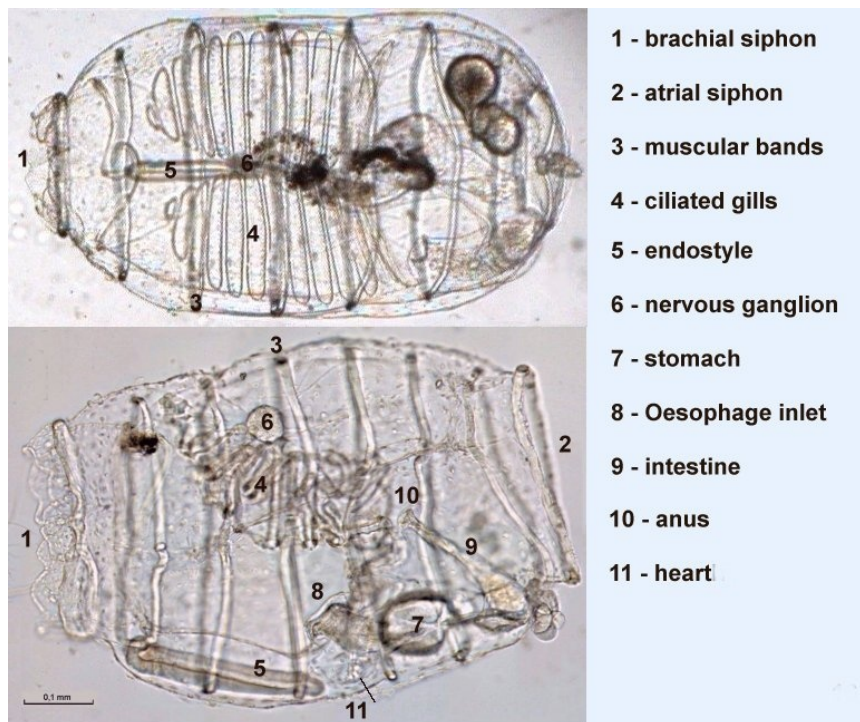
I was lucky on several occasions, to capture specimens, probably carried close to the coast by the streams. The observation being made within the next 2 hours allows us to visualize a certain number of interesting details. It should be noted that their reproductive cycle is complicated and little known, involving 3 generations of individuals including 2 sterile, according to the following diagram: (sorry I can't to illustrate all the phases of development!)



The oozoïds develop a long string of individuals: the gastrozoïds which feed the colony, then each gastrozoïd develops into a phorozoïd which, as its name suggests, will carry a string of buds which will each become a gonozoïd. We can therefore see that there is a multiplicative factor thanks to the two generations, which explains the explosion in the number of gonozoïd specimens.

Gonozoïds have testicles and ovaries but do not self-fertilize: fertilization takes place in water with the contribution of gametes from another specimen. This results in a swimming larva with an outline of a tail which will evolve into an oozoïd.

After this quick presentation to present the place of the 2 types of specimens collected here are images of gonozoïds (view from above and on the left side): it is not the same specimen: probably *Doliolum denticulatum*

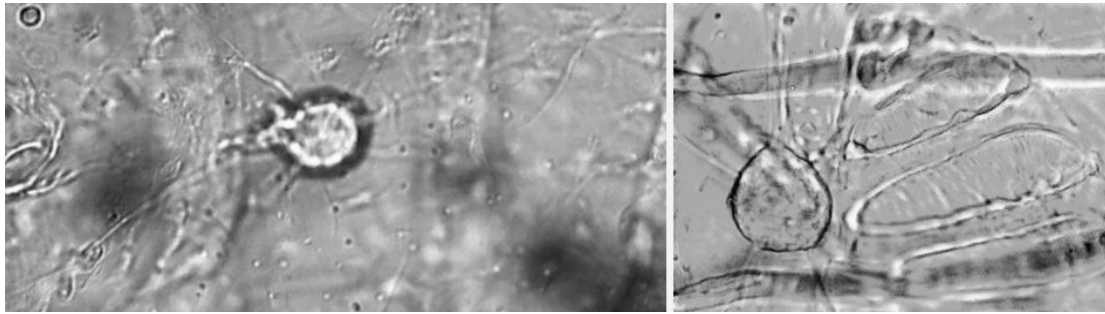


The body is separated into two parts: brachial sac and atrial cavity by a perforated septum behind the brachial gills. These are only used for breathing by circulating water through the incoming siphon. They are lined with cilia and these movements are enough for the individual to move slowly through the water. In case of danger the muscle bands contact each other and the water expelled by the atrial siphon propels the individual forward.

Let's take a closer look at the internal organs:
 ciliae of the brachial gills



Nerve ganglion: it extends nerves ramifications throughout the body (Pictures from 2 specimens)



Digestive system: the capture of food particles takes place in the brachial siphon: The endostyle is formed of a gutter lined with cilia which produces mucus which goes up towards the two pericoronal (parapharyngeal) arches also provided with cilia which secrete mucus which fixes the particles and by the shape of the spiral knot, creates a current which directs them towards the entrance of the esophagus: this process is very well described in this video from year 1967:

<https://www.canal-u.tv/chaines/cerimes/animaux/le-mecanisme-alimentaire-de-la-doliolo>

Detail of peripharyngeal arcs (grooves), according to the video above. These structures are rarely described.



- 1 - Endostyle
- 2 - peripharyngeal grooves
- 3 - spiral node
- 4 - ciliated gills
- 5 - brachial siphon

Heart: (red arrow) it circulates a lymphatic fluid containing a few amoebocytes.. As in other tunicates it pumps a hundred times in one direction then a hundred times in the other direction. Top right : endostyle, left : stomach (Video [here](#) showing heart (top center) stomach (bottom left) and digestive system with algae turning in the intestine)



The digestive system: this is below the detail of the first image: we can better see the endostyle and its central groove on the left, then the entrance to the esophagus, the stomach, the intestine and the anus. We can see the heart (blurred) at the right end of the endostyle:



Below the oozoïd form: specimen is not quite mature but we can see at the bottom right the beginning of the stolon which will carry the string of gastrozoïds: the endostyle is present but the digestive system is regressing and too brachial gills (only 4 or 5 gills remain). This form will degenerate to become a simple float that will be fed by future gastrozoïds



The biology of doliolids is a factor to take into account in the consumption of phytoplankton species because they compete with these other species. Their proliferation at certain times of the year can be exponential: for example a single oozoïd which gives rise to a string of 50 gastrozoïds, each of them giving birth to a phorozoïd, which also bears 50 gonozoïds, this makes 2500 sexual individuals from the only one first gonozoïd!

To learn more :

<https://lanwebs.lander.edu/faculty/rsfox/invertebrates/diliolum.html>

<https://www.skio.uga.edu/2018/07/30/skidaway-institute-researchers-probe-doliolid-secrets/>

<https://archimer.ifremer.fr/doc/1967/publication-3871.pdf>

<https://publications.csiro.au/rpr/download?pid=csiro:EP1312315&dsid=DS2>

Comments to the author J.M. Cavanihac are welcomed, email:
micromars1 AT orange DOT fr

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