

# Sphagnum dwelling Amoebae



*Sphagnum magellanicum* and other species

**B**oglands are beautiful landscapes, but extremely harsh environments to live in. They are mainly fed by rainwater which is poor in minerals. And sphagnum actively produces acid (for those interested:  $C_{11}H_{10}O_5$ ), typical pH-values are well below 5.5.

Very few organisms have adopted to these uncomfortable circumstances i. e. high acidity and special osmotic conditions. These organisms have found ways to survive and thrive, also benefiting from the near absence of predators.

The testate amoebae living here are particularly beautiful and interesting. And the specialists which I am going to describe can survive nowhere else.

Most species have a transparent shell, many have entered a symbiosis with unicellular algae which photosynthesize, supplying sugar to their host and benefit from the protection of the shell.

According to Schönborn about 2 Million testate amoebae live in a square meter of moss.

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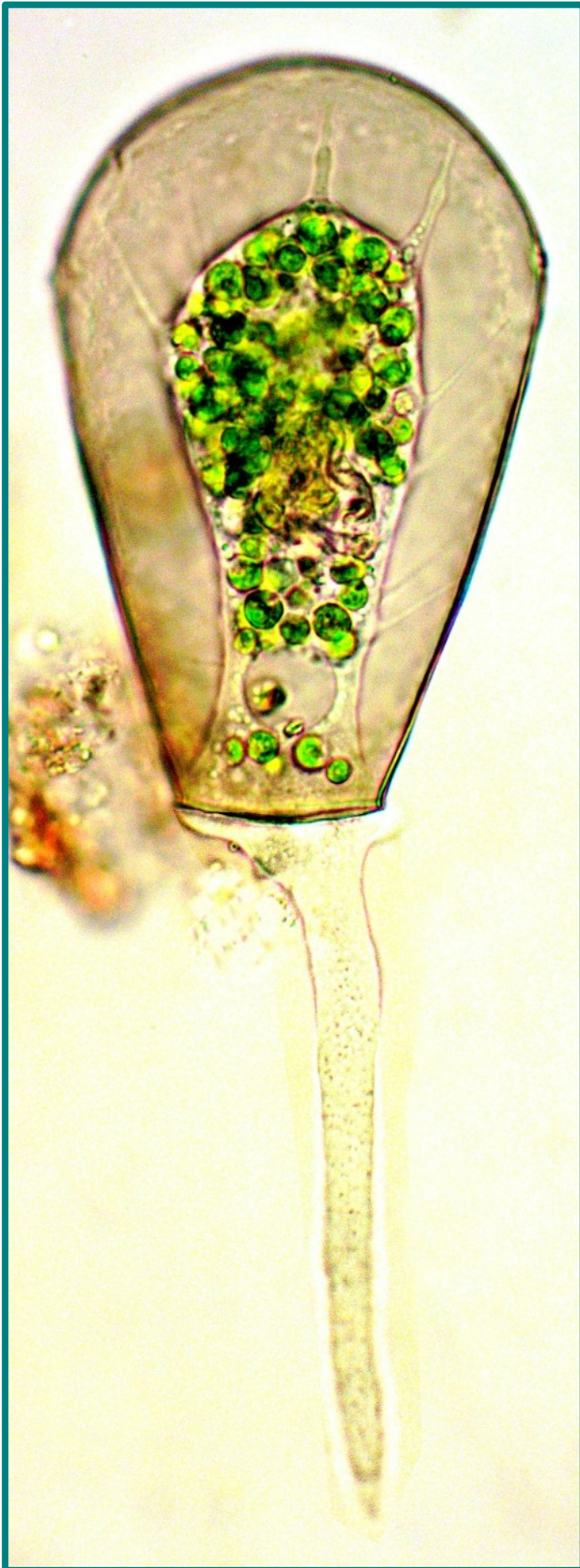
Two terms:

sphagnophil = prefer to live in sphagnum

sphagnobiont = only in sphagnum



Indicator species of bogs, and my favourite, is  
*Hyalosphenia papilio*.



The shell of *H. papilio* is compressed, oblong ovoid or pyriform. Mouth oval. Shell a transparent yellowish chitinous membrane.

Shell height 97-146  $\mu\text{m}$ .

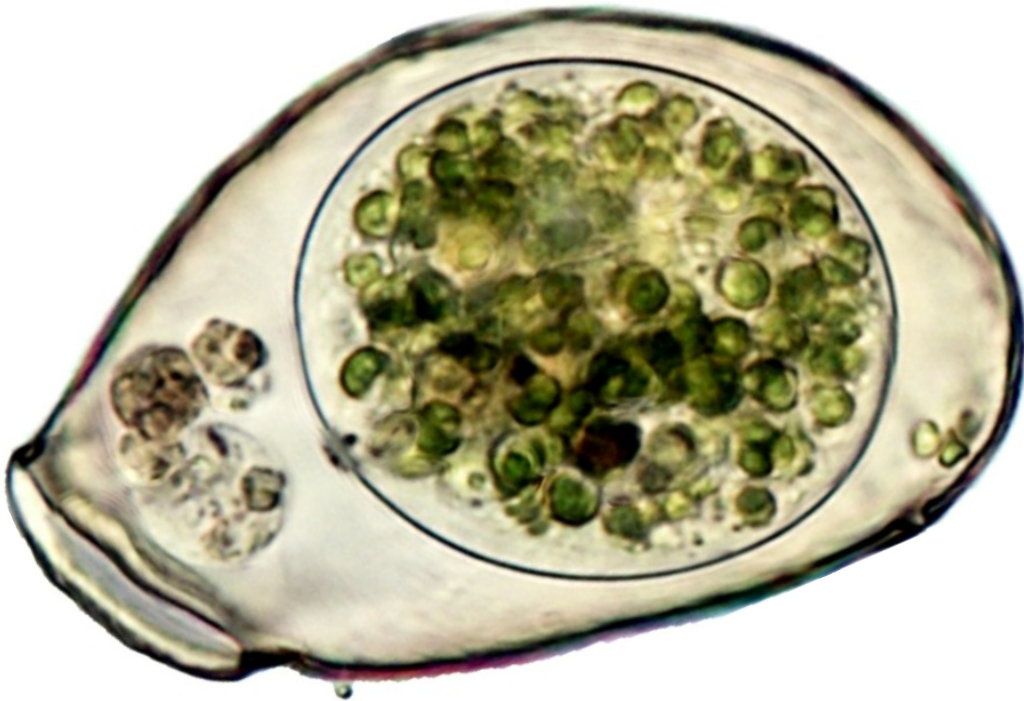
The cell plasma does not fill the whole shell, but is attached to it by plasma threads called epipodes.

They nourish themselves by more than one method, i.e. they grasp nutrients from the environment, and they contain a great number of unicellular symbiotic algae of the chlorella type, which supply them with sugar produced by photosynthesis.

The term is **mixotrophy**.

1879 Joseph Leidy wrote in 'Fresh-Water Rhizopods of North America': "No other lobose rhizopod has more impressed me with its beauty than this one. From its delicacy and transparency, its bright colors and form, as it moves among the leaves of sphagnum, desmids, and diatoms, I have associated it with the idea of a butterfly hovering among flowers." [papilio - latin for butterfly]

This aspect of an encysted *H. papilio* shows the flat shape of the transparent shell and the oval mouth.



Together with *Hylosphenya papilio*, although in slightly greater water depth, you will find the related *Hyalosphenia elegans*:



*H. elegans* never contain symbiotic algae. This specimen is encysted, prepared for the coming winter.

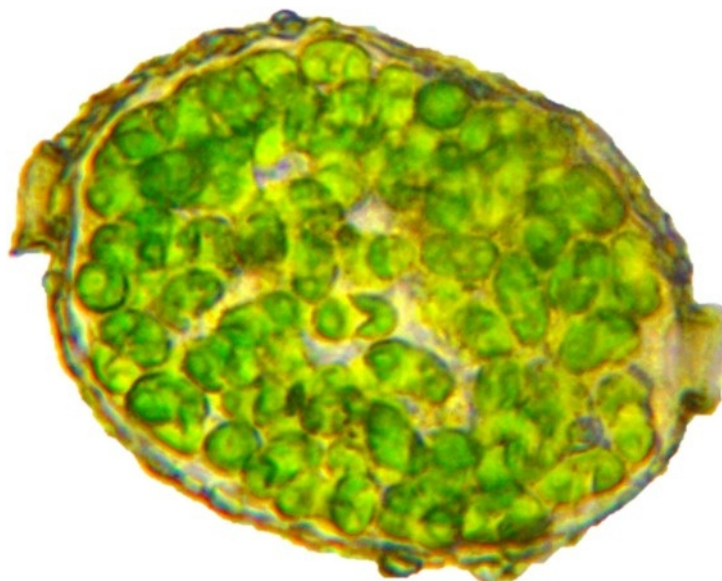


If you find the tiny, about 50  $\mu\text{m}$  long barrel shaped *Archellera flavum* together with *Hyalosphenia papilio*, you are probing an undisturbed rainwater bog.

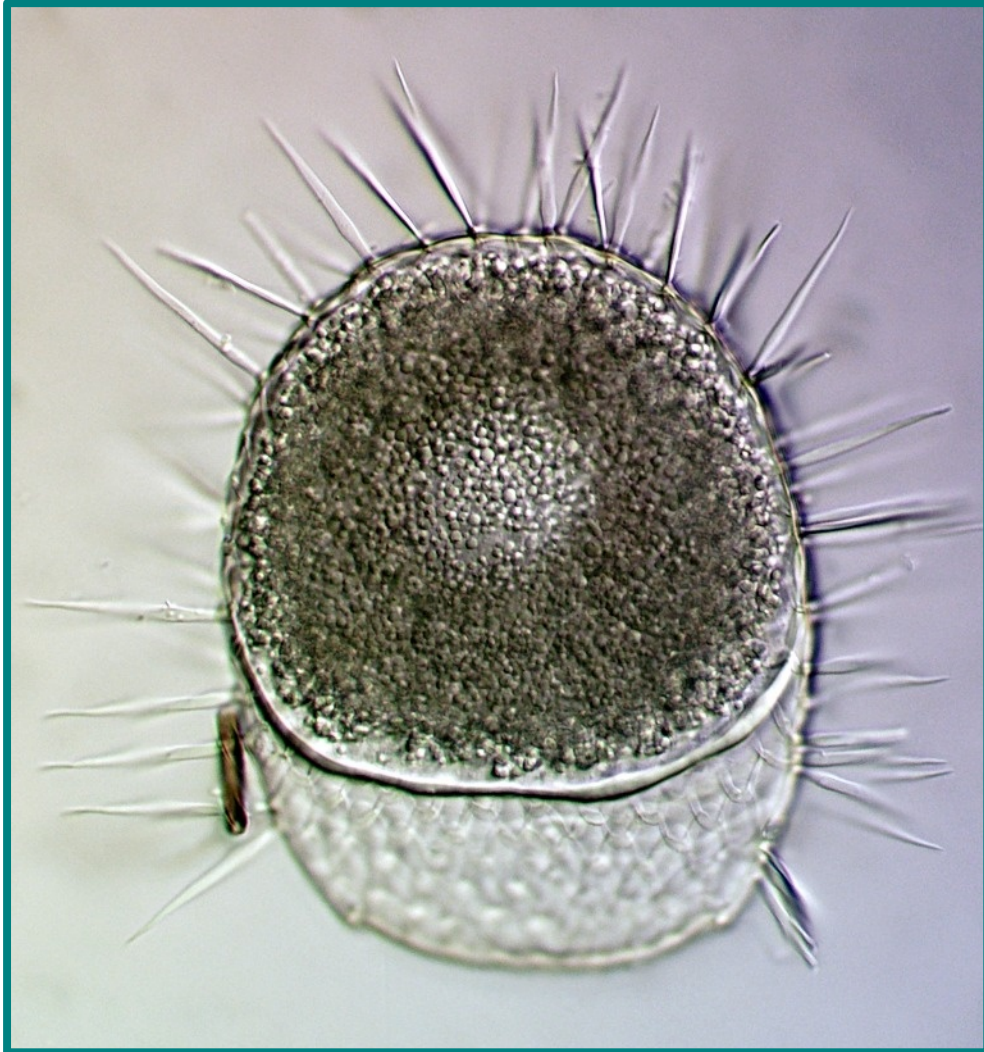


*Archellera flavum* have two pseudostomes at their opposite sides and contain numerous symbiotic algae. They cannot survive without these symbionts.

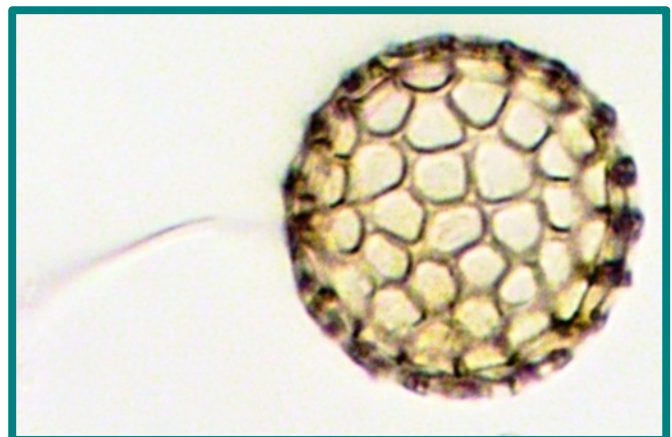
The same applies to their relative *Amphitrema wrightianum* (below). These are even more picky about the quality of their habitat and quite rare.



Another not common sphagnobiont is *Placocista spinosa*. It is reported that *P. spinosa* often host alga symbionts, as do many other bog species. My specimens were without such chlorella algae.

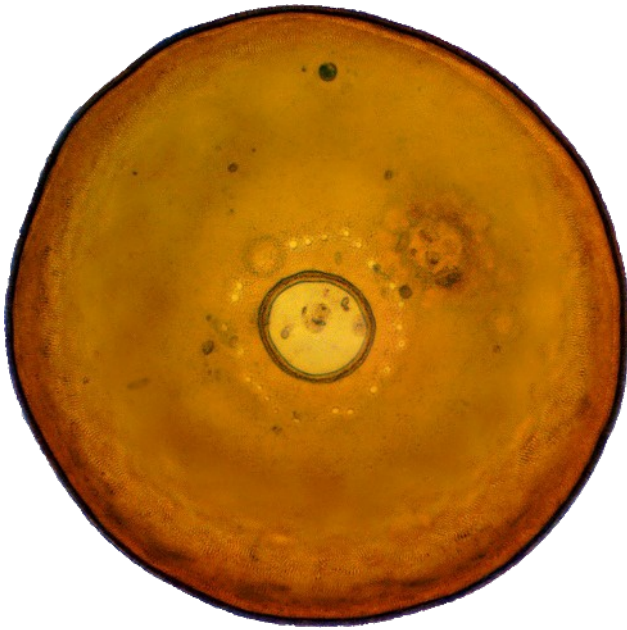


The small (40  $\mu\text{m}$ ) fragile *Clathrulina elegans* sits on a stalk.





## Some more Sphagnophiles:

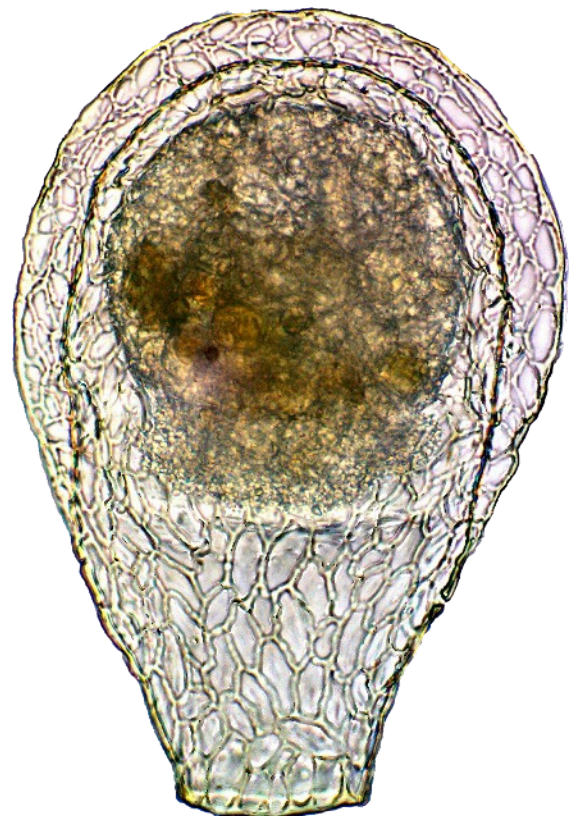


This 170  $\mu\text{m}$  wide *Arcella artocrea* lives in bog water, note the pores around the opening ...



... while this 180  $\mu\text{m}$  large hemispherical *Bullinularia indica* prefers dry bog hummocks. Its slot-like mouth hides behind its upper lip, which wears several pores..

This 210  $\mu\text{m}$  large *Planocarina carinata* wears a broad keel (lat = carina) and dwells in soaking wet sphagnum.



### Further Reading:

- Ferry Siemensmas pages
- Marjorie Hingley, *Microscopic Life in Sphagnum* ISBN 0 85546 291 4
- Bryophyte Ecology, chapter 2, Protozoa
- My page.

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Published in the October 2019 issue of *Micscape* Magazine.

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