Why are plankton ……?

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This short title is not complete! It should be: *Why are plankton so important in the marine food chain and in the regulation of atmospheric gases?* We rather consider the marine origin because the greatest mass of plankton lives in our seas but we must not neglect freshwater plankton, from ponds, lakes and rivers which are less abundant but with other species: rotifers, desmids, etc.

First let's look at the definition of plankton (whose Greek root means "which wanders"): they are aquatic plant or animal organisms which drift according to the currents and have no possibility of going up against the streams.

We therefore distinguish between Phytoplankton: plant and Zooplankton: animal. The specimens are mostly microscopic in size…but jellyfishes and larvae of large adult organisms are planktonic too (meroplankton).

We generally underestimate their importance in the aquatic food chain since without plankton there are no fishes! In a pyramidal food structure from the phytoplankton which feeds the zooplankton and from this to the whales via krill and fishes, we consider that 1 ton of phytoplankton will ultimately produce... 100 grams of tuna.

But the ecological role of phytoplankton in CO2 fixation and oxygen production is essential!: 7 to 25% of the total CO2 on earth is absorbed and 12% of the oxygen produced...(The Amazonian forest that we often cite only produces 6% of oxygen).

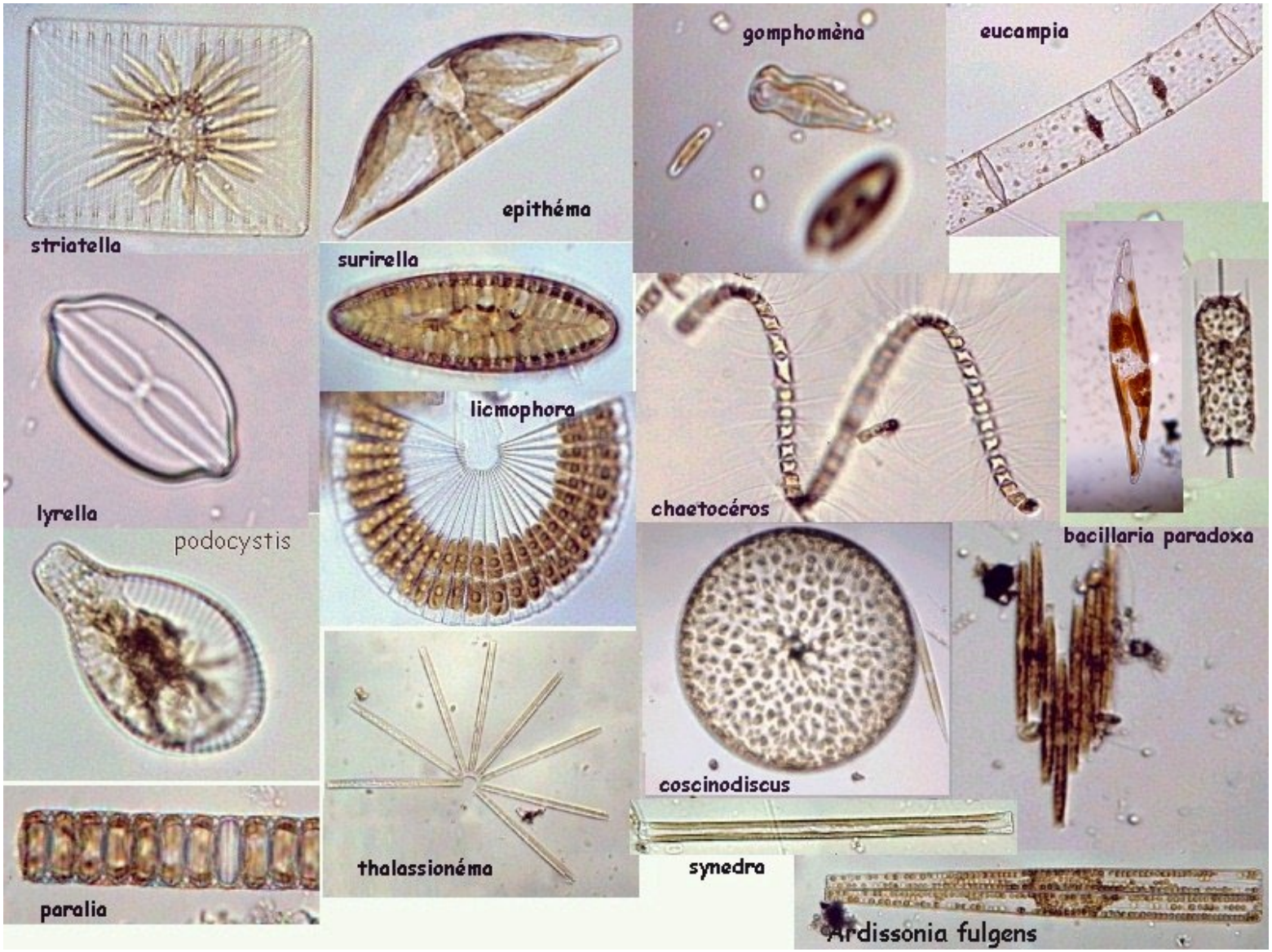
If these reasons were not sufficient to justify our interest in plankton, I would add that many specimens are aesthetic, even graphic, and present a certain beauty. Some technical tips like dark field illumination, Rheinberg lighting produce spectacular images...

It is perhaps this last point which triggered my motivation to observe it and also the fact that I live between sea and ponds in a city crossed by canals, hence the ease of quickly collecting and observing living specimens, in almost all seasons. Spring an Autumn are the best seasons. I remember some years ago, I have seen video projection of living plankton at the Monaco's oceanographic museum.

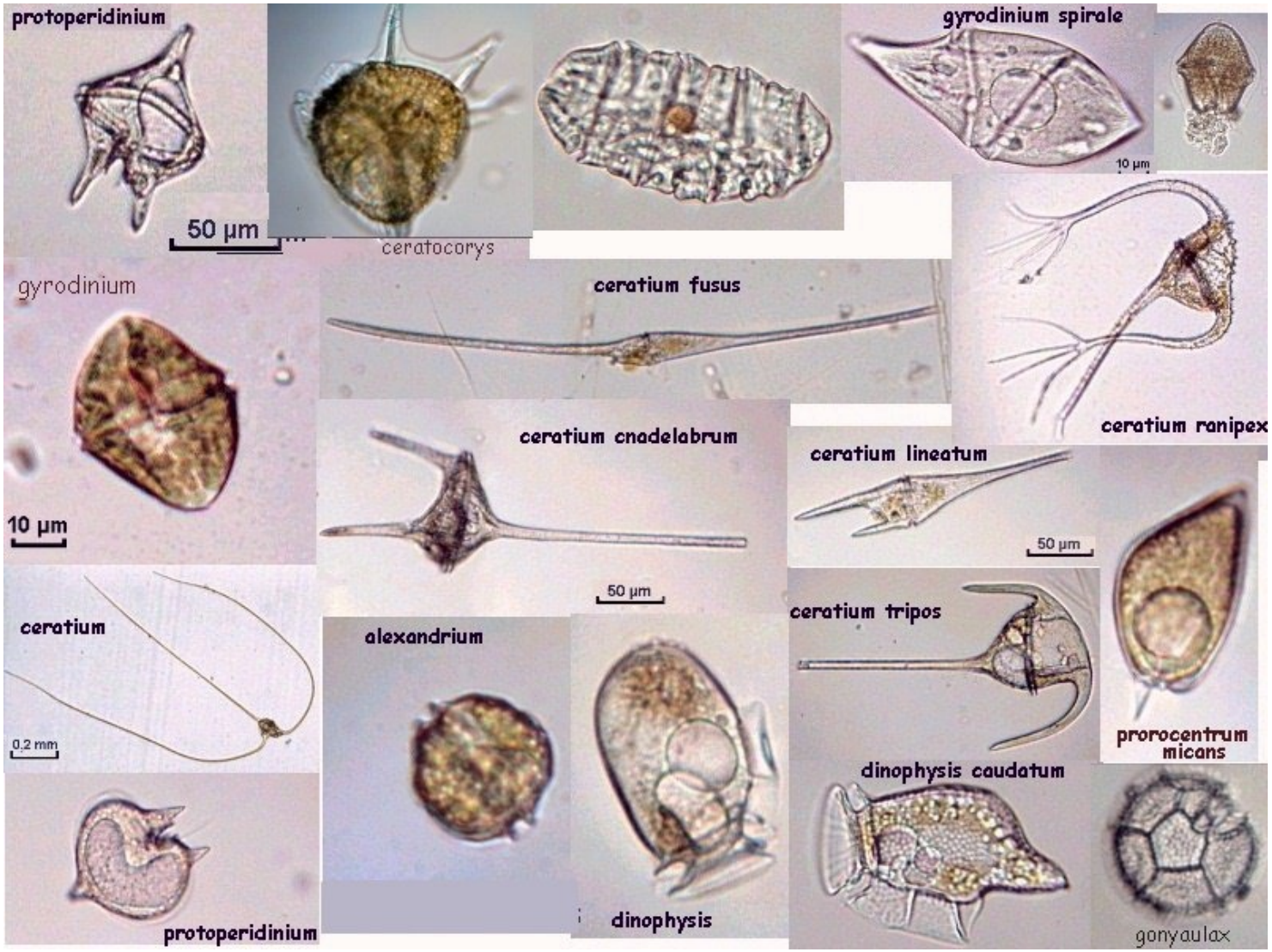
Another benefit of microscopic observations is that there is no need to prepare the subjects: a drop under the objective, often without even placing a coverslip, is enough to see these tiny flora and fauna! This is a good approach when you're starting out into microscopy ….
Additionally, if samples are observed – no more than a few hours after collection – there are still enough specimens moving that children can be interested.

To try to share this interest (which does not require expensive means for harvesting as we will see later) here is a – very small – gallery of what we can observe and which, I hope, will make you want to do it:

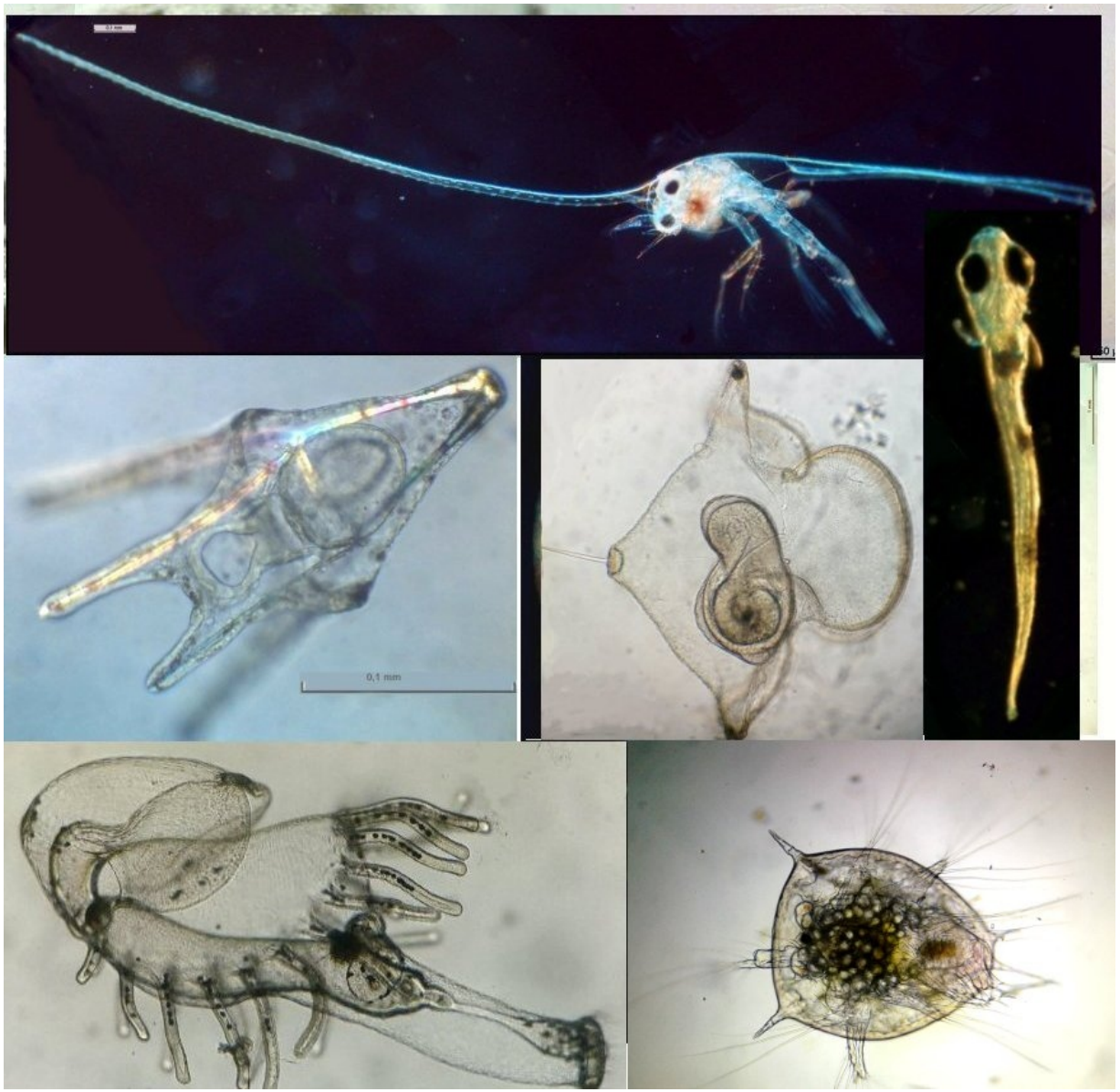
A little geometry with diatoms, lines, circles, rectangles, triangles, stars... Diatoms are unicellular organisms which feed by photosynthesis and build their shells (frustules) in silica. They represent a high proportion of phytoplankton species.



Other phytoplankton species: dinoflagellate micro-algae (often toxic to humans when we eat contaminated shellfish!) and which can move a little with two flagella; a posterior flagellum and a transverse flagellum. Their massive proliferation during seasonal blooms can prohibit fishing activities:

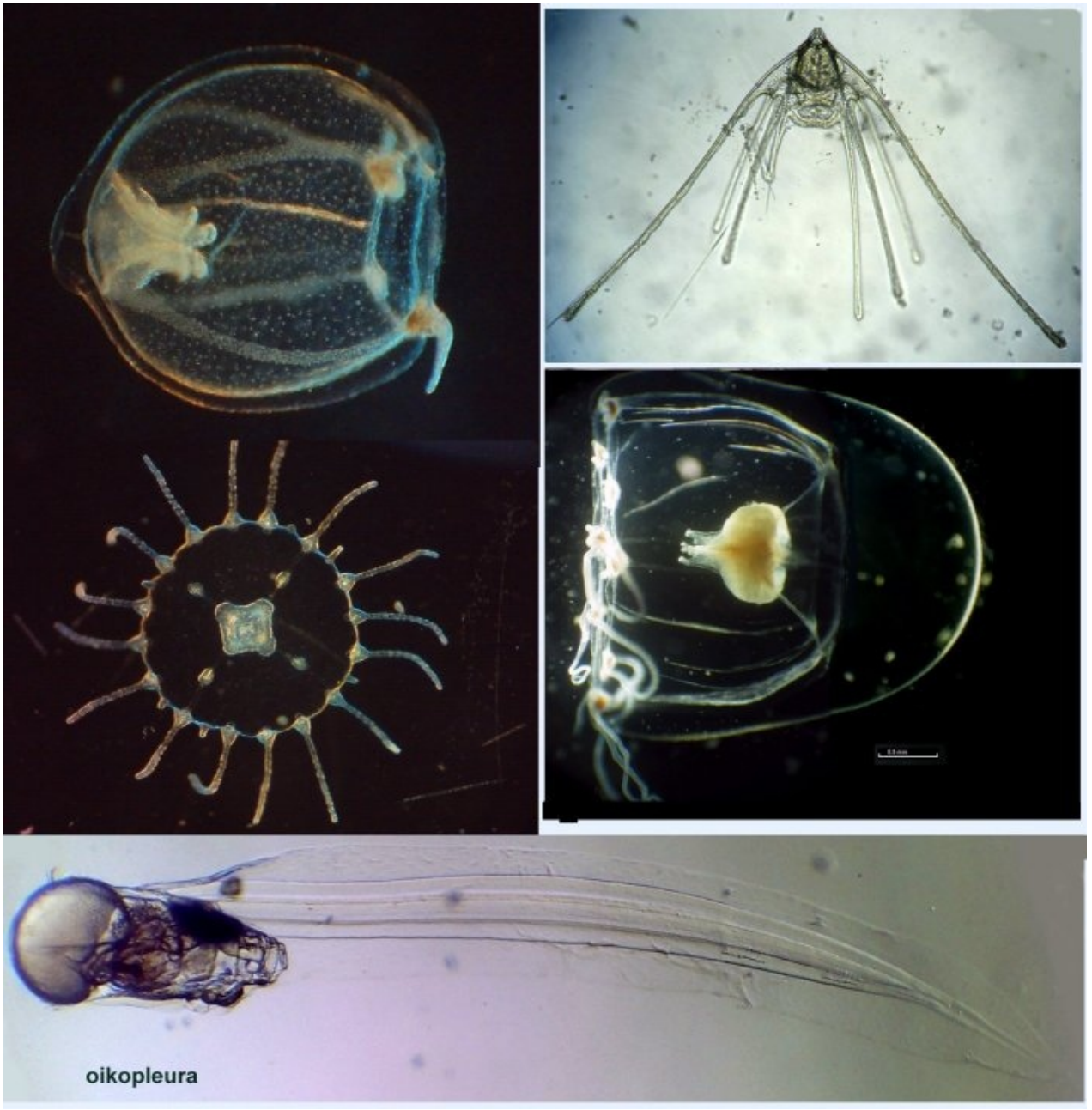


Larvae of larger organisms: (meroplankton): here porcelain crab *Neopetrolisthes maculatus*, sea urchins, worms, barnacle, fish. Here we can see dark field images, very easy to make by placing a partial obstacle in the path of the light under the condenser of the microscope. (A coin of the right size can be enough!)

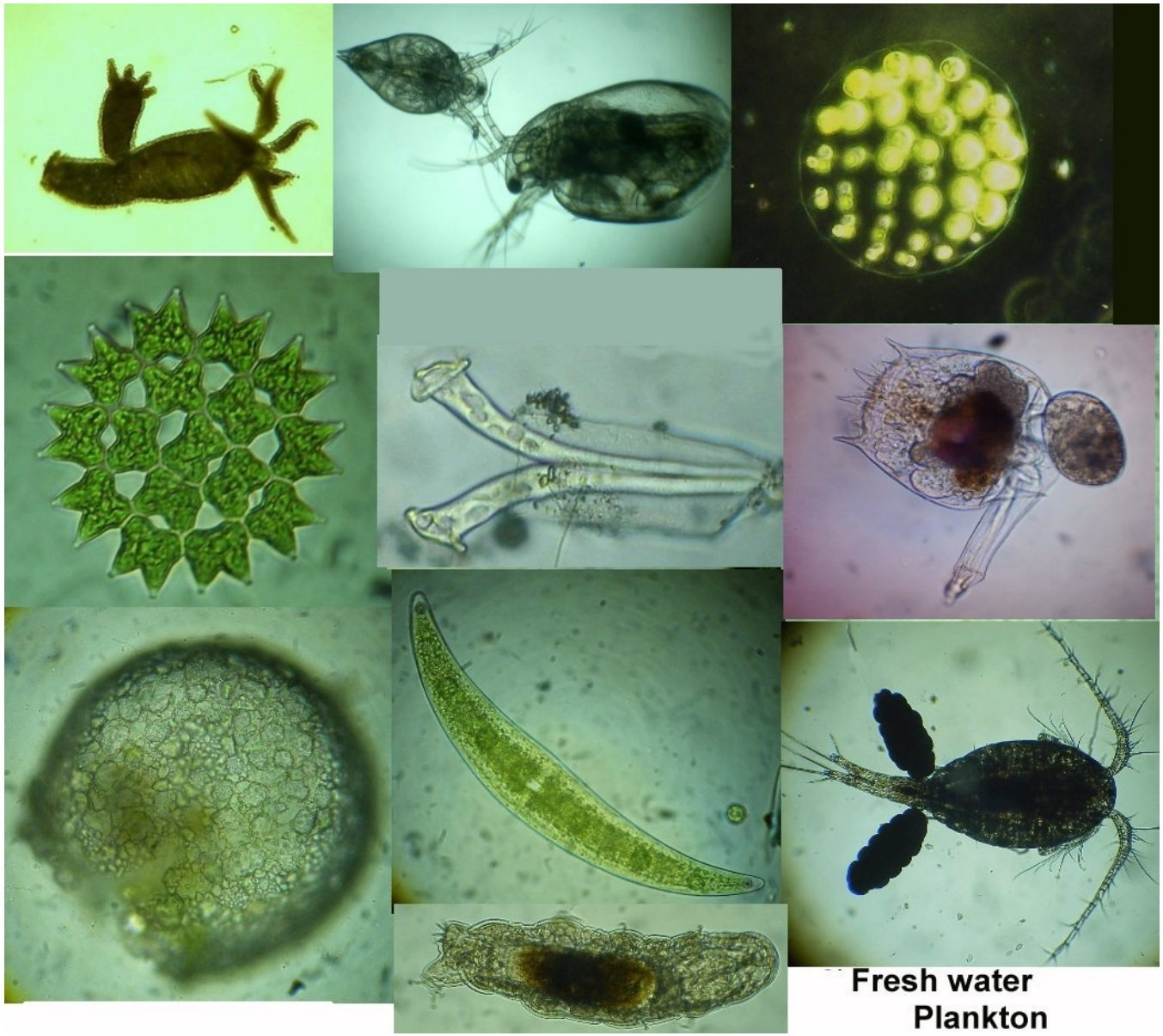


Small crustaceans or their larvae: including galathea, cumaceans, copepod, caprella, etc.

and why not, with a little imagination, a vision of “spaceships” from which micro Aliens land! In reality, micro jellyfish, echinoderm larva and oikopleura larvacean:



But freshwater plankton too, is captivating to study: here a sample from a river crossing of a big town: water flies, rotifers, protozoans, copepods, water bear….
(diatoms too…) by scraping the green deposits on the banks it is possible to collect other kinds of specimens.. hydra, etc.



These were only a small example of what can be observed, and once the specimens have been identified, you can find scientific articles to deepen your knowledge: for example for the specimen (oikopleura) on the last plate of marine sample above:

https://www.researchgate.net/publication/349707756_3D_reconstruction_of_structures_of_hatched_larva_and_young_juvenile_of_the_larvacean_Oikopleura_dioica_using_SBF-SEM

As indicated above, there's no need for expensive means: a simple plastic mesh coffee filter into which a few liters of sampled water are poured is enough to concentrate the species. We then rinse its contents in a jar of jam and there are several hours or even several days of observations... You can also make a plankton net with a piece of curtain net (!) that you can drag into the water along a pier: a small tank at the bottom of the cone and a lead ballast make its use more practical.

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