Zooplankton -
culture tanks and necessary equipment

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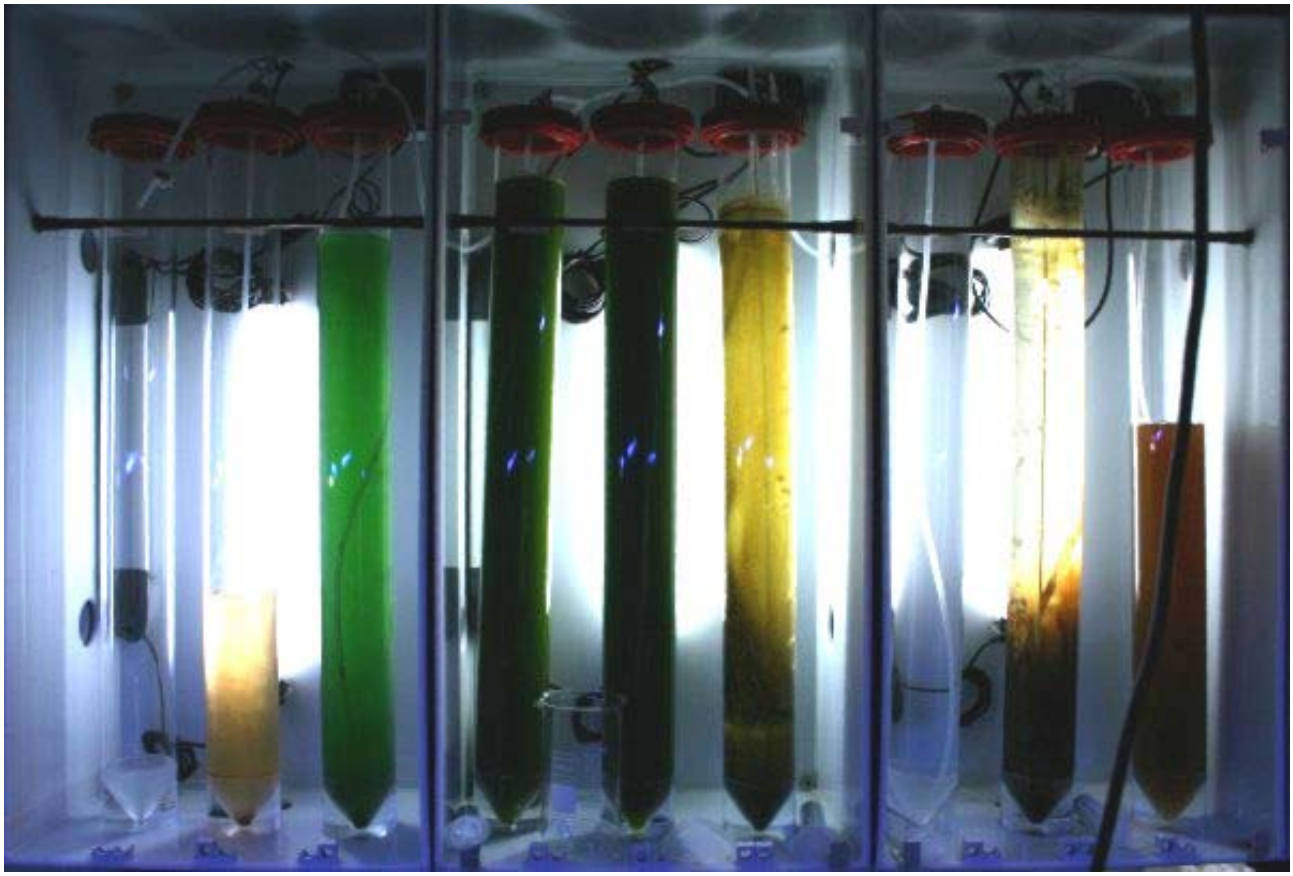

Eine Zooplanktonanlage mit mehreren Planktonröhren

Zooplankton aquarium

Necessary equipment

- Glass aquarium with glass cover, about 20...100 litres.
- Air supply (membrane pump or small compressor); if you supply more than one tank each line should be protected with a check valve.
- Lighting: not necessary but useful, because a part of the produced pollutants are eliminated by feeder algae, if they have light.
- General equipment see overview about breeding phytoplankton.

Functionality

Fill the aquarium preferably with phytoplankton and aerate them with large bubbles (all algae should be in motion). The added zooplankton culture (e.g. *Brachionus* or fresh hatched *Artemia*) subsist on the phytoplankton. If the coloured turbidity diminishes, add additional algae or harvest the zooplankton. Different sizes (stages of the zooplankton) will be separated with different screens. Add the harvested zooplankton to your fish larvae. Possibly enrich the zooplankton with essential nutrients before.

Zooplankton tube

Necessary equipment

- Zooplankton tubes with each 4…5 litres volume; but with more hose connectors than algae tubes. At cultures that generates lots of detritus a paddle scraper is useful.
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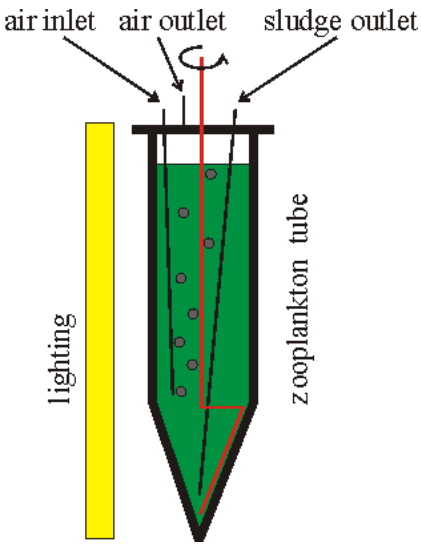

The principle is the same like the zooplankton aquaria. But the system is nearly air-tight to prevent contamination and you can drain the forming detritus. For this purpose the delivered paddle scraper will loosen deposits (detritus) of the cone. Then you can suck the detritus with a hose. The air inlet is mounted about 5 cm over the bottom (only with little sedimenting algae like *Nannochloropsis* spec.). So the algae are in abeyance and the mud sinks into the cone. With strongly sedimenting algae the air should be bubbled at the bottom; about 10…20 minutes before sucking the detritus you must stop the air input to give the detritus time for sedimenting.

A *Brachionus plicatilis* culture, fed with *Nannochloropsis salina* at complete mixing mode (air inlet at the bottom): the medium is turbid by the produced detritus (rest of algae, faeces of the rotifers, dead animals)

The same conditions but not at completed mixing mode (air inlet is about 5 cm over the bottom): the white dots in the water column are *Brachionus* – there are very less other particles in the medium. You can regularly suck the sedimented detritus with a hose. The partition of culture and detritus is only working with aglae that sediment less, e.g. *Nannochloropsis salina*.

Dimensioning the operation parameters

Lighting

- The best are fluorescence lamps with day light spectrum, but engery saving bulbs are useable, too. Compared to algae tubes the light intensity may be very low. So normally you do not get temperature problems.

Air supply

- Use only large bubbles, because fine bubbles produced with air stones are generating much aerosols. Then the danger of contaminating other systems (e.g. algae culture) with predators (e.g. rotifers) is large.
- The more sensitve the organism the lower the air input to reduce powerful currents with strong shearing forces.

Temperature

- Normally too high temperatures are avoided by using less light. But if you raise up organisms with a low temperature maximum you must use a chilling method.
  - Establish the system in a cool room.
  - Work with chilled air.
  - Work with a cooling coil that is installed in an aquarium that contains the zooplankton tube.
  - Do not chill with fans, because closed system will not cool down with fans and at open cultures the danger of drifting predators into algae cultures is too high.

pH value

- Normally the pH is not controlled.
- If very high pH oscillations occur measure the alkalinity (KH value) and add a pH

buffer like AquaCare Triple Buffer when indicated.

Salinity

- The salt content (salinity) should be adapted to the organism you would like to cultivate (zooplankton and phytoplankton). If a species or strain is able to survive high salinities choose a high salinity. The higher the salinity the less contaminants will occur. The culture will be clean for a longer timer.
- The more the air input the more water will evaporate. Check the salinity regularly and add distilled or R.O. water as needed.

Concentration of feeder organisms and waste products

- The more sensitive the cultivated species, the less concentration of the feeder organism, e.g. algae. Too high algae densities cause high growing rates of the zooplankton. In the process high ammonia concentrations are produced and the plankton animals will die. The tolerance against ammonia is very different: *Artemia "salina*" stands concentrations to 391 µg/l (this is 4,08 mg/l Ammonium at 20.5°C, 35/1000 and pH 8,63), others will die faster.