MEASURING AND MODELLING THE DYNAMIC RESPONSE
OF REMOTE MOUNTAIN LAKE ECOSYSTEMS TO
ENVIRONMENTAL CHANGE

A programme of **MO**untain **LA**ke **R**esearch

MOLAR

ZOOPLANKTON

SAMPLING AND LABORATORY PROTOCOL FOR SITE OPERATORS
Work Package 1.

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Zooplankton - Protocol for WP1 - Sampling large zooplankton (ZOOL) with nets

(This is a more detailed description of the sampling methods mentioned briefly in the paragraph **ZOOL** of the protocol **"MICROBIAL (PELAGIC) FOOD WEBS - 1st LEVEL"** supplied earlier (May 19, 1996), which includes also the protocol for sampling small zooplankton (**ZOOS**).

1. Sites, site operators and analysts to whom preserved samples will be sent

Chuna (T. Moiseenko > Fott) - Øvre Neådalsvatn, overlap with WP3 (Lien > Fott) - Stavsvatn (Lein > Fott) - Lochnagar (Rose > Fott) - La Caldera (Cruz- Pizarro) - Lago Redo, overlap with WP3 (Catalan > Cruz Pizarro) - Lago Paione Superiore (Mosello > Manca) - Gossenköllesee, overlap with WP3 (Psenner > Fott) - Dlugi Staw (Galas > Pianowska) - Starolesnianske Pleso (Stuchlik > Fott) - Jorisee (Hanselmann - Fott).

(Note that all **dry samples** for the determination of biomass (org. C) will be sent to Prague).

2. Objective

Sampling pelagic zooplankton for quantitative assessment of the biomass of its components. The biomass (as organic carbon) will be determined by combination on sizing (estimates based on measurements) and direct determination of organic carbon in the large zooplankton fraction.
The samples will be used also for description of seasonality in pelagic zooplankton communities.

3. Equipment and materials

- boat (inflatable or other), anchor, line
- plankton nets:
  a. AL:PE net (1): quantitative pelagic net, Apstein type, #200 µm
  b. AL:PE net (2): qualitative pelagic, #40 µm
- formaldehyde, plastic bottles 100 - 250 ml for preserved samples
- plastic bottle 1 - 2 litres for live zooplankton, cooling box - for the direct determination of biomass

4. Sampling procedure

4.1. Large pelagic zooplankton, quantitative sample for counting and sizing

Quantitative sample from the open water, using the net (1). The boat will be anchored close to the maximum depth. Tow the net from 1 - 2 m above the bottom to the surface, the towing speed being about 0.3 m per second (time in seconds = length in m x 3). After each haul the inner surface of the net must be rinsed carefully by lowering the net (bucket closed) into the water. Then the contents of the bucket is emptied into a sampling bottle. Repeat until all animals are emptied into the bottle. Take several hauls in order to get rich material. Write

down the towing length and the number of hauls per sample. Preserve with formaldehyde to the final concentration of 4%. The sampling bottle must be almost full. Label: ZOOL, lake , date, length (m), number of tows, net opening diameter (cm) - or: AL:PE net (1), if you use a net supplied from Prague.

Note: This sample is taken also for WP3 (take only once at Ovre Neadalsvatn, Redo and Gossenkollesee).

4.2 Large pelagic zooplankton, quantitative sample for determination of biomass (org. C).

Take a quantitative sample using the net (1) as before. Put the live sample into a transparent plastic bottle ~ 1000 ml capacity, filled with lake water.

Check if the sample contains mud or debris, in this case discharge and repeat sampling. Note the length and number of hauls.

Transport cool to the laboratory and go on with the treatment as soon as possible. Zooplankton should stay alive.

4.3 Pelagic zooplankton, all sizes, qualitative sample for taxonomy

Qualitative sample using the net (2): take vertical and long oblique hauls in order to obtain a rich sample. Preserve with formaldehyde. Label: Lake, date, qualitative, #40.

Note: This sample is taken also for WP3 (take only once at Ovre Neadalsvatn, Redo and Gossenkollesee).

Note to the preservation of all plankton samples: Preserve with formaldehyde to the final concentration of 4%. Do not leave too much air in the bottles, after preservation the bottles should be almost full. Be sure that all sampling bottles are tight and put the preserved samples into a plastic bag anyway. Good field bottles for 40% formaldehyde are plastic "shampoo" bottles - they use to be tight.

Overlap with WP3: For Ovre Neadalsvatn, Gossenkollesee and Redo, see also "Sampling zooplankton, WP3".

5. Laboratory treatment (by site operators) of the live zooplankton samples (for determination of biomass as org. C)

5.1 After return to the laboratory

Pour the sample on a white dish, remove macroscopic objects like leaves, insects etc. if present. Write your observations on the state of the sample. Discard the sample if the animals are in an advanced stay of decay (It can be tolerated if some animals do not move). **NOTE A.**

Pour the sample into a filter unit equipped with a pre-weighed circle of nylon netting, apply gentle vacuum, wash with distilled water, suck through with air. Remove the circle from the unit, fold with the zooplankton layer inside, put into a clean labelled vial, dry at 60^{o} C in a dust-free oven (usually overnight). **NOTE B, C.**

Close the vial when the sample is dry. The dried samples, well closed, can be kept in room temperature. **NOTE D.**

Each sample (vial) must be labelled properly and the accompanying protocol must contain this information: Site, date, diameter of the net mouth, length of the tows (m), number of tows, notes on the state of the sample, weight of the circle (#.### g), other comments if appropriate.

5.2 Mailing

Mail to Prague (Dept. of Hydrobiology, Charles University, Vinicna 7, CZ-128 44 Prague 2). Please declare a value of the package of several ECU - if you write zero value, custom officers in Prague are confused and make troubles.

5.3 Analysis

In Prague the samples will be checked for purity, weighed, and either the whole samples or subsamples will be analysed for organic carbon.

6. Notes

a. The success in getting the animals in a good state to the laboratory depends on such factors as: density of the animals in the transport bottle, temperature during the transport, duration of the transport. Things are easy when your laboratory is close to the site.

b. The recommended procedure as they use it at Pallanza: Circles 4.7 cm diameter with a number written on an "ear" on its edge. The filtering unit Sartorius or Millipore, the glass sinter disc removed. The nylon circle buckles to form a dish where zooplankton accumulates. The folded circle with retained zooplankton is clamped by a non-corrosive clip and put into a vial. The vials are clean glass vials with plastic caps, like scintillation vials or similar ones.

c. At the very best zooplankton remains wrapped in the nylon filter but if some animals fall into the vial the sample is not lost for analysis.

d. Before you leave for the MOLAR site please check the procedure with zooplankton from your home lake or the pond in the garden of your Institute.

e. FSCU (Dept. of Hydrobiology) offers sending pre-weighed circles (4.7 cm or other diameter) in vials, ready for use, upon request.

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