European Mountain lake Ecosystems: Regionalisation, diaGnostics & socio-economic Evaluation

EMERGE

06

PROTOCOL FOR THE SAMPLING OF CONTEMPORARY

INVERTEBRATES

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April 2000

EMERGE: Invertebrate sampling - field and laboratory methods

Where conducted properly, sampling and analyses of the invertebrates proved very useful in the ALPE and MOLAR projects. Abiotic factors like climate, hydrology and geology are «summed up» in the biota species composition, and analyses of the invertebrate community is therefore a very important tool in monitoring and evaluating various types of impact.

The Department of Zoology, UiB, will co-ordinate all invertebrate sampling in the EMERGE project, and will receive the invertebrate data from all partners for storage and presentation in a uniform way.

Sampling protocol

Invertebrates will be sampled for two different purposes within the EMERGE project; the horizontal «Lake District» analyses, and the vertical «Invertebrate Gradient» analyses to be conducted in 5 selected areas. The invertebrate sampling programme will differ depending on which category the lake in question belongs to.

It must be stressed that when taking a kick sample, total kicking time should be at least 2 minutes, and kicking should be done in short series while moving around. A kick sample station is considered to be a stretch of a river/stream or a littoral zone (10-30 meters), and not only a single spot. The sample must be taken in this way in order to cover as many different micro-habitats as possible. It is, of course, much better to take too much than too little when visiting these remote sites. Sampling should always be done keeping the substrate in mind. If this is heterogeneous, for example including stones, macrophytes/mosses, and sand, the sample must be taken covering all the different habitat types. Furthermore it must be stressed thatall samples, both the qualitative and the quantitative ones, should be treated using sieves with 250 µ mesh size. Samples must be labelled in an unambiguous way using a pencil on good quality paper. Low quality paper often dissolves, leaving no way of telling where samples were taken from.

1. «Lake District» analyses:

In the Lake District part of the project, only qualitative kick samples will be taken. Three samples should be taken at each site using the «kick sample» method (Frost et al. 1971). One sample in (one of) the inlet stream(s), one in the littoral zone of the lake, and one in the outlet stream of the lake. Any inlet stream is acceptable, as long as it is a proper stream or brook, and not merely a temporary trickle. If sampling has to be done in a temporary habitat (no other type of inlet exists at the site), this must be stated. One kick sample should be taken in the littoral zone of the lake, and one in the outlet stream, approximately 100 - 200 m downstream of the outlet proper. If the lake lacks defined inlet and/or outlet streams, this must be clearly stated in the data file. All samples should be conserved at the site using 96% alcohol.

2. «Invertebrate Gradient» analyses:

Qualitative samples

The same methods and procedures as for qualitative samples in the Lake District analyses.

Quantitative samples

Quantitative samples should be collected from two different depths in the lake: at 3-5 meters and at about 20-25 meters, if such a depth is found in the lake. If not, take the samples at the deepest point. If a Kajak corer (Kajak 1971) or modified versions of this bottom sampler is used, at least 6 parallel samples (6-10) should be collected at each depth. If an Ekman sampler is used, 3 samples at each depth is considered sufficient. It is strongly recommended to use an Kajak sampler, and no other bottom samplers than the two mentioned above is considered adequate. All quantitative samples should be carefully washed out in the field using 250 mm mesh size. All samples should be conserved at the site using 96% alcohol.

Drift-net samples

Sampling chironomid pupal exuviae using drift-nets is optional, but highly recommended due to the great help the exuviae provide in species identification. The drift-net should be left operating for as long as possible. In order to maximise sampling time, put the net in the outlet river (close to the outlet proper) when arriving at the site, and leave it there until departure. Drift samples can be sent to UiB for analyses. Partners who want to take drift samples, but do not have any drift-nets, should contact UiB as soon as possible. The value of having good drift samples as an aid in the taxonomic work cannot be overstated.

3. Laboratory methods

The samples taken with the Kajak corer are quantitative, and all animals must be sorted out from the sediments under a binocular using high (25-40x) magnification. The kick samples are qualitative and animals should be picked out under a binocular for at least 1 hour. If there are few animals, all specimen should be picked out. In cases of high densities of chironomids, additional time should be used to get a representative material of this group. The chironomid larvae should be mounted in Hoyer's solution on microscopic slides and identified as far as possible. All samples should be conserved and stored in 70% alcohol. What is left of a kick sample after sorting out animals for approx. 1 hour must be stored for the duration of the EMERGE project.

4. Data transmission

Taxonomic lists and site data, as EXCEL-files attached to email, should be sent to:

Øyvind A. Schnell, UiB (oyvind.schnell@zoo.uib.no)

Questions about equipment or sampling or any problems that might arise concerning the invertebrate part of EMERGE should be directed to Gunnar G. Raddum or Øyvind A. Schnell at UiB.

5. References

Frost, S., A. Huni & W.E. Kershaw. 1971. Evaluation of a kicking technique for sampling stream bottom fauna. *Can. J. Zool*. 49:167-173.

Kajak, Z. 1971. Benthos of standing water. *In:* W.T. Edmondson and G.G. Winberg (eds) A manual on methods for the assessment of secondary productivity in fresh waters. *IBP Handbook no. 17.* pp 25-65. Blackwell Scientific Publications, Oxford.