

Standard Operating Procedure (SOP) 3.5.2.2

Elutriation of Sandy Rapid Bioassessment Benthic Macro Invertebrate Samples

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1.0 INTRODUCTION

Elutriation is the process of removing substances from a mixture through a process of washing and decanting. When conducting bioassessments, sometimes the benthos samples contain large amounts of inorganic matter. Excessive amounts of sediment can damage benthic macroinvertebrate specimens if they are stored together for a long period of time. These damaged specimens can be more difficult or impossible to identify. Elutriation minimizes or prevents the adverse effects large amounts of sediment have on these specimens. By elutriating the sample, the lighter particles (organic debris and benthic macroinvertebrates) within the mixture are separated from the heavier particles (sediment). The specimens are then retained for later taxonomic analysis.

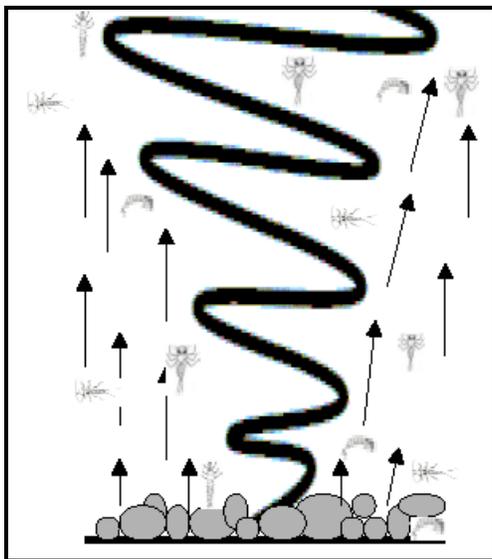


Figure 1. Swirling waters create a vortex, which lifts lighter substances to the surface.

2.0 EQUIPMENT

- Bucket for Elutriation
- Bucket for Elutriation water
- 500 Micron mesh sieve for screening the sample with
- 500 Micron mesh sieve for screening elutriation water (a clean 500 micron mesh net can be substituted)
- Stirring device (spatula...) -optional
- Loupe

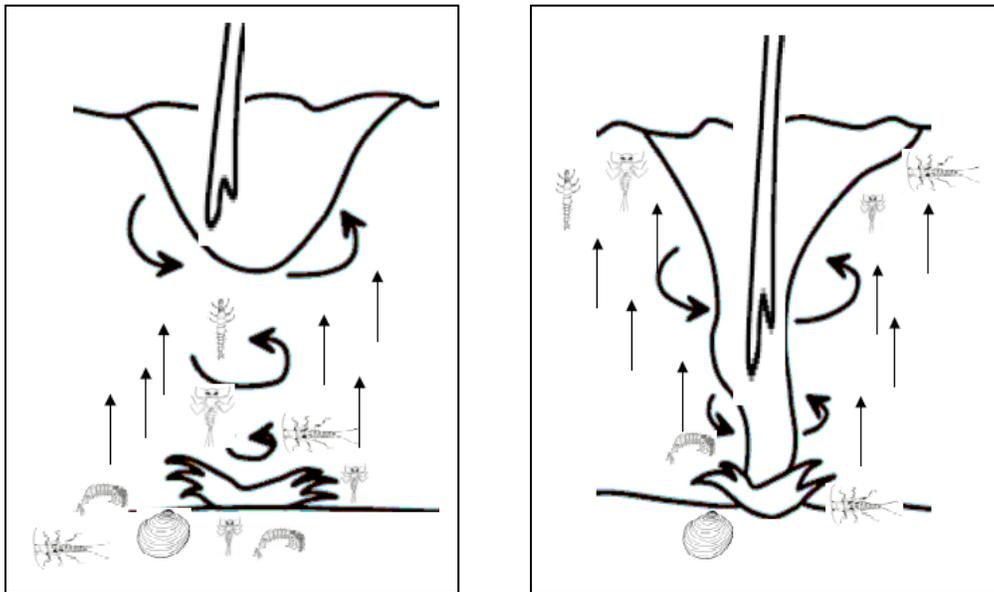
- Sample jar(s)
- Trash jar(s) -optional
- Sediment jar(s) -optional
- Gloves -optional

3.0 PROCEDURE

This elutriation method for the field separation of benthic macro and stream sediments can be time consuming, but field elutriation may save resources by avoiding elutriation in a laboratory.

Through the use of elutriation a gradual suspension of the lighter benthic macro invertebrates and fine-grained sediments which wash through a 500 μ sieve affords gentle treatment of specimens and avoiding specimen damage if the sediment and fauna were kept together for a long period of time.

If the sample contains a large amount (two or more jars) of inorganic substrate such as sand or gravel carefully empty all or a portion of them into a plastic bucket and nearly fill it full with water.



Figures 2 and 3. Cartoons of sediment and invertebrates separating.

Gently circulate the sample using a large, long-handled metal spoon to suspend organisms and fine silt (Figures 2 and 3). Gently pour the water and suspended solids evenly across a 500 micron mesh sieve (Figures 4-7).



Figures 4-7. Sample and water in a bucket. Mixture is swirled to a vortex and then poured into a 500 micron mesh sieve.

Repeat elutriation, pouring cleaned water into the sample containing bucket (water poured through a 500 micron sieve), and sieving/straining until the elutriated water is clear. (Figures 8-10).



Figures 8-10. Additional water is added to remaining sample by pouring creek water through a 500 micron mesh net. The mixture is again swirled to a vortex and then poured into a 500 micron mesh sieve.

Once finished the elutriated sample can then be placed in a jar and preserved. The sediment portion can be retained for quality assurance analysis (Figure 11).



Figure 11. These processes are repeated until all organic material larger than 500 micron within the sample has been removed from the sample. Some sediment may still remain. This sample material can now be preserved.

4.0 SAFETY

Sediments may contain sharp or pointed objects and the water may also contain contaminants. Wearing protective gloves and using a stirring device is suggested.

5.0 REFERENCE

Pedrick, Robert A. 1974. Nonmetallic elutriation and sieving device for benthic macrofauna. Vol. 19, Issue 3, Pg 535 –538

Blackwood, Mary Anne. 2007. Standard Operating Procedure for the benthic macroinvertebrate laboratory. Central Plains Center for Bioassessment, Kansas Biological Survey, University of Kansas

National Environmental Effects Monitoring Office. December 2002, Revised Guidance for Sample Sorting and Subsampling Protocols for EEM Benthic Invertebrate Community Surveys. National Water Research Institute Environment Canada