Baermann Pans

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A great variety of aquatic and terrestrial animals generally less than 1 mm in size may be collected by passive wet extraction methods. These methods have particular value in collecting tardigrades, nematodes, rotifers, and microturbellarians from terrestrial samples. Springtails are quite common in wet extractions and also proturans from forest topsoil. Protozoans and microfungi are also present in the extractions. Forest floor copepods are also common in extractions. A fine sieve (35 microns) is recommended for processing and concentrating the extracted mix (see next page). As a culture method, Baermann pans covered and left very moist for several weeks will yield high densities of various microlife including plasmodia of slime molds, ciliates, nematodes, etc. Materials suitable for placement in a Baermann pan include topsoil, tree bark, bryophytes, lichens, and other substrates from terrestrial settings such as the dry "flow dirt" deposited on the face of rock walls and concert steps. Muck and sand from aquatic habitats may also prove interesting.

Pan Design. A wide range of pan designs are possible whereby the worker uses materials at his or her disposal to construct a tray that holds the sample at the surface of a water-filled dish. Polystyrene foam plates (disposable picnic plates) are ideal in that they are easily cut with a knife or scissors, are waterproof, and inexpensive. A coarse nylon mesh (from fabric store) is stretched taught and stapled between the rims of two plates whose bottoms have been removed. The sample to be extracted is arranged in a thin layer over a cellulose sheet (one-ply plain facial tissue) covering the nylon mesh and this is then nested atop a plate holding distilled water. The sample becomes wet from below and animals migrate through the tissue layer over the course of several hours to collect in the lower plate where they can be harvested by sieving after some hours (generally 12-24 hours). Covering the sample with an inverted plate will retard evaporation and also allow pans to be stacked thus conserving table space. If the sample is slow to hydrate it may be gentle sprayed with water from above.

The Baermann pan technique is attributed to Townshend (1963). The Whitehead tray is similar (Whitehead and Hemming 1965). The Baermann pan technique is presented in step by step instructions in the chapter on nematodes in Carter and Gregorich's Soil Sampling and Methods of Analysis (2007, p. 418-419) which can be read through googlebooks online for free.

A removable Bearmann basket (made from a circular band of thin plastic, e.g. a 2 inch wide strip cut from a report cover fitted with nylon mesh attached with a hot glue gun) can be created to fit a Petri dish bottom so that it is possible to observe the extract directly in the Petri dish without the need to sieve or concentrate the extracted organisms. The reduced size limits the number of organisms but depending on one's purpose the smaller design has its benefits. Larger pans as illustrated on the next page will yield greater diversity and number of organisms.

References

Carter, M. R., and E. G. Gregorich. 2007 Soil Sampling And Methods of Analysis. CRC Press. 2nd edition. [ON-LINE SEARCHABLE WITH GOOGLE BOOKS]

Townshend JL (1963) A modification and evaluation of the apparatus for the Oostenbrink direct cottonwool filter extraction method. Nematologica 9: 106–110.

Whitehead, A. G. and J. R. Hemming. 1965. A comparison of some quantitative methods of extracting small vermiform nematodes from soil. Annals of Applied Biology 55: 25-38.

Baermann Pan Instructions

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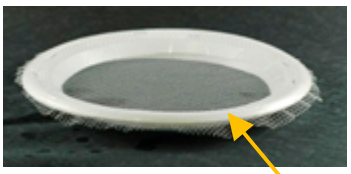
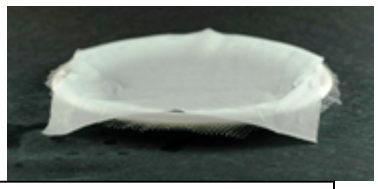
Baermann Pan constructed from foam dinner plates. Hefty Extra Strong and Deep® are excellent. Cheaper plates can be doubled for added strength.

1. Place 1-ply of facial tissue over mesh. (Most facial tissue is 2-ply, so simply pull the two layers apart to get 1-ply.)





Created by stapling a coarse mesh between 2 rims; nylon netting from fabric depts.

2. Arrange sample over tissue in as thin a layer as possible. Soil samples should be run through a screen to produce a uniform material easily spread over the tissue.

3. Place pan where it will be undisturbed. Add distilled water (add plenty of water, better to have too much than not enough).

4. Place sample in pan and leave for 12 – 24 hours.

Fold corners of tissue

Check after a few hours. If water in the pan is greatly reduced and is no longer in contact with the tissue, add water to the pan without disturbing the sample. Do not lift sample from pan until ready for processing. Covering the sample with an inverted pan will reduce evaporation.

5. Lift sample from pan. Tilt to speed drainage.

6. Rinse pan into beaker or other container.

Organisms cling to the bottom of the pan; be sure to rinse pan with wash bottle. Pipet organisms directly from the beaker bottom or go to step 7.

7. Pour through pre-wetted, 35 micron mesh & rinse trappings into observation dish.