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A Quantitative Method for the Study of Pollen and Spores in Bog Sediments

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A Quantitative Method for the Study of Pollen and Spores in Bog Sediments[1]

La Verne H. Durkee[2]

Abstract. A filtration method involving a membrane filter for the collection and subsequent microscopic examination of weighed, treated samples is presented. The filter and the sample collected upon it are both mounted for microscopic examination. The filter permits sufficient light passage for identification of spores and pollen upon its surface. This method permits a more accurate transfer of weighed samples from centrifuge tubes to microscope slides.

Before a palynological study of peat or other similar sediments can be made, the material must be treated in such a way as to remove the extraneous material and still preserve the pollen and spores. Brown (1) reviews several methods for this. The method used depends partly on the material to be studied and partly upon individual preferences. After the pollen and spores have been identified at a number of levels through a peat bed or lake bottom, a profile is developed and conclusions are drawn concerning the history of past vegetation and the environment which supported it. Variations in the proportions of pollen and spores at various levels are considered indicative of variations in the actual flora surrounding the lake or bog.

There are a number of difficulties in interpreting a pollen profile, but the one of greatest concern here is that some plants are known to produce much more pollen than others. As a result of this, it has been shown that some plants are over repre-

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sented in a profile while others are under represented (2, 3). Comparisons of the actual flora with pollen rain studies have been made by Davis and Goodlett (2) and Potter and Rowley (4) in order to minimize the above problem.

Until recently all pollen profiles have been reported on a total percentage basis with 200 or more pollen and spore identifications for a particular level. Another method is to analyze for the number of pollen grains in a known weight of dried sample. This minimizes the effect which high yielding genera have on the total picture, since the lower yielding genera tend to remain more constant while those with higher yields fluctuate widely. Instead of stopping the analysis at a certain number as with the first method, one identifies all of the pollen and spores in the sample.

Because peat samples must often be exposed to considerable treatment for removal of extraneous material, the quantitative method is not an easy one. After treatment, the entire sample must be removed from test tubes (usually centrifuge tubes). Since all of the sample must be examined, it is usually placed upon more than one slide.

Method

The method employed assumes a sample treatment which involves centrifugation. It facilitates transfer of the treated sample to the microscope slide and requires the use of a membrane filter 25 mm in diameter in a pyrex micro-analysis filter holder made by the Millipore Filter Corporation of Bedford, Massachusetts.

The weight of dried samples used was 0.1 g. After treatment, the sample was collected on the membrane filter, and the filter was transferred to a microscope slide. The filter was then trimmed with a razor blade, and the filter plus collected sample were mounted in a glycerine jelly. In this mounting medium the membrane filter is translucent and permits ample light passage for microscopic analysis.

This method was used on sediments from a bog in north central Iowa (Hancock County), where the sediments varied from a sand and clay mixture to black muck. It was found that in all samples except those at the bottom (sandy), the debris was too dense to permit the collection of a 0.1g sample upon one filter and, furthermore, that the pollen and spore count in the muck samples was in the thousands—counting was possible but much too time consuming. For this material, the treated sample was diluted in the centrifuge tube with 10 ml of distilled water, shaken to completely disperse the sample, and then a one ml aliquot of the suspended material was quickly pipetted into the filter apparatus with a serological pipette. The serological pipette

was used because it has a larger opening and permits a more rapid transfer of the sample. In this way it is possible to distribute a sample equally among several slides. If the count at a particular level is exceptionally high, not all of the slides need be counted since each slide is one tenth of the total sample.

This dilution method was compared to a count obtained by examination of the whole sample and the examination of individual slides was found to compare very favorably.

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A Guide to the Common Lichens of Boone and Story Counties, Iowa[1]

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Abstract. A key to the common lichens of Boone and Story Counties, Iowa is presented with brief descriptions of the genera and common species.

The lichens comprise a comparatively inconspicuous portion of the flora of Iowa. They are, however, widely distributed on trees, rocks and soil, and some are large and showy. Many technical treatments of the lichens as a group and excellent monographs of individual genera are available. The majority of these discussions are rather difficult for a beginner to use satisfactorily. Requests for a limited simplified treatment of the more common lichens that occur in central Iowa have motivated the authors to prepare this paper.

The lichen vegetative body or thallus is a composite structure of fungal and algal cells. The fungal cells compose the bulk of the thallus, with the chlorophyll-containing algal cells concentrated in particular areas. The thallus is a structure completely different from that which either organism would form growing alone. There is a great variation in thallus organization. A typical

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