Quantitative Study of Arthropod Ecology

Introduction

This activity allows students who have gained experience in Berlese funnel extraction of microarthropods ("Microarthropod Collection and Examination") and microarthropod identifications ("Microarthropod Variation and Taxonomy") the opportunity to take part in the process that actual scientists go through in their own work. Students begin with online reading and an online literature search to better understand the use of population indices in biological investigations. They follow by writing a brief proposal for their own investigation. This activity melds student skills in microarthropod extraction and classification with independent investigation involving quantitative arthropod ecology study.

Activity Instructions

A. Internet Component

Begin by going to John Meyer's site entitled "SO WHAT'S THE BIG DEAL? (Here are some ways to use the data from your Berlese extractions!)." Read through the sections dealing with population density, ecological pyramids, and species diversity. After reading through the general information regarding the different population estimation indices [Jaccard's Index, Sorensen's Quotient of Similarity (Q/S) and Mountford's Index of Similarity (I)] perform a search for scientific investigations using any of the three estimation indices. Briefly summarize the study in written form, specifying 1) the title of the paper or name of the study, 2) location of the study, 3) agencies involved in the study, 4) information regarding how the investigators collected their samples, 5) any special information regarding how the investigators analyzed their data, and 6) conclusions made from the study. This assignment should be turned in to your teacher in the format and according to the directions they specify during your class period.

B. Proposal Writing Component

After having read about the use of these indices in comparing populations, write a proposal regarding how you would go about investigating a question relating to population differences in microarthropods, combining your knowledge of microarthropod extraction using Berlese funnels, microarthropod classification, population indices and scientific methodology. Several possibilities are presented on Meyer's web page component entitled "Independent Study Projects." Don't feel that there is a need to restrict yourself to those suggestions. Also, examine "Student Research Projects" to see four featured student investigations.

Proposal writing is relatively straightforward, and is something all scientists do prior to performing formal studies. Working with a group or individually, write a single page proposal which states 1) title of your study, 2) purpose of your study, 3) equipment required, 4) a step by step procedure for both the experimental and data analysis components, and 5) why you think this study is important and/or how it ties in with other studies you have encountered through your examination of Internet resources. Your teacher will look over your proposal and give you feedback prior to you performing the study. Incorporate teacher feedback into a quick rewriting of your single page proposal.

C. Experiment and Data Analysis

Perform the experiment and analyze the data using the methodology and approach outlined in your revised draft of the proposal. You may want to review the "Sample Collection, Extraction of Microarthropods" and "Observation of Specimens" sections of "Microarthropod Collection and Examination" prior to performing those activities.

Proceed to Teacher's Guide to Quantitative Study of Arthropod Ecology

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