Investigating Invertebrate Biodiversity with Berlese Funnels

A Carolina Essentials™ Investigation

Student Worksheet

Overview

Understanding the relationships among biotic diversity and abiotic factors in an ecosystem can be a difficult task. Using soil invertebrates, both the number of species present in a soil sample and the number of individuals within a species can be identified. With some simple math, the density of invertebrates found in a plot can be calculated. A Berlese funnel will be constructed to collect and identify soil invertebrates.

Essential Question

How can the biodiversity and density of soil invertebrates be studied?

Investigation Objectives

1. Construct a Berlese funnel.
2. Collect and identify soil invertebrates.
3. Calculate the density of soil invertebrates.

Safety Precautions

Use scissors properly. Take necessary precautions for those with allergies to bug bites, insect stings, plants, or pollen.

Procedure

1. Using scissors, cut the bottom off the jug.
2. Tape around the edge of the cut end.
3. Place the milk spout in the mouth of the jar. The jug serves as the funnel. The jar is the collection chamber.
4. Bend the mesh screen so that it fits securely into the milk jug and forms a stable platform for the soil sample. Do not let the screen fall below the handle.
5. At the assigned location, collect about a cup of soil and leaf litter (the top 1 cm of soil).
6. Place the top layer of soil into the funnel.
7. Pour 2 cm of alcohol into the beaker or jar.
8. Place the funnel on the jar. Tape a ruler or similar support to the handle of the funnel and to the side of the jar to ensure that the funnel remains steady.
9. Place the Berlese funnel under the incandescent lamp.
10. Adjust the lamp to direct the light onto the top of the sample from about 20 cm away.
11. Let the Berlese funnel stay under the light for several days.
12. Identify the soil invertebrates that have fallen into the alcohol.

Disposal

Return excess soil outside. Once invertebrates are identified, flush alcohol down the sink with water. Dispose of invertebrates in the trash.

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MATERIALS

1 1-gallon plastic jug with cap

1 1000-mL beaker or quart jar

Square of mesh screen

Ethanol (70–95%) or isopropanol (70%), 50 to 100 mL

1 incandescent bulb

1 scissors

1 ruler

Tape

1 soil sample from a plot that is 50 cm × 50 cm

1 spade, shovel, or other digging tool per student

Invertebrate key

Data

Identify and record the type and number of invertebrates in the soil sample.

Soil Invertabrates

Species	Class	Number (n)
Total (N)		

Analysis

1. Calculate invertebrate density. (Density = number of animals/area (50 cm x 50cm)

2. Compare group results and discuss differences in samples and locations.