Activity 8

Counting and Classifying Worms

Rationale: The number of young worms in the vermiculture is a good indication of the health of the Habitat. The number of new hatchlings can be determined by sorting and counting. If the worms were sorted and counted carefully when they arrived or when a new Habitat was started, then the sizes and numbers at any time after that can be compared.

Objectives

1) Learn how to sort and size worms.
2) Determine how size relates to maturity or age of the worms.
3) Sort, count, and record measurements accurately.
4) Display the measurements in graphical form.
5) Analyze the measurements and use this analysis in later activities.

PDE Standards

Science and Technology

3.1.7. A,B,C
3.2.7. A,B,C,D,E,F
3.6.7. A,B
3.7.7. A,B,C,D

Math

2.1.8. A,B,D,G
2.2.8. A,B,F
2.3.8. A,B,D
2.4.8. A,B,D,F
2.5.8. A,B,C,D
2.6.8. A,B,C,E,F
2.7.8. B,C,D
2.8.8. F,G,H,I,J
2.11.8. A,B

Materials

Habitat worms
Rulers
Balance, centigram
Plastic weighing pans
Spatulas

Introduction

The newly hatched, healthy worm is between 2 – 3.5 cm long and at reproductive maturity averages about 6 – 10 cm, with a maximum of 13 – 14 cm. Under optimum conditions the worms can double in mass every three months. The average incubation period for the worms is between 32 and 73 days, depending on the Habitat's conditions. Healthy, sexually mature worms (*E. fetida* or *E. andrei*) will produce about four cocoons/week. The hatching rate can be anywhere between 70% and 90% with optimum conditions. About 3 – 4 hatchlings/cocoons will survive in a cocoon. This will

yield between 10 to 15 young per week per adult. The average time for *E. fetida* cocoons to hatch is between 1 – 2 ½ months. After hatching it will take 2 - 2 ½ months to reach reproductive maturity; a band or clitellum will appear. Between 3 and 5 months the amount can increase by nearly an order of magnitude. However, the Habitat will have a maximum carrying capacity; this means the mass of the worms can maximally double every 3 – 4 months. If a small amount of worms was started with – 100 grams – the spectacular population explosion is more likely to occur during the first one or two cycles.

Strategies

This activity can be completed earlier if the class habitat was stocked with bed-worms instead of breeder-worms. Students should read articles or find websites devoted to vermiculture to become well versed in the anatomy, physiology, reproduction, and optimum environmental conditions. Then they should decide on a system of classifying the worms. The students should also find pictures of *E. fetida*, *E. andrei*, or the worms used in the Habitat. Pictures showing how to collect, wash, count, weigh, sort , etc. the worms should be readily available to all students. The best classification system is the one the students devise, but usually the teacher must intervene. Data Table 1 is a typical classification system. Of course, this is the activity that is the most invasive and potentially dangerous to the vermiculture. It is imperative the students be very careful and not injure any worms. If any worms are injured they must be separated from the culture; injured/dying/dead worms can potentially have serious effects on the Habitat unless they are replaced.

Procedure

CAREFULLY CAREFULLY!!!!

1) Collect all of the worms in a dimly lit place.
2) Wash (water temperature the same as the Habitat's) the detritus off of them.
3) Place them on paper towels and blot fairly dry just for weighing.
4) Weigh the total amount.
5) Sort into the devised classes (be sure to keep them moist).
6) Record pertinent data in the journal and Data Table 1.

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Expectations

The students should be able to:

1) make decisions about a classification system.
2) develop good methods for handling worms quickly and carefully.
3) sort carefully and accurately.

<u>Typical Classification system</u>

Hatchling: 1 – 3 cm

Juvenile: >than 3 cm, but no band (clitellum)

Mature: has band (clitellum)

Data Table 1 *(Typical table)*

Date	Ave Mass Worm	Hatchlings totals #	Mass	Ave Mass Worm	Juveniles totals #	Mass	Ave Mass worm	Mature totals #	Mass	Total # of Worms