

Activity Instructions

Toxicants and California Blackworms

This investigation represents a model for testing potential toxicants on organisms. You will determine the behavioral changes that occur when blackworms are exposed to different concentrations of an assigned toxicant through a controlled experiment. At the end of the investigation, you will analyze your data, present your findings to the class, and suggest other possible experiments.

Safety

In a laboratory setting, you are ultimately responsible for your own safety and for the safety of those around you. It is your responsibility to specifically follow the standard operating procedures (SOPs) which apply to you, including all local, state, and national guidelines on safe handling, storage, and disposal of all chemicals and equipment you may use in the labs. This includes determining and using the appropriate personal protective equipment (e.g., goggles, gloves, apron). If you are at any time unsure about an SOP or other regulation, check with the course instructor.

Procedure

You will work in groups and be assigned a toxicant to test.

1. Label four chambers as follows: "Control," "#1," "#2," and "#3" along with the name of the toxicant you've been assigned. Pour distilled water into each chamber to a depth of 1 cm.
2. Using a pipet, transfer 20 worms to your control chamber. Be sure to choose worms that are full length and uniform in color. Do not select worms that have distinct lighter patches.
3. Transfer five worms from the control chamber to each of the other chambers (#1, #2, and #3). Observe the behavior of the worms in all four chambers based on your assigned criterion from Table 1. Also look for physical changes such as bulging in the center, bleeding, or fragments breaking off. If any worms die, record the mortality.

Table 1: Observation Criteria	
Behavior	Procedure
Clumping behavior	Note whether the worms tend to clump together in a ball.
Swimming behavior	Use the probe to touch the anterior end (blunter and more darkly pigmented) of the worm and observe the movement. Then touch the posterior end and again observe the movement. Make note if all worms exhibit the same behavior or if some remain normal while others exhibit a change.
Crawling behavior	Use the pipet to transfer the worm onto moistened filter paper in another chamber and remove all excess water. Probe the worm first on the anterior end and then on the posterior end to make your observations. Use a different worm at each 3-minute interval.
Also make note of activity level (faster or slower than normal) and individual position in the water, such as stretched out, curled in a ball, and ends curled, as well as anything else that might be considered an unusual response.	

- Gently draw your worms from each chamber (except the control) back into a pipet. (If this is too difficult, get another chamber with some distilled water and put your worms there temporarily.) Discard the distilled water and then add your assigned toxicant solution in the corresponding chamber to a depth of 1 cm. Transfer your worms back into the chamber. Expose the worms to the toxicant for at least 15 minutes. During the exposure period, make your assigned observations every 3 minutes on all four chambers and record them by 3-minute intervals on your data sheet.
- After the exposure period has ended, allow the worms to recover. Draw your worms into a pipet or transfer them to a clean chamber. Empty the toxicant into the waste beaker and fill the chamber to a depth of 1 cm with distilled water. Add the worms. (Try to expel as much toxicant as possible out of the pipet first if they have been held in the pipet.) Again observe the worms at 3-minute intervals on all four chambers for at least 15 minutes during the recovery period and record your observations just as you did before. Be sure to make notes about any recovery (a return to normal behavior) that takes place.
- Leave the worms in their chambers overnight and observe again the next day. Be sure to record the number of mortalities that occurred overnight. Return fully recovered worms to the original large container after 48 hours. Any worms that don't appear to be in good health or fully recovered after 48 hours should go in a separate container marked "Recovery."