Effects of Road Salt on Earthworms

Introduction
As you know, in the winter we put road salt on the roads so cars don’t slip. But, during spring when it rains, all the road salt left gets washed away to the sides and in the soil. We want to investigate if road salt affects worms in the environment.

Discussion
Over 60,000 tons of road salt is used annually in Madison and Dane County, Wisconsin. This road salt dissolves into water and seeps into the ground as runoff. We tested the effect of road salt on worms and their reactions to burrowing through dirt with road salt-water in it. Our research question was, how do worms react to the road salt that gets into the ground from runoff? Our data agreed with our hypothesis because the worms burrowed further, on average, in the untreated side (water) than is the treated side (salt concentration). The worms also chose the untreated droplets of the treated (salt concentration) droplets. The worms often retreated from the salt water after making contact with it while they would have no problem with the untreated water. With high concentrations of road salt, the worm would start to seize and quickly move from the treated water. This shows that the worms are affected by the salt concentration. This also shows that the worms aren’t aware of the salt concentration before making contact with it and, in the environment, this could be a problem. As the concentration of road salt decreased, the worms’ reactions to the treated water were much less noticeable. The amount of worms going through each type of water began to even out as they didn’t avoid the salt. We tested the impact of treated water mixed in the dirt on the worm’s ability to burrow. When we compared our data the average depth of the worms in the untreated side was greater than the treated side.

Methods and Materials
1. Gather materials (dechlorinated water, road salt, ant farm, dirt, measuring cup, dropper, worms, paper towel).
2. Get four worms and place in a cup with damp paper towel.
3. Mix salt and water solution, 1:1, 1:2, & 1:3.
4. Take apart ant farm and lay the trays on the table.
5. With one half of the tray, test the control. With the other, test the salt concentration.
6. Make circles of each concentration.
7. Place a worm in the center of the circle.
8. Wait until the worm touches the liquid and record what happens.
9. Repeat this process until four worms have been tested at each concentration.
10. Set up the tray with 4 squares of dirt.
11. In 2 of the squares put 15 mL of untreated water.
12. In the other two squares put 15mL of the 1:1 salt concentration.
13. Put a worm in the center of the squares.
14. Wait until the worm fully choses a square.
15. Record what type of square the worm choses and its reaction to the square.
16. Do this four times (four worms have chosen a square). (Rinse the trays after each test.)
17. Repeat with other concentrations of salt.
18. Clean up, rinse all trays, put worms back.

Results
Average Burrowing Depths in Treated and Untreated Soil

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Average Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000ppm</td>
<td>6.14cm</td>
</tr>
<tr>
<td>800ppm</td>
<td>1.88cm</td>
</tr>
<tr>
<td>600ppm</td>
<td>4.63cm</td>
</tr>
<tr>
<td>400ppm</td>
<td>7.25cm</td>
</tr>
</tbody>
</table>

Citations