Do the Different Juices Affect an Earthworms *(Lumbricus terrestris)* Burrowing time?

Nico Holtzman

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Abstract

Does juice affect earthworms' burrowing time? Orange juice and lemonade are and have been popular liquids in the United States for decades, even dating back to the 1600's. Yet most people don't know how harmful these elements can be, specifically lemonade, which kills plants, and cause harm to animals. However, today we wonder if the effects of it can influence a worm's burrowing time. Through this research, we can find if lemonade or orange juice is good for humans. To begin the experiment, we tested a worm's reaction when doused in Orange Juice and Lemonade. Once doused, we put the worm in a cup full of dirt to see how long it takes to burrow. Using a stopwatch, we timed how long it took to burrow, then logged it on our chart. Lastly, we repeated that for many other worms. We found out that water makes an earthworm burrow the fastest, yet we also found out that orange juice makes an earthworm take the longest to burrow, proving our hypothesis to be correct. As for the experiment, it was difficult to test the worms because when we would wrap them in the paper towel with the liquid soaked in it, the worm would wiggle around in the paper towel and escape. Overall, according to our data, orange juice causes the longest burrowing time, and water causes the fastest, meaning orange juice and lemonade aren't as good for our bodies when not used as directed.

Introduction

Lemonade is made up of water sugar and lemon juice, however orange juice is made up of many acids. Orange juice has more vitamins than lemonade, although lemonade contains concentrations of iron and phosphorus (Mazmanyan, n.d.). Lemonade seems to be more dangerous to us than orange juice. It even stated that animals that digest too much lemon juice can have diarreha and vomiting (*Can Dogs Drink Lemonade?*, n.d.). Lemonade is used as plant or weed killers, and they sink into the soil through spills, or people watering their plants with it. When used in the soil, it kills mainly everything in it's way (Shoop & Blackstone, n.d.). As you can see, specifically lemonade isn't the best for us.

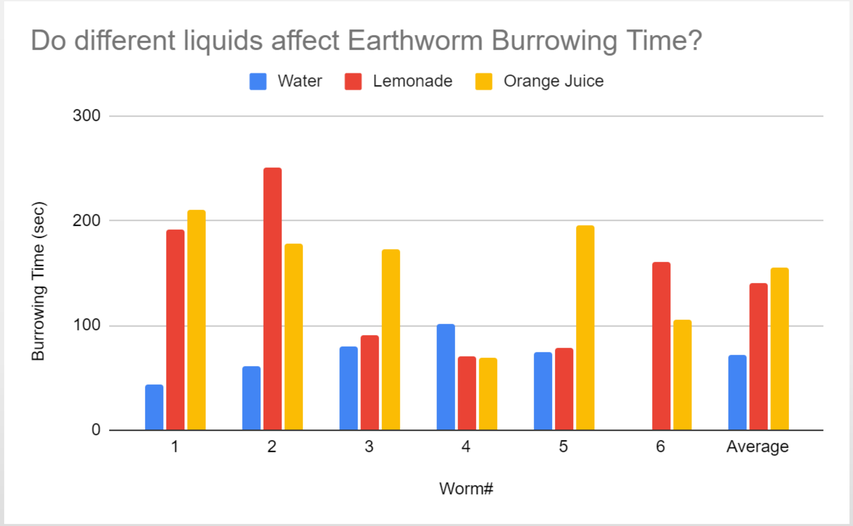
Will the different types of juices affect an earthworm's burrowing time? We think that water will cause the fastest burrowing time, and orange juice will cause the longest.

Materials and Methods

First of all, we gathered all the materials including a cup with soil in it, many worms, a tray to keep you things on, a cup of water, Minute Maid orange juice, as well as Minute Maid lemonade, paper towels, a stopwatch, an eye dropper, and a tweezers. Then, we soaked a paper towel in one of our chosen liquids. Following this, we wrapped a worm in the soaked paper towel, and timed for one minute. Next, you take the worm out of the paper towel after one minute, and we place the worm in the dirt cup. As soon as we did this, we started the stopwatch and timed how long it took for the worm to burrow. After the worm burrowed, we removed the worm from the cup, and grabbed a new worm. We tested five worms for each liquid. After we tested five for the first liquid, we threw away the paper towel, and grabbed a new one. Soon after, we soaked the new paper towel in a different liquid, and repeated the steps for five different worms. After testing those five worms, we switched the paper towel out again for the third liquid and repeated the process. Finally, we recorded the results, and made a graph and data table based on the data. After making the graph, we highlighted the information, and made a t-test based on the data. The t-test showed how accurate our data was. Finally, we turned all our data into this essay, before we shared it with you.

Graph

In our graph, the yellow represents the lemonade, and the orange, with the orange juice, and blue, the water. You can see the trends throughout the graph through the different trials.. The last section on the far right shows the averages. There, you can see the orange juice was a little higher than lemonade, with water lower below.



Results

According to our data, we found that water makes the worm burrow the fastest, lemonade the second fastest, and orange juice the slowest. The results concluded that the average burrowing time for water was 72.2 seconds. The average time for lemonade was 140 seconds, and finally, orange juice was 155 seconds. In our graph, you can see that the yellow represents the different worms lemonade trials, while the orange represents the different orange juice trials. That means that the blue shows the water trials. At the far right side of our graph, you can see our averages for the three liquids, with water being the fastest, and orange juice being the slowest burrowing time. Our variables included the independent variable being the liquids and the dependent variable being the burrowing time. Our controlled variables included the brand of the juices, being Minute Maid, the dirt cup, and the stopwatch. The T-test we did shows the percentage of how accurate our data is. If the data is above five percent, then five percent is caused by other factors. The higher the number, the worse your data is. You want your data to be under five percent. Overall, the experiment proved to be a success, meanwhile our hypothesis was correct.

Discussion

Our significant results included that orange juice caused the longest burrowing time, and water caused the fastest burrowing time. Lemonade fell in the middle, but it was closer to orange juice. As for why this happened, water had the fastest burrowing time because worms like water, and are used to it, as it is always seeping into the soil, but orange juice had the longest maybe because of the pulp, or the texture of it. That's what we predicted in our hypothesis anyway. Furthermore, we did get our hypothesis correct stating that water would have the fastest burrowing time, and orange juice to have the longest. Like all experiments, we did face some limitations, which included the worm crawling out of the paper towel and dirt cup, and the worms almost seemed dead. Some worms didn't move for 30 seconds at a time. However, if I were to do this again, I would make sure to include more acids, and I would get fresh worms, instead of sharing one hundred with my classmates. From our results we concluded that orange juice is the worst for a human body, with lemonade not far behind.

Works Cited

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