

The Effects of Xtra Laundry Detergent on Earthworm Burrowing

Abstract

Earthworms play a big part in increasing the amount of air and water that gets into the soil and break down organic matter like leaves and grass for things the plants can use. When there is urban runoff, anything could go in the sewer or soil. If laundry detergent ends up in urban runoff and get to the earthworms looking at the data we can see that earthworms will move slower or die.

Introduction

This experiment is not just testing to see how earthworms react to laundry detergent, it is also testing to see how earthworms react to a toxic chemical called Diethyl Ester Ammonium Chloride. In general, laundry detergents cost less when it's made with toxic chemicals. Diethyl Ester Ammonium is somewhat flammable mixed with oxygen. In the past people mixed laundry detergent with water and used that to spray wasps to kill them. Diethyl Ester Ammonium Chloride also killed pregnant women and children by being in humidifiers. The scientist thinks that if the concentrated solution gets added to the soil then the earthworm would burrow fast, because laundry detergent can cause skin irritations, allergies, and many chemicals make up laundry detergent.

Materials & Methods

Supplies-

- 5 cups (any size)
- Timer (1 min)/stopwatch
- Xtra Laundry Detergent
- Water (6 cups)
- 3 Worms per trial (any size)
- Soil (10 tps in each cup)
- Plastic spoons (2)
- Measuring cups

Formulas we are using-

- 0%- Just set the worm on the soil
- 2%- 1 tbs solute + 1 cup + 3 tbs
- 5% 1 tbs solute + 1 cup + 9 tbs
- 10% 1 tbs solute + 1 cup + 9tb

Steps-

1. Look at your supplies list and get the items
2. Put 10 tps in one cup
3. Make your formula
4. Let the worm sit in the formula for one minute
5. Start the stopwatch and put the worm in the cup and let the worm burrow

By:Kylee Camble

Xtra Liquid Laundry Detergent Vs. Concentration of the worm

Figure #1

(IV)	Trial #1	Trial #2	Trial #3	Average
0%	29 sec	39 sec	147 sec	71.6 sec
2%	244 sec	134 sec	263 sec	213.6 sec
5%	346 sec	174 sec	700 sec	406.6 sec
10%	456 sec	123 sec	241 sec	659.3 sec

Figure #2

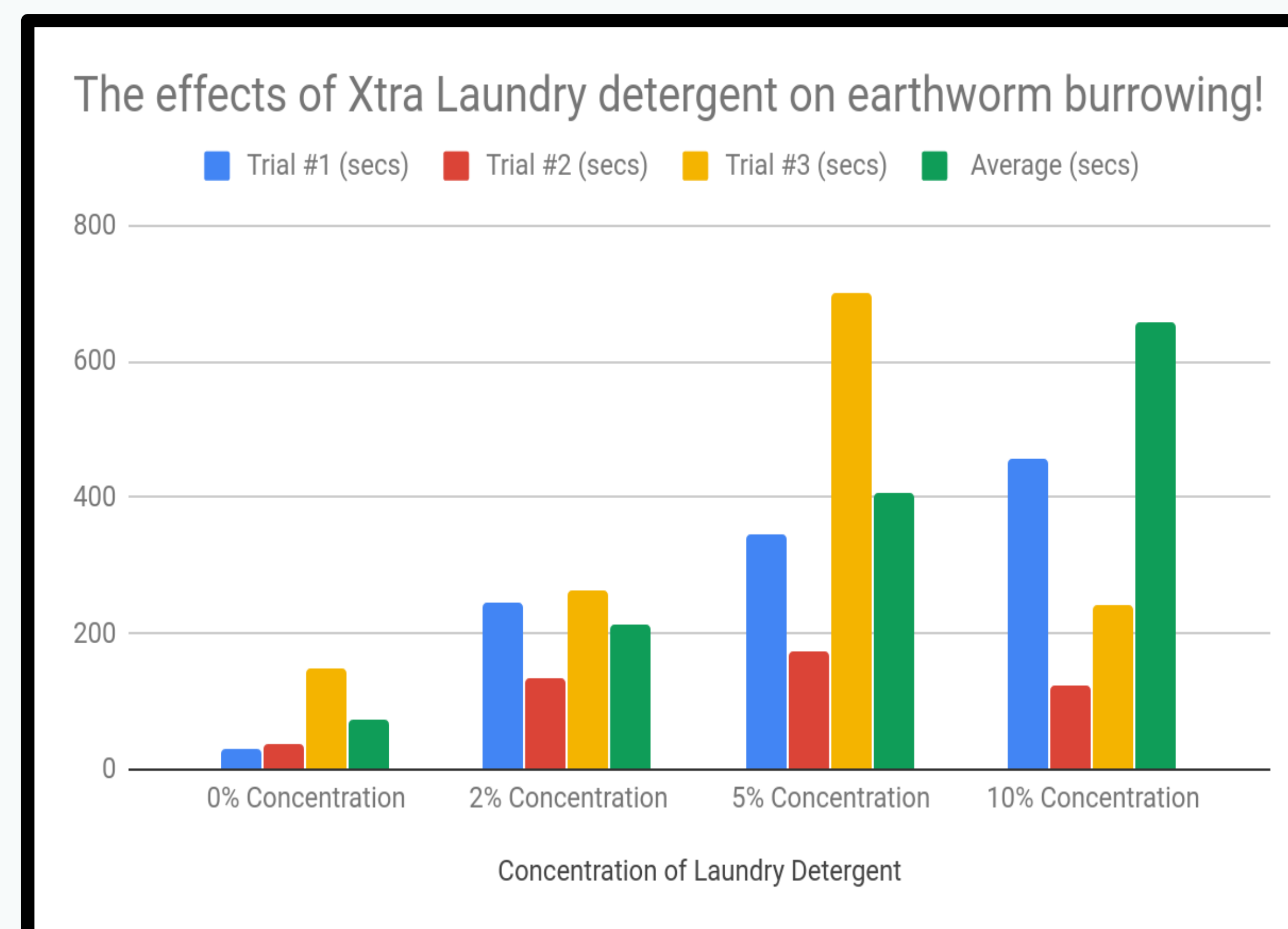


Figure #3



Results

The first thing we have to set up is our chart. The chart will be 5 x 5. The first column is for your IV (independent variable). The next three columns will be for your trials (Trial #1, #2, and #3). Then last column will be for your average. The first solution tested was a 0% solution or just watching the worms burrow, it took the worms 29, 39, and 147 seconds to burrow with an average of 71.6 seconds. The second solution was 2% and it took 244, 134, and 263 seconds with an average of 213.6 seconds. The third solution was 5% and it took 346, 174, and 700 seconds with an average of 406.6 seconds. The fourth solution was 10% and it took 456, 123, and 241 seconds with an average of 659.3 seconds. A trend that the scientist saw was the time increased from trial 2, for example 39 seconds to 147 seconds, this shows us that in trial #3 the worms were more weak. Another trend is the averages increasing.

Discussion

Overall, the scientist noticed that when you increase the amount of laundry detergent in your solution, it decreases the earthworms ability to burrow in a short period of time. The exact opposite of the scientist's hypothesis happened. The scientist's hypothesis was "The scientist thinks that if the concentrated solution gets added to the soil then the earthworm would burrow fast, because laundry detergent can cause skin irritations, allergies, and many chemicals make up laundry detergent." What actually happened was when the earthworms sat in the solution for a minute it would jump around and move fast. Then the earthworm burrowed slowly.

Works Cited

1. Lim, C. H., & Chung, Y. H. (2014). Effects of didecyldimethylammonium chloride on sprague-dawley rats after two weeks of inhalation exposure. *Toxicological research*, 30(3), 205-10.
 2. Owens, R. (2002, June-July). Detergent bug killer. (Country lore readers' tips to live by). *Mother Earth News*, 8+. Retrieved from <http://link.galegroup.com/apps/doc/A86388769/MSIC?u=cudahy&sid=MSIC&xid=0beca812>
 3. "Laundry detergents: clean & green options." *Consumer Reports*, Jan. 2007, p. 43+. *Research in Context*, <http://link.galegroup.com/apps/doc/A161171843/MSIC?u=cudahy&sid=MSIC&xid=a738c601>. Accessed 7 Mar. 2019.
 4. References
 5. References
- Ouellette, R. J., & Rawn, J. D. (2015). *Principles of organic chemistry*. Elsevier
- Jones, J. (2012). *Further adventures of herman j. elkmoos, md*. Publishamerica.
- Melville, H. (1968, 01). *The Writings of Herman Melville: The Northwestern-Newberry Edition, Vol. 2: Omoo: A Narrative of Adventures in the South Seas*. doi:10.1093/actrade/9780810101609.book.1
- Ouellette, R. J., & Rawn, J. D. (2015). *Principles of organic chemistry*. Elsevier.
- Supplementum Epigraphicum Graecum Ephesos. Herma. (n.d.). *Supplementum Epigraphicum Graecum*. doi:10.1163/1874-6772_seg_a4_538