



The Effect of Herbicides on Soil

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Grade 9

Purpose:

The reason behind my project is that herbicides, natural or not, are a part of many people's daily lives.

Many people spray their lawns with weed killers like glyphosate every year without giving it a second thought on how it could affect all the things inside of the soil.

For my project, I want to see whether or not glyphosate and natural weed killer (made of dishsoap, vinegar, and salt) will affect the fungal to bacterial ratio of the soil.

Background Research:

“Herbicides applied to soils potentially affect soil microbial activity. Quantity and frequency of glyphosate application have escalated with the advent of glyphosate-tolerant crops.”

What is the fungal to bacterial ratio?

“The fungal-to-bacterial ratio indicates the ratio between the total fungal biomass and the total bacterial biomass (expressed in g C/kg soil). The ratio can also be used as an indicator for the extent of disturbance. In general, undisturbed ecosystems have a higher fungal-to-bacterial ratio than disturbed systems.”

There is not really a perfect fungal to bacterial ratio—it can vary depending on the soil.

This is why in my project I would like to test whether the herbicides that are sprayed onto the soil *change* the fungal to bacterial ratio of the soil, not so much as if the change is good or bad.

Variables:

Independent Variable: Glyphosate and Natural Weed Killer

Dependent Variable: Fungal to Bacterial Ratio

Control: Untested Soil

Constants: Weed Killers

Hypothesis:

My hypothesis is: the glyphosate will affect the bacterial to fungal ratio more than the natural weed killer will.

Materials:

- Mason Jars
- Glyphosate
- Natural weed killer
- Soil (from a bag)
- Microbiometer that measures bacterial to fungal ratio

Procedure:

1. First, put the soil into six jars and spray two jars with glyphosate and two jars with a natural weed killer, and leave the remaining two for the control group.
2. Next, after ten days, check the fungal to bacterial ratio of all six jars and compare.

Safety:

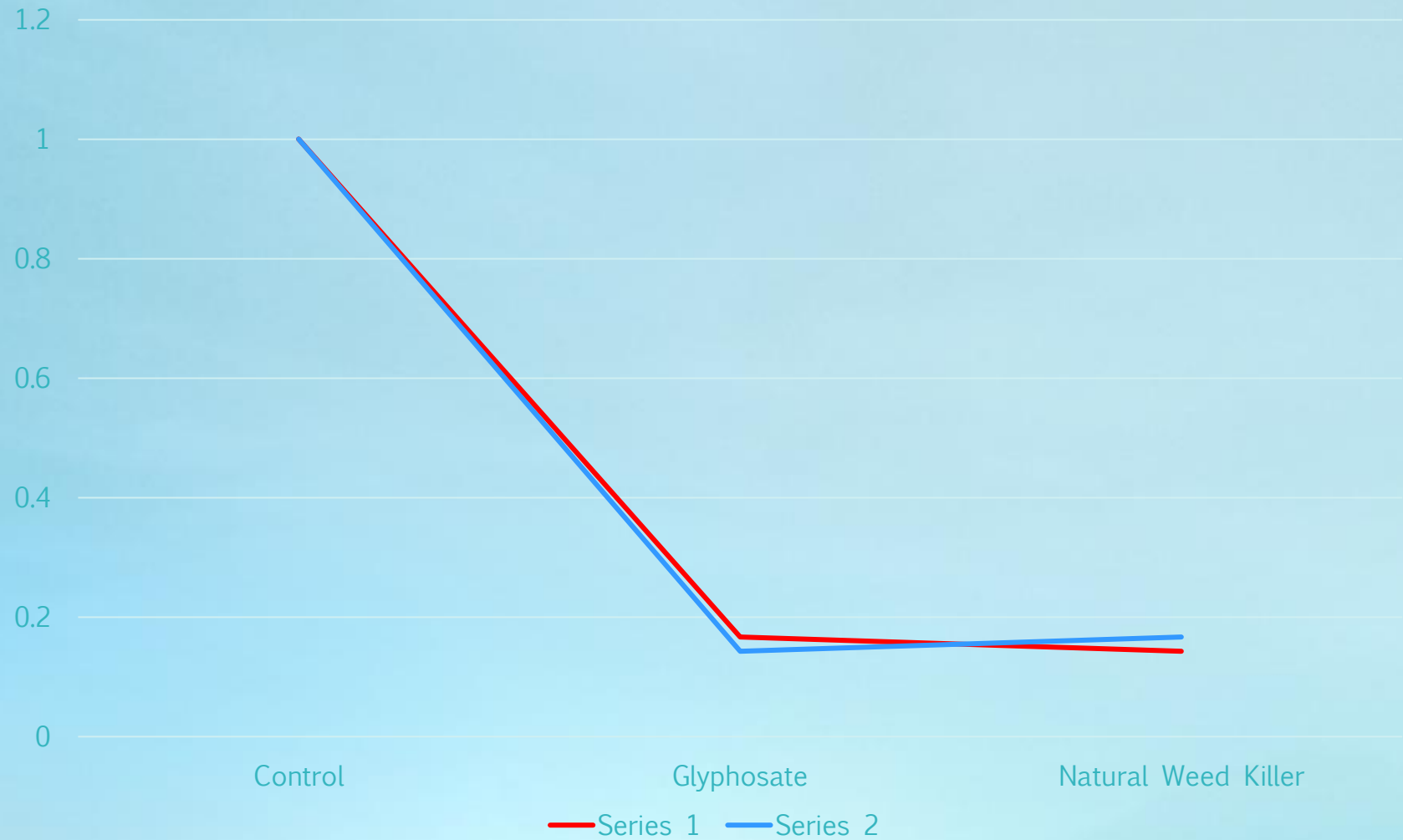
For safety, I handled the chemicals carefully, and gloves were used.



Glyphosate Tests



Chart Title



My results were very similar when it came to the glyphosate and natural weed killer. The fungal to bacterial ratio started at 1, as shown on the graph, but when the weed killers were added, the ratio became unbalance, which is why the lines both slope downwards. Series 1 was my first test, and Series 2 was my second test.

Conclusion

The conclusion in this experiment was that the glyphosate and natural weed killer equally affected the fungal to bacterial ratio. Because the soil was only sprayed once with these two chemicals, the results may have been different had the experiment been prolonged.



Further Research:

One way that I could expand this project is if I tested for different variables in the soil.



Special thank you to everyone at Microbiometer.com!

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Thank You!

Any Questions?