

Can Water Keep a Plant from Growing?

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By

#3529

Introduction

Water is a hot topic in our city. Constantly, people are worried about how healthy it is to drink the tap water, or should we drink bottled, or go without any at all. Every day, something on the news alerts you to another issue with the safety of the water. With all this media hype, one wonders if even plants or animals are in trouble with the water health. If we eat the plants which use the water and eat the animals for food who also drink the same water, are we still getting the same poison?

So, the question comes up, does it matter what you water your plants with? Maybe plants can handle polluted water, even if humans cannot. But what if they can't? What are humans supposed to do?

The research began with looking for information about what kinds of plants could grow rapidly enough that they could be used in a short-term project such as this one. It was discovered that *Raphanus sativus* plants (common radish) grow rapidly and could be the tested plant for this experiment. In the research, it was noted that many urban garden growers spend the first couple years planting things like sunflowers because they are known to remove toxins from the soil.

The purpose of this research was to determine if using polluted water to hydrate *Raphanus sativus* seeds would negatively affect their growth.

The hypothesis to be tested is that hydrating these common radishes with polluted river water will allow these seeds to germinate but will grow less and die off sooner than those watered with the control variable, bottled spring water, or with using regional bottled or city tap water.

I think that watering *Raphanus sativus* plants with polluted water will negatively impact their growth because the pollutants in the water will stunt their growth and even cause early death to the plant.

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Experimental Design

The experimental design will include ten trials using seeds planted in peat pots with potting soil, and watered every one to two days.

Each pot will receive the same seed brand, soil, sunlight, water, and growth opportunity. The only variable being measured will be plant growth, measured with a metric ruler once germination has occurred. Days to germinate will also be noted.

The control variable will be bottled spring water which matches the ideal parameters for healthy plant growth.

City tap water and some varieties of regional bottled water will also be tested.

Each trial will have plants measured that are watered by polluted urban rivers from Michigan and Ohio: The Rouge River, the Detroit River, Silver Creek, and the Ottawa River. Each river has been certified as a polluted urban river by their states' respective EPA (Environmental Protection Agency)

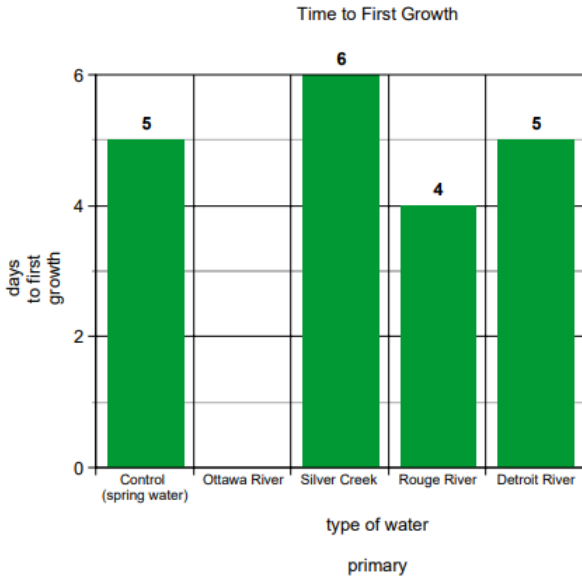
Once sprouted, each plant will be measured every three days notating any growth and data in the logbook. Should a plant die, that data will also be recorded.

All data will be analyzed and the results will determine if the hypothesis was supported or denied by the data.

Materials Needed

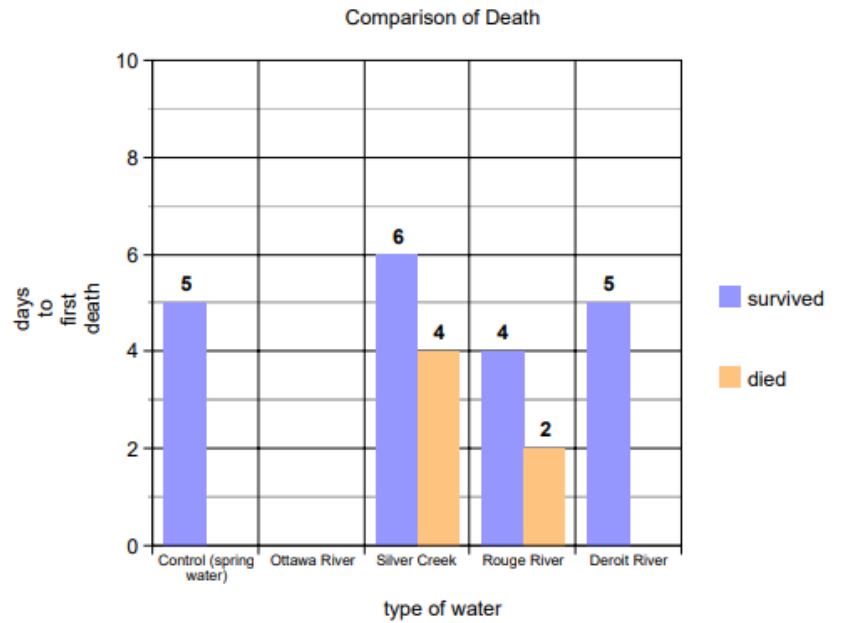
- 50 peat pots (2 inch size)
- Medium bag of Miracle Grow potting medium
- Package of Burpee Raphanus sativus seeds (common radish).
- LaMotte test kits for pH, nitrates, phosphates, turbidity, dissolved oxygen
- Camera, centimeter ruler, log book, printer access
- Labels to identify trials and substance tested
- Craft sticks to tape labels onto
- Cards that show days/dates for pictures
- Planting supplies, gloves, and cleaner
- Two one-Gallon jugs of water from each of the following sources:
 - River Rouge
 - Detroit River
 - Silver Creek
 - Ottawa River
 - Meijer brand spring water (control water source)

Results



The data was not at all what was expected. This researcher expected all plants to grow but exhibit different kinds of growth related to the amount of pollution in the water. This is not what the data showed.

The data was concerning. This researcher thought the experiment was performed incorrectly but even the lack of growth is also data.



Results Discussed

What does this data mean?

Data seems to indicate that the type of water you use does make a difference when watering plants! The Ottawa River performed the worst and was deadly to the seeds. They were even replanted, getting the same results as before.

All rivers showed problems with growth. The control sample grew the same number of plants as the Detroit River BUT some of those died while the control water plants continued to grow. As of the termination of this experiment, out of 50 seeds planted, 20 germinated and 14 survived the total process.

The same seed brand, soil, peat pot, light and warmth were all given to the samples. The control variable was the type of water used.

It seems this data does support the hypothesis.

Although the samples are very small and the timeframe very short, the results are rather dramatic. I was looking forward to enjoying some radishes, but this does not seem to be the case this time.

For this research, the data did support the hypothesis. It is noted that due to the small sample size and the short time frame, the results are considered inconclusive without further research. A larger sample could fully validate this hypothesis.

The literature indicated that the type of water used to produce healthy *Raphanus sativus* plants was irrelevant as these plants can filter out what they need from the water they are given but this data does not support that analysis.

RWA / Next Steps

Some real-world applications for this project would be of interest to growers, water quality specialists, and farmers, who need healthy resources to feed the people of the Earth. City planners might also want to be aware of water quality that feeds their population.

Next steps would include setting up a larger, longer length study of this river and sampling from different places to determine if there is a particular point source of pollution or if a particular area is responsible. Locating the source of pollution can assist in finding the culprit and ending the pollution issues. We cannot create more water for the Earth, but we can clean up what we do have.

Conclusion /Limitations

In conclusion, the data is inconclusive for a larger study but for this small study, it does support the hypothesis, that hydrating these common radishes with polluted river water will allow some seeds to germinate but the plants will grow less and die off sooner than those watered with the control variable, bottled spring water.

Concern is raised over the quality of the Ottawa River which runs through the center of Toledo. This research suggests that a much closer look at this river is of paramount importance and further study is vital. The residents of the city use that river for various events: recreational sports and drinking water. It would be crucial to find and clean up the sources of point pollution.

It would appear from this research that perhaps the Ottawa remains more polluted than the rest of the rivers tested in the research.

Works Cited:

- [How Does Water Pollution Affect a Plant's Life Cycle? \(seattlepi.com\)](#)
- ["How Tap Water and Bottled Water Effects Plant Growth" by Karl Craig and Danna Goss \(swosu.edu\)](#)
- [Is Your Water Safe For Plants: Learn About Water Quality In Gardens \(gardeningknowhow.com\)](#)
- [The Effects of Bottled Water or Tap Water on Plant Growth | Hunker](#)
- [Which Types of Water Are the Best for Plant Growth? | Hunker](#)
- [Everything About Growing Radishes In Containers & Pots \(balconygardenweb.com\)](#)
- [Globe.gov](#)