CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J1606

Project Title
Earthworm Castings: Is There Too Much of a Good Thing?

Abstract

Objectives/Goals
The goal of the experiment was to find out what the ideal proportion of earthworm castings to soil is for young garden plants. I hypothesized that plants would grow best in 100% earthworm castings.

Methods/Materials
Series of ten pots were filled with mixtures of earthworm castings and potting soil. Three series each held 0%, 20%, 40%, 60%, 80% and 100% earthworm castings respectively, for a total of three sets of 60 pots. A different variety of plant- tagetes, lactuca sativa, and viola tricolor- was planted in each set of pots. All pots of a variety received equal amounts of water and light. At the end of the experiment, each series of plants was harvested and photographed. Each plant was weighed and the average weight of the plants in each series, both leaves and roots, was calculated.

Results
The replacement of potting soil with earthworm castings increased the average plant weight up to 389%. The tagetes and lactuca sativa in the medium consisting of 80% earthworm castings produced the most plant growth, while the average weight of the viola tricolor grown in 100% earthworm castings was highest.

Conclusions/Discussion
I conclude that my hypothesis was incorrect and a medium containing 80% earthworm castings promotes more plant growth than one containing 100% earthworm castings. Since the data for viola tricolor in 80% and 100% series was based on a very small sample size, as most of the plants died, it is less reliable than the data for tagetes and lactuca sativa. The leaves of tagetes plants grown in 100% earthworm castings turned yellow, and plants grown in 40% castings had more flower buds than those grown in higher concentrations, indicating that overall plant development might be best at even lower concentrations of earthworm castings. Further research with much larger sample sizes of a single variety of plant, grown over a longer period of time would be necessary to confirm these results.

Summary Statement
This project tested the effect of the amount of earthworm castings in growing medium on plant growth.

Help Received
Mother advised me, helped me make 180 newspaper pots. Father showed me how to make graphs on the computer, printed photos for my board. My brother Noah mounted grow-lights onto the bottom of my bed, helped build mini-greenhouses, helped me select photos for the board.