



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Samantha L. Lowther	Project Number S1609
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Project Title
What's in That Soil? A Study of Zinnia Growth in Four Different Soils

Abstract

Objectives/Goals
Farmers and florists have been trying to uncover the secret to creating crops with strong flowers. Abrupt weather conditions and unknown nutrient deficiencies have been troubling problems. This project was designed to determine which soil is best for growing strong, healthy plants. Although this experiment focused solely on Zinnias, the information gained could be helpful in the growth of other plants. It is predicted that the container mix(soil #1)will prove to be the best soil for the Zinnias. Due to its specific purposes, it is assumed that soil #1 will provide the optimum nutrients for growth.

Methods/Materials
This project began 2 ½ months ago and involved 1 type of Zinnia and 4 different soils. Three of the soils were purchased at a garden store and 1 was taken from a local backyard(no fertilizers). Each one of the 3 store bought soils had an almost completely different chemical analysis, as stated by the manufacturer. Most importantly, each one of the 4 soils contained different amounts of N, P, and K. The Zinnias were planted in late December and were controlled throughout their growth time with equal amounts of soil, distilled water, sunlight, and a constant temperature. Each week, the Zinnias were analyzed and stem and leaf growth were recorded. The plants were also photographed. During the growth period, information was researched and soil tests were conducted. Soil pH and soil texture(sandy, loam, or clay)were determined. N, P, and K levels were also measured and re-measured to validate project results and manufacturer claims.

Results
The Zinnia in soil #1 had the best results. Its stem height was last recorded at 11½#. It had the greatest leaf length and stem diameter as well. The leaves# lengths were last recorded at 5½# and the stem was visibly thicker than the rest. These results are immense considering that the plants in soils #2 and #3, which measured only 8# high with leaves of 3½# long, were the next largest. The Zinnias in soil #2 did, however, appear to be stronger than those in soil #3. The stem in soil #3 required a stilt to stand up. The Zinnias in soil #4 showed the least progress, measuring a mere 5½# high and with leaves of only 2#.

Conclusions/Discussion
The data supports the original hypothesis. Soil #1 was shown to be the best soil for growing healthy, strong Zinnias. Upon project completion, soil #1 supported the most growth due to its high level of N and its loam texture.

Summary Statement
Analyzing four different types of soils to determine which one provides the best growth for Zinnias and why.

Help Received