



Colorado Science and Engineering Fair

2024 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: The Effect of Gray Water on Soil Composition and Growth of *Phaseolus coccineus*

Finalist's Name: Siena Parr

School and City: Dolores High School

Sponsor's Name: Dave Hopcia

Category: Plant Sciences (PLNT)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

This project was designed to test the growth of *Phaseolus coccineus* when irrigated with various types of water. Tap water, gray water, sterile gray water, and irrigation water from the Dolores River were used. To accomplish this experiment, *Phaseolus coccineus* seeds were germinated overnight in distilled water and then planted in individual pots containing the same soil type. Afterward, seeds were divided into four groups of five seeds each. Each group of seeds was watered with one of the four types of water every few days to maintain soil moisture. As the plants grew, their heights were measured and recorded. Alongside the plant growth data, each water type was sent for analysis to Ward Laboratories to determine the water pH and major contents in the water that may have affected plant growth. The soil pH of each group was also tested. At the conclusion of the experiment, it was found that irrigation water maximized plant growth most effectively followed by gray water. The sterile gray water and the tap water showed relatively similar results, resulting in lesser plant growth. Alongside these results, it was discovered that all of the soils used had a similar, neutral pH at the end of the experiment and both the tap and gray water had a pH around 7. In contrast, the pHs of sterile gray water and irrigation water were slightly basic. It was concluded that irrigation water grew plants most effectively but could be replaced with gray water in times of drought.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature: *Siena Parr*

Date: 2/26/2024

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.