CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)
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Project Number
S1808

Project Title
The Effect of Seeding Styles, Competition, and Slope Orientation on a Native Coastal Sage Scrub Community

Abstract

Objectives/Goals
Over the last four years, I have been conducting studies regarding the stomatal conductance and other measurements of coastal sage scrub species based on environmental factors such as seeding patterns, inter-species competition, and intra-species competition.
This year I decided to explore the apparent connection between the slope orientation of plots by analyzing the plants# specific leaf areas (SLAs).

Methods/Materials
I used a Decagon leaf porometer, 48 plants at the Loma Ridge Restoration site, 2 metric rulers, 28 plant pots, 21 native shrub plants, 21 native forb plants, 49 Brassica nigra plants, over 150 samples from the Stipa pulchra, the Artemisia californica, the Eriogonum fasciculatum, and the Sonchus oleraceus, an area meter, a scientific oven, and a scientific scale.
To test the effects of seeding styles, each of 48 Salvia apiana plants was measured with 3 stomatal conductance measurements. The height of the plants was also measured. To test the effects of competition, I tested four groups: Brassica nigra grown alone, Brassica nigra grown with native shrubs, Brassica nigra grown with native forbs, and Brassica nigra grown with its own species. To test the effects of slope orientation, I measured the SLA of four species, with a total of over 150 samples measured.

Results
The average height for the shrubs only plot was higher than that of the mixed plot. The average stomatal conductance for the Salvia apiana in the mixed plot was higher than that of the plants in the shrubs-only plot. For the competition measurements, the average number of leaves was highest when Brassica nigra was grown with shrubs. For the slope orientation measurements, the Sonchus oleraceus had the highest specific leaf area, then the Artemisia californica, then the Eriogonum fasciculatum, and lastly the Stipa pulchra.

Conclusions/Discussion
The seeding style of a plant community affected the height and stomatal conductance of its plants. The invasive species Brassica nigra grows the least when it is grown with its own species, and grows well with native shrubs. My hypothesis regarding which species would have the highest to the lowest SLAs was supported by data. I also found a unique link between the slope orientation of a plot and the average SLAs of the coastal sage scrub plants.

Summary Statement
I found that native plants grow best with a mixed seeding style, that competitive native forb plants are best at combating invasive mustard plants, and that more drought-resistant plants should be planted on south-facing slopes.

Help Received
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