



CALIFORNIA SCIENCE & ENGINEERING FAIR

2018 PROJECT SUMMARY

Name(s) Eric Yang	Project Number J1929
Project Title Investigating Salt Tolerance of Western Plant Species	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Global warming is posing risks to many shrubs and plants at the world's lagoons and salt marshes. The purpose of this project was to investigate which native plants might be most impacted by rising saltwater during the process of germination. I wanted to discover how seeds of various native plants would react to increasing levels of salinity and which native plants might be most vulnerable to harm.</p> <p>Methods/Materials I experimented with more than 600 seeds from Western native plants ranging from California to Colorado, including <i>Purshia tridentata</i>, <i>Penstemon strictus</i>, <i>Atriplex lentiformis</i>, and <i>Fragaria chiloensis</i>. I carried out seed germination tests, including more than ten levels of salinity ranging from 0.5% salinity to 5.0% salinity. I attempted to germinate seeds that I collected from local native plants, but none of those seeds germinated. I then obtained a mix of native California seeds to use in my second experiment.</p> <p>Results My tests showed that <i>Purshia tridentata</i> (Antelope Bitterbrush) was incapable of germinating in a 3.5% salinity concentration. The highest level of salinity the <i>Purshia</i> (Antelope Bitterbrush) could tolerate was 2.0% salinity. The <i>Penstemon strictus</i> (Rocky Mountain Penstemon), <i>Atriplex lentiformis</i> (Saltbush), and <i>Fragaria chiloensis</i> (Beach Strawberry) were all able to germinate in a 3.5% salt concentration. In fact <i>Atriplex</i>, the Saltbush, was even able to tolerate a 4.5% salt concentration and the <i>Fragaria</i> survived up to 4.25% concentration. The <i>Penstemon</i> germinated until the salinity concentration reached 4.0%. Approximately 70% of the mix of California native seeds I tested tolerated concentrations of up to 3.25%.</p> <p>Conclusions/Discussion Surprisingly, many seeds were able to germinate in saline water conditions. <i>Fragaria</i> and <i>Atriplex</i> tolerated the highest salinity levels and are plants living near ocean water or on the margins of wetlands and sink communities where ocean water may fill in and salt spray may reach them. According to my results approximately 50% of the California native seeds I tested were able germinate even at a 3.5% salinity. It seems that plants that normally endure a life exposed to coastal salinity might survive germination, but if salt accumulates in the soil, this may compromise any further growth. Soil salinity issues are an important topic for future studies.</p>	
Summary Statement Investigating Salt tolerance levels of plant species ranging from Colorado to the Pacific Coast.	
Help Received Professor Ren Hou and my science teacher for guiding me through my project and supplying all necessary material. My parents for project support and guidance.	