



CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s) Kaden Z.T. Agha	Project Number S2301
Project Title Investigation of the Disparity between the Abundance of Tamalia spp. Galls on Arbutus unedo and Arctostaphylos spp.	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to investigate the disparity between abundance of Tamalia spp. galls on non-native Arbutus unedo and native Arctostaphylos spp. and explore the implications of finding Tamalia spp. on Arbutus unedo. It is hypothesized that a significantly lower number of Tamalia spp. galls per cubic meter on non-native Old World Arbutus unedo relative to native New World Arctostaphylos spp. is related to A. unedo's susceptibility to New World fungal diseases.</p> <p>Methods/Materials The populations consisted of shrubs where Tamalia galls were found, ten Arbutus unedo individuals and seventy-four Arctostaphylos spp. individuals, with data collected regarding the species, crown volume, number of branch divisions, number of galls on three outermost branch divisions, pathogenic status, and gall contents. These data were analyzed in R to find a pathogenic agent present on all ten Arbutus unedo individuals and that was associated with lower abundance of galls in the Arctostaphylos spp. population.</p> <p>Results Of the thirty-four pathogenic agents recorded, the presence of thrip (Heliothrips haemorrhoidalis) induced sooty mold (Capnodium) was associated with a lower abundance of galls in the Arctostaphylos spp. population and was present on all Arbutus unedo individuals. The pervasive presence of Heliothrips haemorrhoidalis and the accompanying Capnodium on the A. unedo individuals are associated with the much lower number of galls per cubic meter. Other pathogenic factors that were associated with differences in gall abundance were found in the Arctostaphylos spp. population.</p> <p>Conclusions/Discussion Based on the survey results, the hypothesis was accepted. Non-native Arbutus unedo individuals appear to be more susceptible to a fungal disease spread by a New World vector than their native Arctostaphylos spp. counterparts. The presence of Tamalia on Arbutus unedo is significant, as previous literature restricts its host plants to only New World Arbutoideae, which this discovery directly contradicts. All factors associated with gall abundance that were found in the experiment are new to science.</p>	
Summary Statement I found aphids on a plant they are not supposed to be on, found a factor that was associated with why they were much less abundant on that plant, and discuss the implications of finding aphids on that plant.	
Help Received I designed, executed, and discussed the project myself. Dr. Pam Durkee (mentor), Lisa Agha, Carrie Bretz, Kim Kiest, Scott Johnson, and Dr. Jeff Hanna helped proofread and refine my work.	