



# CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

<b>Name(s)</b> <b>Aradhana Sinha</b>	<b>Project Number</b> <b>S1912</b>
<b>Project Title</b> <b>Triforine Sensitivity in Lettuce</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this experiment is to determine if the mutation controlling triforine sensitivity in primitive romaine lettuce (PI491224) is in the same or similar location as the mutation that causes triforine sensitivity in modern romaine lettuce (cv. Valmaine). <b>Methods/Materials</b> In the first phase of the experiment I determined sensitivity to triforine in the inbred F4 filial that originated from a cross between insensitive cv. Iceberg and sensitive lettuce PI491224. I tested this by spraying the two-week-old plants with a diluted triforine solution, which killed the sensitive plants. In the second phase of the experiment I wanted to locate the gene for triforine sensitivity. I accomplished this by checking the parent plants (cv. Iceberg and PI491224) of tested population for polymorphism in four molecular markers located next to the triforine sensitivity gene previously mapped in cv. Valmaine. Using the markers that show polymorphism between cv. Iceberg and PI491224, I tested their offspring (population from phase 1) to see if these alleles are linked to triforine sensitivity. In Phase 3, sequencing was done on DNA amplified with Marker 4. <b>Results</b> Phase 1: 104 plants died, and 80 remained alive. According to the Chi test, $P = .9407$ Phase 2: I was unable to differentiate alleles using gel electrophoresis, as all amplified lengths were the same size. The LightScanner showed two parent plants displayed polymorphism for Primers 4 (BAIS) and 6 (BOLP). All 8 plants showed that the BAIS (Primer 4) gene was linked to the Triforine sensitivity gene. Phase 3: There are Single Nucleotide Variations at bp38 and bp76, and an Insertion/Deletion (InDel) from bp121 to bp150. <b>Conclusions/Discussion</b> In Phase 1 of the experiment, I found that the F4 filial matched the phenotypes predicted by Mendelian distribution. In phase 2, I determined that the Triforine sensitivity gene was located in a similar location in Valmaine and Romaine. In the future, I can differentiate alleles using Gel Electrophoresis with a smaller Primer that brackets the InDel.	
<b>Summary Statement</b> I will determine if the mutations that caused triforine (a fungicide) sensitivity in primitive romaine lettuce (PI491224) is at the same or similar location as the mutation that causes sensitivity in modern romaine lettuce (cv. Valmaine).	
<b>Help Received</b> My mom drove me to and from the USDA. Dr. Ivan Simko, Ms. Amy Folck, and Ms. Amy Atallah at the USDA guided me through my project.	