



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Mary Clare Bernal; Jacquelynn Besse	Project Number S1702
Project Title The Effects of Shortwave UV-C Radiation on Pea Plant Seedlings	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To assess UV-C (at 254 nm) on the germination, growth rate, height, and biomass of pea seedlings. Does UV-C affect the germination percentage, the growth pattern and rate, the height at harvest, and the biomass? Assertion: UV-C causes #stunting# of the seedlings. Much attention has been given to the adverse effects of the ultraviolet components of sunlight (UV-A and UV-B) on human skin, yet many people do not give UV its due regard. Animal tests are difficult to perform, so this project uses plants to reveal that UV has adverse effects on living tissues. It is believed that UV-C will affect the genetic material of the seeds and cause #stunting# in seedlings.</p> <p>Methods/Materials 20 seeds were randomly selected for the Treatment Group and exposed for 24 hours to UV-C and 20 seeds were randomly selected from the same population for the Control Group. They were kept at ambient conditions exposed to the visible light spectrum. All seeds were planted in a uniform soil mixture under grow lights with heating substrates. The plants were culled to 8 plants for each group and transplanted. These plants were then culled to 5 plants in each group accounting for #transplantation shock.# Plants were grown to #maturity,# depotted and weighed by components (total, leaves, stems, and roots). Data was analyzed. A germination experiment was performed by germinating 10 treatment seeds (exposed to UV-C for 24 hours) and 10 control seeds (exposed to ambient light) to determine germination percentage. Data was analyzed using EDA and Student's-t test.</p> <p>Results Germination percentage was not affected. The growth pattern and rate of the groups did not differ significantly. The controls yielded taller plants with more variability than the Treatment Group. The treatments had more biomass. The plant components of treatments showed less variability. In the germination experiment all plants germinated. Genomic studies could determine the impact of UV-C.</p> <p>Conclusions/Discussion UV-C radiation has an effect on the development and growth of pea seedlings. The assertion is supported. UV-C passes into the dormant seeds and affects the genetic material. Selection of plants reduced variability in both groups. The survivors in treatments appear stronger than those in controls indicating removal of weaker plants in treatments. The plants in controls showed more variability.</p>	
Summary Statement The effects of UV-C radiation on the growth and development of peas seedlings was assessed in a controlled experiment.	
Help Received Dr. John C. Howe provided on-going mentoring, and our parents provided financial support.	