



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

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| Name(s) Marc J. Matossian | Project Number J2016 |
| Project Title The Effects of Intense Pulsed Lighting on the Growth Behavior of Bush Bean Plants | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my science project was to compare the growth characteristics of Bush Bean plants under intense pulsed and continuous lighting conditions.</p> <p>Methods/Materials Plant height, leaf color and leaf size were used to assess growth characteristics of Bush Bean plants. All plants were grown in plastic containers with the same volume, and at the same temperature, to rule out container and temperature effects. Pulsed lighting was achieved using strobe lamps to provide intense pulses of light with the same average total light level as a continuous light source. Continuous lighting was achieved using fluorescent lamps. A Silicon solar cell was used to measure the pulsed and continuous lighting conditions and to ensure all plants were exposed to the same average total light levels. The pulsed-lighting strobe lamps and the continuous-lighting fluorescent lamps were operated on a timer to turn ON every day for 8 hours. Bush Bean plants without any illumination were used as controls. My hypothesis was that the intense pulsed lighting would reduce the growth characteristics of Bush Bean plants compared to continuous lighting.</p> <p>Results</p> <ol style="list-style-type: none">1. Plants exposed to intense pulsed lighting had about a 40 % reduced plant height compared to constant lighting at the same average light level.2. Plants exposed to intense pulsed lighting had about a 50 % reduced leaf diameter compared to constant lighting at the same average light level.3. Plants exposed to intense pulsed lighting had less intense leaf color compared to constant lighting at the same average light level. <p>Conclusions/Discussion Bush Bean plants exposed to intense pulsed lighting had reduced growth characteristics (plant height, leaf diameter, and leaf color) compared to plants exposed to continuous lighting with the same average light level.</p> | |
| Summary Statement Plants exposed to intense pulses of light have reduced growth compared to plants exposed to continuous light. | |
| Help Received Discussed my major findings with Professor Thomas Sharkey of Michigan Technical University, Father helped set up oscilloscope. | |