



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

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| Name(s) Gabriella N. Lewin | Project Number J2013 |
| Project Title The Interaction of the Phototropic and Gravitropic Effects on the Growth of Cress Seedlings | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to determine the relative potency of effects gravity and light on the growth of cress seedling</p> <p>Methods/Materials Materials: cress seeds, soil, cups, lamp, cardboard box, black spray, protractor, knife, maker, masking tape, mesh, toothpicks, rubber bands, and blocks. Paint inside of the box black; place three ounces of soil and one cress seed each in cup. Grow in normal conditions (light directly above) until stem is ~3". Three experiments performed all with the seedlings were inverted and suspended in a box and endpoint was deviation of the seedlings stem from vertical (DFV). Experiment 1: light was shown only from below - gravitropic and phototropic effects opposed. Experiment 2: no light - the gravitropic effect is measure. Experiment 3, exposed to ambient light (from above) - here gravitropic and phototropic effects are in the same vector.</p> <p>Results Experiment 1, the seedlings showed very little DFV - mean DFV = 1.6 degrees. Experiment 2, there was significant DFV- mean DVF = 83.3 degrees. Finally, in experiment 3 there was significant DFV again noted - mean DFV = 85.2 degrees. The pair T-test was used to compare the deviation of experiment 1 vs. 2, 1 vs. 3 and 2 vs. 3. There was a significant difference in DFV in experiment 1 vs. 2 ($p = 2E-12$) and 1 vs. 3 ($p = 4.9E-14$), however, there was no significant DFV found between experiment 2 vs. 3 ($p = 0.3$).</p> <p>Conclusions/Discussion Experiment 1 there was little deviation from vertical. Since the phototropic effect was in the exact opposite vector as the gravitropic effect, it can deduce that phototropism is more potent than gravitropism since the seedlings did not deviate significantly from vertical toward the vector of gravitropism. Experiment 2 was designed to show the gravitropic effect in the absence of the phototropic effect. The seedlings deviated from vertical significantly towards the gravitropic effect vector. Experiment 3 examined the potency gravitropism in ambient light. There was significant deviation of the seedlings towards the gravitropism vector. From this it can conclude that, in the absence of direct opposition by light, gravitropic effect was not reduced.</p> | |
| Summary Statement This project determines the relative potency of effect of gravity and light on a cress seedling. | |
| Help Received My father helped me design and carry out my experiments, he helped with my research paper, and he helped keep me organized. He also did the statistically analysis for me and helped me use Microsoft Excel. | |