



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

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Project Title Inhibiting Zophobas morio Larva Development with UV Light: A Phase III Expansion	
Abstract Objectives/Goals In my Phase I research project my goal was to arrest the development within the larval stage of Zophobas morio (mealworms). Zophobas will not pupate if they are maintained in stocks allowing them to #touch# each other en masse. Development may also be arrested with Hydrocortisone, a chemical which mimics JV juvenile hormone not allowing them to develop into a pupa or adult. I wanted to explore if UV light might do the same thing. My Phase III project expands the data that examines the possible mechanism. Methods/Materials Research is suggesting possible DNA damage, and/or destruction of Prothoracicotropic Hormone (PTTH) producing cells and ecdysone triggering mechanisms required for molting and pupal development. I thought it improbable that UVB light would penetrate the exoskeleton of the larval stage of Zophobas morio and interfere with the PTTH producing cells. Since these cells are located very close to the brain and eyes of the larvae, my thought was that this was the entry source of the light causing damage to those cells. Basically, I painted over the eyes with a non-toxic correction fluid and tried exposure to UVB light over a 24/7 period. I used 500 control larvae and 500 UV exposed larvae. Results My results indicated that there was a strong statistical correlation between successful development in the #painted# group, and, again, lack of development in the untreated group suggesting that this is the UVB light entry source that damages the PTTH producing cells preventing molting and pupal development. Conclusions/Discussion I found that an application of UVB light to untreated, normal Zophobas morio larvae arrested their development into pupal stages and adults. The control groups continued to develop normally. The UVB test groups that were #painted# with the non-toxic White Out over their eyes also continued to develop normally, though with a slightly lower rate of growth. I am speculating that these two pairs of PTTH cells have been permanently damaged or destroyed being in close proximity to a logical entry point for the UVB light through the eye structure and head nearest the brain, rather than the destruction of the entire ecdysone producing glands. By painting over the eyes with a non-toxic correction fluid, I prevented the UV light from following a course to these PTTH producing cells and allowed them to continue PTTH production without presumed destruction to the cells.	
Summary Statement This project examines if UV light is causing damage to PTTH producing cells.	
Help Received My teacher, Dr. Morse, provided his classroom and equipment to do this project. All work was mine.	