



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Nykolas A. Maxey	Project Number S2210
Project Title Inhibiting Zophobas morio Larva Development with UV Light	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In Phase I my research project goal was to arrest the development within the larval stage of Zophobas morio (mealworms). I applied UVB light to exposed Zophobas larva in a mid-instar stage. The results indicated an arrest of molting and no pupal development into further adult stages, unlike the control groups. 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.</p> <p>Methods/Materials Having seen that there is an unexplained arrest of growth taking place, my Phase II goal was to examine a possible mechanism. I thought it improbable that UVB light would penetrate the exoskeleton of the larval stage of Zophobas morio (mealworms) enough to 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 again using my previous 7 day exposure routine of my Phase I project.</p> <p>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 the eye channel is the UVB light entry source that damages the PTTH producing cells preventing molting and pupal development. All individuals in the treated group surviving the typical mortality rate had arrested development. No individuals pupated. All individuals in the untreated group surviving the typical mortality rate experienced pupation. No individuals in this group failed to pupate.</p> <p>Conclusions/Discussion Data would seem to support my hypothesis that the entry point of the damaging UVB light is through the eye channels. It is logical that my speculation that the two pairs of PTTH producing 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 UVB light from following a course to these PTTH producing cells and allowed them to continue PTTH production without presumed destruction to the cells.</p>	
Summary Statement The purpose of this project is to examine the mechanism by which UVB light may enter the larval stage of Zophobas morio and cause PTTH producing cell damage of the DNA producing a dimer for those cells, thereby arresting larval development.	
Help Received I performed all the work on my own in a classroom lab.	