



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Emily A. Koch	Project Number J1915
Project Title Controversy in Forensic Entomology and Crime Scene Investigation: The Question that Is Bugging Forensic Entomologists	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My question was: Is maggot mass temperature significantly above ambient air temperature so as to affect the calculation of accumulated degree hours in estimating the time of exposure of decaying animal tissue? I learned that there is a huge controversy among forensic entomologists as to the effect of maggot mass temperature and I tried to design an experiment to help settle this disagreement.</p> <p>Methods/Materials I raised <i>Sarcophaga bullata</i> fleshflies and exposed them to rotting beef liver. After the fleshflies deposited larva on the liver, I monitored the development of the maggots through the first, second, and third instars stages of development. I placed third instar maggots in groups of 25, 50, 75, 100, 125, and 150 in individual jars with rotting beef liver. I put a digital thermometer in the middle of each maggot mass and recorded the temperatures every hour for 22 hours until the maggots escaped to pupate. I also recorded the ambient air temperature and humidity during this time. I used time lapse photography on my digital camera and a digital watch to record the data.</p> <p>Results As a result of my experiment, I recorded 176 temperature and humidity readings. Group I - An average of 1.03% higher than ambient air temperature. Group II - 2.21% higher. Group III - 2.86% higher. Group IV - 4.04% higher. Group V - 2.25% higher. Group VI - 1.22% higher. The highest percent above ambient air temperature was 5.81% in Group IV. The data suggested that the more maggots in a mass, the higher the temperature they generated.</p> <p>Conclusions/Discussion My experiment proved that maggot mass temperature is significantly above ambient air temperature. This may affect the calculation of accumulated degree hours in estimating the time of exposure of decaying animal tissue or post- mortem interval. However, since my maggots were confined to rotting beef liver in glass jars, my data may or may not apply to field work. From contacting members of the American Board of Forensic Entomology, I have learned that maggots may self-regulate their temperature by moving in and out of the feeding mass. More research is needed to determine the general effect of maggot mass temperature.</p>	
Summary Statement My project measured maggot mass temperature and compared it to ambient air temperature.	
Help Received Forensic entomologists Dr. M. Lee Goff, Chaminade University of Honolulu; Mr. David Faulkner, San Diego; Dr. Richard Merritt, Michigan State University; Dr. Neal Haskell, Rensselaer, Indiana; Ms. Rebecca Bullard, UC Davis. My mother helped me design my graphs and my father helped me set up my	