## G67 Temperature-Dependent Development of the Blow Fly *Calliphora Vicina (Diptera: Calliphoridae)* and the Effects on the Estimation of the Postmortem Interval

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After attending this presentation, attendees will understand the importance of temperature on the development of the forensically important blow fly *Calliphora vicina* and present new research on the same.

This presentation will impact the forensic community and/or humanity by attempting to improve the quality, accuracy, and reliability of scientific data upon which estimates of the postmortem interval using insects are based. This will help strengthen the science of forensic entomology, but more importantly, serve to help investigators come closer to the truth when investigating the circumstances surrounding a death.

Forensic entomology deals largely with the estimation of the postmortem interval, or PMI, of the victim of a violent crime. There are several ways that entomological evidence may be used to calculate the PMI, but the most commonly used method involves using the developmental rates of blow fly (Diptera: Calliphoridae) and flesh fly (Diptera: Sarcophagidae) larvae. One forensically important blow fly is *Calliphora vicina* Robineau-Desvoidy, commonly known as the blue bottle fly. This species is nearly worldwide in distribution, and is commonly recovered on human remains through the course of forensic investigations.

Because insects are poikilothermic (cold-blooded), blow flies develop at rates which are largely dependant on the temperature of their surroundings. In general, development slows with cooler temperatures and accelerates with warmer temperatures. These developmental rates are of prime importance when calculating the PMI estimate. The temperatures experienced by the developing larvae must be taken into consideration when estimating the time it has taken for them to reach a given stage of development.

There have been a number of studies published on the developmental rates of blow flies at different temperatures. Because of variations in the experimental design, equipment, and sampling regime, there are some discrepancies in the literature regarding the accumulated degree-hours (ADH) and accumulated degree-days (ADD) needed for completion of the life cycle in these flies, as well as their developmental thresholds (those temperatures at which the larvae cease development). These discrepancies, when used to analyze evidence in a capital murder case, for example, can cause an exaggerated estimate of the PMI and cost an innocent person their freedom or help free a guilty person.

Our research has attempted to correct these problems and provides reliable data which forensic entomologists may use when estimating PMIs. Temperature trials over seven constant temperatures were conducted to determine developmental rates. Flies were reared on beef liver within plastic containers in environmental chambers. Thermocouples were placed within each container to accurately record the temperatures experienced by the developing larvae. Development times recorded to the nearest half-day were used to construct a degree-day model for each larval stage. The minimum temperature required for egg hatching within a five-day period was determined and ADH were calculated.

**Forensic Entomology, Postmortem Interval, *Calliphoridae***

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