G50 Nocturnal Oviposition of Blow Flies (Diptera: Calliphoridae) in the Lower Mainland of British Columbia, Canada

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After attending this presentation, attendees will better understand the nocturnal egg-laying behavior of several of the blow fly (Diptera: Calliphoridae) species that commonly inhabit suburban regions of the Lower Mainland of British Columbia, Canada.

This presentation will impact the forensic science community as it will discuss the potential implications of nocturnal oviposition of blow flies (Diptera: Calliphoridae) on postmortem interval (PMI) estimations in human homicide investigations.

The most important and common use of forensic entomology is to estimate the elapsed time since death. Specifically, the postmortem interval (PMI), defined as the minimum time that has elapsed since death, is determined through the analysis and identification of the forensically important insect species present at the crime scene. An accurate PMI estimation has been proven very valuable in homicide investigations as it points the investigators toward the correct time frame.

Nocturnal oviposition of blow flies has not been investigated in Canada; therefore, the potential effect of its presence on the PMI was unknown. If some or all of the blow fly species in British Columbia were found to lay eggs at night, this could have major implications in the Canadian Criminal Justice System, as the presence of nocturnal oviposition could alter the PMI by up to eight to twelve hours. Such an error rate could lead to the appeal of previous cases in which conviction was based on the assumption that nocturnal oviposition does not occur. This may also play a role in unsolved homicides, as suspects would have originally been interrogated based on a time of death that was incorrect.

In this study, six beef liver baited inverted cone traps were put outside in a suburban garden on individual days in July and August in order to monitor the egg-laying behavior of local blow fly species. Individual experimental days were chosen based on an expected nocturnal minimum temperature of greater than 12ºC. Oviposition was monitored over twenty-four hour periods in two locations, one with complete darkness nocturnally and one in the presence of artificial light produced from a high pressure sodium street light. The bait was replaced with fresh bait every four hours and the number of eggs was visually estimated. The eggs were then reared to adulthood at the Centre for Forensic Research at Simon Fraser University, for species identification. The use of these traps also allowed for the nocturnal activity levels of blow flies to be assessed as active adults were caught in the plastic bag attached to the top of the trap.

In this experiment, no eggs were ever found after sunset or prior to sunrise on any of the experimental days. The artificial street light was not sufficient to stimulate egg laying at night. The three species that were primarily caught were *Calliphora vicina* (Robineau-Desvoidy), *Lucilia sericata* (Meigen), and *Lucilia illustris* (Meigen). No calliphorid adults were caught after sunset or before sunrise, except on one night, in which three *L. sericata* adults were caught post sunset in two different traps. Based on these results, forensically-important blow fly species in this region do not nocturnally oviposit or remain active at night.

This experiment is the first of its kind to be done in Canada and therefore, these results suggest that the assumption of no nocturnal oviposition that has been used for many years by the Canadian Criminal Justice System and local forensic entomologists is likely to be accurate. As a result, this research will allow forensic entomologists to estimate time of death in future B.C. homicide investigations with greater accuracy and confidence.

Forensic Entomology, Nocturnal Oviposition, Blow Flies

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