



Pathology/Biology Section - 2013

G156 The Pre-Colonization Gap: When Do Blow Flies First Lay Live Larvae on a Corpse?

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The goal of this presentation is to show how Postmortem Interval (PMI) determination remains the main focus of forensic entomology. However, minimum time frames are based on time of first colonization by the oldest immature found on the body. Following this presentation, attendees will have a better understanding about the question that has always eluded forensic entomologists, which is the period between death and colonization. However, this study also revealed that so-called secondary and tertiary species that visit a corpse are, in fact, primary.

This presentation will impact the forensic science community by determining how soon following death an exposed corpse is colonized by both oviparous and ovoviviparous adult flies, hopefully playing a major role in future PMI determinations.

Forensic entomology is the study of insects within a legal framework. The outstanding variable in determining an accurate PMI is the time that adult flies first lay live larvae or eggs onto a body. The "hinge pin" in forensic entomology is based on the predicted order of insects, typically blow flies and flesh flies, which are attracted to a decomposing corpse or cadaver. Many references have divided the predicted order into primary, secondary, and tertiary insects. This correlates with the process of decomposition and how it changes over time e.g., fresh, bloat, active decay, and skeletal stages. Blow flies generally arrive after death and recent research has shown that *Calliphora dubia*, *Calliphora varifrons*, and sarcophagid adults lay live larvae onto guinea pig carcasses within one hour of exposure. These flies are typically the primary visitors to a corpse. Very little is known about ovoviviparous blow flies, which are invariably the first blow flies to visit a corpse in southwestern Australia and are often the critical species in a PMI determination. New trials exposed 30 guinea pig carcasses throughout the day (0600 – 2000 hours) during spring and summer in bushland on each of five successive days. Replicate carcasses were set up randomly along a kilometer of bushland track and a carcass was removed every 0.5, 1.0, 2.0, 4.0, 8.0 hours throughout the day. Blow flies laid eggs onto carcasses within 30 minutes (33% of carcasses) and, on average, on all carcasses within 1.5 hours of death. Eight different oviparous (including *Lucilia sericata*, *Chrysomya rufifacies*, *Chrysomya varipes*, and *Australophyra rostrata*) and the ovoviviparous fly species above deposited either eggs or live larvae onto the carcasses within six hours.

This study highlights the previously unknown rapidity with which blow fly species are able to commence laying onto carcasses and takes into account a large number of fly species, some of which are considered in the literature to be late colonizers of carcasses. A repeat exposure of carcasses again over five successive days in summer revealed five similar species of blow flies laid onto carcasses; however, extreme high temperatures significantly reduced overall blow fly activity. A further trial will be conducted in spring and summer to again evaluate this pre-colonization period. This research has many ramifications for the PMI calculation, especially if all flies previously designated secondary and tertiary are, in fact, primary visitors to a corpse.

Postmortem Interval, Ovoviviparity, Blow Fly