G74 Colonization Behavior of Forensically Important Blow Fly Species: Implications for Postmortem Interval Estimations

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After attending this presentation, attendees will have a better understanding of ecological interactions between various forensically important blow fly species and how this relates to PMI estimation.

This presentation will impact the forensic community by providing insight into the importance of understanding species interactions and individual colonization events and how these behaviors can impact one's estimation of the MTC. This presentation will highlight the importance of rigorous scientific testing in order to validate current assumptions in the field with respect to delays in colonization prior to their incorporation into estimations of colonization events and, ultimately, PMI estimations.

Blow fly species are known to be among the primary colonizers of remains and as a result, blow fly species composition, colonization events and successional patterns are important aspects to consider in the determination of the postmortem interval (PMI) and minimum time of colonization (MTC). Previous research and case studies have indicated that certain blow fly species may experience a delay in colonization (i.e., *Phormia regina* (Meigen) and *Chrysomya rufifacies* (Macquart)). These findings have led to a debate within the field of forensic entomology as to whether or not these delays should or should not be incorporated into MTC and PMI estimations.

It was hypothesized that the colonization behaviour of blow flies (i.e., *P. regina* and *C. rufifacies*) would be altered based upon the presence or absence of an additional blow fly species (i.e. *Lucilia* impede black soldier fly egg and adult eclosion.*sericata* (Meigen)). The colonization behaviour of three forensically

important blow fly species were examined: *L. sericata*, *P. regina* and *C. rufifacies*. Specifically, gravid adult females of *L. sericata* and *P. regina* and *L. sericata* and *C. rufifacies* were allowed to colonize fetal pig carcasses, *Sus scrofa* (Linnaeus), however, their arrival order varied according to one of five different treatment conditions. Species were allowed to colonize either on their own, in the presence of an additional species, and prior to and subsequent to an additional species. colonization events and behaviour were recorded from the time of arrival to forty hours postmortem. Upon removal of the carcasses, egg masses were examined and depth measurements were recorded. The eggs masses were then photographed and volumetric measurements were obtained using the Image J software program. A linear regression was carried out (using SPSS) with volume (mm^3) versus total number of eggs in known egg masses in order to predict the number of eggs based upon the volumetric measurements recorded.

It was determined that the colonization behaviour varied with respect to time of first colonization, location of colonization, and total number of eggs laid on an individual species basis. In particular, *P.regina* experienced a significant decrease in time to first colonization and laid more eggs in the presence of *L. sericata*, which indicates that the presence of an additional blow fly species could act to facilitate the colonization of *P. regina*. Thus, the colonization behavior of blow flies should be examined on an individual basis. Furthermore, ecological interactions between other blow fly species could play an important role in altering a species colonization behavior, specifically with respect to the time and location of colonization, as well as the amount of eggs laid.

Blow Fly, Postmortem Interval, Minimum Time of Colonization

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