



Pathology/Biology Section - 2016

H113 The Influence of Predator Presence and Habitat Type on Blow Fly Oviposition

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After attending this presentation, attendees will be informed concerning oviposition timing differences between forest and prairie habitats. In addition, data will be presented on the impact of predators (Hymenoptera: Vespidae) on blow fly oviposition.

This presentation will impact the forensic science community by presenting a study in an area in which very little previous work has been performed. Blow flies are usually the first insects to arrive at a crime scene, so information about their oviposition is crucial for accurate postmortem interval estimations.

Forensic entomology uses data derived from insects to aid in criminal investigations. Blow flies (Diptera: Calliphoridae) are usually the first insects to arrive at a crime scene, often within minutes after exposure.¹ Their quick appearance on carrion is the foundation for Postmortem Interval (PMI) estimations.² Two areas that could potentially affect oviposition timing, and therefore PMI estimations, are the habitat carrion is in, and if there are blow fly predators present. This study examined the effect of habitat (prairie vs. forest) and the presence of predators (Hymenoptera: Vespidae) on blow fly oviposition timing.

Research was conducted from June 1, 2015, through August 10, 2015, at Pierce Cedar Creek Institute in Barry County, MI. Forest and prairie habitats were compared in observation trials. Ten bait cups were used in each of nine paired trials. Each cup consisted of a 453g clear plastic cup with 6mm of vermiculite in the bottom and a foil cup with approximately 60g of aged chicken liver. The cups were covered before they were placed in the field in one of three paired prairie and forest sites, with five bait cups per habitat. The covered cups were placed on the ground at the sites four hours after sunrise. Six hours after sunrise, the lids were removed from the cups and observations began. Every half hour the cups were checked for blow fly eggs and the presence of blow flies and other insects. Once blow fly oviposition was observed, the cup was covered, labeled, and removed from the field. Observations ended 12 hours after sunrise. Bait cups with blow fly eggs or flesh fly larva were placed in a fume hood and reared to the third larval instar stage and identified.

The manipulation studies were all conducted in the same forest location. Nine bait cups, as described above, were used for each of ten manipulation trials. Three bait cups contained chicken liver and served as controls. Three bait cups had a pinned wasp placed on the chicken liver to serve as a visual manipulation. An odor manipulation consisted of crushing two wasps and sprinkling the crushed pieces over the chicken liver. Bait cups were covered and randomly placed using a random number generator into yellow platform stands in the fields at four hours after sunrise. Observations started at six hours after sunrise and were conducted as described above.

Data will be analyzed using Statistical Package for the Social Sciences (SPSS) statistical software. Preliminary data suggests there is no significant difference in habitat preference between prairies and forests. Oviposition occurs on average of one hour earlier in the prairie than the forest locations. Preliminary results suggest that the presence of pinned wasps and crushed wasps does not impact oviposition occurring, but could impact the timing. Live wasps that were observed on bait cups did impact oviposition. Blow fly behavior observations and final results will be included in the presentation.

Any information on blow fly oviposition timing is critical for accurate PMI estimations. A one-hour difference in oviposition doesn't sound significant, but could have an impact on criminal investigations.

Reference(s):

1. Byrd J., Castner J. 2010. *Forensic Entomology: The Utility of Arthropods in Legal Investigations*, 2nd ed. CRC Press, Inc., Boca Raton, Florida. 681 pages.
2. Haskell N., Williams R. 2008. *Entomology and Death: A Procedural Guide*, 2nd ed. Forensic Entomology Partners, Clemson, South Carolina. 182 pages.

Blow Fly, Forensic Entomology, Predator Presence