H89 Diurnal Oviposition Timing by Blow Flies (Diptera: Calliphoridae) in Different-Aged Carrion

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Learning Overview: After attending this presentation, attendees will have a better understanding of the timing of blow fly oviposition in relation to sunrise and how the age of the carrion affects this timing. Species composition and ambient factors will also be presented.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing how the timing of blow fly oviposition in relation to sunrise greatly affects accuracy in estimating the Postmortem Interval (PMI).

Blow flies (Diptera: Calliphoridae) are among the first insects to oviposit (lay eggs) on carrion.[1] The timing of blow fly oviposition is critical for determining a PMI estimation, which is the time that has passed between death and corpse discovery.[2] The objective of this investigation was to gain more information about the timing of blow fly oviposition so that a more accurate PMI can be calculated. Past research in the lab has shown that blow fly oviposition occurs an average of 4.75 hours after sunrise in Northwest Indiana. This research expanded on previous studies by using carrion that had been thawing for different amounts of time to simulate different ages of carrion. To see if there was a difference in the timing of oviposition related to the age of the carrion, three piglets were thawed for approximately 15 hours ("new pigs"), and three piglets were thawed for approximately 55 hours ("old pigs"). The six piglets were then placed in a remote, wooded area one hour after sunrise. The piglets were checked once an hour until oviposition occurred, and it was recorded whether flies and eggs were present each hour. The research was repeated six times in the fall of 2017. Egg masses were collected and reared to the third larval instar stage for identification using taxonomic keys.[3]

The timing of oviposition, in hours after sunrise, was analyzed with respect to temperature, humidity, and light intensity. There was no significant difference found in the timing of oviposition between treatments. ($t=.120$, $df=27$, $P=.441$). Oviposition occurred an average of 3.9 hours after sunrise in new and old pigs. The species composition varied by date and between new and old pigs. The most common flies found ovipositing were Diptera: Calliphoridae, *Phormia regina* (Meigen) and Diptera: Calliphoridae, *Lucilia coeruleiviridis* (Macquart). *Calliphora vomitoria* (L.) were only collected on new pigs and were absent on old pigs. *Phormia regina* (Meigen) oviposited on new pigs with the same, or higher, frequency than on old pigs, which is the opposite of what was expected. There were record high temperatures in September 2017 (34°C), and this could account for the slightly early oviposition timing found in this experiment (3.9 hours after sunrise). After three years of research, it was found that the average timing of oviposition in Northwest Indiana is 4.4 hours after sunrise in the fall months. This research has importance in both the scientific and forensic communities, as a more accurate PMI can strengthen the validity of a forensic investigation.

Reference(s):

1. Byrd, J. and J. Castner. 2010. *Forensic Entomology: The Utility of Arthropods in Legal Investigations*, 2nd ed. CRC Press, Inc., Boca Raton, Florida. 681 pages.
2. Haskell, N. and R. Williams. 2008. *Entomology and Death: A Procedural Guide*, 2nd ed. Forensic Entomology Partners, Clemson, South Carolina. 182 pages.
3. Stojanovich, C., H.D. Pratt, and E.E. Bennington. 1962. *Fly Larvae: Key to Some Species of Public Health Importance*. US Department of Health, Education and Welfare. Public Health Service, communicable Disease Center, Training Branch, Atlanta, Georgia.

Forensic Entomology, Blow Fly, Oviposition