



Physical Anthropology Section – 2004

H25 Investigation of Nocturnal Oviposition by Forensic Flies in Central Texas

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After attending this presentation, the participants will be presented with additional data supporting the idea that forensic flies do not oviposit under nocturnal conditions. These data and those from previous studies support the idea that lack of nocturnal oviposition should be considered in estimating the postmortem interval (PMI).

This presentation will impact the forensic community and/or humanity by providing knowledge regarding the nocturnal oviposition behavior of forensic flies is required for estimating postmortem interval.

The postmortem interval (PMI) establishes a framework within which the time of death can be estimated. Laboratory and field investigations, using non-human oviposition baits, are important in interpreting data associated with human death scene investigations. These investigations in different geographic areas identify the species available for ovipositing, the time of oviposition, and the effects of environmental factors on oviposition behavior.

There continues to be discussion of the ability of flies to oviposit on corpses deposited at night. Several studies have reported nighttime oviposition under artificial lights and in darkened conditions. Other studies have reported no oviposition during the nighttime. Such contradiction continues to promote research to determine the degree to which nocturnal oviposition occurs.

We will report on the effect of artificial light on oviposition by forensic flies in the Waco, Texas area. Three baits were used: 1) freshly killed white rats (*Rattus rattus*) (placed three feet off the ground), 2) recently thawed subadult pigs (*Sus scrofa*) (placed on the ground), and 3) ground beef (fresh, one, two and three day old; placed three feet off the ground). The fly species attracted to and ovipositing on the baits and environmental parameters at the baits were recorded to determine the degree to which these factors might interact to affect fly attraction and oviposition. The elevated presentation of the rat and beef baits and the short exposure time for the pig baits minimized the effect on oviposition usually experienced from foraging workers of *Solenopsis invicta* (red imported fire ant) common in the area. However, during one observation period the rat bait was foraged on by vespid wasps and they did seem to interfere with oviposition by forensic flies.

Field studies were conducted during the summer of 1993 (rats, seven nights, June-August, 1800-0900 hours CDST, urban site), and the summer of 2003 (pigs, three nights, June and July, 2100-2300 hours CDST, rural site; ground beef, three nights, 2200-0400 hours CDST, rural site). Diurnal oviposition studies determined that flies were present in the area and did oviposit on the baits. All baits were removed from the field sites and maintained under laboratory rearing conditions to determine fly species that oviposited on them.

Species present on the rat bait included *Phaenicia coeruleiviridis* (green bottle fly), *P. cuprinus* (bronze bottle fly), *Cochliomyia macellaria* (secondary screwworm fly) and *Sarcophaga haemorrhoidalis* (flesh fly). With the exception of *P. cuprinus*, these species oviposited on rats (freshly killed, viscera exposed; placed at 1800, 2100, 2400, and 0600 hours) in lighted and dark situations before 2130 hours and after 0630 hours. The pig baits attracted *Musca domestica* (house fly), *P. coeruleiviridis*, *C. macellaria*, and *Chrysomya rufifacies* (the hairy maggot blow fly). These species arrived at, and oviposited on, pigs in lighted and dark areas before 2120 hours but not between 2120 and 2300 hours. No flies oviposited on the ground beef baits placed in lighted and dark sites. These data support studies reporting no nocturnal oviposition by forensic flies.

Forensic Science, Forensic Entomology, Nocturnal Oviposition