



G71 Attraction of Two Forensically Important Fly Species: *Chrysomya rufifacies* (Macquart) and *Cochliomyia macellaria* (Fabricius) to Inter- and Intraspecific Eggs

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The goal of this presentation is to elucidate the attractive mechanism of inter- and intra-specific eggs to two forensically important fly species: *Chrysomya rufifacies* (Macquart) and *Cochliomyia macellaria* (Fabricius). The evolutionary relationship between the two species will also be discussed, as well as the potential for this information to elucidate mechanisms used to initiate colonization of a resource by blow flies at the conclusion of the pre-colonization interval (pre-CI) which is described below.

This presentation will impact the forensic sciences community by:

(1) explaining the importance of the pre-CI when attempting to estimate time of colonization, (2) examining the biology of, and interactions between, two forensically important fly species, *Chrysomya rufifacies* and *Cochliomyia macellaria*, and (3) investigating one possible mechanism triggering and/or inhibiting their oviposition on a resource.

Carrion represents a temporary and ever-changing habitat and food source for a wide variety of organisms. Previous studies indicate the first macrobiotic decomposers to discover ephemeral resources include blow flies (Diptera: Calliphoridae). However, their arrival does not necessarily translate into immediate colonization of the remains. Therefore, the period of insect activity (PIA) is broken into two portions. The pre-CI is from the time of death until arrival of arthropods on the corpse. The post-colonization interval is from colonization of the remains until discovery. Colonization can be defined as utilizing a resource as a habitat or for offspring development.

Blow flies arrive in predictable patterns and are present for a predictable time interval depending on abiotic and biotic factors. These primary colonizers may colonize carrion within hours of death. The act of colonization starts a "biological clock" and given the collective knowledge of blow fly biology, it is possible to determine the post-CI of the PIA. Since the majority of blow fly species do not colonize living tissue, exposure interval of the remains may be synonymous with the post-CI or minimum postmortem interval (PMI). In some instances estimates of the post-CI are analogous to the PMI.

The accuracy of estimating the pre-CI along with the full PIA may provide greater understanding of the period of exposure of the remains and more accurate estimates of the PMI. While a great deal is known about a few species of forensically important arthropods, much more research is needed. The community of necrophagous insects differs between habitats and between geographical areas. These differences mean that general successional and life history studies may be of some use to all forensic entomologists, but accurate PIA is dependent upon intimate knowledge of the community makeup, specific successional patterns, and life histories of forensically important flies common in the area of the crime.

Ten forensically important species have been collected in Brazos County, Texas, USA and deserve further investigation: *Calliphora livida*, *C. vicina*, *Cynomyopsis cadaverina*, *Lucilia cuprina*, *L. eximia*, *L. coeruleiviridis*, *Cochliomyia macellaria*, *Chrysomya rufifacies*, *C. megacephala*, and *Phormia regina*. Of these, *Cochliomyia macellaria* and *Chrysomya rufifacies* dominate the maggot mass during the warmer months, and are therefore important in time of colonization estimates.

Recent studies have characterized an ovipositional phenomenon in a family closely related to blow flies. Female *Musca domestica* (Linnaeus) (Diptera: Muscidae) utilize bacterial volatiles present on conspecific eggs to mediate oviposition preference. Due to the ubiquity of bacterial symbionts in the insect realm and the related life histories of Muscidae and Calliphoridae, this same oviposition mechanism may be present in forensically important blow flies, and may therefore be important to the post-CI. The current study was designed to test volatiles emitted from Calliphoridae eggs.

In this study, the attractiveness of inter- and intraspecific eggs to adult flies was investigated. A y-tube was used to present individual males and females of each species with a choice between egg clusters of each species and blank controls, and the preference recorded. The results help elucidate the mechanism for oviposition choice and timing, and help characterize the pre-colonization interval.

Entomology, Diptera, Calliphoridae