G72 Effects of Resource Age and Sterilization on the Attraction of *Cochliomyia macellaria* (Fabricius) and *Chrysomya rufifacies* (Macquart)

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After attending this presentation, attendees will understand the attraction of two forensically important blow flies, *Cochliomyia macellaria* (Fabricius) and *Chrysomya rufifacies* (Macquart) (Diptera: Calliphoridae), to different resources. This presentation will also serve to educate attendees about the roles bacteria on dead tissue serve to attract flies.

This presentation will impact the forensic community by demonstrating the need to exercise caution in estimating the period of insect activity (PIA) because of the different rates of colonization by different species. By understanding differences in colonization between species, more accurate period of insect activity (PIA) estimates may be developed.

C. macellaria and *C. rufifacies* are two species of forensically important blow flies whose interaction is important to understanding both their behavior and their impact as evidence in forensic investigations. When both species are present on decomposing animals or bodies, *C. rufifacies* larvae commonly prey on *C. macellaria* larvae. Furthermore, studies on carrion succession suggest that *C. macellaria* is a primary colonizer of carrion, while *C. rufifacies* is a secondary colonizer. However, these studies have all provided only anecdotal conclusions about their colonization behavior.

Blow flies locate carrion primarily through odor signals given off by the decomposing tissue which combine with visual cues to attract flies to a resource. Female flies use these signals to locate the most suitable oviposition location. The aim of this study was to examine the preference of *C. macellaria* and *C. rufifacies* for resources at different

ages of decomposition; to determine if fly preference is due to the microbial content of the resource; and to determine if bacteria isolated from the resource is attractive to blow flies.

A Y-tube olfactometer was used in these experiments. In the first experiment, males and females of both species were allowed to choose between fresh and 3-day old beef liver. The second experiment consisted of testing the preference between sterile and non-sterile beef liver of different ages. In the final experiment, both species were given the choice between sterile nutrient agar and agar colonized with bacteria from the liver. Initial choice, choice after 5 minutes, and residence time at each resource was recorded in each experiment.

Chi-square analyses of the data indicate no significant preference in either species to a resource based initial response. Therefore, final response (i.e. after 5 minutes) was tabulated. *C. macellaria* and *C. rufifacies* exhibited significant preference for fresh liver and 3-day old liver, respectively. Closer analyses of the data indicate males of both species demonstrated a significant preference, but females did not. For experiment two, neither initial nor final choice showed a significant difference between species. Finally, neither species exhibited a significant preference between sterile agar and agar treated with bacteria.

T-test analysis of residence time provided similar results to those determined with the Chi-square tests. Both species spent a significant amount of time at a particular resource. *C. macellaria* resided a significant amount of time on fresh liver while *C. rufifacies* had a greater residence time on 3-day old liver. Additionally, both species spent a significantly greater amount of time on the bacteria and agar than on the sterile agar.

The results from the first experiment support the assumptions that *C. rufifacies* is a secondary colonizer and *C. macellaria* is a primary colonizer. While only anecdotal information was previously available, the data collected in these studies provide a better understanding of the behavior of these blow flies. In some cases, succession data are used to estimate the PIA. For instance, these data are useful in the case of predicting sequence of colonization by *C. macellaria* and *C. rufifacies*. Data from the studies indicate that odors from decomposing remains as well as associated bacteria might be regulating attraction and colonization by these species.

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