



## Pathology Biology Section – 2009

### **G66 The Activity of *Calliphora vicina* (Diptera: Calliphoridae) Can Alter the Morphology and Presumptive Chemistry of High Impact Bloodstains**

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After attending this presentation, attendees will have a better understanding of fly artifacts, their importance when interpreting and reconstructing a crime scene, and practical applications in locating and identifying fly artifacts.

This presentation will impact the forensic community by increasing knowledge of outside influences, specifically *Calliphora vicina*, on crime scenes and the means of using this knowledge to make more accurate scene reconstructions.

The study being presented examined the effect of *Calliphora vicina* on high impact bloodstain patterns and to test presumptive blood tests that could be used to differentiate between blood spatter and fly artifacts.

The experiments were conducted in microscenes (.46 m<sup>3</sup> wooden boxes) that had two walls of glass and a ceiling of plexiglass to facilitate observation and photography. Interchangeable inserts were made to allow for surface changes in the microscenes. Surfaces used in this study were combinations of indoor materials commonly found at crimes scenes. Combinations of white linoleum with white textured and painted walls (Combination 1), wood floor laminate with a wallpapered wall (Combination 2), and mid-grade carpet with light hued paneling (Combination 3) were used to demonstrate surface texture and its effect on the flies' ability to feed and deposit artifacts. High impact bloodstains were made from fresh (within 5 minutes of drawing) human blood on two walls and a pool was formed on the floor. The flies were placed in holding cages that attached to the microscene. This design provided an opportunity for the flies to choose to enter the microscene. Flies entered the microscene within 30 minutes with combinations 1 and 2. They entered the microscene within 60 minutes with combination 3. The flies remained in the microscenes for 48 hours. After they were removed, measurements, photo documentation, and presumptive chemical tests were performed. Four commonly used presumptive blood tests were used: phenolphthalein, Hemastix<sup>®</sup>, leucocrystal violet, and fluorescein.

The deposition of artifacts was evenly distributed between floor and wall surfaces within a microscene. Both male and female flies fed on the blood and deposited artifacts. Artifacts could range from completely clear, consisting mainly of water, to completely opaque, consisting mainly of blood. Regurgitation was the most common method of deposition, but defecation did occur. Regurgitated artifacts were generally small, 1-2 millimeters, with little or no tail. Defecated artifacts were of similar size to the regurgitated but generally had a tail from a few to over 20 mm in length.

There was no difference in reaction time between blood spatter and artifacts when using phenolphthalein, Hemastix<sup>®</sup>, and fluorescein. The reaction times with leucocrystal violet were generally similar although increased reaction time was seen in some instances. Artifacts that consisted of less blood fluoresced under a blue/green light when viewed through an orange filter without chemical enhancement.

#### **Forensic Entomology, Insect Artifacts, Blow Fly**