A175 *Lucilia sericata* and Their Effect on the Morphology and Presumptive Chemistry of Medium Impact and Pooled Bloodstain Patterns

Larry Barksdale, MA, Lincoln Police Department, 575 South 10th Street, Lincoln, NE 68508; Amanda Fujikawa, MS, University of Nebraska- Lincoln, 202 Entomology Hall, Lincoln, NE 68583-0816; and David O. Carter, PhD, University of Nebraska-Lincoln, Department of Entomology, 616 Hardin Hall, Lincoln, NE 68583-0996*

After attending this presentation, attendees will have a better understanding of insect stains, their importance in bloodstain pattern analysis, and practical applications of locating and identifying insect stains.

This presentation will impact the forensic science community by increasing knowledge of confounding variables, specifically the activity

of Lucilia sericata, on bloodstain patterns and the means of using this knowledge to make more accurate scene reconstructions.

Bloodstain pattern analysis can give insight into many events of a crime scene. However, bloodstain patterns can be altered in the presence of insects. To address this problem, we conducted an experiment to test the effect of *Lucilia sericata* on medium impact and pooled bloodstain patterns and to assess presumptive blood tests for differentiating between blood spatter and insect stains.

The experiments were conducted in microscenes (.46 m^3 wooden boxes) that had two glass walls and a plexiglass ceiling 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. Medium impact bloodstains were made from fresh (within five 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 provided an opportunity for the flies to choose to enter the microscene. The flies were provided access to the microscenes for forty eight hours at a temperature of 22 ºC ± 2 ºC. Flies entered the microscene within two hours with combinations 1 and 2. They entered the microscene within 3 hours with combination 3. After they were removed, measurements, photo documentation, and presumptive tests were performed. Five commonly used presumptive tests were used: phenolphthalein, Hemastix®, leucocrystal violet, fluorescein, and an alternate light source.

Lucilia sericata fed from the pooled bloodstains but left little physical evidence of feeding. *Lucilia sericata* added insect stains through regurgitation and defecation of consumed blood but no artifacts were deposited on the carpet (Combination 3). Defecation was the most common source of insect stains. *Lucilia sericata* formed defecatory trails of artifacts that indicated directionality. No evidence of tracking was observed. There was no difference (< 2 seconds) in the reaction times between blood and insect stains tested with phenolphthalein, Hemastix®, leucocrystal violet, and fluorescein. However, defecatory artifacts fluoresced under light at 465 nm when viewed through an orange filter (Marumi, 58 mm, YA2) with no added chemicals. Thus, insect stains differ with different surfaces and textures and *L. sericata* will likely only form insect stains within 48 hours of the formation of bloodstain patterns without the presence of an additional food source.

Insect Stains, Bloodstain Pattern Analysis, Fly Spots

 ** Presenting Author*