

Forensic Entomology and Crime Scenes

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This mini-paper will discuss issues on the subject of forensic entomology as it relates to crime scenes and the forensic entomologist as an expert witness. Forensic entomology is the study of insects in criminal investigations, usually death investigations (Amendt, Campobasso, Gaudry, & Reiter, 2007). An important use of forensic entomology is to determine how long a deceased person found at a crime scene has been dead. This is called the post mortem interval or PMI (Haglund & Sorg, 1997). Establishing the approximate time of death is of great importance for the prosecution of murder cases because the accused may offer an alibi defense.

The crime scene may extend beyond that of the obvious. Take an example of a dead body dumped in a ditch alongside a country road. The immediate area around the body would likely be considered the crime scene; but, what of the routes ingress and egress? Is it possible that the culprits moved the body using a motor vehicle; could not the vehicle leave tire prints on the shoulder of the road or in mud going to or from the crime scene? Could entomology artifacts or other entomological evidence have been disturbed, contaminated, or lost? Fly pupae and puparia collected at crime scenes that are not associated with human remains, but from other decomposing material may cause an erroneous PMI estimate (Archer, Elgar, Briggs, & Ranson, 2005).

Identification of the crime scene is important. Forensic science begins in the field (Almog, 2006). In the example above, the dump site is likely a primary crime scene, while the routes of egress and ingress are likely secondary crime scenes. In the case where a person was killed in one place, and the body deposited somewhere else, there are multiple crime scenes associated with the same crime. These scenes taken together are known as a macroscopic crime

scene. Trace evidence, such as residue on a body, are known as microscopic crime scenes (James & Nordby, 2005).

Even though forensic entomology has been in use since 1855, the ignorance and skepticism of its uses and investigative potential by investigators and coroners remains (Haglund & Sorg, 1997). To the unskilled eye, damage caused to soft tissue by insects may appear to be wounds inflicted by an assailant. Forensic entomology can be used to identify damage caused by postmortem insect infestation from wounds caused perimortem. Forensic entomology can also assist investigators by using developmental changes of fly eggs and larva found on a body to help determine an estimate of PMI. One study revealed that blow fly egg age can be determined within two hours of their true age when the evidence is identified and examined properly (Tarone, Jennings, & Foran, 2007).

To be of prosecutorial value, the evidence obtained by the forensic entomologist must be introduced at trial. Accordingly, the entomologist must be recognized as an expert witness. It is commonly accepted that the role of the expert witness is to assist the trier of facts in understanding the specific scientific or medical issues (McHenry, Biffel, Chapman, & Spain, 2005). Generally, before a person can testify as an expert witness, the person must be qualified as an authority with respect to the subject matter (Federal Rules of Evidence 702, 2000). Three broad issues in this regard are of concern. First, whether the science or information of the testimony involved is based on generally accepted principles in the scientific community (Frye v. U.S., 1923). Second, whether expert testimony is based on information that has been based on scientific method rather than on uncorroborated conjecture (Daubert v. Merrel Dow Pharmaceuticals, Inc., 1993). Third, whether or not the witness is qualified to the satisfaction of

the court to have scientific, technical, or other specialized knowledge of the subject matter (Federal Rules of Evidence 702).

In a 1970 appeal of a murder conviction, the Defendant attacked the testimony of Doctor Bryant Rees, an entomologist at Fresno State College, who, at the request of the pathologist, examined the larvae found on the body in order to fix the time of death. The Doctor testified that the larvae were of the black blow fly, that these blow fly larvae pass through three larval stages, and that he was able to determine their exact stage of development. He also explicated that the minimum growth period for the larvae between inception and maturity at 99 degrees temperature is four days, and the maximum period at 58 degrees temperature is fifteen days. He further explained that by applying a series of averages or norms, he concluded that the eggs had been laid about three and one-half days before the body was discovered. The California Court of Appeals found that the lower court did not abuse its discretion when it found that Dr. Rees, through accepted scientific methods, was able to ascertain the exact stage of development of the larvae found on the decedent's body (People v. Clark, 1970). Other jurisdictions have also held that the testimony of properly qualified forensic entomologists is admissible to establish PMI (Pasco v. State, 1990 & Simmons v. State, 2006).

Forensic entomology can be an effective tool in determining PMI and distinguishing soft tissue damage done to bodies by insects from those caused by other means. The ability to recognize, document, collect, preserve entomological evidence at crime scenes is essential to its proper use and admissibility. Because blow flies are the first insects to colonize human remains (Haglund & Sorg, 2002), the study of their larvae development through incremental instars is valuable in determining PMI. Forensic entomology has been found to be scientifically acceptable

and properly qualified forensic entomologists are eligible to give opinions as experts regarding PMI and the effects of insect infestation on soft body tissue.

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