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Perspective

Importance of Insects in Identifying the Criminal Cases of Forensic Entomology

Jeffrey Carlos*

Department of Criminology, Chiang Mai University, Chiang Mai, Thailand

ABOUT THE STUDY

Forensic entomology is the use of insects and their arthropod relatives that live in decaying remains to aid in legal investigations. Forensic entomology typically identifies insects and other arthropods associated with human cadavers and determine the time and place of death. Time of death can often be determined by obtaining ambient temperature and other weather conditions from the day before the crime scene and correlating this information with developmental rates of major extant arthropod species. The location where the crime was committed is different from the location where the crime was discovered, and may also be determined by the presence of unique arthropods of known distribution that do not include the area where the body was discovered. Investigators carefully collect insect evidence of arthropods representing taxa with unique geographic features that influence their distribution in other crimes (e.g., drug shipment sources, criminal offenses, the origin of the vehicle, and other accessories used for the crime).

Forensic entomology is divided into three distinct areas forensic (medicolegal), urban, and stored product pests. The forensic (medicolegal) field focuses on criminal elements related to insects found eating or found on human carcasses. These insects are called macrophages or carrion. The urban field of forensic entomology has both civil and criminal elements. The insects covered in this section feed on both living and dead. Investigators examine skin patterns. Marking is caused by the insect's lower jaw and can be mistaken for marking abuse. A forensic entomologist may be called an expert witness in a civil damages lawsuit. A final area of forensic entomology is pests in preserved products. This area focuses on insects found in food. A forensic entomologist may also be called in as an expert witness in this field.

They can be called in for either a civil or a criminal case that involves food contamination. Insects have been helping forensic scientists solve crimes for centuries. The first incident ever recorded described how the murderer of a farmer was found, by observing the activity of blow flies that were attracted to the murder weapon, resulting in a confession. Forensic science has continued to use the vital clues provided by the invertebrate world. Many insects help forensic scientists in their detection efforts, but two groups are of particular importance in most cases, flies (Diptera) and beetles (Coleoptera). Flies produce larvae that live in semi-liquid media and can consume organs and tissues from carcasses. When the carcasses are mostly depleted, various types of beetles also go to the scene to continue processing. In addition, other invertebrates will then colonize the area within, above, around, and on the bottom of the carcass. Forensic entomology also helps determine how long a person or animal has been dead, or the post-mortem interval. Researchers can determine this with the help of insects by studying insect development. Certain insects specialize in growing on decomposing bodies. When the body dies, a series of physical and biological changes occur. The corpse is said to be in various stages of decomposition. These different stages of decomposition attract different insects at different times.

One of the first insects to settle into a freshly dead body is the blowfly. Blow flies are microphagous (they feed on corpses or carrion) and may arrive anywhere within a few minutes or a few hours of death. Knowledge of blow flies and their ecology can assist in forensic detection work. Scientists are also trying to use this type of successional development to evaluate the time of death using microorganisms, many of which are responsible for decomposition changes that develop on a dead body.

Correspondence to: Jeffrey Carlos, Department of Criminology, Chiang Mai University, Chiang Mai, Thailand, E-mail: carjeffery@edu.th

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