E35 A Maggot in the Justice System

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The goal of this presentation is to provide attendees with an overview on a number of entomological tools that may be helpful in solving crime. The research presented here is novel and maybe useful to both law enforcement and the judiciary when conducting an enquiry.

This presentation will impact the forensic science community by highlighting to what extent forensic entomology can aid in crime solving. Forensic entomology is regarded as the "gold standard" for estimating time since death.

Based on the experience of any scientist everything is falsifiable and facts are but fleeting moments on a sliding scale. To the lawyer the Forensic Entomologist (FE) like many experts presents an interpretation of an event(s) based on an existing set of principles interpreted in the context of expertise and past training. Of course the result is a probability not a certainty. Experience with many lawyers is they do not really understand what is done in analyses. This paper will hopefully enlighten the judiciary of a number of recent and informative research studies.

Forensic entomology is the study of insects pertaining to legal investigations. The occurrence of decomposing remains within an environment provides a temporary habitat and food resource opportunity for numerous insect species. Insect succession patterns are also closely linked to the progression of carcass decomposition and as such, while a continuous process, decomposition can be defined into distinct stages which are linked to specific insect groups used as markers for the estimation of postmortem interval (PMI). The following topics concerning PMI that will be briefly discussed include:

Other Useful Insects Attracted to Cadavers - This study considered annual, seasonal and shorter-term variation in patterns of insect succession onto decomposing remains at two contrasting locations in Western Australia, *bushland* and *agricultural*. Forensically relevant data detailing the seasonal pattern of insect succession onto decomposing remains for Western Australia are briefly discussed. An additional focus of discussion has been directed towards Hymenopteran parasitoids that frequent decomposing remains and parasitise Diptera colonisers. Parasitoids can be used to provide an extended PMI timeframe in cases where traditional forensic indicators have completed their development

Restricted Access Environments - This research was conducted in two parts, insect accessibility into trash containers and vehicles. Bodies dumped in trash containers or suicide victims ensconced in vehicles how do they decompose and most importantly for the FE what insects are involved in the decomposition process. Most suicides conducted in vehicles happen in isolated areas where the vehicle is parked in wooded areas for the purposes of concealment. Decomposition rates are compared between the pig in the vehicle and two other pigs (one pig sacrificed by CO poisoning and the other by head bolt) decomposing under normal conditions. A model has now been determined which adequately explains how temperatures change in vehicles.

Trash containers are becoming popular repositories for homicide victims but little is known about how bodies decompose in such environments. Research conducted in Knoxville, TN will highlight how humans decompose in wheeled trash containers and the significant disruption to the expected faunal succession.

Entomotoxicology, Drugs, GSR, DNA - Finally, a brief overview of an alternate detection method for gunshot residue (GSR). This research involves blowfly larvae as analytical specimens for the detection of GSR. The results indicate the detection of lead, antimony and barium and suggest bioaccumulation of these elements within the larvae.

Entomotoxicology, Decomposition in Restricted Environments, Developmental Life Cycles

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