



Pathology/Biology Section - 2015

H99 Factors Related to Body Temperature From Scene to Autopsy: Implications for Forensic Entomology

Michelle R. Sanford, PhD, Harris County Institute of Forensic Sciences, 1885 Old Spanish Trail, Houston, TX 77054*

After attending this presentation, attendees will better understand the temperature variation experienced by insect larvae during death investigations. These temperature variations represent an underestimated source of variation that occurs during transport and storage of the body prior to autopsy. This information is important to the calculation of the heat energy units (Accumulated Degree Hours (ADH)) that the developing insects use to complete their developmental milestones. These milestones are used by forensic entomologists to determine insect age, Time Of Colonization (TOC), and ultimately to generate an estimate of minimum Postmortem Interval (PMI_{min}). Heat energy as measured by temperature over a lower developmental threshold can be used by the insect toward growth and developmental progression. Hence, knowledge regarding the temperature history of the developing insect larvae is critical to accurate TOC estimation.

This presentation will impact the forensic community by improving accuracy in the calculation of TOC by more accurately accounting for the temperatures experienced by the developing larvae prior to collection. One assumption often made during the calculation of ADH is that when the body is stored in the morgue cooler, the temperature is below the 50.0°F/10.0°C lower developmental threshold assumed for most flies. Thus, no growth is assumed during cooler storage; however, the data to be presented will show that there is not only an extended cooling period for the body before it drops below the threshold temperature in the cooler, but that under some circumstances the body may never drop below the lower developmental threshold for the insect larvae.

Small temperature sensors were placed with bodies during transport and storage to investigate a variety of cases involving various stages of decomposition, insect activity, scene temperatures, scene location, nearest local weather station temperature, and decedent characteristics (e.g., weight, age, primary cause of death). These factors were used to develop a preliminary regression equation to analyze the importance of these factors on the amount of time that a body may stay above 50.0°F/10.0°C before insects can be collected during autopsy. These data are regularly collected by the medical examiner's office and hold potential to be used to adjust for transport and storage temperatures during casework. Forensic entomologists are often sent specimens collected during or after autopsy from which to estimate a TOC. A better understanding of the factors affecting body cooling and temperatures when insect growth might occur during transport and storage will aid in improving the accuracy of TOC and PMI_{min} estimates.

Time of Colonization, Minimum Postmortem Interval, Accumulated Degree Hours