



## Pathology/Biology Section - 2016

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### H116 Indoor vs. Outdoor Forensic Entomology: Exploring the Differences, Challenges, and Opportunities of Indoor Scenes

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After attending this presentation, attendees will better understand the differences, challenges, and opportunities presented by indoor forensic entomology scenes and cases.

This presentation will impact the forensic science community by highlighting this understudied area of forensic entomology casework, which will allow for more thorough observations at scenes and more intensive evaluation of forensic entomology reports of indoor scenes. This presentation will also highlight areas for future research in the area of forensic entomology.

Forensic entomology in the medical examiner's office involves the collection, identification, and evaluation of insects and related organisms from decedents whose deaths are being investigated by the medical examiner. These cases often involve the collection of insects that have colonized decomposing decedents during the course of the medicolegal death investigation and need not be limited to homicide investigations but can include any manner of death. Estimation of the Time Of insect Colonization (TOC) of human remains can be used to estimate the Postmortem Interval (PMI) for the decedent.<sup>1</sup>

In this presentation, forensic entomology casework data from indoor scenes analyzed by the Harris County Institute of Forensic Sciences (HCIFS) will be presented, highlighting several areas of interest to the interpretation of forensic entomology specimens and data. The forensic entomology cases from January 2013 through June 2015 consisted of 67% indoor scenes, 31% outdoor scenes, and 2% from hospitals (myiasis cases), illustrating the large percentage of indoor scenes. The presence of the body indoors significantly influences the insect community, the temperatures experienced by the insects, and the potential interpretation of TOC and how accurately it reflects the PMI. Humans typically alter the temperature of the indoor environment through the use of heating, air conditioning, or by other means, illustrating the potential difficulty in using weather station data to approximate indoor temperatures when calculating the development of the colonizing insects. The presence of the body indoors has been suggested as a cause of delayed colonization; however, the impact of this delay in practice is unknown, particularly when factors such as hoarding or pets are introduced to the scene.<sup>2-4</sup> Case data from indoor scenes also present the opportunity to use differences in insect community composition to potentially identify movement of decedents.<sup>3-5</sup> In Harris County, TX, flesh flies (Sarcophagidae), including the commonly encountered species *Blaesoxipha plinthopyga*, were encountered in 52.5% of forensic entomology cases (N=139 through June 2015). Sarcophagidae were encountered in 94.5% of cases from indoor scenes and only 5.5% were from outdoors. Phoridae, including the scuttle fly, *Megaselia scalaris*, were found in 37.4% of the forensic entomology cases for this same period and were encountered in 96.2% of the cases from indoor scenes and only 3.8% of the cases from outdoors. Blow flies (Calliphoridae) were encountered in 64.0% of the forensic entomology cases, 55.1% of the cases from indoor scenes, and 44.9% of the cases from outdoor scenes. This suggests that under certain circumstances, finding Sarcophagidae and/or Phoridae on a body indoors or outdoors might indicate possible body movement and the possibility of an additional scene.

The abundance and importance of indoor scenes has become evident in the forensic entomology casework analyzed by the HCIFS. Indoor scenes present new challenges and opportunities not only for methods development and research but also for more intensive observation of insects at indoor scenes and more critical interpretation of forensic entomology reports based on indoor scenes.

#### Reference(s):

1. Catts E.P., Goff M.L. Forensic entomology in criminal investigations. *Annu Rev Entomol* 1992;37:253–72.
2. Anderson G.S. Comparison of decomposition rates and faunal colonization of carrion in indoor and outdoor environments. *J Forensic Sci* 2011;56(1):136–42.
3. Bugelli V., Forni D., Bassi L.A., Di Paolo M., Marra D., Lenzi S., et al. Forensic Entomology and the Estimation of the Minimum Time Since Death in Indoor Cases. *J Forensic Sci* 2015;60(2):525–31.
4. Reibe S., Madea B. How promptly do blowflies colonise fresh carcasses? A study comparing indoor with outdoor locations. *Forensic Sci Int* 2010;195(1-3):52–7.
5. Pohjoismäki J.L.O., Karhunen P.J., Goebeler S., Saukko P., Sääksjärvi I.E. Indoors forensic entomology: Colonization of human remains in closed environments by specific species of sarcosaprophagous flies. *Forensic Sci Int* 2010;199:38–42.

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#### Sarcophagidae, Phoridae, Decomposition

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