



Physical Anthropology Section – 2008

H31 Basement Bodies: The Effect of Light on Decomposition in Indoor Settings

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The aim of this presentation is to introduce participants to the specific aspects of decomposition in indoor ambient with conditions involving access to insects but no or minimal access to light. During the presentation, examples of a serial homicide case of bodies found in the cellar will be demonstrated for comparative purposes, and the accuracy of their PMI estimation will be discussed.

This presentation will impact on forensic sciences by making attendees aware of the importance of light as a variable, and the potential danger of bias in the estimation of postmortem interval (PMI) for human remains found in advanced stages of decomposition in basement settings such as cellars, subterranean vaults, metros, tunnels, caves, or crypts.

The review of forensic entomology studies indicated that maggot development is almost entirely dependent on the ambient air temperature, but is nevertheless reduced in sunlit areas. Fully developed maggots are further recorded as largely sensitive to direct sunlight, resulting in the higher succession of shaded body parts. Since the impact of maggot masses on decomposition process in a mostly dark indoor ambient is unknown, the author hypothesized that given the favorable temperature conditions for larvae development, the remains exposed to the indoor ambient with no or minimal access to light will decompose faster than the remains exposed to direct sunlight or shaded indoor areas with same temperatures.

Inasmuch as pig as an animal model is an acceptable substitute for human cadavers, three *Sus scrofa* ranging from 18 to 20 kg were used in the experiment. Pig carcasses were placed on purpose built flat steel mobile platforms on three levels of a building with identical humidity and room temperature throughout the experiment. The main animal model was in the cellar with no access to the light. Second controlled carcass was on the next level with natural exposure to daylight cycle, and the third controlled model was constantly exposed to light either natural or artificial. The study lasted from 03 May 2007 until 25 June 2007 when signs of skeletonization were shown on all pig models. Experiment control procedure included observations of decomposition at various times of day for the sample exposed to natural light; during the day for sample exposed to constant light, and during the night for sample in the cellar. Internal body temperature and insect activity was recorded regularly. Body mass was weighted by sliding the platforms with carcasses into immediate floor drive-thru scales to minimize disturbance. Average indoor temperature conditions were assumed in the experiment; temperature was controlled by air-conditioning system at 15°C constant, and humidity of 40% was controlled by humidity generator.

General patterns of decomposition to include bloating, deterioration, disintegration and the decay were observed on the samples. Fly succession on all three floors was noted within fifteen minutes from the start of the study with the subsequent insect succession following the familiar pattern. A significant site of insect activity was recorded on the main carcass in the cellar that decomposed considerably faster than the two control samples. Insect succession did not follow the usual pattern of preference to body openings. Maggot masses were noticed on all parts of the carcass allowing the succession to proceed relatively evenly. A sixteen day difference in decomposition was noted between the main and the first control sample exposed to natural day and night cycle, and the 22 days difference with the second control sample exposed to the light throughout the experiment.

In addition to other variables that cause alterations to PMI estimation, changes introduced by the effect of light in indoor ambient must be considered, particularly with bodies found in basement settings. For this reason principles of decomposition patterns in dark indoor ambient for the purpose of PMI estimations are recommended across the board for medico-legal investigators.

PMI, Indoor Decomposition, Light