A73 An Analysis of Clothed Pig Proxies (*Sus Scrofa*) When Cold Temperatures Are Present in Central Illinois

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Learning Overview: After attending this presentation, attendees will better understand the decompositional changes that occur when clothed, buried pig proxies are subjected to the cold temperatures and weather conditions of central Illinois.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing preliminary insights of cold temperature effects on the decomposition processes of clothed specimens that have been placed in shallow and deep burials by using dismembered pig proxies in place of human cadavers.

Relatively little is known on how cold temperatures and associated weather conditions influence the rate and processes of decomposition on buried remains. Understanding how these factors influence taphonomic variables is important due to the presence of winter weather phenomena across the world. When ambient temperatures drop to below 37°F, decomposition is usually reduced or can be halted. Few studies have been conducted to track the quantitative and qualitative decompositional changes that occur to human and/or animal remains when cold temperatures (<37°F) and winter weather conditions (i.e., snow, sleet, ice, frost) are present over the course of several months. It was hypothesized that the freezing temperatures of central Illinois would inhibit the taphonomic process of buried pig remains, and, after a period of four months, those placed in deep burials would be in an earlier stage of decomposition than those in a shallow burial.

From early January to early May 2018, a total of four adult partial pig specimens labeled A–D were buried at depths of 6 inches (shallow burial) and 18 inches (deep burial) below the ground surface. Specimens consisted of the hind legs of domestic pigs (*Sus scrofa*), which were cut into thirds prior to burial. None of the four specimens had been frozen prior to the experiment. Each proxy was comprised of skin, fat, muscle, bone, and bone marrow and would be close in comparison to a dismembered human limb. All four specimens were wrapped individually in a single white cotton t-shirt prior to burial, with A and C placed at 18 inches and B and D placed at 6 inches below the ground surface. After taking initial photographs and measurements (i.e., circumference and weight), specimens were buried at the testing site located in Normal, IL. A thorough examination was conducted on specimens A and B after two months, and then after four months on specimens C and D. During this time, specimens were photographed, weighed, measured, and written observations on insect activity and weather data (i.e., temperature, humidity, precipitation) were gathered. Weather data were also obtained daily from the United States Weather Service for Normal, IL. Decomposition stage scoring was based on Galloway and colleagues' methodology with some modification: fresh, early decomposition, advanced decomposition, and skeletonization.[1]

At the two-month interval, specimen B (6 inches) appeared relatively fresh, which was in contrast to specimen A (18 inches) that appeared paler in color with the soft tissue beginning to liquefy. At the four-month interval, specimen C (18 inches) was completely liquefied with maggots on the external surface of the t-shirt. In contrast, specimen D (6 inches) had fewer maggots than specimen C as well as a less advanced stage of liquefaction in which the skin, muscle, and fat were still discernable. Specimens at 18 inches experienced more marked evidence of decomposition after two and four months compared to their counterparts buried at 6 inches. This was evident by a greater percentage loss in weight and an increase in circumference due to the continued breakdown of tissues.

Based on this study's results, which contradict previously conducted studies on burial depth, the hypothesis was rejected. Burial depth in geographic regions with prolonged cold ambient temperatures, such as central Illinois, plays a role when using clothed pig proxies. Findings suggest that when cold ambient temperatures are present, an increase in burial depth correlates to an advanced rate of decomposition. Ultimately, while the examination of buried pig proxies allows for a better understanding of real-world decomposition processes of dismembered limbs, the use of human cadavers would provide the most valuable insight of the decomposition process in these settings.

Reference(s):

1. Galloway, A., Birkby, W., Jones, A.M., Henry, T.E., Parks, B.O. 1989. Decay rates of human remains in an arid environment. *Journal of Forensic Sciences* 34(3): 607-616.

Forensic Taphonomy, Decomposition, Cold Temperatures

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