H80 Using the Freeze-Thaw Cycle to Determine the Postmortem Interval: An Assessment of Pig Decomposition in West Central Montana

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The goal of this presentation is to educate attendees about the variables of human decomposition in west central Montana during the freeze-thaw cycle of winter and spring. Previous decomposition studies have found that temperature is the most influential factor on the rate of decomposition; however systematic research in cold, dry climates has yet to be conducted. West Central Montana represents a climatic region characterized by cold winters and hot, arid summers. This presentation provides information from the second half of a two-part systematic study conducted on two *Sus scrofa* in west central Montana.

This presentation will impact the forensic science community extending the knowledge and comprehension of decomposition patterns in an array of geographic climates. Establishing the postmortem interval, or PMI, is one of the most important factors used when attempting to identify human remains for the medicolegal field as it can establish the time period and context surrounding a death. The study of human decomposition is crucial to understanding the postmortem interval, and outdoor human decomposition has been most notably assessed at the Anthropology Research Facility at the University of Tennessee in Knoxville, an area characterized by warm temperatures and high humidity.

This study investigated the decomposition pattern of pig carcasses during the freeze-thaw cycle of winter, spring, and summer in west central Montana. Data collection focused on the particular physical changes associated with colder temperatures and the decomposition stasis that occurs during the late fall and winter months. The preliminary findings suggest the stasis that occurs during periods of subfreezing temperatures can result in an inaccurate assessment of decomposition and an imprecise estimation of the PMI. Analysis of the pattern of the decomposition cycle after the spring thaw was carried out to assess differential patterns of previously frozen remains.

This baseline project suggests that the rate at which a body becomes frozen during the freeze-thaw cycle of the Montana winter and spring alters the expected decomposition pattern. These observations can be used to differentiate between remains that experience the freeze cycle quickly as opposed to remains that experience a delayed freeze. This

indicates whether or not remains had become exposed to taphonomic forces before or after the onset of subfreezing temperatures in this region. To establish an accurate postmortem interval in west central Montana the impact of the freeze-thaw cycle and the unique decomposition patterns associated with delayed and rapid freezing of remains must be understood.

Decomposition, Freeze-Thaw Cycle, Postmortem Interval

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