



## Physical Anthropology Section – 2009

### H98 A Study of the Human Decomposition Sequence in Central Texas

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After attending this presentation, attendees will understand the decomposition sequence for human remains found in the context of this study in the late spring and early summer seasons of South Central Texas. Professionals regularly involved in investigations of unidentified remains will benefit from the decomposition information and visuals presented.

This presentation will impact the forensic community by establishing a preliminary decomposition baseline for human remains in Central Texas and regions of similar climate and geography. This study provides the forensic community with the foundation for a new and original data source tailored to specific environmental conditions and compared against previously published descriptive and quantitative studies.

Understanding the human decomposition sequence from varied geographic locations provides those charged with the investigation of unidentified human remains a tool for more accurately estimating the postmortem interval. Attendees of this presentation will gain insight into the timing and mechanisms of the decomposition sequence for human remains found within the context of this study during the late spring and early summer seasons of South Central Texas. Professionals regularly involved in time since death estimations of unidentified remains found in outdoor settings will benefit from the decomposition information, timelines, and visuals presented.

The outdoor decomposition of human remains involves a suite of complex, highly variable processes. Early processes including autolysis, putrefaction, and insect activity are dependent on environmental conditions, particularly temperature and humidity. Other decomposition processes, such as animal scavenging, are also site specific to the local environment and its faunal constituency. Due to such dependencies, a "one size fits all" decomposition model is unrealistic. It is imperative that ecologically distinct regions establish specific benchmarks by conducting controlled analyses that consider local conditions. Although retrospective and experimental human decomposition studies have established decay rates for specific eco-locations, such studies have been limited and primarily confined to the Southeastern and Southwestern United States. In Central Texas similar studies have been performed using pigs (*Sus scrofa*) and other nonhuman substitutes; however, no study to date has utilized intact human remains. This report provides summarized data from the first controlled field study involving human remains at the Forensic Anthropology Research Facility, Texas State University-San Marcos.

A donated human cadaver was placed at the open-air laboratory and regularly observed over a ten-week period. Data collected included the visual assessment of the stages of decomposition, insect specimens and observations of insect activity patterns, and weather conditions recorded at the permanent weather station located at the research facility. Additionally, the data were utilized to test a recently developed quantitative method for estimating the postmortem interval. Although two unexpected events occurred during the study, general results indicate a high degree of similarity with decomposition studies originating in the Southwestern United States, as well as preliminary support for a quantitative approach.

The purpose of this study was to establish a preliminary decomposition baseline for human remains in Central Texas and regions of similar climate and geography. This study provides the forensic community with the foundation for a new and original dataset—one tailored to these specific environmental conditions, and compared against previously published descriptive and quantitative studies. Further research is critical for the continued refinement of this initial study, and future studies should include observations in different seasons and varying depositional and burial contexts.

In addition to presenting the results of this study, the authors will briefly report on the current state of the Forensic Anthropology Research Facility, the largest and newest open-air decomposition laboratory in the world, and the third facility in existence explicitly utilizing donated human remains along with the University of Tennessee at Knoxville, and Western Carolina University. Expansion, construction, and current and future services will also be outlined, as will ongoing and future research designs which will build upon and complement this project to provide a better overall picture of the human decomposition sequence in Central Texas.

#### Decomposition, Postmortem Interval, Accumulated Degree - Days