H3 Decomposition in the Santa Monica Mountains: A Seasonal Taphonomic Analysis of Buried and Exposed Remains

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This poster represents many of the taphonomic processes at work in the Santa Monica Mountains. This ecosystem is representative of a specific type of climatological area found in Los Angeles County as well as southern Africa, southwestern Chile, southwestern Australia, and the Mediterranean. Aattendees will gain insight into the seasonal differences in decay rates of both buried and exposed remains.

As the first study of its kind in the greater Los Angeles area, this presentation will impact the forensic community and/or humanity by providing much needed data to law enforcement and coroner agencies in Los Angeles. Inaccurate assessment of the postmortem interval is counterproductive to the expeditious manner in which these agencies attempt to identify decedents who are found in Los Angeles County, particularly in the mountainous environment of the Santa Monica region.

Taphonomic studies allow scientists to more accurately estimate postmortem interval, making identification and investigation proceed more smoothly. The process of decomposition may be categorized into five stages: fresh, early decomposition, advanced decomposition, skeletonization, and extreme decomposition [2]. The duration of each stage is greatly influenced by many factors including: temperature, humidity, burial, soil type, trauma, and clothing [4].

Several studies have been done on postmortem interval in specific areas of North America including Galloway 1997; Galloway *et al*. 1989; Komar 1999; Mann *et al*. 1990; Rhine and Dawson 1998; Rodriguez and Bass 1983; Schoenly *et al*. 1991; Shalaby *et al*., 2000; Shean *et al*., 1993. However, due to the variation in local rates of decay, these studies are of limited utility outside the local geographic and climatic regions in which they are conducted. This study involved collection of data of decomposition rates in one climatic and geographic region of Los Angeles County, in order to more accurately determine postmortem interval in this area.

A 16-month field study was conducted on decomposition and scavenging rates in the Santa Monica Mountains (located in Los Angeles County, California). This area has a Mediterranean microclimate, involving relatively high daily temperatures, little rainfall, and both large and small scavenging animals. This microclimate is found only in the Santa Monica Mountains, southern Africa, southwestern Chile, and southwestern Australia. Due to their approximate human body size, their skin texture, and relative hairlessness, domestic pigs (*Sus scrofa*) were used as human models in this decomposition study. A total of eight pigs were used, two placed during each season; one pig was left on the surface, secured inside a chain link cage to prevent removal from the site by animal scavengers. The second pig was buried in a shallow grave 2 feet below the surface. This was done to document decomposition differences between seasons as well as between buried and exposed remains.

Significant differences were noted in decomposition rates between the spring and summer surface pigs. The two sets of pigs took approximately the same time to reach the advanced decomposition stage, but the spring pig reached skeletonization far more quickly than the summer pig despite the greater heat during the summer. The fall pig remained in the early stages of decomposition four times longer than either the spring or summer pig, and carnivores ended this experiment when they extracted the pig from the cage and removed it from the site.

The buried pigs fell victim to carnivore activity as well, although the timing of their excavations varied significantly. The spring pig spent 10 weeks underground, the summer pig a mere four days, and the fall pig two weeks. Differences in extraction times are possibly due to the soil porosity during the time of interment, with the pigs buried in moister, and hence denser, soil, remaining buried for longer periods of time. These specimens experienced adipocere formation as well, although it is unclear whether the adipocere development was due to moisture content or duration of interment. Data collection for the winter pigs is still underway, although winter decomposition rates appear similar to those of spring and summer (possibly due to a lack of rainfall this year).

The unexpected tenacity of the coyote population proved problematic, although the placement of the pigs does not appear to have attracted additional scavengers into the area, as the fall pig remained in the ground for two weeks, and the winter pig showed no signs of carnivore activity for more than five months.

As well as providing pertinent data to Los Angeles County decomposition rates and how they compare with rates documented in other areas of North America, this study also demonstrate the significant differences in decomposition rates seasonally within one microclimate. Additional studies are suggested to address this issue.

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Forensic Anthropology, Taphonomy, Decomposition

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