A41 The Decomposition of Child-Sized Remains in Different Depositions

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After attending this presentation, attendees will be better acquainted with the specific environmental factors that influence seasonal decomposition.

This presentation will impact the forensic science community by presenting the significant environmental factors that affect decomposition during each season.

Thirty-seven *Sus scrofa* (16 juvenile and 21 fetal) remains were obtained fresh from the North Carolina State University (NCSU) swine farm in the summer, fall, winter, and spring months. The traditional calendar for the start of each season was used as the initial day of placement from summer 2013 to spring 2015. Juvenile pigs were used as a proxy for human children up to 9 years of age (35-50 pounds) and fetal pigs were used as a proxy for human neonatal remains (4-6 pounds). Two juvenile pigs were placed on the surface each season, one fetal pig was placed in a plastic bag, and the other fetal pig was wrapped in a baby blanket. From spring 2014 to spring 2015 (5 seasons), a third fetal pig was placed on the surface as a control. All remains were enclosed in cages to prevent scavenging.

Total Body Score (TBS) was used to record decompositional observations. Accumulated Degree Days (ADD) were calculated from daily maximum temperature with data obtained from the State Climate Office of North Carolina Lake Wheeler Road Field Lab weather station located one-half mile from the open-air site. In addition to daily temperature, daily precipitation, relative humidity, fly activity, soil temperature, and soil moisture were collected.

A mixed random coefficients model, which is useful for analyzing repeated measures, was used to examine the relationship between the dependent (ADD) and independent variables (TBS, daily temperature, daily precipitation, soil temperature, soil moisture, and deposition). All statistical analyses were performed using JMP® Pro 12.1. For the fall season, TBS, deposition, fly activity, and relative humidity were not significant effects in the fetal remains (*deposition* (bag, blanket) DFNum = 2, DFDen = 116, F ratio = 0.107, Prob >F = 0.956; *relative humidity* DFNum = 1, DFDen = 116, F ratio = 57.469, Prob > F = 0.470; *fly activity* DFNum = 1, DFDen = 116, F ratio = 0.086, Prob >F = 0.770; *TBS* DFNum = 1, DFDen = 116, F ratio = 1.99, Prob >F = 0.160;); however, daily precipitation, soil moisture, and soil temperature were significant at the <.0001 level. The juvenile remains followed the same pattern in the fall as the fetal pigs with the only significant effects being daily precipitation, soil moisture, and temperature. For the spring, all variables were significant (0.01-0.0001 level) with the exception of the fly activity for the fetal remains (*p*-value = 0.119). The juvenile remains displayed a different pattern with TBS, soil moisture and temperature as significant factors in the spring. Summer yielded a different pattern with only two significant effects for fetal remains (*soil temperature* DFNum =1, DFDen = 104, F ratio = 7.27, Prob >F = <.0082; *soil moisture* DFNum =1, DFDen = 104, F ratio = 19.69, Prob >F = <.0001) and only TBS (*p*-value = 0.05) for the juveniles. Winter also showed a different pattern with TBS, deposition, fly activity, and soil moisture having significant effects (*TBS* DFNum =1, DFDen = 140, F ratio = 90.20, Prob >F = <.0001; *Deposition* DFNum =2, DFDen = 140, F ratio = 4.77, Prob >F = <.0099; *fly activity* DFNum = 1, DFDen = 140, F Ratio = 9.77, Prob>F = 0.002; *soil moisture* DFNum =1, DFDen = 201, F ratio = 70.87, Prob >F = <.0001). For the juvenile remains, only TBS and soil temperature were significant effects in winter (*TBS* DFNum =1, DFDen = 54, F ratio = 42.03, Prob >F = <.0001; *soil temperature* DFNum =1, DFDen = 54, F ratio = 17.50, Prob >F = <.0001).

Results demonstrate that size has a significant impact on the pattern of decomposition and further support the importance of seasonal and geographic-specific indices for estimating the postmortem interval. This project was supported by a National Institute of Justice grant.

PMI, Decomposition, Seasonal