H130 Methods for Recognizing, Collecting, and Analyzing Vulture Evidence in Forensic Contexts Obtained Through GPS Tracking and Long-Term Scavenging Research

Lauren R. Pharr, MA, Louisiana State University, Dept Geography & Anthropology, 227 Howe-Russell Geoscience Co, Baton Rouge, LA 70803*

After attending this presentation, attendees will be aware of the 14 skeletal and contextual traits indicative of prior vulture scavenging and how such data can be used to more accurately estimate the Postmortem Interval (PMI). Additional data will be provided regarding methods for determining vulture scavenging from other sources of skeletal trauma during laboratory analysis of the remains.

This presentation will impact the forensic science community by providing new criteria for recognizing vulture-scavenged remains and for differentiating the skeletal marks caused by vultures from those left by other animal scavengers as well as the peri-mortem trauma inflicted by humans. Furthermore, this is the first forensic study to use satellite telemetry, or animal Global Positioning System (GPS) tracking, to help explain the taphonomic processes of vulture scavenging.

Vultures are the world's only obligate scavengers and are known to scavenge humans and accelerate decomposition, yet methods for recognizing, collecting, and analyzing vulture evidence from forensic contexts do not exist.[1-3] To address this problem, vulture taphonomic data were collected from controlled decompositional studies as well as from 10 months of trapping and GPS tagging of vultures at the Texas State Forensic Anthropology Research Facility (FARF) and surrounding areas.

Over a two-year period, 43 uncaged juvenile pigs were placed across 6,000 km^2, dozens of animals were used to bait a vulture trap, and 52 vultures were housed and monitored for 10 days. Results from these studies, combined with the ongoing hourly monitoring of five vultures fitted with 70-g solar Argos/GPS PTT-100 tracking devices, provide comprehensive insight into how vultures scavenge and reveal that vulture scavenging is influenced largely by the birds' physiology and their need to liftoff and soar post-scavenging.

These physiological limits of vultures appear taphonomically. Vultures often began scavenging by pulling the internal organs and soft tissues out and away from the ribs and spine, leaving the heavy and less nutritious vertebral column behind. A total of 14 taphonomic characteristics were observed in relation to vulture scavenging, and each is related to the biology and soaring behavior of the bird. The key traits for recognizing vulture scavenging are an intact vertebral column and down (plumulaceous) feathers left at the site. The down feathers can be used to both identify the species of bird and more accurately estimate the PMI.[4]

Although variation does exist in vulture scavenging behavior both over time and between different-aged vultures, certain traits indicative of vulture scavenging were present regardless of the type of bait being scavenged. Reoccurring similarities were observed in the vulture scavenged juvenile pigs, the animals used to bait the vulture trap, and the human cadaver scavenged by vultures and depicted in the 2012 presentation by Mavroudas and colleagues.[5]

The results from this study will allow investigators to make more informed decisions about when to include vulture scavenging into assessments of the crime scene, PMI estimations, and trauma analysis associated with unidentified human remains. Vultures accelerate decomposition, so if their scavenging is unaccounted for, then PMI estimates may suggest an overestimate in the amount of time between death and discovery, and the marks left by vultures may be misinterpreted as peri-mortem trauma inflicted by a human.

Support for this research was provided by the National Science Foundation (NSF) Doctoral Dissertation Research Improvement Grant (PD 98-1352) and the Louisiana State University (LSU) West-Russell Award. The findings and opinions to be presented are those of the author and not necessarily those of either the NSF or LSU.

References:

1. DeVault TL, Reinhart BD, Brisbin IL, Rhodes OE. Flight behavior of black and turkey vultures: Implications for reducing bird-aircraft collisions. J Wildl Manage 2005;69(2):601-08.
2. Spradley MK, Hamilton MD. Spatial patterning of vulture scavenged human remains. Forensic Sci Int 2012;219(1-3):57-63.
3. Reeves NM. Taphonomic effects of vulture scavenging. J Forensic Sci 2009;54(3):523-28.
4. Dove CJ, Koch SL. Microscopy of feathers: A practical guide for forensic feather identification. J Am Soc Trace Evidence Examiners 2010;1(1):15-61.

 ** Presenting Author*

5. Mavroudas SR, Wescott DJ, Spradley MK, Hamilton MD, Stull KE The Forensic Anthropology Center at Texas State. P Am Acad Forensic Sci 2012.

Vulture Scavenging, Taphonomy, GPS Tracking

