H34 The Unique Biodiversity of Avian and Mammalian Carrion Scavengers in Southern Illinois and Their Effect on Decomposition Rate and Pattern

Megan K. Cleary, BA, D.C. Martin, MA, and Gretchen R. Dabbs, PhD, Southern Illinois University, Department of Anthropology, 1000 Faner Drive, MC 4502, Carbondale, IL 62901*

After attending this presentation, attendees will be aware of the unique biodiversity of the faunal assemblage in southern Illinois and how it affects the rate and pattern of soft tissue decomposition in the region. Those involved in human remains recovery and investigation will benefit greatly from the information and visuals presented.

This presentation will impact the forensic science community by highlighting the previously unknown differences between the faunal assemblages of southern Illinois and other regions housing forensic anthropology research facilities. Furthermore, this presentation will demonstrate how these unique assemblages can affect the rate and pattern of decomposition, further supporting arguments for multiple outdoor research facilities in various environments.

Scavengers can alter or destroy evidence pertinent to the cause and manner of death, destroy or scatter remains, and cause taphonomic effects that could potentially mimic trauma. Within specific microenvironments unique assemblages of mammalian and avian scavengers affect decomposition rates and patterns. Thus, it is imperative to study local fauna and the specific effects that they can have on both soft and hard tissues. Studies of scavenger behavior will aid in efforts to locate and recover dispersed remains, interpret the relative time the scavenging took place, and distinguish between faunal and other modifications on soft tissue and skeletal elements.

This study utilized a sample of 12 pigs (*Sus scrofa*) obtained from the Southern Illinois University-Carbondale (SIUC) Swine Center. Each pig was humanely euthanized with a 15mm captive bolt gun (approved by the SIUC Institutional Animal Care and Use Committee) and all were scheduled to be euthanized due to illness or trauma. Once euthanized, the animals were immediately brought to the Complex for Forensic Anthropology Research for placement. Pig size ranged from approximately 1-64kg (nursery-15 weeks). Seven carcasses were buried (25-46cm). Five carcasses were placed on the surface in a mix of sun and shade (two frozen, three fresh). Subjects were placed at CFAR during two trials (October and December 2010) to assess seasonal differences. The five surface subjects were covered in 18-gauge wire mesh allowing scavengers access the subject from all angles, but preventing them from carrying off the entire carcass. Daily observations of the subjects were made by one of the authors and multiple measures of collection were used (Total Body Score, photographs, and written personal observations). Site-specific temperature data were recorded by iButton Link thermochrons (DS1921G). Motion-activated cameras were used to take still images and video of research subjects in the absence of the authors. All subjects were exposed for nine months before skeletal elements were cleaned and assessed for taphonomic damage.

Results show a multitude of scavengers feeding on the subjects beginning on the first day after placement for up to six months, with some evidence that feeding occurred even later. The most commonly observed species were the turkey vulture (*Cathartes aura*), Virginia opossum (*Didelphis virginiana*), and several species of rodent such as the eastern woodrat (*Neotoma floridana*). There is also moderate evidence of the common coyote (*Canis latrans)*, bobcat (*Linx rufus*), and white-tailed deer (*Odocoileus virginianus)* being involved in the scavenging process.

Each species affected the decomposition rate and pattern of the subjects differently. This is clearly visible in the time of scavenger onset. Rodents and the opossum were present early, while the turkey vulture appeared after and seemed to be present only on the warmer days of the colder months. While rodents would gnaw on several small areas of the carcass, turkey vultures would rip apart the limbs of the subjects and abscond roughly 10m away to imbibe the flesh from the bones. The opossum was seen entering into the body of the carcass through the anal cavity to remove visceral tissue. Though the surface subjects were scavenged sooner, in some cases six months sooner, all subjects exhibited evidence of scavenging. The rate of decomposition was most affected by the turkey vulture and opossum, both accelerating the decomposition process by removing large quantities of flesh, thus exposing more carcass surface area to environmental and entomological elements. After skeletal elements were cleaned, characteristic light scores with flat floors were witnessed most prominently from rodent scavengers, while deep furrows and punctures point to possible carnivore or vulture damage. The bones collected exclusively from the vulture scatter pattern exhibit deep punctures, furrows, and multiple fractures.

It is clear that the southern Illinois region displays a unique biodiversity of scavengers that could affect the rate and pattern of decomposition, and possibly hinder a criminal investigation or positive identification. Further research is needed in this area and is currently ongoing at CFAR.

Taphonomy, Scavenging, Forensic Anthropology

 ** Presenting Author*