



Physical Anthropology Section - 2014

H58 How Black-Billed Magpie Scavenging Can Skew Postmortem Interval Estimates in Western Montana

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After attending this presentation, attendees will understand how estimates of Postmortem Interval (PMI), utilized from several current methods, are not appropriate for remains that have been scavenged by facultative black-billed magpies in western Montana and, therefore, should not be used.

This presentation will impact the forensic science community by challenging forensic anthropologists to elevate their knowledge of micro-environmental and regional taphonomic patterns and paradigms, especially those that incorporate the estimation of postmortem intervals.

The PMI in Montana is difficult to establish, as most of the data sets and methods developed to estimate the PMI have been developed for only a few bioclimatic zones. Bodies found deceased in Texas, Indiana, or Florida, for example, will decompose at a different rate than bodies in Montana. Applying the same PMI methods to all climatic zones will likely result in inaccurate estimates of PMI. Likewise, the condition or environment in which the body is discovered (e.g., water submersion, mummified, hanging, burial, burned) can also affect the PMI estimation.

In order to examine the decomposition processes in western Montana, three pig (*Sus scrofa*) cadavers (SS1, SS2, and SSC, the control cadaver) were placed in a research facility on a ranch just outside of the Missoula, Montana, city limits from August 1, 2011 through August 20, 2012, in two separate micro-climates (full sun versus full shade). Data from the decomposition process, climatic variables, entomological activity and Black-billed Magpie scavenging were observed for over one year. Researchers involved in determining stages of decomposition for estimating PMI need to be cognizant of the taphonomic impacts avian scavengers can have on the decomposition process. The research goal was to determine what variables had the biggest effect on the decomposition specimens in this study. All three cadavers advanced from the fresh stage of decomposition to the advanced stage of decomposition within nine days, at which time desiccation in the form of mummification took place. Full skeletonization did not occur, but after 120 days at least 50% of the skeletal remains were visible on SS1; after 250 days at least 50% of the skeletal remains were visible on SS2; and, at no point did SSC experience skeletonization. The Black-billed Magpies were almost wholly responsible for the skeletonization process.

The hypothesis posited is predicated on the supposition that cadavers that are placed outdoors in the hot, semi-arid environment of western Montana, in August will mummify rather than advance to the skeletonization stage without the aid of avian or terrestrial scavengers.

Several studies have been conducted on obligate avian scavengers (vultures), but there has never been a study on how the facultative Black-billed Magpie scavengers affect decomposition and, consequently, skew the PMI. In this study, it was impossible to prevent avian and small rodent scavenging without making alterations to the enclosures. As this was a longitudinal study looking for the variables that effect decomposition, scavenging was allowed to take place on SS1 and SS2, but prevented from accessing SSC, which was used as the control cadaver. The considerable influence of Black-billed Magpie scavenging on the decomposition process in this research study demonstrates that future studies need to consider what scavenging species are in the environment, both spatially and temporally, and where a human body may be found. Avian and terrestrial scavenging accelerate decomposition to such an extent that the PMI estimates can be thrown off by days, months, or even years. For the most accurate estimations of PMI, all naturally occurring variables such as scavenging need to be included in decomposition studies.

The greatest observation from this research is that there are too many stochastic variables to consider in each bioclimatic zone to attempt to make a broad statement about taphonomic "universals." In closing, the only way to accurately estimate a PMI is to incorporate all variables that effect decomposition. It is our responsibility as forensic scientists to continually look for better answers, to toss out outdated methods, and open our minds to new methods.

Black-Billed Magpie Scavenging, Postmortem Interval, Decomposition