**Inferring predator identity from skeletal damage of small-mammal prey remains**

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**ABSTRACT**

**Questions:** Do predator-derived small-mammal skeletal assemblages record statistically distinguishable predator-specific damage signatures? Can a given skeletal assemblage of unknown origin be correctly attributed to a specific predator based on skeletal damage? Has the type of predator responsible for creating the Holocene faunal sequence at Homestead Cave, Utah, remained constant over the depositional history of the record?

**Data incorporated:** Two data sets were compiled from published counts of small-mammal skeletal material recovered from modern scatological assemblages produced by a variety of predators from around the world. One data set contained skeletal part frequencies, whereas the other contained proportional fragmentation information. Skeletal part frequencies and proportional fragmentation data were also compiled for 15 strata spanning the Holocene from Homestead Cave, Utah.

**Method of analysis:** Principal components analysis and discriminant function analysis with cross-validation of predator classification success rates.

**Conclusions:** Modern small-mammal skeletal assemblages produced by owls are reliably differentiable from those produced by diurnal raptors and mammalian carnivores. Owl-produced assemblages are characterized by a low frequency of fragmentation and the survival of a high proportion of fragile skeletal specimens, whereas assemblages produced by diurnal raptors and mammalian carnivores exhibit increased bone destruction and a residual concentration of teeth. The ability to perform species-specific predator identifications is not supported, but skeletal damage patterns are extremely useful for identifying the general type of predator responsible for creating a skeletal concentration of unknown origin, with classification success rates of 70–100%. Finally, application of the method indicates that owl prey were the dominant source for skeletal material over the entire depositional history of the Holocene Homestead Cave record.

**Keywords:** Homestead Cave (Utah), discriminant function analysis, paleoecology, predation, principal components analysis, skeletal damage patterns, small mammals, taphonomy.

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