Study explores violent world of raptors

November 25 2009

A journey that started with a box of bird feet carried three Montana State University graduate students into the gruesome world of raptors and led to their findings being published in a prominent journal.

Normally focused on dinosaurs, the students compared the claws and killing methods of four types of raptors and published a paper about their research in the Nov. 25th issue of PLoS One, a scientific journal published online by the Public Library of Science. The birds of prey that were studied live in North America and Europe and include eagles and hawks, owls, osprey and falcons.

"It was very surprising that it wasn't done before," lead author Denver Fowler said of the study.

"It was a very interesting project," said Elizabeth Freedman, one of two co-authors. "People just haven't noticed some of these things before."

Fowler, Freedman and John Scannella -- all MSU graduate students who conduct paleontology research in MSU's Museum of the Rockies -- planned to investigate a box of raptor feet stored in the museum, Fowler said. The feet were preserved by Cynthia Marshall Faux, a former postdoctoral researcher at the university. The graduate students thought that examining the feet was a small project they could do over spring break a few years ago, but it took far longer and became much more involved than they expected.

By the time they finished, they were immersed in a violent world where

some raptors dismember their prey and eat them alive. Depending on the type of raptor, the birds of prey break necks, pry open body cavities, pierce internal organs and strike killing blows.

Fowler and his co-authors examined hundreds of raptor claws, photographs and videos to understand raptor-prey interactions. They measured the length and curvature of claws, then compared them. They surveyed preserved skins and mounts in MSU's ecology department, the Museum of the Rockies and the American Museum of Natural History.

They learned that talons varied in shape and size among families of raptors, and that this was related to differences in killing technique. All raptors hold small prey inside their feet and immobilize them by constriction. Owls only tend to eat small prey, so they have feet and claws specialized for high grip strength, making them more efficient constrictors, Fowler said.

Hawks and eagles have specially enlarged talons, which evolved to restrain large, struggling prey by embedding deep, keeping an anchor hold while the raptor stands on top, and immobilizing prey by dismemberment.

Falcons only use their talons to prevent their prey from escaping, Fowler continued. They generally strike their prey at high speeds, then use a "tooth" on their beak to break its neck or crush the head.

Osprey have talons that are large, highly curved and nearly uniform, especially good for catching fish.

The most surprising find was that no one had conducted such a study before they did, Fowler said. Lots of research has been done on feathers and flying, but not on the predatory technique of raptors. Maybe it's because raptors are hard to track and observe in the air, Fowler added.

Studying raptor claws fills a need in raptor research, but it may also apply to dinosaurs, Fowler said. He added that the findings published in PLoS laid the groundwork for their follow-up study. That study takes what they have discovered about raptor claws and behavior and applies it to carnivorous dinosaurs.

Freedman said, "It's often helpful to look at modern species and make comparisons to how dinosaurs may have behaved."

Source: Montana State University (news : web)