

Mammoth moms heavily invested in offspring

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Details about the life of a young woolly mammoth that died thousands of years ago are emerging from a study of the animal's fossil tusk. One intriguing finding: the calf nursed from its mother six or more years, apparently depending on the calorie-rich milk to survive in harsh, arctic conditions.

A research team from the University of Michigan, Wrangel Island State Preserve and the University of Minnesota will present the results of their tusk analysis Saturday (Oct. 22) at a meeting of the Society of Vertebrate Paleontology (SVP) in Mesa, Ariz. The researchers also will discuss their findings today at a news conference organized by SVP.

"Like the tusks of modern elephants, mammoth tusks were ever-growing, adding a thin layer of dentin (ivory) each day of the animal's life," said U-M graduate student Adam Rountrey, a member of the research team. Over weeks and years, changes in the rate and conditions of growth also produced visible layering. By analyzing these layers, Rountrey and coworkers were able to reconstruct the mammoth's growth history and estimate how many years it lived.

The tusk's chemistry helped fill in other details. The researchers analyzed protein extracted from tusk layers and measured the ratios of different forms (isotopes) of carbon and nitrogen in the tusk. These chemical clues can reveal what type of plants a mammoth ate, whether or not it was nutritionally stressed and, as this new study shows, if it was nursing from its mother.

"Milk has a higher proportion of heavy nitrogen and a lower proportion of heavy carbon than the plants a mammoth might eat, and these differences should show up in the tusk of a nursing calf," Rountrey said. The research team's results suggest that weaning took place gradually over at least four and a half years and possibly six or more years.

"That compares with an average of about five years for African elephants at weaning," said co-author Daniel Fisher, who is the Claude W. Hibbard Collegiate Professor of Paleontology and a professor of geological sciences and of ecology and evolutionary biology at U-M. "Independent of this study, I had some indication that calving intervals for these mammoths could be as long as seven years. In African elephants, weaning age often corresponds to calving interval, so that suggests we might be on the right track."

It also appears that the mammoth calf was feeding on high-fat "early milk" during the first year recorded in its tusk, which probably represents the third year of the animal's life, as about two years' worth of tusk tip is missing.

The study "provides a new understanding of the lives of young mammoths," Fisher said. The harsh arctic conditions in which the young animals lived probably required long-term supplementation of their diet with mother's milk.

Rountrey and Fisher collaborated on the project with Sergey Vartanyan of Wrangel Island State Reserve and David L. Fox of the University of Minnesota.

Source: University of Michigan

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