

Ice Age extinction claimed highly carnivorous Alaskan wolves

June 21 2007

The extinction of many large mammals at the end of the Ice Age may have packed an even bigger punch than scientists have realized. To the list of victims such as woolly mammoths and saber-toothed cats, a Smithsonian-led team of scientists has added one more: a highly carnivorous form of wolf that lived in Alaska, north of the ice sheets.

Wolves were generally thought to have survived the end-Pleistocene extinction relatively unscathed. But this previously unrecognized type of wolf appears to have vanished without a trace some 12,000 years ago.

The study, which will be published in the June 21 online issue of *Current Biology*, combined genetic and chemical analyses with more conventional paleontological study of the morphology, or form, of the fossilized skeletal remains. This multifaceted approach allowed the researchers to trace the ancient wolves' genetic relationships with modern-day wolves, as well as understand their role in the ancient ecosystem.

“Being able to say all of those things—having a complete picture—is really unusual,” said lead author Jennifer Leonard, a research associate with the Smithsonian Genetics Program, and currently at Uppsala University in Sweden.

The researchers extracted mitochondrial DNA from the fossil wolf bones preserved in permafrost and compared the sequences, called haplotypes, with those of modern-day wolves in Alaska and throughout

the world. The fossils showed a wide range of haplotypes—greater in fact than their modern counterpart—but there was no overlap with modern wolves. This was unexpected.

“We thought possibly they would be related to Asian wolves instead of American wolves because North America and Asia were connected during that time period. That they were completely unrelated to anything living was quite a surprise,” Leonard said.

The result implies that the Alaskan wolves died out completely, leaving no modern descendents. After the extinction, the Alaskan habitat was probably recolonized by wolves that survived south of the ice sheet in the continental United States, Leonard said.

The ancient Alaskan wolves differed from modern wolves not only in their genes, but also in their skulls and teeth, which were robust and more adapted for forceful bites and shearing flesh than are those of modern wolves. They also showed a higher incidence of broken teeth than living wolves.

“Taken together, these features suggest a wolf specialized for killing and consuming relatively large prey, and also possibly habitual scavenging,” Leonard said.

Chemical analyses of the bones back up this conclusion. Carbon and nitrogen isotope values of the Alaskan wolf bones are intermediate between those of potential prey species—mammoth, bison, musk ox and caribou—suggesting that their diet was a mix of these large species.

The cause of Pleistocene extinction (called the “megafaunal” extinction because of the large size of many of its victims) is controversial. It has been variously blamed on human hunting or climate change, or on a combination of factors as the Ice Age waned.

For the specialized Alaskan wolves, the story is perhaps less complicated. “When their prey disappeared, these wolves did as well,” Leonard said. But the results of this study also imply that the effects of the extinction were broader than previously thought. “There may be other extinctions of unique Pleistocene forms yet to be discovered,” she added.

Source: Smithsonian

Citation: Ice Age extinction claimed highly carnivorous Alaskan wolves (2007, June 21)
retrieved 1 May 2024 from
<https://phys.org/news/2007-06-ice-age-extinction-highly-carnivorous.html>

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