

Mammoth dung clue to extinction

By Victoria Gill

Science reporter, BBC News



Mastadons and other megafauna left traces of dung in ancient lake beds

Mammoth dung has proved to be a source of prehistoric information, helping scientists unravel the mystery of what caused the great mammals to die out.

An examination of a fungus that is found in the ancient dung and preserved in lake sediments has helped build a picture of what happened to the beasts.

The study sheds light on the ecological consequences of the extinction and the role that humans may have played in it.

Researchers describe this development in the journal *Science*.

The study was led by Dr Jacquelyn Gill from the University of Wisconsin, Madison, in the US.

She and her colleagues studied the *Sporormiella* fungal spores contained in the sediment deep within the bed of Appleman Lake in Indiana.

Many very large mammals including mammoths, mastodons, ground sloths and giant kangaroos inhabited forests in this area of North America about 20,000 years ago.

Sporormiella produces spores in the dung of large herbivores. These are then preserved in the layers of mud and can provide an index of the number of these animals, or megafauna, that roamed the environment at a particular time.

"Sediment cores are much like ice cores, except with lake mud," explained Dr Gill. "The spores [and other materials] settle out into the lake mud and get buried over time."

She and her team simply counted the pollen, charcoal and Sporormiella in these layers of mud, tracking the timescale of ancient environmental changes.

Their results showed a slow decline in megafauna that began about 15,000 years ago and appeared to last for about 1,000 years.

This discovery rules out one idea that the extinction might have been caused by an extraterrestrial object striking Earth 13,000 years ago.

The scientists also spotted signals of major environmental changes around the time of the extinction.

"This study is exciting because we're getting some solid data about the ecological consequences of the removal of these animals," said Dr Gill.

"After their decline we see an increase in the more warm-adapted deciduous trees, and an increase in charcoal [which means there was] an increase in the number of forest fires.

"So we can see that the forest is reassembling following the extinction."

Human or environment

The study also shows that the decline began about 1,000 years before the Clovis period - when the archaeological record shows that humans were making the tools specifically to hunt large animals.

Prior to this discovery, some scientists believed that Clovis people hunted the animals to extinction.

But Professor Christopher Johnson from James Cook University in Queensland, Australia, said that the study still supports the hypothesis that humans were primarily responsible for the mammals' decline.

Professor Johnson was not involved in the study but wrote an accompanying article in the same issue of Science, outlining its significance.

He wrote: "If people were responsible... they must have been pre-Clovis settlers.

"The existence of such people has been controversial, but archaeological evidence is slowly coming to light."

Dr Gill commented: "We can't resolve the climate versus humans debate but we have eliminated one of the main hypotheses for each camp."

She added that there were "modern conservation implications" to the study.

"We know the large herbivores on the landscape today are some of the most threatened," she said.

"And we're starting to learn that they're ecological keystones. They're not just charismatic, they might also be ecologically significant."

Professor Johnson told BBC News: "If we want to understand the history of ecosystems across the planet we really need to understand the effects of megafaunal extinction."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8368485.stm>

Published: 2009/11/19 19:07:50 GMT

© BBC MMIX