

Research shows lemmings were wiped out by Ice Age's climate change

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(Phys.org)—Small mammal populations across Europe were wiped out multiple times during the last Ice Age, due to an inability to deal with rapid climate change, according the research published today in the journal *Proceedings of the Natural Academy of Sciences*.

Led by researchers at Royal Holloway university, the international team of scientists found that a series of short-lived [warm periods](#) led to inhospitable environments for many cold-adapted animals, leading to a series of collapses in local ecosystems.

The research casts further doubt that humans played a significant role in causing the megafaunal extinction at the end of the last Ice Age – a

period which saw the demise of many of the world's largest terrestrial animals, including woolly mammoth, giant deer and cave bears.

Focusing on a key arctic small [mammal species](#) called the collared lemming, the team analysed ancient [DNA sequences](#) from remains in caves in Belgium and the UK to obtain a picture of how it had evolved over the last 50,000 years. Previously, scientists had believed that this and other [small mammals](#) had been largely unaffected during the last Ice Age, and only disappeared from more southern regions at the beginning of the current warm stage around 10,000 years ago.

"By focusing on a small mammal, we could remove the possibility that humans were having any significant impact on their population size - lemmings are just too numerous and prolific. So any changes in the population had to be linked to wider environmental changes," said project leader, Dr Ian Barnes from the School of Biological Sciences at Royal Holloway.

"While lemmings have an undeserved reputation for leaping off cliffs, in reality they are critical [prey species](#) for many [arctic animals](#)," said lead author Dr Selina Brace at Royal Holloway. "And removing them from the ecosystem would have massive knock-on effects for predators."

Scientists have known for a long time that the Ice Ages led to diversification and speciation in many animals. However, this study is one of the first to demonstrate that the climatic changes that took place during the last Ice Age, were also important drivers for the extinction process.

The results showed that a series of extinctions had taken place in Western Europe, and that each extinction was followed by recolonisation of genetically different lemmings.

"That the lemmings in Western Europe became extinct five times during the last Ice Age is unparalleled among mammals. We were really surprised by this finding," said Eleftheria Palkopoulou from the Swedish Museum of Natural History.

"Our research shows that the modern-day genetic variation in lemmings is just a small fraction of the variation that existed in the past. The amount of diversity that was lost due to these past changes in climate is simply stunning," said Dr Love Dalén from the Swedish Museum of Natural History.

Provided by Royal Holloway, University of London

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