

Arctic Fox May Be Left Behind by Warming

Arctic Fox May Be Left Behind By Warming, Study Suggests

by James Owen for National Geographic News
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Contrary to popular opinion, not all cold-loving animals can simply retreat north in the face of global warming. New research into vanished populations of arctic foxes suggests there is no easy escape route.

Scientists who investigated the fate of arctic foxes living in Europe during the end of the last ice age say the animals most likely died out after becoming isolated by rapidly rising temperatures.

Since arctic foxes are highly mobile animals, the findings don't bode well for other, slower creatures that are sensitive to climate warming, the Swedish-led study team warned. (Related: "Polar Bears Suffering as Arctic Summers Come Earlier, Study Finds" [September 21, 2006].)

"What our results show is that Arctic species don't retreat, they just disappear," said zoologist Love Dalén of Stockholm University.

A team headed by Dalén and Anders Götherström of Uppsala University compared the DNA of arctic foxes in Scandinavia to genetic samples from animals that lived to the south some 20,000 years ago, when the previous ice age was drawing to a close.

If the prehistoric foxes had retreated north as temperatures rose, their DNA should be reflected in current populations in northern Scandinavia, the study team said.

But the genetic analysis of fossil bones unearthed in Germany, Belgium, and western Russia indicated no ancestral link to arctic foxes living today.

Siberian Origins

The researchers found instead that Swedish and Norwegian populations are descended from foxes that had spread thousands of miles west from eastern Siberia as the northern ice sheets melted.

"The arctic foxes in mid-latitude Europe became extinct," the team concludes in the current issue of the journal *Proceedings of the National Academy of Sciences*. "Their genes did not contribute to the make-up of present-day populations."

Clues to the disappearances may come from the way Scandinavian arctic foxes are responding to current climate change, Dalén said.

"What we see is that the populations are decreasing, but they aren't really moving," he said.

Movement is usually driven by high population density and competition for territory. But today numbers are actually falling due to climate-caused impacts, Dalén noted.



"In a decreasing population, which was likely the case when the Ice Age was gone, probably there were lots of empty territories," he said.

So instead of moving to more northerly latitudes, the arctic foxes gained altitude, Dalén suggested, taking to higher areas such as the Alps.

But the killer blow may have been the arrival of red foxes as milder conditions took hold.

Red Invasion

"Red foxes, which are twice the size, could suddenly survive in these areas and out-compete the arctic foxes," Dalén said. "The red foxes probably came in and took over the lowland areas, and the arctic foxes got marooned."

History may already be repeating itself. The recent northward spread of red foxes into polar regions in Europe and North America is being linked to the disappearance of the Arctic species in some regions.

Conservationists say Scandinavia's arctic fox population, with fewer than 200 individuals remaining, now faces serious threat of extinction. Culling of red foxes has been introduced in arctic fox territories.

The study team says its findings have far-reaching implications for understanding how species respond and adapt to climate change, suggesting that many animals could be more vulnerable to global warming than previously thought.

"Arctic species may be unable to track the shifting habitat as the temperature increases," the researchers write. "This may result in losses of genetic variation as local populations become extinct."

Dalén said similar studies are needed, because the ability of a species to follow climate-caused shifts in habitat isn't properly considered when predicting how the creature might respond to future warming.

"Personally, I suspect most Arctic species will behave like the arctic fox," he said. "I would be very surprised, for example, if polar bears behaved differently."

Source: <http://news.nationalgeographic.com/news/2007/04/070409-arctic-foxes>