

# Mice roar message: genetic change happens fast

October 19 2007

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While looks can be deceiving, heredity is revealing, and two scientists who've studied the genetic makeup of a common field mouse report that what's most revealing to them is how fast both genes and morphology can change.

Oliver Pergams, visiting research assistant professor of biological sciences at the University of Illinois at Chicago, and Robert Lacy, population geneticist and conservation biologist at the Chicago Zoological Society, compared the genetic makeup of 115 white-footed mice in the Volo Bog State Natural Area northwest of Chicago using mitochondrial DNA taken from collection samples as old as 150 years and mice collected in recent years.

They found a new type of mouse replaced the old type in Volo Bog between 1976 and 2001.

"The new mice were genetically very different," says Pergams. Structural changes were readily apparent. "Looking at size and shape, the new mice were much bigger and a little flatter."

Pergams and Lacy report the findings in *Molecular Ecology*, Volume 17, now online, and in print in late December.

Pergams and UIC biological sciences professor Mary Ashley reported in 2001 on similar morphological changes in size and shape over the past century of two widely disparate habitats and species -- deer mice on

three different California Channel Islands, and black rats from two Galapagos Islands. While Pergams found these coincidental changes surprising, he said it is too soon to say if this is somehow related to world climate change.

Pergams said the Volo Bog change is best explained by the old mice being replaced by new mice migrating from distinct neighboring populations that are better adapted to survival in the protected bog, which is now surrounded by suburban residential communities.

"This was likely helped by the large environmental changes occurring over the 1976-2001 time period. Replacement with better-adapted genotypes from external populations may be a common way evolution works in an increasingly human-impacted world," Pergams said.

Lacy studies and compares changes of Volo Bog mice both in the wild and in subsequent generations of their offspring raised in his laboratory.

"It was surprising to us to see how fast genetic and physical change could occur even in the wild population," he said.

Pergams said a lesson of the surprisingly fast replacement of the mouse types is not to assume that animal populations are constant. He also said there's a message for environmentalists.

"Humans are changing the global environment at unprecedented rates," he said. "Plants and animals react to these massive environmental changes either by going extinct or [by] adapting very rapidly."

Source: University of Illinois at Chicago

Citation: Mice roar message: genetic change happens fast (2007, October 19) retrieved 25 April 2024 from <https://phys.org/news/2007-10-mice-roar-message-genetic-fast.html>

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