

Climate change makes more shrew species, 70 genetic varieties

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Anyone who went outside this summer felt the effects of climate change. Now the Eurasian shrew, *Sorex araneus*, can say the same. A new study by P. David Polly of Indiana University found that climate change caused shrews to change, genetically, and eventually become different species. Using shrew DNA and fossils, he found that this change occurred over hundreds of thousands of years during repeated times of extreme cold, or glaciations.

Over the last 740,000 years the Earth has gone through eight different glaciation events, with warmer times between them when the ice sheets subsided, called interglacial events – we are currently in one of these now. In Europe and Asia these substantial glaciers diminished the home ranges of the tiny shrews that live there and forced them to congregate in smaller areas called glacial refugia (little refuges from the cold). Polly found that during glacial periods Eurasian shrews went to one of 10 refugia; these refugia served as a means to keep each group of shrews separate from other groups, allowing each group to develop their own distinct genetic signal. When the ice subsided, the shrews all came together again and had little difficulty inbreeding, but they still kept a genetic signal from their refugium. The Eurasian [shrew](#) has gone through this cycle multiple times, corresponding to multiple glaciations events, eventually leading to 70 different genetic varieties!

Since the [glacial periods](#) were more protracted than the interglacial periods, the shrews were in the refugia longer than they were intermixing. The long-term isolation in the refugia has built up enough

genetic differentiation to consider some of these varieties separate species. "The [climate cycles](#) have an important effect on [speciation](#) and genetic differentiation, but it isn't speciation every cycle, but rather two steps forward and one step back," said Polly. Not only does *Sorex araneus* fit this pattern, its more [distant relatives](#) and other small critters seem to fit it too. Polly commented, "The populations that are most easily and completely isolated have speciated, whereas the ones that are isolated in glacial refugia only transiently have lots of diversity, but they haven't speciated." Will future climate change make more shrew species, or fewer? Only time and science can tell.

Provided by Society of Vertebrate Paleontology

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