

# Species in the north are more vulnerable to climate change

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For the first time, researchers have proposed the hypothesis that animals that live in climate zones at a safe distance from both the poles as well as the tropics have the most to gain from acclimating to changes in climate. The findings contradict previous research in the field.

Acclimation means the ability of both animals and plants to adjust their physiology when it gets hotter or colder. In this way, individual organs are able to interact effectively and various processes in the body function optimally in varying conditions.

The common perception has long been that animals and plants that live near the Earth's poles are best at acclimating. This assumption was based on the idea that they have the most to gain from acclimating, due to the large fluctuations in temperature between summer and winter in these regions.

Now this picture is being challenged by new [research findings](#) that demonstrate the opposite. Acclimation is most beneficial at intermediate, temperate latitudes. In Europe, this area corresponds to the regions between southern Spain and northern Germany.

"Seasonal temperature changes are quite marked at intermediate latitudes, but they happen relatively slowly. In this type of [climate zone](#), acclimation is the most effective, as acclimation is often quite a slow process," says Viktor Nilsson-Örtman, a biologist at Lund University in Sweden.

The research findings could change our perception of which species are likely to be most affected by climate change.

"High-latitude species could have a less flexible physiology than previously thought and thus be more vulnerable to climate change," he says.

Together with a colleague from Uppsala, Viktor Nilsson-Örtman studied two species of damselflies. One is native to northern Sweden and one to central Europe. Individuals from both species lived in laboratory environments corresponding to the seasonal climate in northern Sweden and central Europe respectively. The northern Swedish environment featured rapidly decreasing temperatures in the autumn and rapidly rising temperatures in the spring. The central European temperature fluctuations were slower.

The findings show that the central European species is always best at acclimating regardless of the type of climate. But it gains a greater advantage from being able to acclimate in the central European [climate](#) with slow changes.

"Our study shows that acclimation works best at intermediate latitudes. We now need to study more [species](#) from across the globe to see if they do in fact become less adept at acclimating nearer the poles," he says.

According to Viktor Nilsson-Örtman, most previous studies were conducted over a short time and under conditions with very rapid [temperature](#) changes, which rarely correspond to actual fluctuations in nature.

"We ran the study for a long time and under realistic ecological conditions, so it provides a unique insight into how acclimation happens in practice," he says.

**More information:** Viktor Nilsson-Örtman et al. The Rate of Seasonal Changes in Temperature Alters Acclimation of Performance under Climate Change, *The American Naturalist* (2017). [DOI: 10.1086/694412](https://doi.org/10.1086/694412)

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