

# Climate change could benefit northern lizards

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Higher temperatures result in Swedish sand lizards laying their eggs earlier, which leads to better fitness and survival in their offspring, according to research published in the open access journal *BMC Evolutionary Biology*.

The findings indicate that climate change could have positive effects on this population of high-latitude lizard, but the authors warn that climate change is likely to affect a whole suite of traits, in addition to egg-laying date, which together would have an unknown combined effect on survival and reproductive success.

The global climate is changing more rapidly than ever before, with large effects on ecosystems, species and populations worldwide. Some species are able to adjust to these changes by adapting or dispersing to new locations, while others have been removed from their fitness peaks and have decreased in numbers. One of the most frequently reported responses to recent climate change are shifts in timing of lifecycle events, such as emergence from hibernation, migration and breeding (including egg-laying).

Lead author Gabriella Ljungstrom from the University of Gothenburg, Sweden, said: "Shifts in the timing of lifecycle events in response to climate change is widespread, but the crucial question is how this affects an animal or plant's fitness. Are these shifts adaptive and will thus help the population to persist under climate change, or not?"

"For this high-latitude population, our results contrast global projections of extinction risk for lizards as a result of climate change. This highlights the importance of taking spatial differences into account when predicting future effects of [climate change](#) on species and populations."

Lizards rely on external sources of heat to regulate their body temperature, meaning that [ambient temperature](#) has a strong influence on many of their basic physiological functions, as well as on their timing of lifecycle events.

As tropical lizard species currently live in climates very close to their optimal body temperatures, their fitness is predicted to decrease with increasing temperature. In contrast, at high latitudes, warming could bring individuals closer to their optimum temperature and thereby even enhance fitness.

The researchers analysed records of over 350 female Swedish sand lizards (*Lacerta agilis*) over 15 years, and looked at the effects of local temperature on egg-laying date.

Earlier egg-laying is strongly linked to [reproductive success](#) in this species and, through its relationship with hatching date, is also connected to offspring fitness and survival in reptiles at large. Shifts in this trait may therefore have potentially large effects on population survival.

The results showed that female sand lizards laid eggs earlier in relatively warmer years. This means that the females respond adaptively to fairly rapid annual changes in ambient temperature, and indicates that climate warming may have some positive fitness effects in this high-latitude lizard, at least in the short term.

The authors say that having such a long-term dataset of a wild population is rare, especially for a reptile, and is important for understanding how

individuals, populations and species respond in nature today, and are likely to respond in the future.

**More information:** Gabriella Ljungström et al. Sand lizard (*Lacerta agilis*) phenology in a warming world, *BMC Evolutionary Biology* (2015). DOI: [10.1186/s12862-015-0476-0](https://doi.org/10.1186/s12862-015-0476-0)

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