Survival of the oldest

May 3 2016

The oldest surviving species of vertebrates, such as the cane toad and the California sea lion, which have endured past extreme environmental events, will be more likely to adapt to future climate changes than younger species, such as the European hamster, according to a study published in the open access journal *BMC Evolutionary Biology*. These species include those with various color morphs; those which give birth to live young; and/or which live at low latitudes.

Researchers from the University of Lausanne identified which factors render some species more vulnerable to extinction than others, and found that there are large differences in the ability of species to persist over evolutionary time scales. The researchers believe that their findings will be useful for conservationists and help them to predict which species are most at risk from climate change.

Dr. Sylvain Dubey, from University of Lausanne, one of the authors, said: "We have provided a complete picture of the factors shaping the resilience of species. Organisms that have persisted for a long time, and have survived across a wide range of environmental conditions, may be more likely to deal with future modifications of their environment. A recently evolved taxon, in contrast, would not have been tested to the same degree."

Dr Dubey added: "Looking at the history of species survival will help us to predict which ones could be better able to deal with current climate change and to better predict the threat status of species on the red list of the International Union for Conservation of Nature (IUCN)."

The researchers looked at over 600 species from all classes of vertebrates worldwide and did a phylogenetic analysis to consider the evolutionary relationships between species. They tested for an effect on geographic location; reproduction mode; newborn dependence behavior; body size; and color variations between individuals of the same species.

They found that species with varying colored individuals; those that give birth to live young; and/or those that live at low latitudes, were the most resilient to past environmental changes.

Species found at higher latitudes tended to be younger because extinction rates are greater at high latitudes, while low latitudes offer more stable climate conditions. Oviparous species (egg laying organisms) found at higher latitudes also tend to be younger. However, latitudinal distribution had no influence on viviparous species (organisms which give birth to live young), suggesting they are more resilient to cold climates. The evolution of viviparity is associated with species ability to inhabit cold climates.

Body color is a major evolutionary influence as it is involved in behavior and predator-prey interactions, and allows species to exploit a larger range of habitat types. Color polymorphic species (organisms with at least two different colored forms) were older, by an average of 1.86 million years, than species with no individual color variation.

It was previously thought that differences in past climate conditions shaped the age of species, so the ones from the southern hemisphere were older than those from the northern hemisphere. This study refutes previous findings that the hemisphere of origin has an impact on the age of the species.

More information: Laure Cattin et al. Why are some species older than others? A large-scale study of vertebrates, *BMC Evolutionary*

Biology (2016). DOI: 10.1186/s12862-016-0646-8

Provided by BioMed Central

Citation: Survival of the oldest (2016, May 3) retrieved 9 April 2024 from https://phys.org/news/2016-05-survival-oldest.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.