

The effect of climate on age specific survival and senescence in a Hazel Dormouse (*Muscardinus avellanarius*) population in Lithuania, across 1997-2021

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Abstract

It is well known that survival and the dynamics of wild populations are affected by environmental factors. Recent research has found that, among some species of mammal, differences in environmental conditions between populations of the same species translate into changes in infant and juvenile mortality, but not in the rate of senescence ('rate of aging'). This has been confirmed among primates and some species of carnivores, but has not been tested on other taxonomic groups, such as rodents. Here, we analyse age-specific survival and mortality on the most extensive capture-mark-recapture data set on Hazel Dormouse available from Lithuania. We used Bayesian survival trajectory analysis (BaSTA) and tested different models of age-specific mortality. Since the Hazel Dormouse population is in decline across its northern distribution, potentially in response to climate change, we divided the data into three periods to assess changes in survival over time. Regional climate data were obtained from the NOAA data service to test the effect of climatic factors on survival during winter and summer respectively. Our results show that, during all three periods, male life expectancies were longer than those of females. We found that the overall level of mortality was high for all three periods, with lowest mortality during the period 1999 - 2004. We found large differences in juvenile mortality and age-independent mortality between the three periods, but not in adult mortality or in the rate of senescence. This is consistent with previous findings on other mammals, supporting the invariant rate of aging hypothesis.

Keywords

Muscardinus avellanarius, age specific survival, climate effects, senescence, invariant rate of aging

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Author contributions

Thomas Bjørneboe Berg acted as main author.

Fernando Colchero conducted the BaSTA analyses and commented on the manuscript

Owen Jones conducted the modeling and commented on the manuscript

Lene Bech Sanderhoff contributed to datahandling and commented on the manuscript

Rimvydas Juškaitis collected and provided the data and commented on the manuscript

Conflicts of interest

There are no conflicts of interests.