

Demography of the enigmatic low phase in a cyclic lemming population

Dominique Fauteux (✉ dfauteux@mus-nature.ca)

Canadian Museum of Nature <https://orcid.org/0000-0001-5373-8701>

Gilles Gauthier

Universite Laval Faculte des sciences et de genie

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Abstract

Deciphering the mechanism behind the lack of growth during the prolonged low abundance phase of cyclic populations represents a major challenge due to the lack of data. However, long-term capture-mark-recapture datasets can help resolve this question through demographic analyses. We analysed the demography and movements of cyclic brown lemmings on Bylot Island, Canada, with a 16-yr (2004-2019) live-trapping program and looked for inversely density-dependent factors that could contribute to a prolonged low phase. We found that the proportion of females in the population was inversely density-dependent with a strong male-biased sex ratio at low densities but not at high densities. In contrast, survival of adult females was higher than adult males, but both had lower survival at low densities than at high ones. Distances moved by both adult males and females were density-dependent, and proportion of females in reproductive condition was weakly density-dependent. Individual body condition, measured as monthly change in body mass, was not density-dependent. Overall, the strong male-biased sex ratio at very low densities suggests a loss of reproductive potential due to the rarity of females and appears to be the most susceptible demographic factor that could contribute to the prolonged low phase in cyclic brown lemmings. What leads to this sexbias in the first place is still unclear, but indirect evidence suggests that this may be due to a higher vulnerability of nesting females to predation in winter than males.

Full Text

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