Data from: Trait-demography relationships underlying small mammal population fluctuations

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Abstract

Large-scale fluctuations in abundance are a common feature of small mammal populations and have been the subject of extensive research. These demographic fluctuations are often associated with concurrent changes in the average body mass of individuals, sometimes referred to as the ‘Chitty effect’. Despite the long-standing recognition of this phenomenon, an empirical investigation of the underlying coupled dynamics of body mass and population growth has been lacking. Using long-term life-history data combined with a trait-based demographic approach, we examined the relationship between body mass and demography in a small mammal population that exhibits non-cyclic, large-scale fluctuations in abundance. We used data from the male segment of a 25-year study of the monogamous prairie vole, Microtus ochrogaster, in Illinois, USA. Specifically, we investigated how trait–demography relationships and trait distributions changed between different phases of population

fluctuations, and the consequences of these changes for both trait and population dynamics. We observed phase-specific changes in male adult body mass distribution in this population of prairie voles. Our analyses revealed that these changes were driven by variation in ontogenetic growth, rather than selection acting on the trait. The resulting changes in body mass influenced most life-history processes, and these effects varied among phases of population fluctuation. However, these changes did not propagate to affect the population growth rate due to the small effect of body mass on vital rates, compared to the overall differences in vital rates between phases. The increase phase of the fluctuations was initiated by enhanced survival, particularly of juveniles and fecundity, whereas the decline phase was driven by an overall reduction in fecundity, survival and maturation rates. Our study provides empirical support, as well as a potential mechanism, underlying the observed trait changes accompanying population fluctuations. Body size dynamics and population fluctuations resulted from different life-history processes. Therefore, we conclude that body size dynamics in our population do not drive the observed population dynamics. This more in-depth understanding of different components of small mammal population fluctuations will help us to better identify the mechanistic drivers of this interesting phenomenon.

Usage Notes

Males segment of a prairie vole population in Illinois

The data collection was led by Lowell L. Getz and consisted of monthly captures of prairie voles over the period 1972 - 1997. For more details please refer to http://www.life.illinois.edu/getz/index.html . The data contained in data.zip is the part of the data from the overall dataset that was used in the associated paper. Please refer to the ReadMe for an explanation of all columns and files.
Data.zip

References

This dataset is supplement to https://doi.org/10.1111/1365-2656.12627

Location

Illinois

Urbana

Keywords

trait–based demography, population regulation, body mass, trait dynamics, Microtus

ochrogaster, small mammal population fluctuations, Phenotypic Plasticity, Population Ecology, Integral Projection Models

Files

2 files for this dataset

Data.zip	56.50 kB	application/zip
README_for_Data.txt	1.50 kB	text/plain

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