

Demographic dynamics of a neotropical small rodent (*Phyllotis darwini*): feedback structure, predation and climatic factors

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Summary

1

The leaf-eared mouse (*Phyllotis darwini*) exhibits large numerical fluctuations associated with high- and low-rainfall years in semi-arid Chile. Using capture–mark–recapture (CMR) statistical modelling, we provide a detailed description of the demographic variation in this species. We studied between-year and seasonal variation of demography, and tested for the relative importance of endogenous and exogenous factors as covariates of survival, recruitment, maturation and reproduction over a 12-year period.

2

The demographic variables studied show larger between-year than within-year (seasonal) variation, emphasizing the importance of this source of external variability. We found that both feedback structure and exogenous factors operate together on different demographic processes of this species.

3

We found positive direct feedback effects on survival rate and negative feedback on recruitment, fraction of reproductive individuals and female maturation rates. The ratio between barn and magellanic horned owls showed an important effect on most of the demographic variables of leaf-eared mice, in particular by influencing negatively survival rates and the fraction of reproductive individuals, thus suggesting the importance of non-lethal predation.

4

Hence, feedback intrinsic mechanisms (density-dependence), owls and climate (rainfall and Southern Oscillation Index (SOI)) operate simultaneously in determining the demography of leaf-eared mice. We hypothesize that trophic interactions with owls (and perhaps other predators) may cause second-order feedback responses in demography and population dynamics of this small rodent species.