

Second-order feedback and climatic effects determine the dynamics of a small rodent population in a temperate forest of South America

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Abstract

The multiannual cyclic fluctuations exhibited by arvicoline rodents in the Northern Hemisphere have attracted the attention of population ecologists. However, despite the abundant information on small rodent dynamics in South America, there are no studies reporting cyclic population dynamics. Here, we report evidence of cyclic population dynamics in a South American small rodent, the longhaired field mouse (*Abrothrix longipilis*) from southern temperate forests in Chile. The time-series analyses showed that longhaired field mice dynamics are better represented by a second-order autoregressive model characterized by 3-year cyclic dynamics. The 3-year cycles are clearly shown in the autocorrelation factor (ACF) pattern and in the dominant frequency of the spectral analysis. In addition, we determined nonlinear effects of the Antarctic Oscillation Index (AAOI). The results shown here pointed out that we need the integration of studies about cyclic small rodent populations from the different continents and beyond the Northern Hemisphere to resolve the enigma underlying the cyclic population dynamics exhibited by many small rodent species.