

## The Puzzles of Population Cycles and Outbreaks of Small Mammals Solved?

ERKKI KORPIMÄKI, PETER R. BROWN, JENS JACOB, AND ROGER P. PECH

Well-known examples of high-amplitude, large-scale fluctuations of small-mammal populations include vole cycles in the boreal zone of Eurasia, lemming cycles in the high-arctic tundra of Eurasia and North America, snowshoe hare cycles in the boreal zone of North America, and outbreaks of house mice in southeastern Australia. We synthesize the recent knowledge of three key aspects of these animals' population cycles: (1) periodicity, amplitude, and spatiotemporal synchrony; (2) reproduction and survival; and (3) underlying mechanisms. Survival rather than reproductive rate appears to drive rates of population increase during these fluctuations. Food limitation may stop increases of cyclic vole, lemming, and hare populations, whereas the decline from peak numbers is caused by predation mortality. In house mice, without coevolved predators, outbreaks may be driven by rainfall, food supply, and disease.

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