Can outbreaks of house mice in south-eastern Australia be predicted by weather models?

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Abstract

Outbreaks of house mice (*Mus domesticus*) occur irregularly in the wheat-growing areas of south-eastern Australia, and are thought to be driven by weather variability, particularly rainfall. If rainfall drives grass and seed production, and vegetation production drives mouse dynamics, we should achieve better predictability of mouse outbreaks by the use of plant-production data. On a broader scale, if climatic variability is affected by El Niño–Southern Oscillation (ENSO) events, large-scale weather variables might be associated with mouse outbreaks. We could not find any association of mouse outbreaks over the last century with any ENSO measurements or other large-scale weather variables, indicating that the causal change linking mouse numbers with weather variation is more complex than is commonly assumed. For the 1960–2002 period we were only partly successful in using variation in cereal production to predict outbreaks of mice in nine areas of Victoria and South Australia, and we got better predictability of outbreaks from rainfall data alone. We achieved 70% correct predictions for a qualitative model using rainfall and 58% for a quantitative model using rainfall and spring mouse numbers. Without the detailed specific mechanisms underlying mouse population dynamics, we may not be able to improve on these simple models that link rainfall to mouse outbreaks.

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