Population Dynamics – Session 2

The long-haired rat (*Rattus villosissimus*): an ecosystem disrupter in arid Australia

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Species in the genus *Rattus* are well-known as pests in agricultural systems. In natural ecosystems they can have strong top-down effects on vegetation through seed predation and seedling herbivory. However, the broad ecosystem impacts of population outbreaks of *Rattus* species are not well understood. We examined this issue for the long-haired rat (*Rattus villosissimus*) in a region of arid Australia with highly unpredictable rainfall. The species is the largest extant rodent in arid Australia (body mass: 150 g). The long-haired rat is not resident in the study area in the western Simpson Desert, rather population outbreaks occur every 25-30 years. We sought to describe and assess the full range of ecological interactions that occurred during a population outbreak that ran from June 2010 to December 2012. The long-haired rat outbreak resulted in a series of novel ecological interactions; these interactions had not been observed during the periods when the rat was not present. The interactions that were observed included; 1) long-haired rat predation on smaller mammals (body mass <100 g) especially other rodents; 2) invasion by the rats in to refuge habitat of the nationally vulnerable plains mouse (*Pseudomys australis*), and 3) feeding and associated damage to the nationally vulnerable keystone tree species *Acacia peuce*. In addition, long-haired rat burrow construction resulted in large volumes of soil redistribution and the presence of rats produced a spike in rodent biomass that was over twice that during irruptions where the rat was absent. The sporadic occurrence of the long-haired rat and the intensity and spatial scale of the novel interactions indicate that it can be considered a disruptive factor in the functioning of the Simpson Desert ecosystem.

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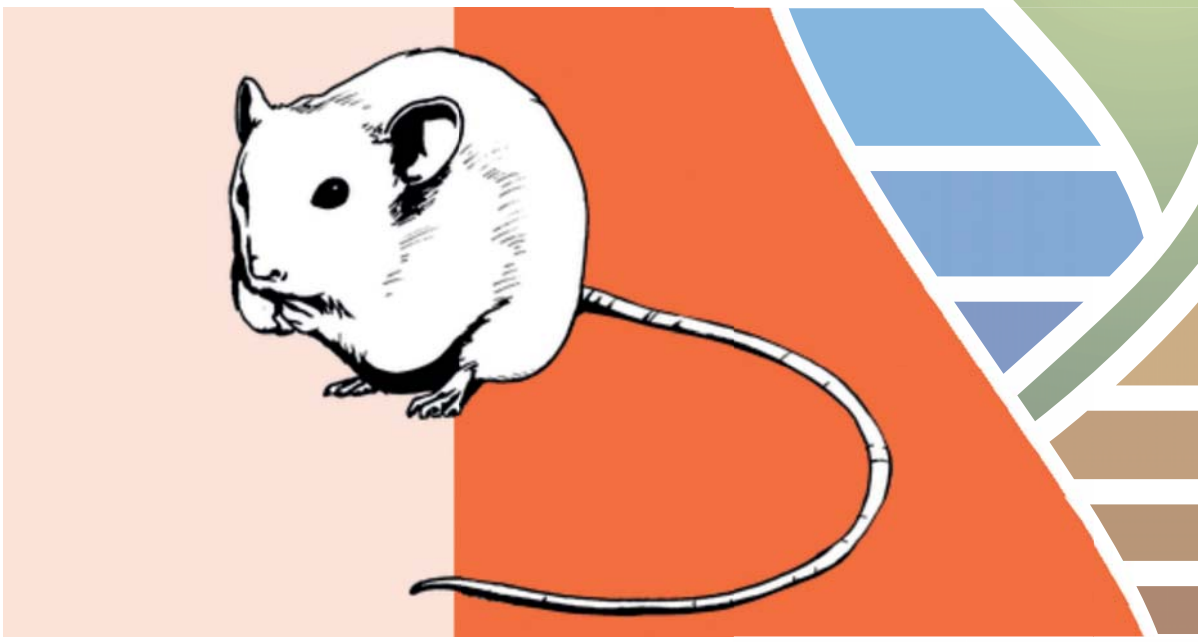

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