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The influence of predators and prey naivety on reintroduction success: current and future directions

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Summary

Despite decades of research into predator control, predation by exotic predators is the leading cause of reintroduction failure in Australia and New Zealand. A variety of methods are used to deal with the threat of predation, including the exclusion and control of predators and improved prey responses. Fenced reserves and islands are becoming increasingly popular reintroduction sites and generally have high reintroduction success. However, in this chapter, we argue that the current emphasis on predator exclusion is short-sighted and does not consider the underlying issue of prey naivety. We call for a new paradigm focusing on improving the ability of prey to co-exist with exotic predators – one that acknowledges behavioural plasticity and natural selection.

Introduction

Since their intentional introduction to Australia and New Zealand over the last 200 years, exotic mammalian predators have decimated native fauna populations and contributed to widespread extinctions. In Australia, the red fox (*Vulpes vulpes*) and feral cat (*Felis catus*) are generally considered responsible for Australia's ignominious record of the worst mammal extinction rate in the world (Johnson 2006; Johnson and Isaac 2009). More than a quarter of Australian mammals have gone extinct since Europeans arrived in 1788 (Short and Smith 1994). New Zealand bird species and populations have also been decimated through the addition of exotic predators such as stoats

(*Mustela erminea*), black rats (ship rats, *Rattus rattus*) and feral cats (Diamond and Veitch 1981; Atkinson 2001). Although mammalian predators have been introduced to many countries around the world (Nogales *et al.* 2004; Clout and Russell 2008), their impacts have been particularly devastating in Australia and New Zealand. Both these countries lack indigenous eutherian predators, meaning that native prey species lack experience with these evolutionarily novel predators (Salo *et al.* 2007). Native prey may fail to recognise or enact appropriate and effective anti-predator responses when faced with evolutionarily novel predators: a phenomenon known as prey naivety (Cox and Lima 2006; Banks and Dickman 2007; Carthey and Banks 2014).