

Biodiversity impacts of mice alone

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The house mouse *Mus musculus* is the smallest of four rodent species introduced to New Zealand. It is the hardest to eradicate and prevent from reinvasion, and thus frequently is the only pest mammal species present in fenced mainland sanctuaries. We have completed a 5-year study of mouse abundance, biodiversity impact and behaviour in podocarp-broadleaved forest at Maungatautari, a 3,200 ha fenced sanctuary near Hamilton, NZ. In one block, mice reached 29-45 per hectare after summer breeding each year before we eradicated them; in a second block, mice increased to 24 per hectare after control stopped. Thus we effected a mouse 'treatment' switch. Mouse density was positively related to a footprint-tracking index of their abundance. Mice halved the number of litter invertebrates generally and of beetles, spiders and weta as specific groups, and mean size of beetles and weta increased when mice were absent. Mean earthworm biomass was halved when mice were present, and increased when they were eradicated. We did not detect strong impacts of mice on seedlings, litter snails or fungi. Across 20 sites in Maungatautari Sanctuary, mice were detected in 93% of chew-track devices at ground level, 35% of devices at shrub height (1.6m above ground) and 17% at subcanopy height (5m). In a paired trial at Te Tapui Reserve where all pest mammals are present, only one mouse was detected at one ground device, while ship rats and possums occurred at all levels, including the canopy (mean 8m). Mice ate unattended bird eggs but their interactions with active forest bird nests remain unknown. Mice alone greatly reduce litter invertebrates, but their total impacts are vastly less than those from diverse, unmanaged pest mammals across most of NZ. Having mice as diet may deflect invading predators like cats or mustelids from eating endemic fauna in sanctuaries.