



Improving the success of mouse eradications on islands

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Overview

- Where mice came from and where they are now
- Review of mouse eradication attempts on islands
- Future research
- Summary
- Recommendations



Where did house mice (*Mus musculus*) come from?

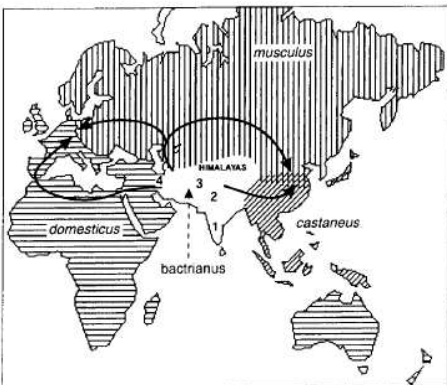
- Originated in Northern India around 900,000 years ago
- Radiated into 3 distinct subspecies
 - *M. m. domesticus* (W. Europe, N. Africa, Near East)
 - *M. m. musculus* (E. Europe & N. Asia)
 - *M. m. castaneus* (E. India, S.E. Asia)
- All subspecies show commensal behaviour and are closely associated with humans
- All three subspecies in NZ





Where are mice now?

- EVERYWHERE!
- Introduced by humans to every continent
- Colonised almost all possible habitats
- Present on many islands from sub-Antarctic to tropics



How are mice eradicated from islands?

- Almost exclusively poisoning
- 3 Bait delivery methods
 - Bait stations
 - Aerial
 - Hand spreading
- Range of different toxins
(anticoagulant and acute toxins)



Review of mouse eradication attempts

- Recent review of rodent eradications used as starting point (Howald *et al.*, 2007)
- Supplemented with extra information provided by others
- Analysed to investigate which (if any) operational factors best predict eradication success/failure
- Presented at recent conference, proceedings published soon





Eradications summary

- First recorded attempt 1971 50ha Flatey Island, Iceland
- Largest success Enderby Island 710ha
- Largest attempt St Paul Island 800ha
- 56 attempts on 51 islands in 11 countries
- 28 successful, 20 failed, 2 stopped, 6 to be confirmed
- 38% of eradications failed (excluding unconfirmed islands)





Toxins

- 7 different toxins used in mouse eradication attempts
 - 3 first generation anticoagulants
 - 3 second generation anticoagulants
 - 1 acute toxin
- Brodifacoum main toxin in 45 attempts (80% of total attempts)
 - 22 successful (49%)





Bait Delivery

- Bait stations
 - Main method in 30 attempts
 - 14 successes (48%)
- Hand broadcast
 - Main method in two attempts, also used to supplement bait station and aerial drops
 - One attempt successful
- Aerial broadcast
 - Main method in 25 attempts
 - 12 successes (48%)



Other Mammal Species

- Mouse eradications attempted in presence of 8 other mammal species
 - Ship rats, Norway rats, kiore, stoats, weasels, cats, rabbit and possums
- Interactions between mice and other mammal species complex, doesn't seem to affect eradication outcome





Why do eradications fail?

- The big question!
- Operational problems (gaps in coverage)
 - Helicopter inaccuracies?
- Behavioural issues
 - Cereal aversion?
- Poison tolerance
- Subspecies difference



Mouse population monitoring in Abel Tasman

- Adele, Tonga and Fisherman Islands
- Visited June/July 2007 to study mouse population
- 2 live trapping grids on Adele, some radio-tracking
- Snap trapping on all three
- Returned to Adele after poison drop





Future research

- Subspecies genetics
 - Behavioural differences known between subspecies – could that affect eradication outcome?
- Population ecology
 - Home range size, ranging behaviour, densities
 - All 3 never investigated in same population
- Response of population to poison
 - Tracking population decline following poisoning
 - Changes in ranging behaviour?
- Mouse behaviour after failed eradication
- Poison tolerance





Recommendations

- Will the chosen poisoning method allow every mouse on the island access to poison?
- Take genetic samples prior to the eradication attempt.
- Consider the effects of other mammals. Will they prevent mice accessing poison?
- Are there areas which may require extra poison?
- Will the mice eat the bait? Consider bait trials to check for cereal aversion





Summary

- More mouse than rat eradications fail
- Reasons not always clear, proven techniques can result in failure when replicated
- Future research into mouse population ecology and different mouse subspecies aimed at improving mouse eradication success





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