

Antipodes antipasto: mice make a meal of Subantarctic insects

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Introduction

Invertebrate surveys on Antipodes Island and adjacent Bollons Island provided a unique opportunity to examine the impact of mouse predation on the invertebrate fauna. The diversity and abundance of larger beetle species (length > 4 mm) on mouse-infested Antipodes Island were compared with those of mouse-free Bollons Island.

Antipodes Islands

The Antipodes Islands lie 730 km southeast of the South Island of New Zealand and are part of New Zealand's Subantarctic World Heritage Site. The islands support about 150 insect species, many of which are endemic, and are important breeding grounds for several land and seabird species including large penguin and albatross colonies.

House mice (*Mus musculus*) were first recorded from Antipodes Island in 1909 and are the only resident introduced mammal. They occur from the coast to the highest peak at high densities (up to 117 catches/100 trap nights). No other island of the Antipodes group has mice.

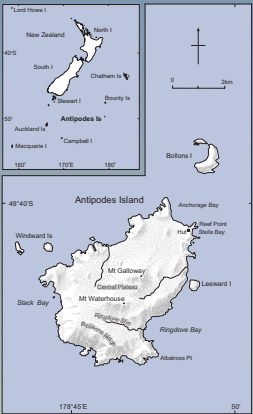


Table 1 Comparison of numbers of larger (>4 mm) beetle species collected from Antipodes Island (over 26 days) and Bollons Island (over 7 hours).

Species (max. length in mm)	Antipodes Island	Bollons Island
Carabidae		
<i>Kenodactylus audouini</i> (4.8)	18	1
<i>Loxomerus</i> n. sp. (11.8)	0	19
<i>Ooapterus clivinoidea</i> (5.6)	7	33
Hydrophilidae		
<i>Tormissus guanicola</i> (5.5)	0	8
Staphylinidae		
<i>Quediocafius insolitus</i> (10.9)	3	15
Tenebrionidae		
<i>Pseudhelops antipodensis</i> (7.2)	3	0
<i>Pseudhelops clandestinus</i> (8.2)	5	50
Curculionidae		
<i>Gromilus insularis antipodarum</i> (5.4)	19	3

Methods

Invertebrates were collected over 26 days on Antipodes Island and during a 7-hour visit to Bollons Island. Antipodes Island collecting included pitfall, pan, Malaise and light trapping, sweeping, beating, insecticide fogging, litter extraction and hand collecting. Habitats sampled included the littoral zone, around penguin colonies, tussock grassland, herb fields and rocky outcrops. Collecting on Bollons Island was by hand and litter sampling among tussock grassland, herb fields and around penguin colonies.

Results and Discussion

Beetle species composition

- Two species, *Loxomerus* n. sp. and *Tormissus guanicola*, were found on Bollons Island but not on Antipodes Island, despite the greater collecting effort there.
- No live *Loxomerus* n. sp. have ever been found on Antipodes Island, although beetle remains collected in 1969 indicate its past existence.



Loxomerus n. sp.

Beetle abundance

- Five species were more numerous on Bollons Island, ranging up to a ten-fold difference for the tenebrionid *Pseudhelops clandestinus* (Table 1).
- Three species were more commonly collected on Antipodes Islands, probably due to greater collecting effort over a wider range of habitats there.

Beetle distribution

- On Antipodes Island, two *Pseudhelops* species were collected alive only from a single rock outcrop on the Central Plateau at 300 m altitude.
- Remains of these species found at lower altitude (ca. 80 m) show they were previously more widely distributed on the island.

Summary

- Antipodes and Bollons Islands share similar geological, climatic and vegetational characteristics.
- The main biological difference between the islands is the presence of mice on Antipodes Island.
- Differences in beetle diversity and abundance between the islands are probably mainly due to mouse predation, resulting in the extinction or severe depression of beetle populations on Antipodes Island.
- Mouse predation may restrict some species' distributions, with relict populations limited to high altitude areas of low mouse density.

Looking forward

Future studies should examine the indirect effects of mouse predation on the ecology of the Antipodes Island ecosystem.

The eradication of mice from Antipodes Island is now possible due to improved mammalian pest control technology. If achieved, this would be a major advance in the restoration of the island's ecology.

For further details on this study see:

Marris, J. W. M. 2000: The beetle (Coleoptera) fauna of the Antipodes Islands, with comments on the impact of mice; and an annotated checklist of the insect and arachnid fauna. *Journal of the Royal Society of New Zealand* 30(2): 169-195



Wandering albatross and John Marris



Antipodes Island parakeet



Rockhopper penguin



Light-mantled sooty albatross



New Zealand fur seals



Subantarctic megaherbs