



Global Re-introduction Perspectives: 2010

Additional case-studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Re-introduction of the leaf-vein slug to Quail Island, Banks Peninsula, Canterbury, New Zealand

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Introduction

The leaf-vein slug (*Pseudaneitea maculata*) (Anthracophoridae) was first described by Burton (1963) but the taxonomy of Anthracophoridae is currently under review (Gary Barker, Landcare Research; pers. comm.). Although the species is not considered threatened, habitat loss and predation are likely to have restricted its range. The leaf-vein slugs were collected from Orton Bradley Park, Banks Peninsula, Canterbury (S 43.66575°, E 172.7079°) found in artificial refuges called weta motels and under wooden discs purposely placed there as habitat. The slugs were translocated to Quail Island (S 43.6290°, E 172.6876°) less than 5 km away in Lyttelton Harbour, Banks Peninsula, Canterbury, New Zealand. The Quail Island Ecological Restoration Trust in partnership with Department of Conservation and Te Hapu o Ngāti Wheke of Rāpaki are restoring the indigenous vegetation and fauna on the island and provide refuge for locally extinct or rare and endangered species of the Banks Peninsula region. Quail Island (85 ha) is located in Lyttelton Harbour which links the mainland via mudflats at low tide. Introduced mammalian pests, mice, rats, hedgehogs, cats and possums have been eradicated, and 90% of the mustelids (stoats, weasels and ferrets) are trapped en route to Quail Island (Bowie *et al.*, 2003). The close proximity to the mainland and the open access to public, makes this island vulnerable to reinvasion by pests, so traps and bait stations are needed to protect the island.

Goals

- Goal 1: Identification of potential re-introduction source close to Quail Island.
- Goal 2: Development of artificial habitat and non-destructive sampling techniques.
- Goal 3: Testing of restoration techniques.
- Goal 4: Annual monitoring of slug population at release site.
- Goal 5: Double release population in four years.



Leaf-vein slugs and eggs (inset)

Success Indicators

- Indicator 1: Ten percent of translocated slug numbers within one year and 20% within two years.
- Indicator 2: Dispersal of slug populations to other suitable habitat on Quail Island.

Project Summary

The leaf-vein slug is nocturnal and live in holes, cracks, crevices and rotten logs usually found in mature forests.

The slugs eat fungi and therefore play an important ecological role or ecosystem service as a 'cleaner', feeding on fungi such as sooty mould

on leaf surfaces which allows plants to photosynthesize more effectively. Quail Island is in the early stage of ecological restoration and contained few mature native trees suitable for slug habitat. Suitable refuges had to be developed using simple artificial techniques that also served as a convenient way to monitor slug numbers. Wooden discs cut out of tree trunks (Bowie & Frampton, 2004; Bowie, 2008) and placed on bare soil provided a cool dark habitat for the slugs. Weta motels (Bowie *et al.*, 2006), hollowed-out blocks of wood with a narrow entrance to exclude predators like mice were tied to tree trunks and used to provide safe, dark refuges for the slugs. Both the refuge types were also useful for monitoring, but the discs provided a good source of fungi beneath which provided a food source for slugs. Slug eggs were also laid under some discs in large numbers. Leaf-vein slugs were collected from Orton Bradley Park (5 km from Quail Island) from weta motels and under wooden discs in 2004, and were held in an incubator at 12° C with leaves infested with sooty mould (*Capnodium* sp.) prior to releasing. A total of 26 slugs (and 32 eggs laid while in captivity) were translocated to Quail Island and placed under wooden discs in a moist area containing a mixture of six year old native trees, flax (*Phormium tenax*) and exotic grasses (Burrows *et al.*, 1999). The release site discs were surrounded by a 6 x 6 grid of discs with approximate 5 m spacing creating a network of refuges they could use (see figure 1).

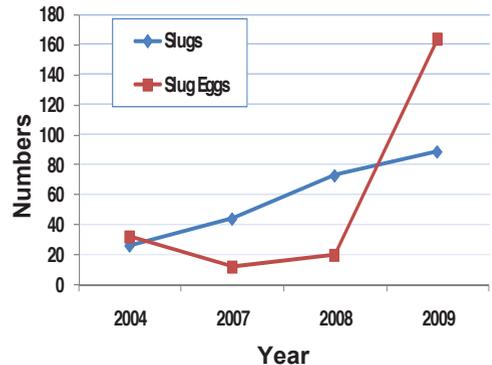
Major difficulties faced

- Identification of slug species was difficult so a selection of specimens were sent to an expert for verification.
- Predation by mice was a concern so we put a grid of mouse traps between the wooden discs around the release site to enhance slug establishment.

Major lessons learned

- Hermaphrodite species are advantageous for re-introductions as a male and female are not required for mating. This makes the collecting phase prior to translocation and the ability of slugs to find mates considerably easier.

Fig. 1: Leaf-vein slug and egg numbers since release on Quail Island in 2004



Invertebrates

- Testing restoration techniques (wooden discs and weta motels) prior to translocation also proved to be useful for sourcing of specimens.
- Sampling too often may be detrimental to the slugs as lifting the discs to inspect breaks the soil-wood seal created by worm action which protects slugs from desiccation and predators.
- Wooden discs may need to be replaced every four to six years as wood-boring insects and fungi cause natural deterioration of the wood.

Success of project

Highly Successful	Successful	Partially Successful	Failure
√			

Reason(s) for success/failure:

- Good numbers of slugs and slug eggs were found after three years even in the presence of house mouse (*Mus musculus*) on the island.
- Relatively low numbers were needed to establish a viable population of slugs.
- The simplicity of the method for creating micro-habitat and sampling slugs.

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