

Restoring island biodiversity: the reintroduction of endemic Mauritian reptiles



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Darwin Initiative Project

Three main aims to this project:

- To initiate the restoration of reptile communities on the offshore islands
- Train Mauritians from MWF and NPCS to conduct reptile research and conservation
- Increase awareness of the related biodiversity issues within Mauritius




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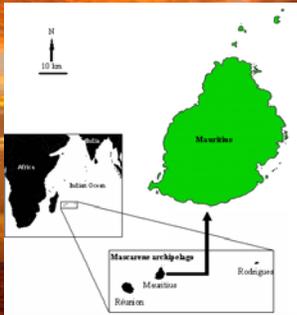
- To initiate the restoration of reptile communities on the offshore islands
 - Reptile translocation
 - Post-translocation monitoring
- Train Mauritians from MWF and NPCS to conduct reptile research and conservation
- Increase awareness in Mauritius of the related biodiversity issues

- Background to the Mauritian reptiles
- The need for conservation and re-establishment
- Progress with translocations and monitoring




Darwin Initiative Project

- Mauritius – Mascarenes – Indian Ocean




Mauritian reptiles

- Once held one of the richest reptile diversities in the World
- An important contribution to a leading biodiversity hotspot



Mauritian reptiles

- In the absence of terrestrial mammals, the reptiles evolved to fill all available niches
- Allowed an adaptive radiation of:

Giant tortoises	Geckos	Skinks	Snakes
			

Mauritian reptiles

- Formed a unique reptile dependent ecosystem
- Reptiles occupied all main functional groups:



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Predators



Mauritian reptiles

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Prey



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Browsers & Grazers



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Seed Dispersers & Pollinators



The need for translocation

- Over the past 400 years Mauritius has experienced extensive habitat destruction and species invasion
- Loss of >60% of the reptile species from the main island
 - Reptiles now mostly confined to one or a few offshore islands
 - Occur in isolated or highly fragmented populations
 - At risk of extinction



- A need to translocate reptiles - re-establish island reptile communities:
 - Secure future survival and restore ecological links integral to ecosystem stability and sustainability of biodiversity

The need for translocation

- The idea to translocate was first formulated 30yrs ago
- Little was known about the ecology of the reptiles or the islands
- Many islands still inhabited by predators responsible for reptile loss
- Since then...
- DWCT, the Forestry Service, MWF and NPCS have been instrumental in island restoration
- Extensive herpetological research:
 - >40 scientific publications, numerous reports and academic studies
- **Now in a position to initiate the first endemic reptile translocations within the Mascarenes**



Translocations

- Reptiles selected for translocation based on:
 - Vulnerability and need for conservation
 - Past co-existence and relationships with other endemic species



- Recipient islands were chosen:
 - Availability of habitat and food resources
 - Lack of introduced competitors or predators
 - Future status e.g. no plans for tourist development – hotels!

Translocations and monitoring

- Four species selected for translocation:

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- Bojer's skink, *Gongylomorphus bojerii*
- Telfair's skink, *Leiopisma telfairii*
- Durrell's night gecko, *Nactus durrelli*
- Lesser night gecko, *Nactus coindemirensis*

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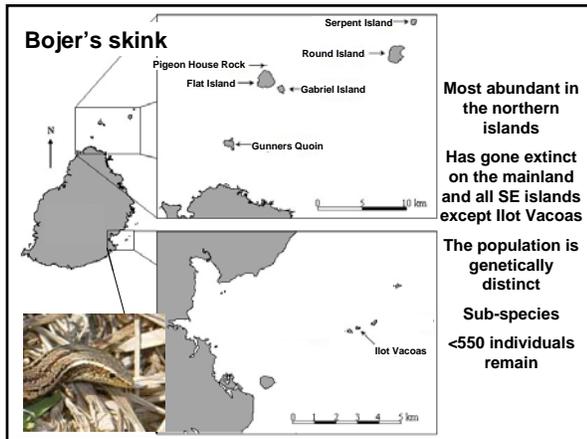
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Bojer's skink *Gongylomorphus bojerii*



Bojer's skink

- The future survival of the SE population is dependent upon translocation



Bojer's skink

- January 2007 – 1st annual translocation of 20 skinks from Ilet Vacoas (1.1 ha) to Ile aux Fouquets (2.5 ha)



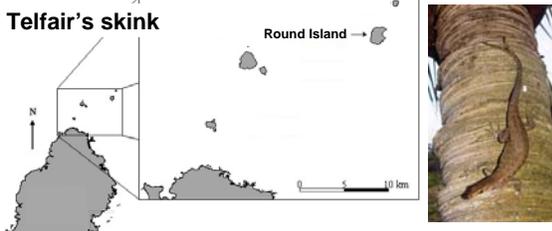
- Released in similar habitat



Telfair's skink *Leiolopisma telfairii*



Telfair's skink



- Restricted to Round Island, but once widespread
- >30,000 skins on Round Island
- A robust generalist and ideal candidate
- The replacement of a lost:
 - Predator / Seed Disperser / Pollinator / Potential Prey Item

Telfair's skink

- Two islands repeatedly identified for the first Telfair's reintroductions:
 - Gunners Quoin (66.5 ha)
 - Ile aux Aigrettes (27.7 ha)



- Suitable habitat
- Abundant food resources
- No highly threatened endemic reptiles
- Rats eradicated

Telfair's skink

- December 2006 – high publicity release of 39 skins onto Ile aux Aigrettes
- February 2007 – translocation of 221 skins from Round Island to Ile aux Aigrettes
- Released in mature native forest



Réintroduction réussie des Telfair skinks, espèce menacée de disparition

Telfair's skink

- February 2007 – translocation of 250 skins from Round Island to Gunners Quoin
- Released:
 - 40 in native veg at the summit
 - 110 in mixed wooded valley
 - 100 in the central exotic thicket



Night geckos

Nactus spp.

- Lesser night gecko
Nactus coindemirensis
- Durrell's night gecko
Nactus durrelli
- Serpent Island night gecko
Nactus serpensinsula



Night geckos

- The most abundant reptiles in pristine Mauritius
- Catastrophic reduction in range caused by the introduced house gecko *Hemidactylus frenatus*



Night geckos

House gecko

Night geckos only exist in absence of the house gecko

LNG and DNG populations at risk from further invasion

Few islands left for translocation

Beneficial to translocate two night gecko species to the same island

Currently segregated – could night geckos co-exist?

Night geckos

- Research suggests that the lesser and Durrell's night geckos once co-existed
 - To test this theory we moved 30 of each species to Ilot Chat in October 2006

Ilot Chat

- Ideal site to test co-existence**
 - No other terrestrial vertebrates
 - Suitable habitat and prey abundance
 - Small (0.03 ha) easily controlled and monitored

Monitoring

- Prior to the translocations
 - Habitat surveys of recipient islands

- Cut/marked out transects to:
 - Survey resident vertebrate populations
 - Place pitfalls and litter plots for invert sampling
- Obtained baseline data:
 - Health and disease status of the reptiles
 - Population estimates of vertebrates on the recipient islands
 - Population estimates of small donor reptiles on Ilot Vacoas
 - Relative abundance of invertebrate groups

Monitoring

- Also prior to release each reptile was given its own identity to aid in post translocation monitoring
 - Telfair's skinks were PIT tagged
 - All others too small for tagging:
 - Given photographic IDs
 - Pattern of scarring, missing toes/claws, tail breaks recorded

Monitoring

- Post translocation monitoring essential to determine the success of reptile re-establishment

- Monitoring of recipient and donor populations will occur 3/yr in each season to allow:
 - Comparisons of:
 - Shifts in diet and habitat utilisation
 - Health and disease status
 - Determine survival, distribution and recruitment

Monitoring

- Seasonal monitoring also important to determine the positive and negative impacts upon:
 - The resident native and non-native terrestrial vertebrate populations
 - The resident invertebrate groups
 - The impact of removing reptiles from small populations on Ilot Vacoas

Progress

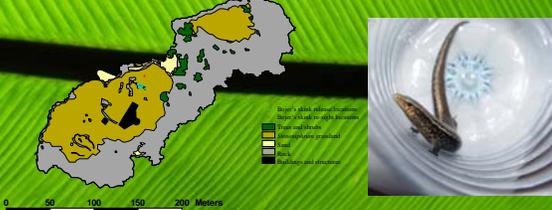
- Completed the first lizard translocations within the Indian Ocean



- A recent event
- Post translocation monitoring only completed for the first season except for the night geckos, which were released earlier

Progress

- The Ilot Vacoas Bojer's skink
 - Removal of 20 - little impact upon the Ilot Vacoas population - can be repeated next year



- Proving difficult to recapture on Ile aux Fouquets (1 skink/1250m²)
- Four re-sights - all appear healthy and active
- No change in resident reptile populations

Progress

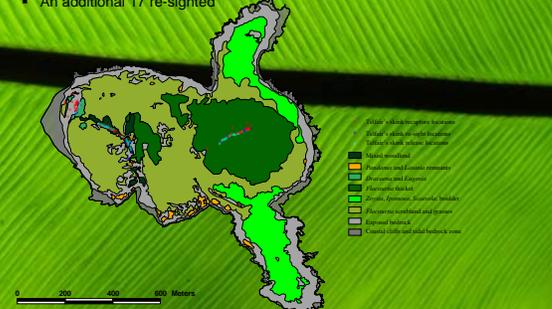
- The Telfair's skink
 - Diet and habitat data collected
 - Comparative data obtained from Round Island



- Population estimates generated for all resident terrestrial vertebrates on recipient islands
- Invertebrates sampled for all islands
- Evidence that skinks are starting to disperse

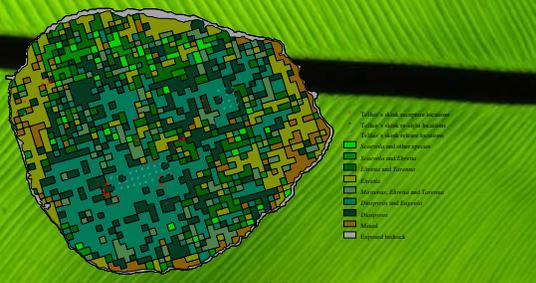
Progress

- Gunners Quoin (66.5ha)
 - 30 skinks recaptured, several more than once
 - An additional 17 re-sighted



Progress

- Ile aux Aigrettes (27.7ha)
 - 40 skinks recaptured, several more than once
 - An additional 3 re-sighted



Progress

- Translocated skinks appear fit and healthy
- Comparisons of blood values, particularly to baseline data indicate:
 - Translocated skinks are finding enough food and water
 - Round Island skinks dehydrated - unseasonably dry
- All blood smears are negative for parasitic infection
- Translocated skinks > body mass
 - < skink density - < intra-specific competition for food



Progress

- Resident vertebrate populations
 - Too recent for skinks to have had an impact
 - Some changes - natural seasonal effects
 - Monitoring after breeding season - most endemic populations increased





- Continued monitoring is paramount to determine the full impact of the translocations
- Particularly on some of the introduced species on Ile aux Aigrettes that prevent smaller reptile reintroductions
 - Indian musk shrew, *Suncus murinus*
 - The wolf snake, *Lycodon aulicus*
 - House gecko, *Hemidactylus frenatus*
- All are potential prey for the skink

Progress

- The night geckos on Ilot Chat
 - No noticeable impact of removing lesser night geckos from the small Ilot Vacoas population (<700)
 - Recaptured up to 50% of each population on Ilot Chat
 - All fit and healthy – body conditions no different from donor populations



- Diet and habitat data have been collected and invertebrates surveyed
- No evidence of negative interactions between the two species
- First juveniles of both species discovered

- However, the island has experienced three exotic invasions since the translocations

Progress

- Invasions on Ilot Chat

Musk shrew
Suncus murinus
Oct 06



Agamid lizard
Calotes versicolor
Dec 06



Wolf snake
Lycodon aulicus
Mar 07



 - None were found to contain gecko remains
 - Possibly introduced by fisherman that frequently use the island
 - Increasing awareness is paramount



First year completed

- Only just getting started...
- Possibly several years to determine success
- But the wheels are now in motion!
- The next monitoring trips are just about to start



- Mauritian involvement and awareness is crucial for the success of this project and future reptile conservation programs
- A learning process:
 - Initial steps to restoring reptile communities
 - Protocols for further translocations



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