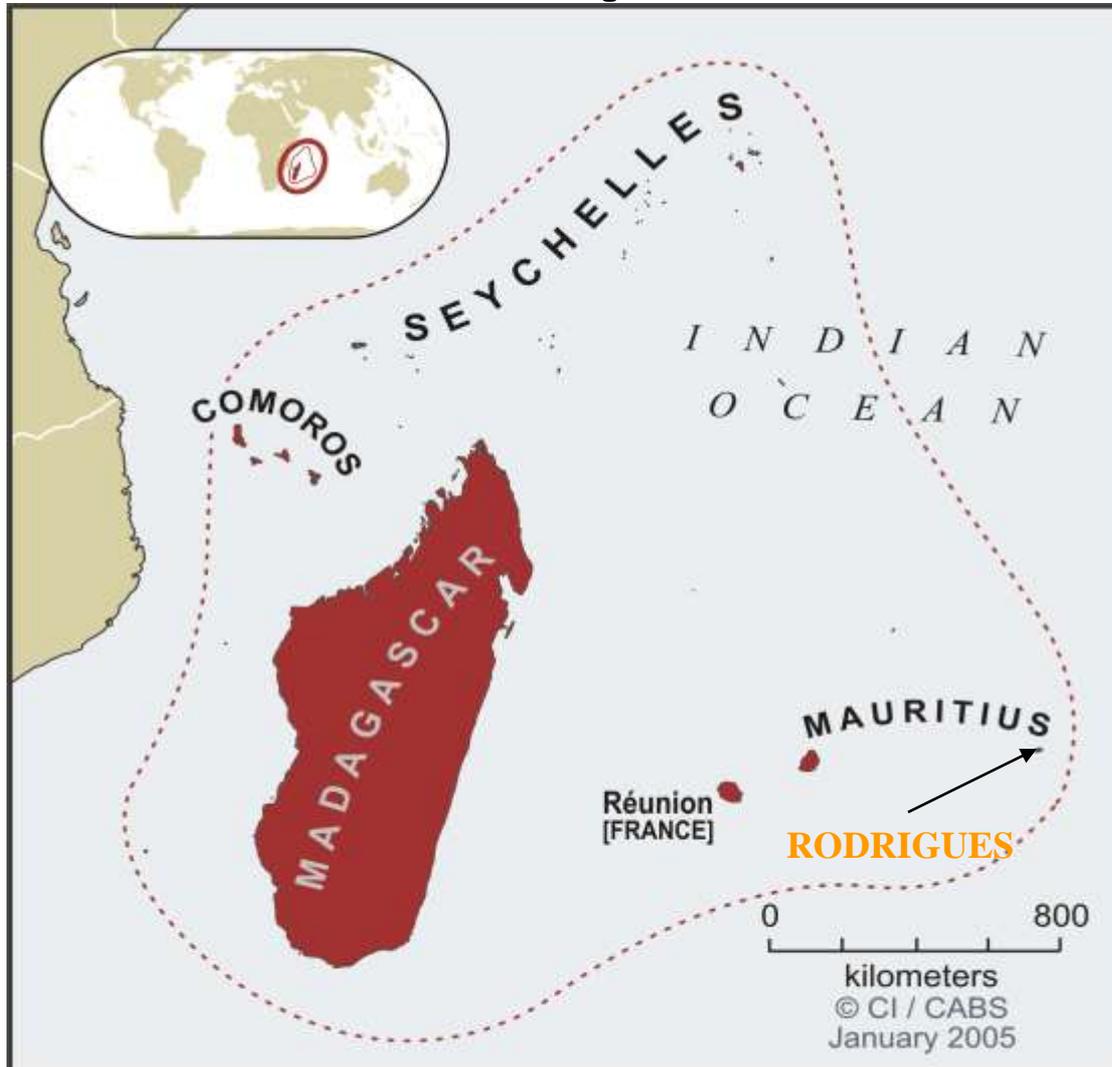


# *In situ* conservation: restoration experience Mauritius and Rodrigues

Dr. Vikash Tatayah, Conservation Director



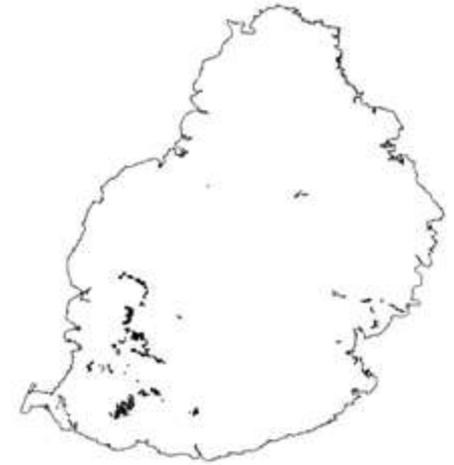
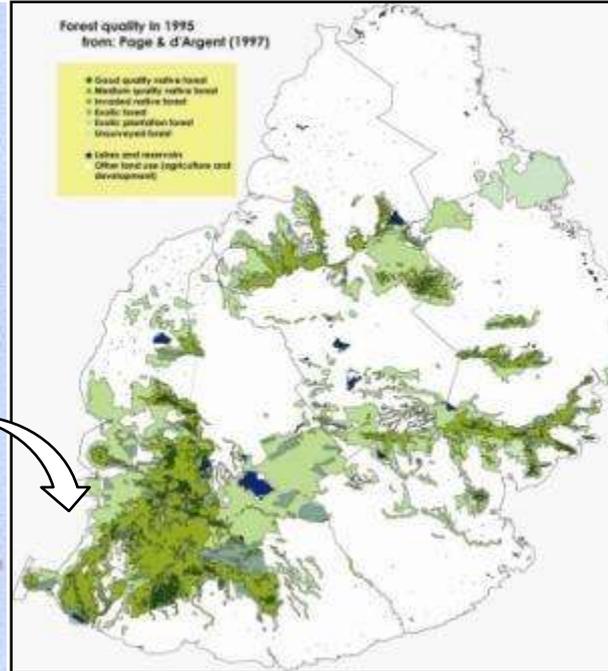
# The Madagascar and Indian Ocean Islands Hotspot



Madagascar and the Indian Ocean Islands Hotspot

# Introduction

## The vegetation of Mauritius



**20% of the endemic plants of Mauritius are common to Réunion and Rodrigues**

**About 16% of Mauritius is covered by forest land**

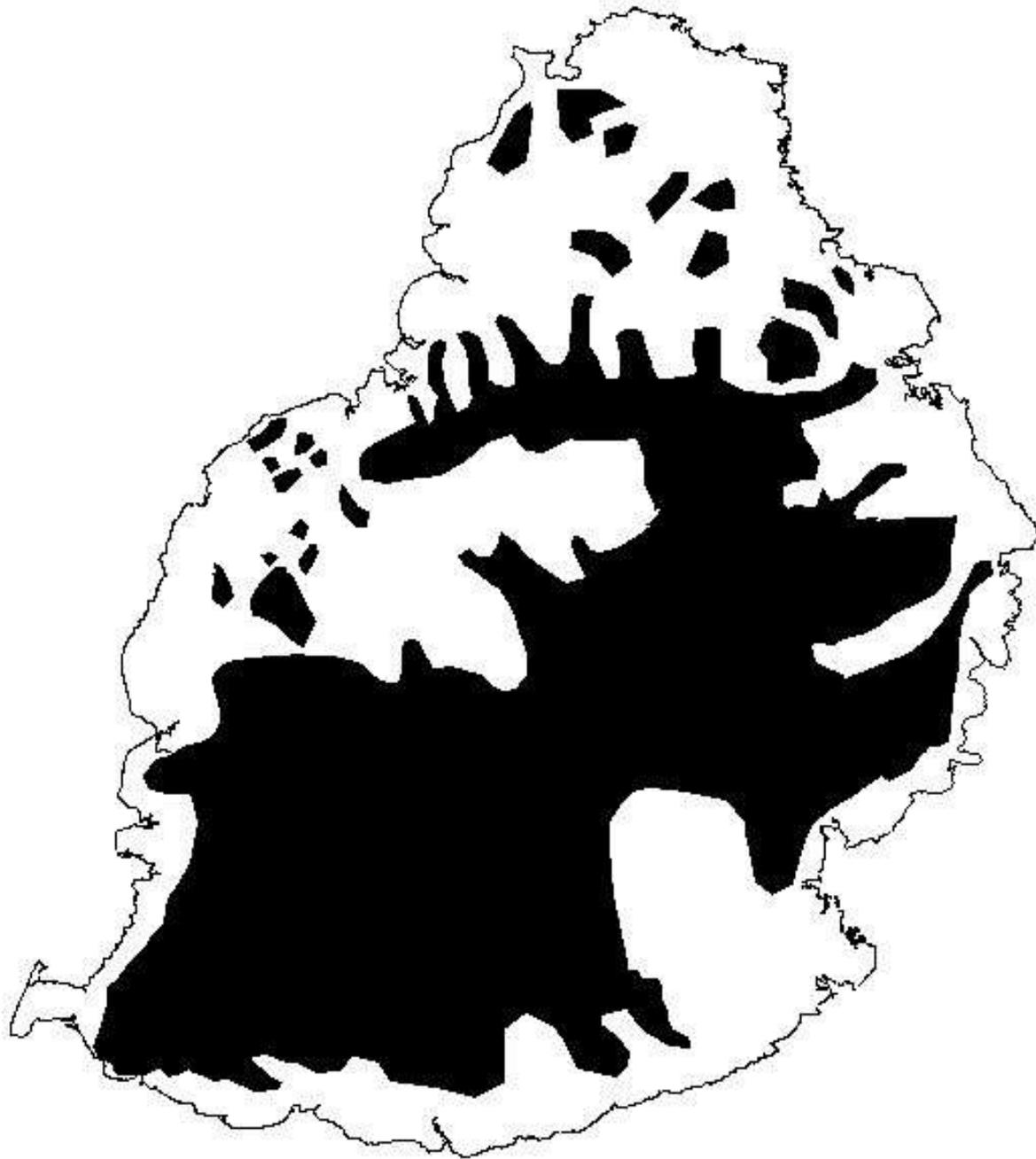
**Distribution of a good quality forest with 50% of native vegetation <1.3%**



1773



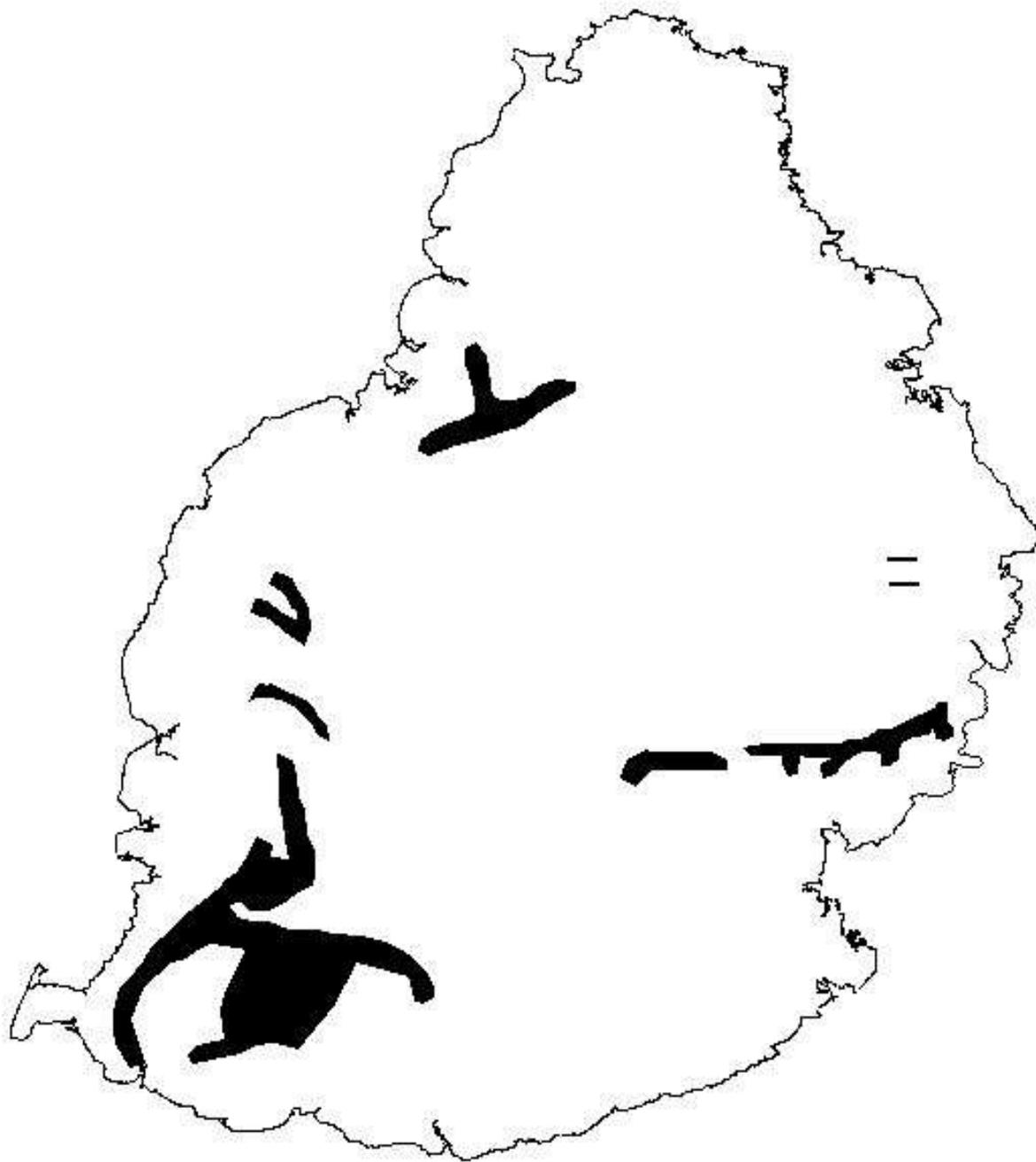
**1835**



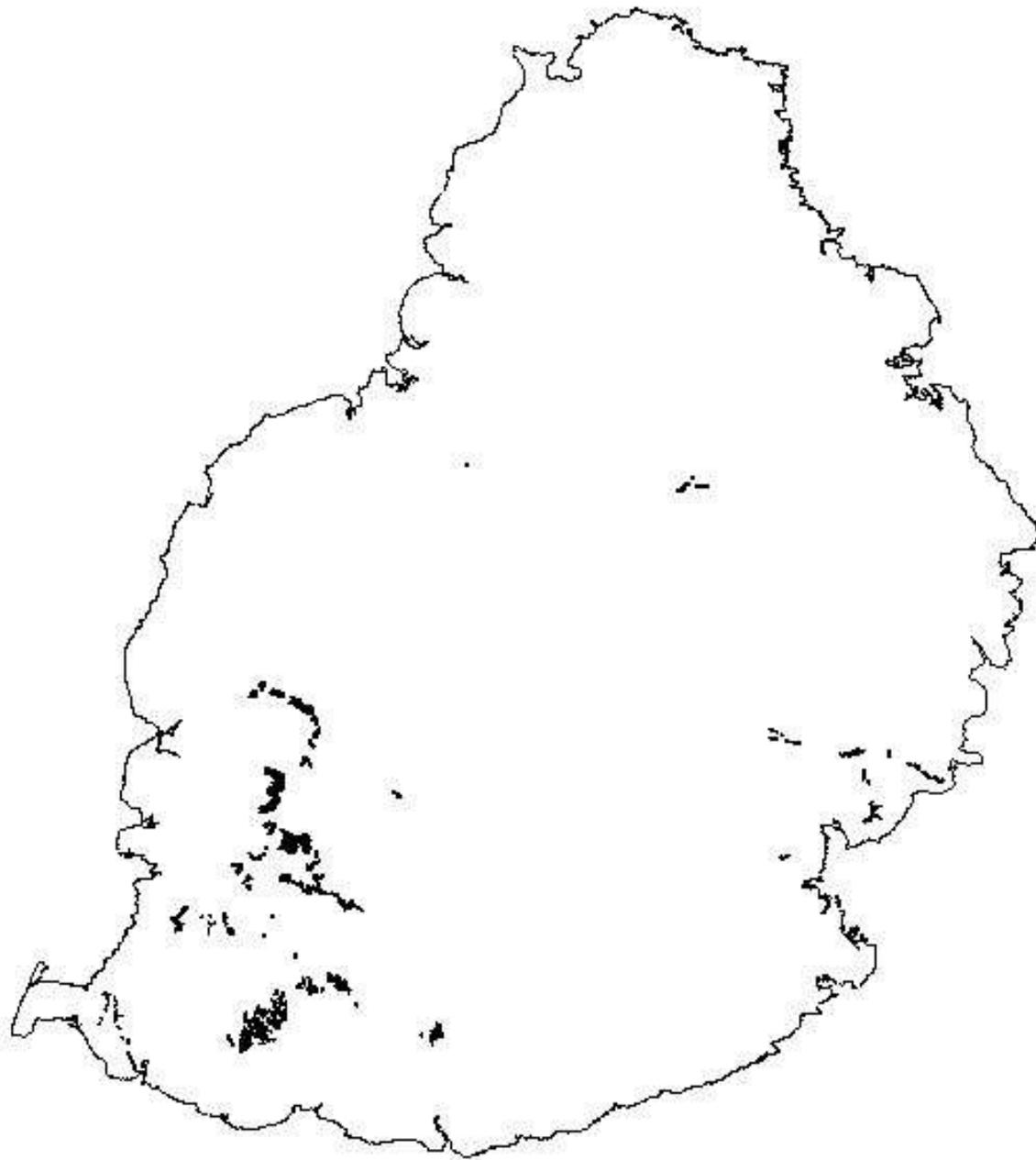
1872



1935



**1997**



- **Mauritius has/had 691 species of flowering plants**
- **273 species, and 6 genera, are endemic to Mauritius**
- **Rodrigues has/had 132 flowering plants of which 44 (33%) are endemic**
- **Invasive alien species are a major threat to native species and their habitats**



# Rare plants project

- Of the endemic Mauritian plant species 82% are threatened
- Identify Critically Endangered species in need of urgent attention
- Locate these species
- Grow in field nurseries in natural range
- Keep back-up of species in Field Gene Banks
- Reintroduce at source locations wherever possible.



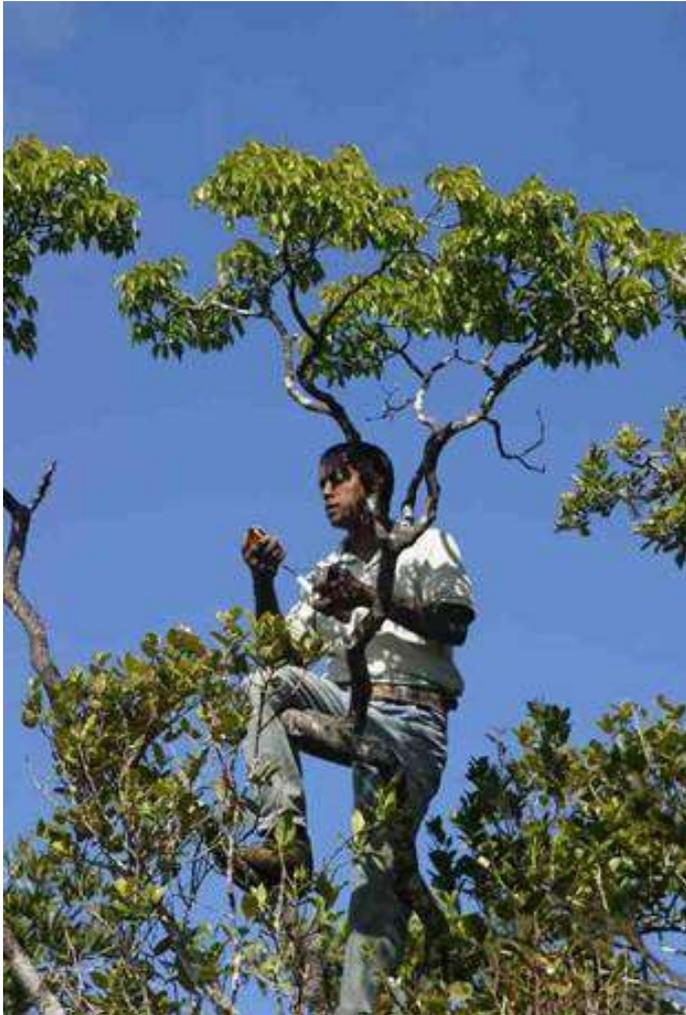
# Rare plants project

## Rare plant search



Rare plant search on Piton du Milieu

# Rare Plants Propagation



**Identification, location and labeling**



**Lowland plants propagated in the Ile aux Aigrettes Nursery**



**Upland plants propagated in Pigeon Wood Nursery**

# Field Gene Bank

- **Pigeon Wood**
  - Set up in 2005
  - Upland plants
  
- **Ile aux Aigrettes**
  - FGB set up in 2007
  - Lowland plants



**Pigeon Wood**



**Ile aux Aigrettes**

# Ile aux Aigrettes field gene bank and rare plants monitoring



# Restoration of Round Island



# The Palm Savannah



# Unique plants

*Aerva congesta*



*Hyophorbe lagenicaulis*



*Selaginella barklyii*



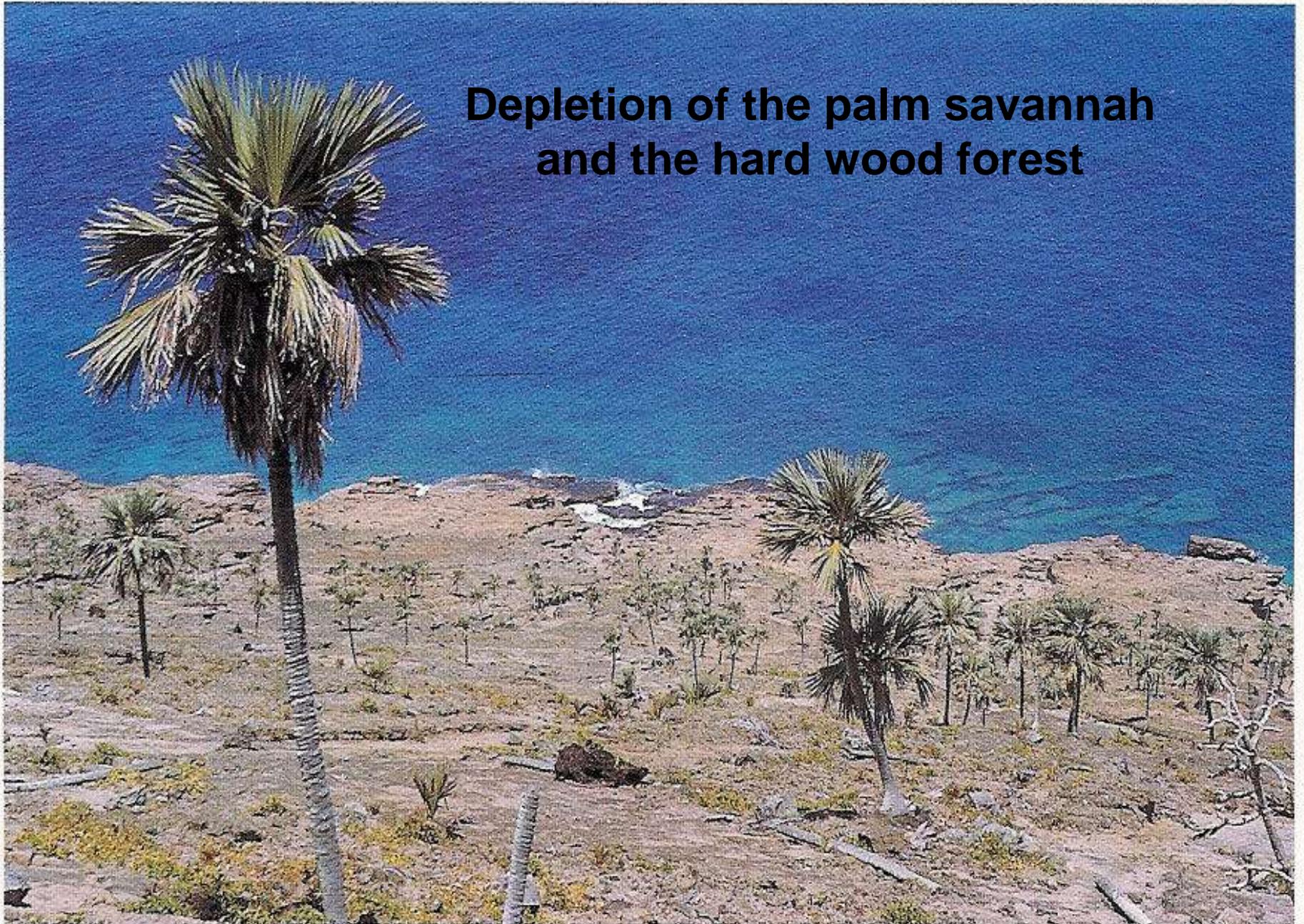
*Phyllanthus revaughanii*



# Goat and Rabbit Hunters in 1973



**Depletion of the palm savannah  
and the hard wood forest**





# Restoration of Round Island



- Replacing species that were once thought to be on the islets
- Production of plants in nursery set up on the island

# Establishment of a nursery





# Plants growing in the wire cages



# Shallow soil planting



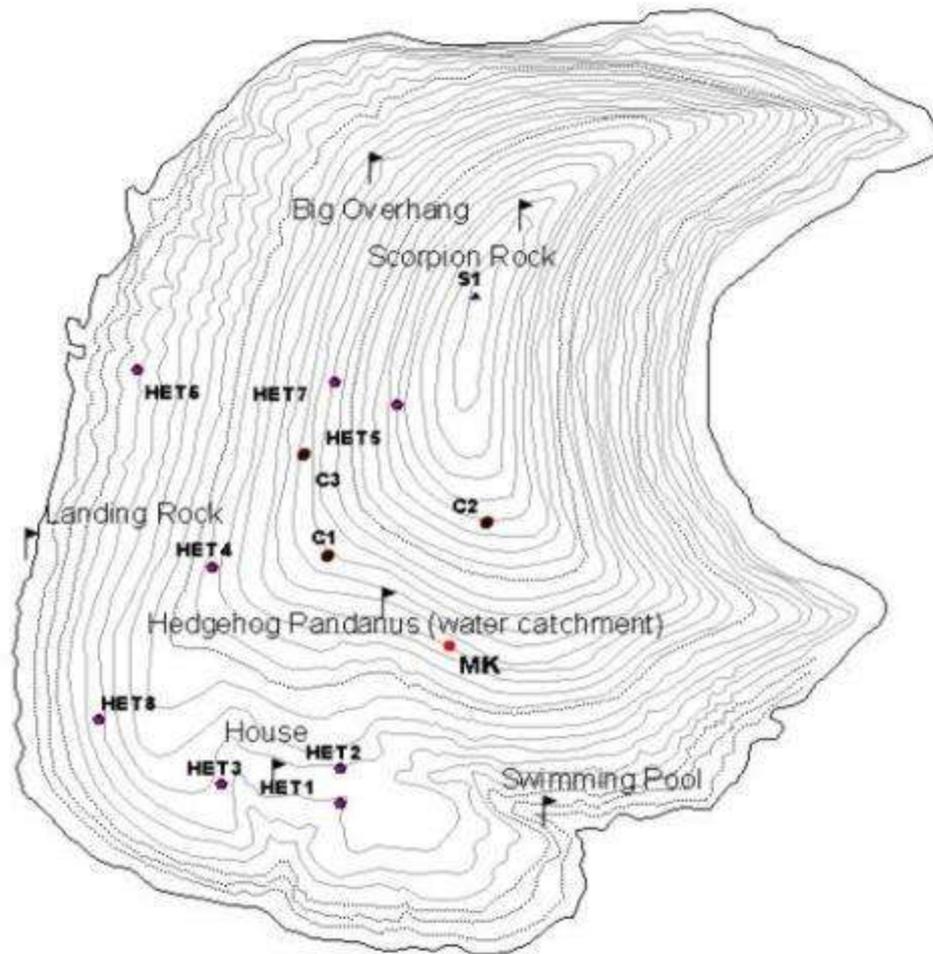
# Gully planting



# Soil trap planting



# ROUND ISLAND WEED SITES



- ▲ Sporobolus.txt
- Mikania site.txt
- Heteropogon sites.txt
- Chromolaena sites.txt
- ┆ Landmarks.txt
- ▨ Minor\_con\_wgs84\_polyline.shp
- ▨ Minor\_con\_wgs84\_region.shp
- ▨ Major\_con\_wgs84\_polyline.shp
- ▨ lle\_wgs84\_region.shp



# Weeds that are controlled on Round Island



***Heteropogon contortus*, Mar. 1998**



***Chromolaena odorata*, Oct 2002**



***Sporobolus indicum*  
var *capensis***



***Mikania micrantha*, June 2006**

***Leucaena leucocephala* found on 20 Sept.2010**



# Black plastic mulching



## Strict quarantine of supplies and equipment



# Vegetation changes



**December 2003**

**August 2009**



# Creation of a hard wood forest





# Tortoises as grazers and dispersers



# Restoration of Ile aux Aigrettes



# Alien animal pests



Most dominant weed  
*Leucaena leucocephala* (Acacia)

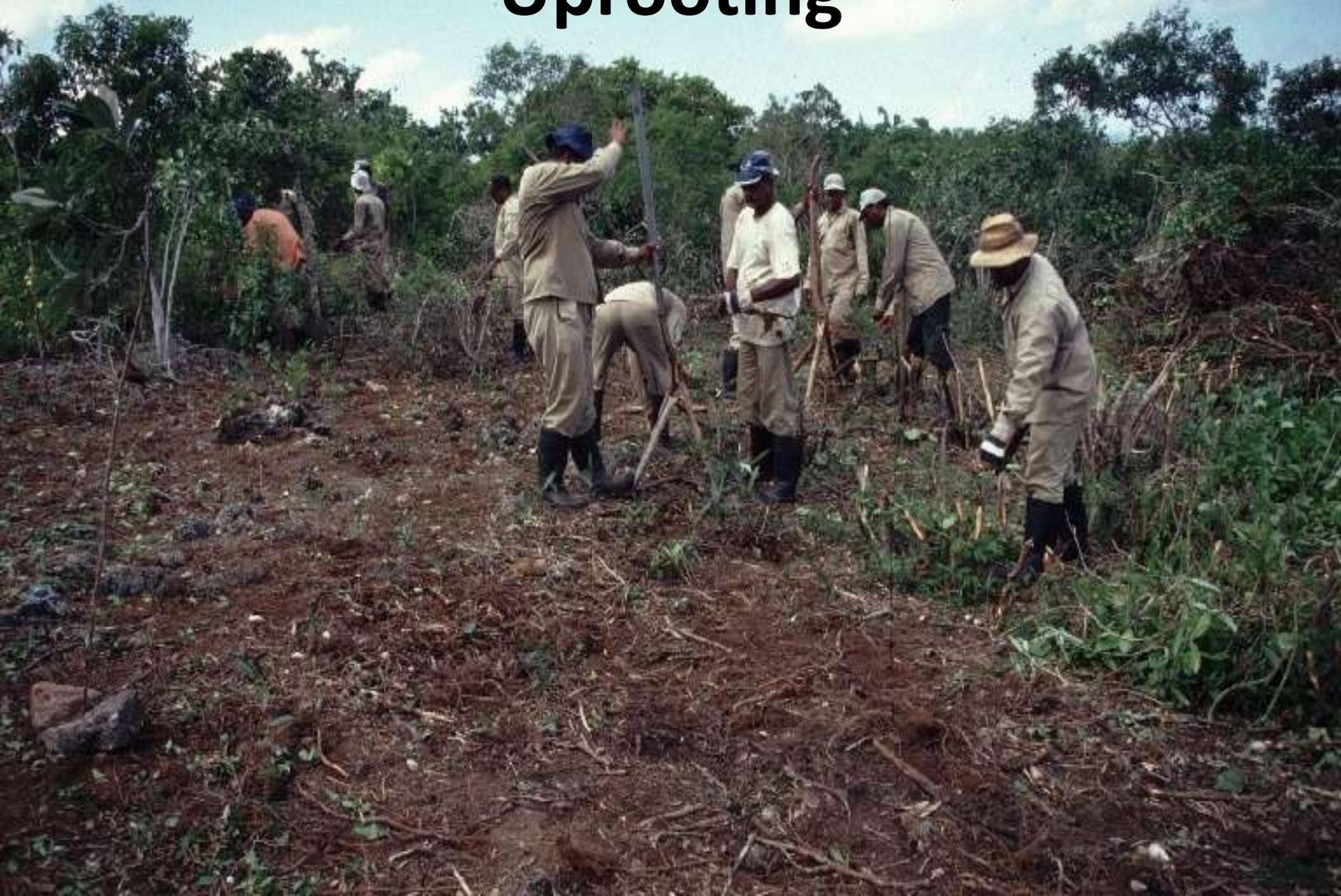


Highly abundant weed  
*Flacourtia indica* (prune malgache)





# Uprooting



# Stump Uprooter



# Freshly weeded area





# Ile aux Aigrettes Nursery



# Planting in the open areas



## Introduction of herbivores to control weeds...



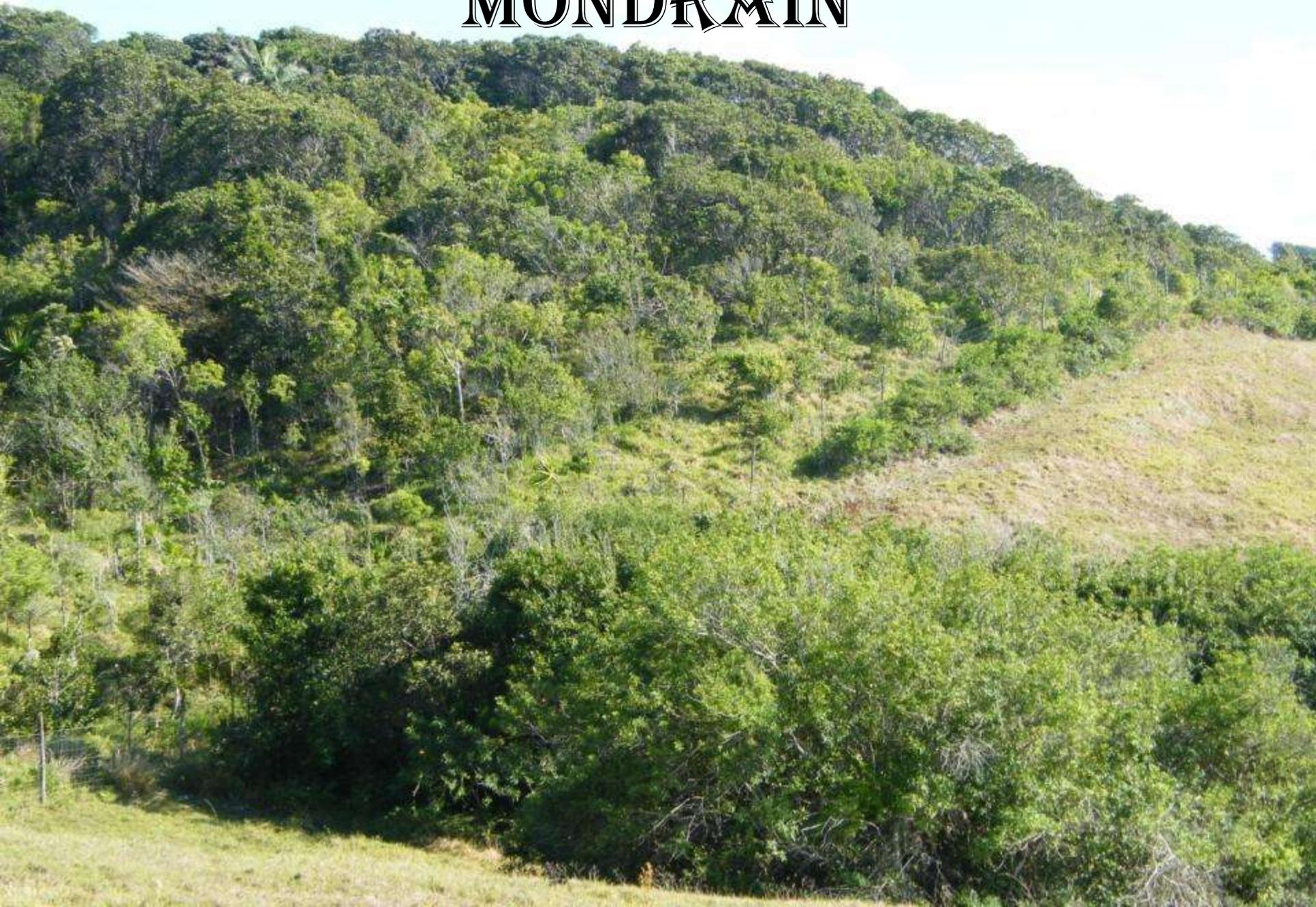
**... and disperse native seeds**



# Reintroducing bird and reptiles



# MONDRAIN





# Consultancies

## Forest restoration projects

- **Bioculture Ltd.**
  - Vallée de l'Est
  - Chamarel Ebony Forest
- **Compagnie Sucrière de Bel Ombre**
  - Chamarel
  - Bel Ombre
  - Case Noyale

*Restored forest at Vallée de l'Est*

# Forest Restoration projects: Bioculture Ltd



- Nursery at Vallée de l'Est



# Forest Restoration projects: Bioculture Ltd

Chamarel Ebony Forest



# Forest Restoration projects: Bioculture Ltd



**Area planted with native species following weeding at**

**Chamarel Ebony Forest**

# Forest restoration projects: Compagnie Sucrière de Bel Ombre



Weeded area at Chamarel



**Endemic garden at Chamarel  
Coloured Earth site**





**Forest restoration projects:  
Compagnie Sucrière de Bel Ombre**

**Weeded area in Bel Ombre, Valriche**

# Forest restoration projects: Compagnie Sucrière de Bel Ombre

Weeding at Case Noyale



# Phenology

## What is plant phenology?

- Study of
  - the timing of recurrent biological events such as
    - leaf flushing
    - flowering
    - fruiting
  - the causes of their timing with regard to biotic and abiotic factors
  - the interrelation among phases of the same or different species.



*Diospyros egrettarum*

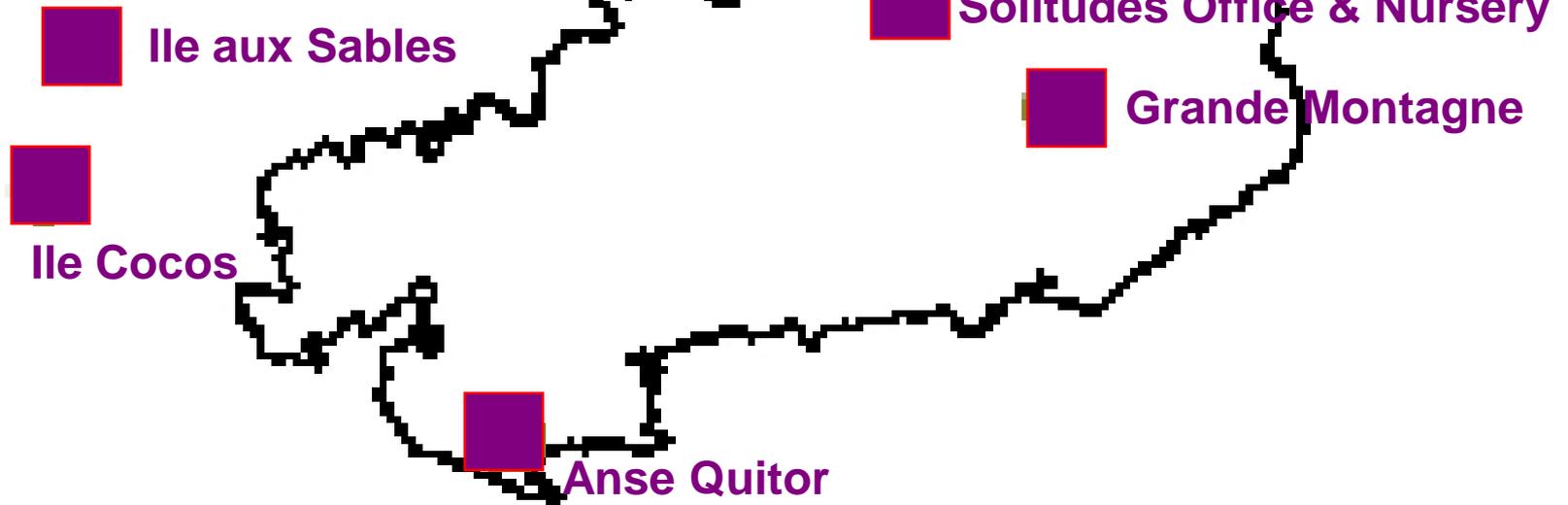
# Phenology Outreach







# RODRIGUES



# endemic plant exploration



# rare plant propagation



**café marron**  
*Ramosmania rodriguesii*



*Myoporum mauritiana*



*Gouania laxiflora*

# Solitudes Nursery



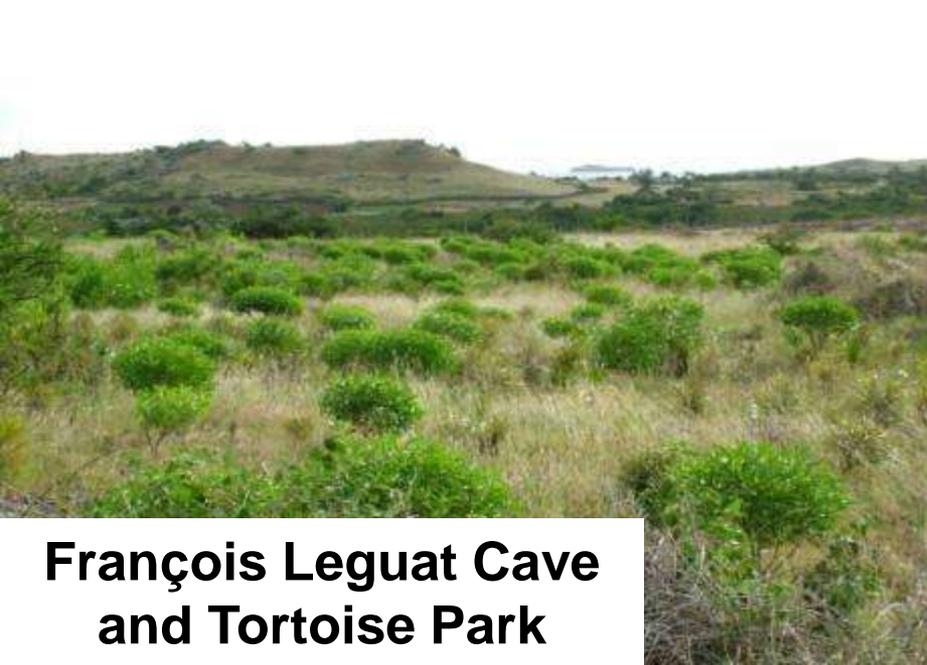
**Grande Montagne**



**Anse Quitor**



# Habitat Restoration and Species Recovery



**François Leguat Cave  
and Tortoise Park**



**Ile Cocos**

# Field Restoration Team



# Thinning of exotics



# Planting native and endemic seedlings



# Maintenance of planted plots



# Monitoring survival and growth rate





## Community Participation





# Grassroots Community Projects in Rodrigues



# Awareness and communication



# The Rodrigues Environmental Education Programme



**Reach out to school children of all ages**



# Grande Montagne Nature Reserve



***Obetia ficifolia***



***Sarcostemma odontolepis***



***Peperomia reticulata***



***Aeranthus arachnites* var. *balfourii***

- 
- Fenced area 30 Ha
  - Nature Reserve 25.5 Ha
  - 24 Ha restored: 19 Ha (MWF), 5 Ha (Forestry Service)
  - Number of plants planted by MWF >150 000
  - Used by Rodrigues Fodies, Warblers and Fruitbats
  - 12 labourers trained in restoration, 6 employed
  - Exchanges of staff with Mauritius and UK



**café marron**  
*Ramosmania rodriguesii*



**Grande Montagne Visitor's Centre**



## ENDEMIC & NATIVE PLANTS



Scientific name:  
*Hibiscus liliiflorus*  
Local name: Mandrinette



Scientific name:  
*Pittosporum balfourii*  
Local name: Bois begasse



Scientific name:  
*Foetida rodriguensis*  
Local name: Bois puant



Scientific name:  
*Latania verschoffeltii*  
Local name: Latanier jaune



Scientific name:  
*Dracaena reflexa*  
Local name: Bois chandelle



Scientific name:  
*Pandanus heterocarpus*  
Local name: Vacoas



Scientific name:  
*Fernelia buxifolia*  
Local name: Bois bouteille



Scientific name:  
*Hypochoeris verschoffeltii*  
Local name: Palmiste maroon



Scientific name:  
*Peperomia reticulata*



Scientific name:  
*Gaconia rodriguensis*  
Local name: Bois blanc



Scientific name:  
*Sideroxylon galeatum*  
Local name: Bois fer



Scientific name:  
*Olea lancea*  
Local name: Bois cerf

Scientific name:  
*Ramsonia rodriguensis*  
Local name: Café marron



Scientific name:  
*Mathurina penduliflora*  
Local name: Bois gauloise



"This plant is unique to Rodrigues Island."  
Cette plante est unique à Rodrigues.

The only three remaining endemic vertebrates on Rodrigues.  
*Les seuls trois vertébrés endémiques de Rodrigues*

Scientific name:  
*Acrocephalus rodriguensis*  
Rodrigues Warbler  
Fauvette de Rodrigues



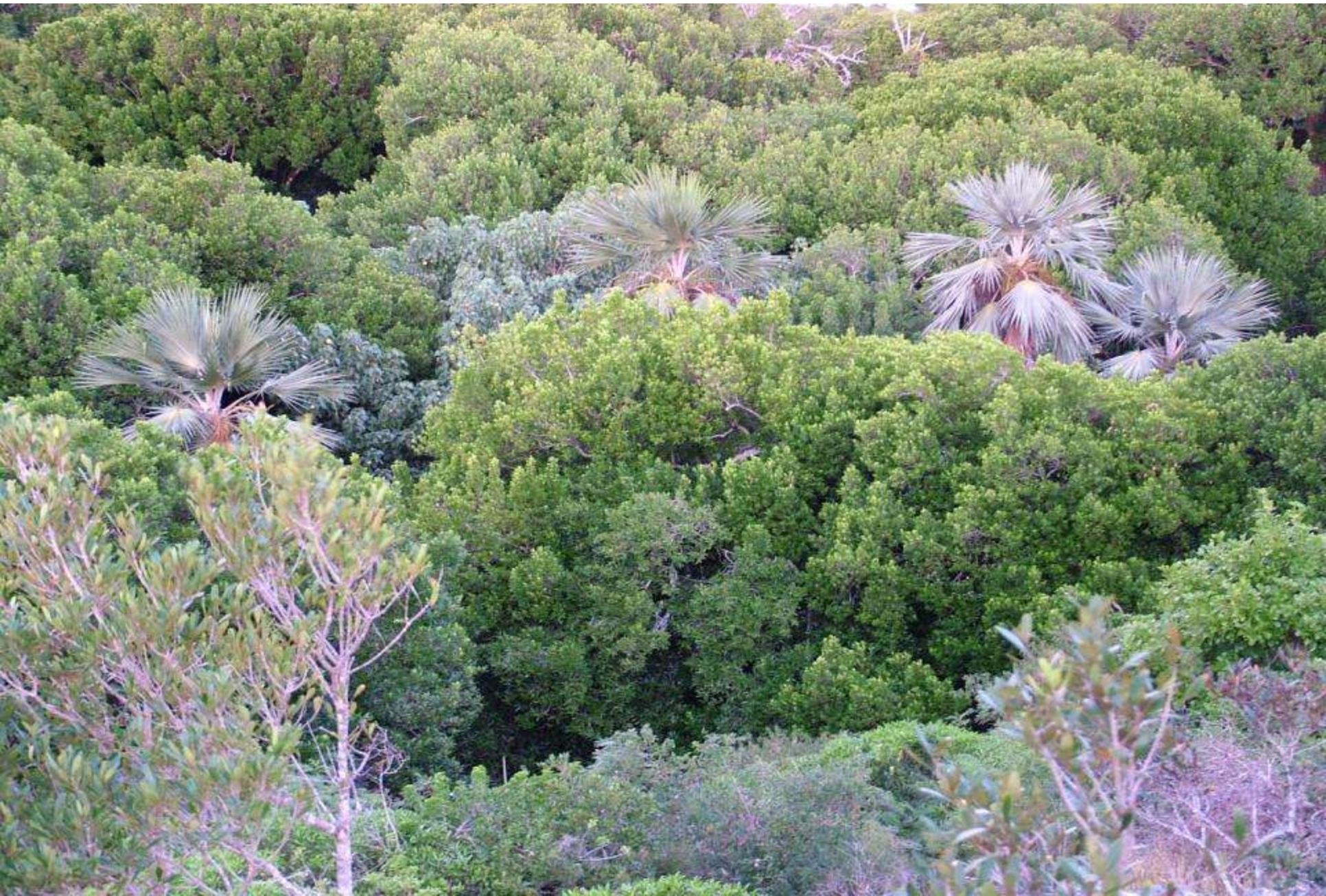
Scientific name:  
*Foudia flavicans*  
Rodrigues Fody  
Cardinal jaune



Scientific name:  
*Pteropus rodriguensis*  
Rodrigues Fruit Bat  
La Chauve souris de Rodrigues



# Anse Quitor Nature Reserve



- 
- Fenced area 35 Ha
    - Nature Reserve 10.3 Ha
      - *Foetidia rodriguesiana* (bois puant),  
*Polyscias rodriguesiana* (bois blanc) and  
*Terminalia bentzoe* ssp. *rodriguesi* (bois benjoin)
        - 18 Ha restored: 12 Ha (MWF), 6 Ha (Forestry Service)
  - Number of plants planted by MWF > 90 000
    - 6 labourers trained in restoration
    - Staff exchange with Mauritius &

***Latania verschaffeltii***  
**latanier jaune**



***Gastonia rodriguesiana***  
**bois blanc**



***Zanthoxylum paniculatum***  
**bois pasner**



# RESTORATION OF ANSE QUITOR NATURE RESERVE



Seedling nursery

Through restoration, 4 ha within Anse Quitoir Nature Reserve will be restored and 40,000 nursery propagated endemic seedlings will be planted.



Uprooting of invasive species & Planting of endemic seedlings

Invasive alien species are being removed and native and endemic seedlings are being planted. Through the project a team of 6 villagers were recruited and are being trained in propagation techniques for the restoration of Anse Quitoir Nature reserve.



Conservation of rare species

The biodiversity and rare plant species of the Anse Quitoir region are being protected.

Anse Quitoir region is an area of high endemism with the only remaining wild species of *Zanthoxylum paniculatum* (Bois pasner) and the last female *Dombeya rodriguesiana* (Bois pipe) was found in this area.

Mauritian Wildlife Foundation will increase the awareness of Rodrigues biodiversity and the Anse Quitoir Nature Reserve through educational visits and participation by schools, businesses, and community groups.

Anse Quitoir is also an interesting area with caves, namely Gastonia, in which many bones of the extinct Solitaire and tortoise have been found.



Before



1 month later

## Local community involvement



Volunteer helping in the reserve



Educational visit in the reserve



Community talk with villagers

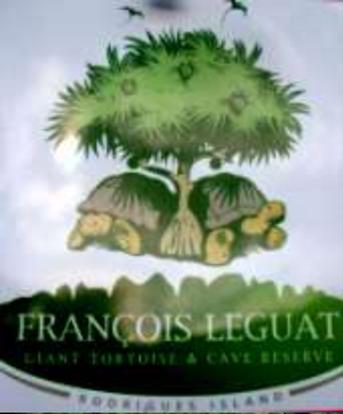


Awareness campaign with business group



GLOBAL ENVIRONMENT FACILITY





**120 000 plants supplied to the François Leguat Giant Tortoise and Cave Reserve**







- **Regular bird survey since 1983**
- **Weed control**
- **Helped in rodent eradication in 1995**
- **Produced a draft management plan**

# Seabirds on Ile Cocos and Ile aux Sables



**Fairy Tern**

**Important site for wading and overwintering birds-  
Ruddy Turnstones, whimbrel, plovers, sandpipers**



# Invasive plant control



# Restoration of Ile Cocos



# Restoration of Ile Cocos



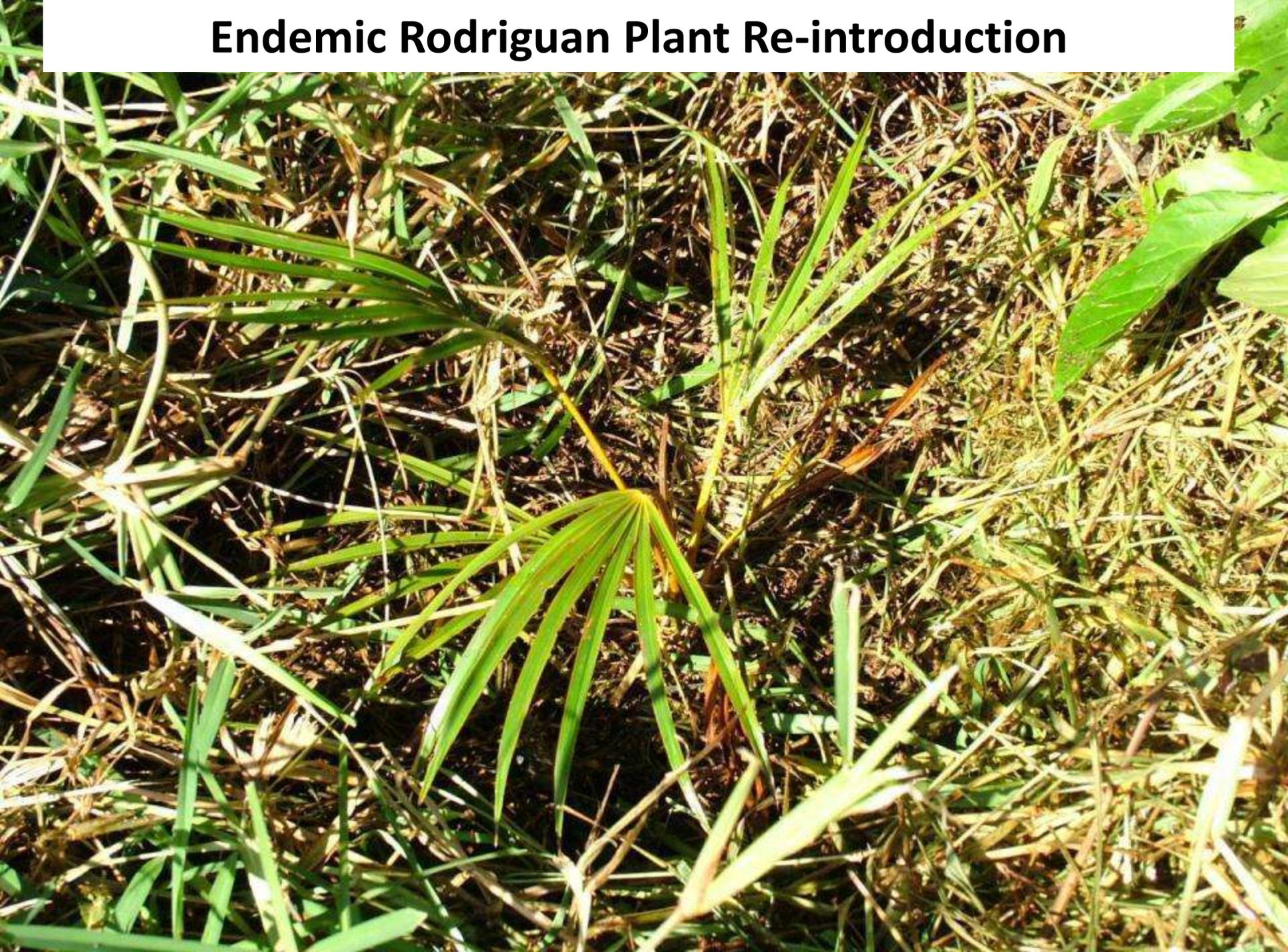
Transporting seedlings from Nursery to Ile Cocos

# Restoration of Ile Cocos



Planting on Ile Cocos

# Endemic Rodriguan Plant Re-introduction



# Guide de la Faune et de la Flore de l'île Cocos

(Rodrigues)



Février 2009

## *Ipomea pes-caprae*



Plante rampante du littoral, reconnue pour son rôle dans la protection naturelle des plages contre l'érosion. Elle est aussi utilisée dans la pêche au casier et en médecine traditionnelle.

**Nom commun :** Liane batatran, Liane petite à Durand

**Nom local :** lian batatran

**Famille :** Convolvulacée

**Distribution :** Largement répandue sous les tropiques, cette plante est aussi indigène des Mascareignes. Elle est commune à Rodrigues sur les côtes sablonneuses ou rocheuses. Les fleurs sont rose-rouges et le centre plus sombre. Elle est efficace contre l'érosion des plages.

## *Lycium tenue*



Le 'bwa mato' est exploité par le Noddy à bec grêle pour nidifier.

**Nom commun :** Bois matelot

**Nom local :** bwa mato

**Famille :** Solanacée

**Distribution :** indigène des Mascareignes, cette plante est communément rencontrée à Rodrigues le long des côtes. Occasionnelle à Maurice et rare à la Réunion.

## *Pisonia grandis*



Arbre croissant seulement à Rodrigues, pour les Mascareignes, il est utilisé par l'abeille-léopold pour récolter.

**Nom commun :** bois mapou

**Nom local :** bois mapou

**Famille :** Nyctagracée

**Distribution :** Cet arbre, des îlots de Rodrigues jusqu'à la Polynésie, se trouve rarement à l'intérieur des terres. Il forme des touffes sur l'île Cocos où les Noddys et les Gouffettes blanches nichent. Leurs fruits très collants se fixent sur les oiseaux, les plantes utilisent ainsi cette adaptation pour disperser leurs graines à large échelle. Dans les cas extrêmes, les fruits collants peuvent entraver le bon développement des pousses, et même entraîner leur mort. Curieusement, cette espèce n'a jamais été recensée à Maurice ni à la Réunion.

## *Stenotaphrum dimidiatum*



Herbe typique du littoral et des îlots des Mascareignes.

**Nom commun :** Herbe bourrique

**Nom local :** l'eti burik

**Famille :** Graminée

**Distribution :** Existe en Afrique et en Asie, à Madagascar, aux Comores et dans les Mascareignes. Très commune à Rodrigues, le long des côtes, sur le sable dunare, et pouvant former des peuplements denses dans les sous-bois des plantations de cacao. On la trouve à toutes les altitudes sur l'île Cocos, ainsi que sur les autres îlots et sur l'île principale.





# Rodrigues Passerines



**Rodrigues Warbler**  
**fauvette de Rodrigues**



**Rodrigues Fody**  
**cardinal de Rodrigues**  
**VULNERABLE**

**On the brink of extinction in  
the 1970's**

# How many bird extinctions have we prevented?

Stuart Butchart, Alison Stattersfield, and Nigel Collar (Birdlife International)

**31 bird species have been saved from extinction during 1984-2004**

**3 are from Mauritius (Mauritius Kestrel, Pink Pigeon, Echo Parakeet)**

**2 are from Rodrigues!**

**Rodrigues Warbler**

**Rodrigues Fody**



# Rodrigues Warbler

**c. 30 individuals in early 1970's**

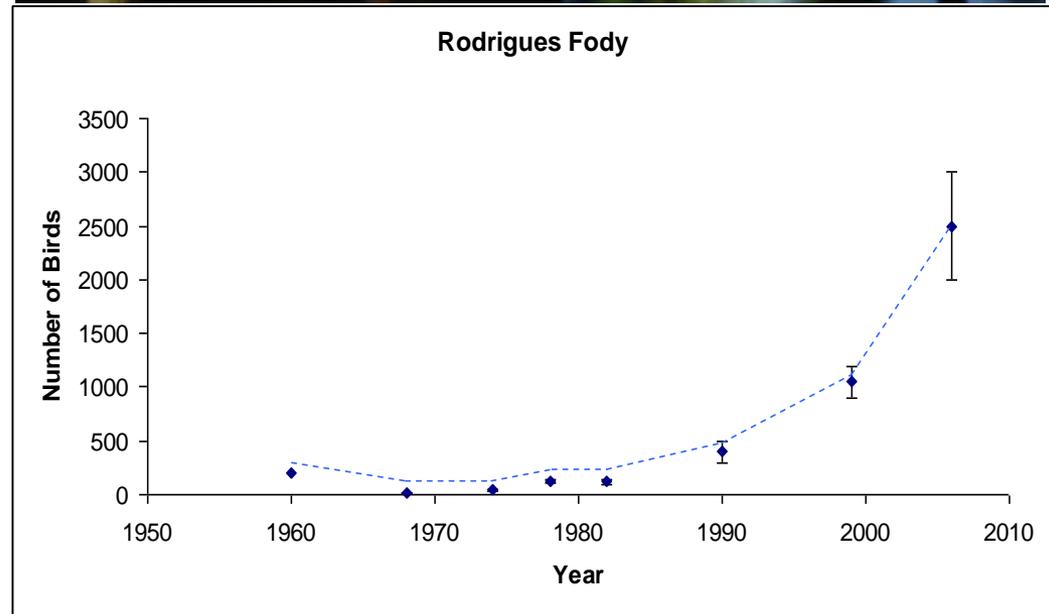


**c. 4000 individuals**

**Near Threatened**

# Rodrigues Fody

- c. 30 birds in 1974
- > 8000 birds in 2010
- Near Threatened
- Most successful passerine restoration?



**<100,  
1974**

**> 15 000,  
2013**



**Rodrigues Fruitbat**

# Red-listing of Flora of Mauritius and Rodrigues

