

Table of contents



Box

Case study

Foreword	10
Preface	12
A tribute to Don Merton (1939–2011)	14
Important definitions	16
What is an Invasive Alien Species?	18
About this book	20
Introduction	22

Part 1

Why and how to eliminate Invasive Alien Species?

Impacts and management options	24
--------------------------------	----

Chapter 1

Why fight Invasive Alien Species?

27

Invasive alien species: A global problem	28
The impacts of invasive species in Seychelles	30
Loss of native biodiversity and ecosystem disruption	30
Socio-economic impacts	33

<i>How do alien species arrive and become invasive?</i>	35
---	----

Why are Seychelles and islands in general so vulnerable?	38
Vulnerability of islands to biological invasions	38
Vulnerability of the biodiversity and economy of Seychelles	38

<i>The hairy caterpillar (?Euproctis sp.) invasion in Seychelles – novel threats from a highly resistant pest</i>	42
---	----

<i>Hybridisation: a source of genetic enhancement for invaders and a major threat for native biodiversity</i>	49
---	----

<i>Marine invasive species in Seychelles</i>	53
--	----

Chapter 2

Restoring islands to save species: The Seychelles experience

55

<i>The biological and conservation value of small islands</i>	57
Small predator-free islands: Biodiversity refuges protecting species from extinction	58

Eradication of introduced predators and competitors:	
The first step to ecosystem recovery	61
Mammal eradications	64

<i>Seychelles: a leading country for the eradication of invasive vertebrates from islands</i>	68
---	----

Bird eradications	70
Removal of exotic invasive plants and trees to replant native vegetation ...	71
Species translocations and recolonisations to rehabilitated islands	74

Recovery and (re)colonisation	74
-------------------------------------	----

Translocations of rare and threatened species	75
---	----

Creating more island refuges for native biodiversity	82
New perspectives and challenges in invasive species management and restoration strategies	85

Availability of additional islands suitable for restoration and preservation	85
--	----

Challenges to eradicate rats from larger tropical islands	85
Suitable habitats at restored islands non-existent or too limited for some species	86
Increased interspecific interactions on small islands with multiple reintroductions	88
The need to develop alternative conservation approaches such as 'mainland islands' or predator-proof fences	89
Developing partnerships and ecotourism to fund ecosystem restoration	92
■ <i>Rehabilitation of Island Ecosystems. A programme combining invasive species management, habitat restoration, threatened species recovery and capacity building</i>	96
Chapter 3 Preventing new invasions and defining priorities for action	101
■ <i>Some fundamental principles of invasive alien species management</i>	102
Prevention is better than cure: Acting on entry points and pathways ..	103
■ <i>Why do we need biosecurity protocols?</i>	105
■ <i>General basic recommendations for island biosecurity</i>	106
Early detection and rapid reaction	109
Establishing priorities for action: What to fight against first?	111
Deciding on the most important species to target	111
Decide on where to act first	111
Take national priorities into account	112
The need for more regional cooperation	113
■ <i>The Melon fruit fly, a challenge for Seychelles agriculture</i>	114
Chapter 4 How to eliminate invasive alien species	117
Physical, chemical and biological methods	118
Physical or mechanical control	118
Chemical methods	119
■ <i>Ethics, animal rights principles and public concerns</i>	120
Biological methods	123
Euthanising invasive animals	127
Inhalation of carbon dioxide (CO ₂)	127
Inhalation of Carbon monoxide (CO)	128
Inhalation of anaesthetic gases	129
Lethal injection	129
Stunning or concussion	130
Cervical dislocation	130
Shooting at close range	130
Confirming the death	131
Disposing of carcasses	131
Chapter 5 Which management option to choose?	133
Four main management options	134
Making the right choice	134
Eradication	138
Preparing the operation	138
■ <i>The Pacific Invasives Initiative Resource Kit for Rodent and Cat Eradication .</i>	140
During the eradication phase	146

After the eradication phase: Ascertaining success and general evaluation	146
Containment and exclusion	148
■ <i>Predator fencing: A sophisticated exclusion technique that could be employed in Seychelles</i>	150
Control	152
■ <i>Planning and setting up a control operation</i>	154
Mitigation of impacts and ecosystem management	155
Acting on multiple fronts: An integrated management strategy	157
■ <i>Some best practice guidelines for island and property managers</i>	159
■ <i>Seychelles National Biosecurity Strategy</i>	160
Managing invasive species: How much does it cost?	162
Chapter 6 Improving knowledge and measuring change	165
Monitoring biodiversity	166
Ecosystem recovery after the eradication of rats and cats	169
Chapter 7 Which are the species that require particular attention for being or becoming invasive?	177
■ <i>The case of native invasive species</i>	183
Invasive species – How can you help?	186
Part 2 Identification and management of priority species	190
Mammals	192
Black (or Ship) rat	192
Brown rat	201
House (or Common) mouse	208
■ <i>Processing rats and mice</i>	213
General recommendations and considerations for the control and eradication of rodents, including lessons learnt from Seychelles ..	214
■ <i>Rodent trapping</i>	216
■ <i>Index-trapping</i>	218
■ <i>Rodenticide treatment</i>	220
Feral cat	230
Feral (European) rabbit & Black-naped (Indian) hare	238
Common tenrec	242
■ <i>The eradication of Feral goats from Aldabra atoll</i>	245
Birds	248
Barn owl	248
Common myna	251
■ <i>The eradication of Common mynas from Frégate Island</i>	259
Feral chicken	261
House sparrow	265
(Indian) House crow	270
■ <i>The eradication of introduced Red whiskered bulbuls and Madagascar fodies from Assumption and Aldabra</i>	273
■ <i>Addressing the threat of the Ring-necked parakeet to the Seychelles black parrot</i>	276
Reptiles	278
Crested tree lizard	278

	Red-eared slider	282
	Invertebrates	285
	Big-headed ant, African big-headed ant	285
■	<i>Cousine Island Big-headed ant management programme</i>	289
■	<i>Aride Island Big-headed ant eradication attempt</i>	291
	Crazy ant	292
	Giant African snail (Pale-lipped / Pink-lipped)	295
	Rosy wolf snail	295
	Spiralling whitefly	299
	Coconut whitefly	299
	Tiger mosquito	304
	Broadleaf trees	308
	Albizia	308
	Cinnamon	311
	Cocoplum	314
	Devil tree	317
	Red sandalwood/coralwood	319
	Strawberry guava/Chinese guava	321
	White cedar	324
	Management recommendations for broadleaf exotic species	326
■	<i>Results of ongoing trials combining physical control and herbicide application</i> ..	327
■	<i>Personal protection for pesticide use</i>	330
	Creepers	332
	Devil's ivy	332
	Japanese climbing fern	334
	Merremia	337
	Management recommendations for alien invasive creepers	340
	Other plants	344
	Koster's curse	344
	Sisal	347
	Green aloe or Yucca	347
	Water lettuce	352
■	<i>Water hyacinth</i>	355
	Fungal disease	356
	Takamaka wilt disease	356
	Bibliography	362
ANNEX	Example of rat abatement and biosecurity protocols [North Island]	376
	Useful contacts regarding IAS management in Seychelles	383

This book is to be quoted as follows: Rocamora G. & Henriette E. 2015. *Invasive Alien Species in Seychelles: Why and how to eliminate them? Identification and management of priority species*. Island Biodiversity & Conservation centre, University of Seychelles. Biotope, Mèze; Muséum national d'Histoire naturelle, Paris (Inventaires & biodiversité series), 384 p.