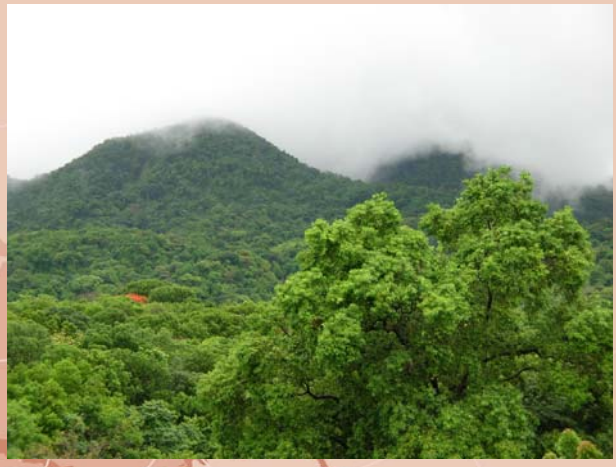
Durrell Conservation Monograph No.1



A biodiversity assessment of the Centre Hills, Montserrat.

Edited by Richard P. Young

Durrell Wildlife Conservation Trust
Montserrat Ministry of Agriculture, Lands, Housing and the Environment
Montserrat National Trust
Montana State University
Royal Botanic Gardens, Kew
Royal Society for the Protection of Birds
South Dakota State University
Centre Hills Project

durrell

A biodiversity assessment of the Centre Hills, Montserrat.

R. P. Young, (ed.)

Durrell Wildlife Conservation Trust
Montserrat Ministry of Agriculture, Lands, Housing and the Environment
Montserrat National Trust
Montana State University
Royal Botanic Gardens, Kew
Royal Society for the Protection of Birds
South Dakota State University
Centre Hills Project

Durrell Conservation Monographs No.1
2008

The Durrell Conservation Monograph series is published by,
Durrell Wildlife Conservation Trust
Les Augrés Manor
Trinity
Jersey, JE3 5BP
Channel Islands

Tel: +44 1534 860000
Fax: +44 1534 860001
www.durrell.org

Series Editor: John E. Fa
Editor: Richard P. Young
Design: Frameworks

ISBN: 978-0-9559034-1-0

Recommended citation:
Young, R. P. (ed.) (2008). *A biodiversity assessment of the Centre Hills, Montserrat*. Durrell Conservation Monograph No. 1. Durrell Wildlife Conservation Trust, Jersey, Channel Islands.

Front cover photo:
The Centre Hills forest, Richard Young (Durrell Wildlife Conservation Trust)
Eleutherodactylus johnstonei, Matthew Morton (Durrell Wildlife Conservation Trust)
Epidendrum montserratense, Martin Hamilton (Royal Botanic Gardens, Kew)

Table of Contents

Contributors

Sara Bárrios
Royal Botanic Gardens
Kew
Richmond
Surrey, TW9 3AB
UK
s.barrios@kew.org

Colin Clubbe
Royal Botanic Gardens
Kew
Richmond
Surrey, TW9 3AB
UK
C.Clubbe@kew.org

Ian A. Foley
Montana State University
1901 S. 19th Ave.
Bozeman
MT, 59717
USA
ifoley@montana.edu

Kelvin A. Guerrero
Montana State University
1901 S. 19th Ave.
Bozeman
MT, 59717
USA
kaguerrero@hotmail.com

Martin A. Hamilton
Royal Botanic Gardens
Kew
Richmond
Surrey, TW9 3AB
UK
M.Hamilton@kew.org

Geoff M. Hilton
Royal Society for the Protection of Birds
The Lodge
Sandy
Bedfordshire, SG19 2DL
UK
geoff.hilton@rspb.org.uk

LaDonna L. Ivie
Montana State University
1901 S. 19th Ave.
Bozeman
MT, 59717
USA
divie@montana.edu

Michael A. Ivie
Montana State University
1901 S. 19th Ave.
Bozeman
MT, 59717
USA
mivie@montana.edu

Katherine A. Marske
Montana State University
1901 S. 19th Ave.
Bozeman
MT, 59717
USA
marskeka@yahoo.com

Lloyd Martin
Ministry of Agriculture, Lands, Housing & The Environment
P.O. Box 272
Brades
Montserrat
West Indies
martinl@gov.ms

Will Masefield
Durrell Wildlife Conservation Trust
Les Augrés Manor
Trinity
Jersey, JE3 5BP
Channel Islands
will.masefield@durrell.org

Matthew N. Morton
Durrell Wildlife Conservation Trust
c/o St Lucia Forestry Department
Castries
St Lucia
West Indies
matthew.morton@durrell.org

Agnieszka Ogrodowczyk
Durrell Wildlife Conservation Trust
Les Augrés Manor
Trinity
Jersey, JE3 5BP
Channel Islands
agiogr@yahoo.com

Scott C. Pedersen
South Dakota State University
Brookings, SD 57007
USA
Scott_Pedersen@sdstate.edu

Stuart K. Robbins
Royal Botanic Gardens
Kew
Richmond
Surrey, TW9 3AB
UK
s.robbins@kew.org

Richard P. Young
Durrell Wildlife Conservation Trust
Les Augrés Manor
Trinity
Jersey, JE3 5BP
Channel Islands
richard.young@durrell.org

Foreword

On Montserrat there has long been a commitment to a balanced, integrated approach to forest conservation, designed at maintaining a range of functional habitats and assemblages of species. The major aims are (i) to promote sustainable use of natural resources and environmental goods and services in an equitable manner and (ii) to maintain biodiversity in its widest definition, including genes, populations, species and ecosystems.

Over the years, a number of studies have been conducted on the biodiversity and natural environment of Montserrat, and recently, some conservation prescriptions have been tested, particularly on forest avifauna. While some of these efforts have produced useful data and are interesting conceptually, what have been largely lacking are mechanisms for translating sound conservation policies into routine practices in the field, based on the ecosystem approach. This inadequate application of conservation action is due primarily to limited capacity including human and financial resources, decision support systems and access to information.

The apparent need for improved conservation action was brought into stark focus following the onset of volcanic eruptions in 1995 in which two-thirds of the island was rendered inaccessible and a similar proportion of its forest was destroyed. As a result settlements and economic activities are expanding in areas where fragile ecosystems coexist and where competition for space is acute. Of particular concern was the plight of the Centre Hills Forest and surrounding habitats, the largest remaining tract of continuous forest on the island.

The Centre Hills are of national, regional and global conservation importance because they support *inter alia,* assemblages of single-island and regional endemic species of fauna and flora, as well as eight globally threatened vertebrate and plant species. The Centre Hills also provide many environmental goods and services which are important to sustainable livelihoods and quality of life. For example, all potable water comes from the Centre Hills; they serve as a buffer against the impacts of natural disasters such as hurricanes, floods and volcanic eruptions; and they control soil erosion thereby protecting agriculture and fisheries based livelihoods and beach, dive and eco-tourism.

From the start, it was recognised that conservation of the Centre Hills required a strategy for integrated management of the natural resources and the ecosystem services they provide on a sustainable basis, for the benefit of key stakeholders. As a result, a number of national and international partners, who have previously worked together on similar projects, presented a successful bid to the UK Darwin Initiative for a project to conserve the Centre Hills. Key partners in the project included the Ministry of Agriculture, Lands, Housing and The Environment; Montserrat National Trust; Montserrat Tourist Board; Royal Society for the Protection of Birds; Durrell Wildlife Conservation Trust and the Royal Botanic Gardens, Kew. The purpose of the project was to strengthen the capacity of the people of Montserrat to take targeted action to protect biodiversity and manage protected areas.

In developing a management strategy for any resource, it is vital to know the resources that are available and in what quantity, where they are located, how they are changing over time and how these changes are impacting on the remaining resources. Therefore, before a management plan could be developed for the Centre Hills, a systematic assessment of biological resources was conducted.

The biological assessment has provided robust data on which to base management of the Centre Hills and its biodiversity. It represents a first attempt at making a comprehensive assessment of the major plant, vertebrate and invertebrate animal taxa and the ecosystems of which they are a part. The key results and outputs of the biodiversity assessment and the highest priority conservation recommendations are summarised under the caption 'The Report in Brief.' Chapter 1 more fully summarises the findings and recommendations of the whole report, and Chapter 2 gives the background on Montserrat's natural history and the Centre Hills Biodiversity Assessment Project. Entire chapters have been devoted to plants and habitats; invertebrates (with emphasis on beetles); amphibians and reptiles; birds; bats; and invasive rats. The appendices should not be overlooked as much valuable information is presented on invertebrates and native and non-native plants.

The report will be particularly useful to scientists, researchers, conservation managers, students and enthusiasts, as it represents the definitive text on Montserrat biodiversity following the onset of volcanic eruptions.

Gerard A L Gray

Director of Environment

Ministry of Agriculture, Lands, Housing and The Environment – Montserrat

President

Montserrat National Trust

Acknowledgements

The biodiversity assessment of the Centre Hills, Montserrat, has been a significant effort, made possible only by an effective and close collaboration between the team of Montserratian and international biologists, forest rangers and taxonomic experts. The project team sincerely hopes that the Centre Hill's unique and globally important biodiversity is better understood and will be made more secure thanks to this assessment. A number of people working for, or with, the Montserrat Department of Environment and Montserrat National Trust in the past or present made this project achievable, through their considerable skills, expertise and hard work, despite many challenging field conditions. These include, in no particular order, Lloyd Martin, James Daley, Calvin Fenton, Philemon Murrain, John Martin, James Boatswain, Lloyd Aymer, Jervain Greenaway, Gerard Gray and Claude Gerald. Their knowledge of the Centre Hills and passion for its wildlife is remarkable, and they are effective advocates for its conservation and sustainable use of its natural resources.

The authors of the chapters in this volume deserve many thanks for all of their efforts; in the field, in the laboratory and at their desks. In terms of furthering our knowledge of the flora and fauna of the Centre Hills, Michael Ivie and his team at Montana State University, and Colin Clubbe, Martin Hamilton and colleagues at Royal Botanic Gardens, Kew, have made major contributions. Information about the invertebrates and plants of Montserrat has been massively improved through their efforts. The invertebrate and plant species checklists reported in an appendix to this volume are an invaluable resource for Montserrat. Geoff Hilton, Richard Allcorn and colleagues at the Royal Society for the Protection of Birds, in collaboration with the Department of Environment, have developed a systematic and well-organised forest bird monitoring programme which delivers scientifically robust data on the state of the Centre Hills' bird populations. These data are fundamental to the effective conservation of Montserrat's birds and greatly strengthen this biodiversity assessment. Scott Pedersen from South Dakota State University and colleagues have invested much time, effort and money to research and monitor the bats of Montserrat over the past 10 years or more, providing vital information on this important taxon, which has been utilised in this report. Will Masefield of Durrell Wildlife Conservation Trust made a significant contribution to the bat survey in 2005, including catching the rare and little known white-lined bat. Agnieszka Ogrodowczyk, also of Durrell, was meticulous and tenacious in leading an excellent survey of the reptiles and amphibians of the Centre Hills, which included hugely important finds of the Montserrat galliwasp that will advance the conservation of this unique but highly threatened and unknown species.

Thanks to the 'Centre Hills Project', the findings of the biodiversity assessment are currently informing the design of a Management Plan for the Centre Hills that seeks to ensure this ecosystem is conserved over the long term. Carole McCauley, Stephen Mendes and Sarah Sanders of the RSPB have all worked extremely hard to ensure the Centre Hills will soon be designated as a National Park, with a suitable management infrastructure and an enabling legislative framework in place. The value of having a biodiversity assessment embedded into a management planning project is worth noting here and it is gratifying that these data are being actively used to inform conservation and not just sitting on a shelf.

Throughout the biodiversity assessment, the people of Montserrat have shown overwhelming support for the project, despite having many other overriding issues to deal with, none more severe than the effects of the volcanic crisis on lives and livelihoods. Their friendliness and hospitality has been remarkable. The landowners in the Centre Hills area kindly allowed the project team to carry out the important biodiversity assessment fieldwork. The local media have shown a keen interest in the project and enabled the team to deliver information to people locally, and elsewhere, in order to raise awareness of the importance of Centre Hills biodiversity. Various people in the Governor's Office and Department for International Development have also shown a keen interest and provided welcome support for the project.

John Fa of the Durrell Wildlife Conservation Trust deserves much gratitude for conceiving and initiating the Centre Hills Biodiversity Assessment project. Also from Durrell, Sarah Seymour played a key role in supporting the management and delivery of the project, and Quentin Bloxam provided useful advice and encouragment. Finally, funding was provided by the Jersey-based Elizabeth Violet Annie Rouse Settlement, the UK Darwin Initiative and all of the collaborating institutions.

The report in brief

Background

Through conversion of land to agriculture and human settlement, and impacts of natural disasters and invasive species, Montserrat has lost much of its natural habitats and the Centre Hills now supports the largest remaining tract of forest on this island. The Centre Hills forest can be regarded as internationally important due to an assemblage of island and regionally endemic species and highly significant, and in some cases entire, populations of eight globally threatened vertebrate and plant species. Although the majority of the Centre Hills forest is protected as a forest reserve, important habitats outside the boundary remain threatened with destruction and degradation, and the ecosystem as a whole is negatively impacted by invasive mammals and plants. The delineation of the forest reserve boundary was not based on robust data on the distribution of key biodiversity features. As momentum built in Montserrat for an effectively managed protected area for the Centre Hills, there was a clear need for a systematic biodiversity assessment to guide the design of a management plan for the Centre Hills forest.

Project scope and objectives

A team of national and international experts was assembled to conduct the Centre Hills Biodiversity Assessment (CHBA). Among its objectives were to:

- inventory the biodiversity of the Centre Hills forest, by sampling a number of indicator taxa, including plants, invertebrates (with emphasis on beetles), amphibians, reptiles, birds and bats,
- evaluate the status of species of biodiversity value and conservation concern,
- map spatial patterns in biodiversity and important sites for key species in order to identify key biodiversity areas,
- assess the status of invasive plants and mammals and their potential impact on indigenous flora and fauna, and
- make recommendations for conservation management priorities within the Centre Hills forest.

A variety of data-gathering methods were employed in the assessment, including biodiversity surveys following a stratified (by elevation) random sampling design, ad-hoc surveys, and analysis of existing datasets and specimen collections.

Key results and outputs of the biodiversity assessment

The Montserrat plant checklist contains 795 known native species, 78 of which are of restricted-range representing the highest priority plant species for conservation. Two of Montserrat's endemic plants, *Epidendrum montserratense* and *Rondeletia buxifolia*, were discovered to have extremely limited distributions, the vast majority of which are not protected. The third endemic plant *Xylosma serratum* was not found and is feared extinct. The Centre Hills vegetation map clearly demonstrates the under-representation of dry and littoral forest in the protected area.

The number of invertebrate species known to occur in Montserrat is quadrupled to 1,241 species, including an increase in the number of known beetle species from 94 to an incredible 718 species from 63 families. The majority of these invertebrate species are probably only found in the Centre Hills forest. Roughly 120 invertebrate species have been identified as being possibly unique to Montserrat, and these should be considered the highest invertebrate conservation priorities.

The almost unknown endemic Montserrat galliwasp *Diploglossus montisserrati* was observed on three occasions, confirming the species' continuing survival, and further suggesting that it has an extremely restricted distribution limited to the Woodlands Spring area. Interesting spatial patterns in mountain chicken *Leptodactylus fallax* population trends suggest hunting may be having a severe localised impact on their populations.

An analysis of the bird monitoring data indicates highest population growth rates of the endemic Montserrat oriole *Icterus oberi* on the eastern flanks of Centre Hills, and important parts of its distribution falling outside of the northern boundary of the protected area. The Centre Hills appears to be a global stronghold for the endangered forest thrush *Cichlherminia lherminieri*.

For the first time, all 10 species of bat known from Montserrat were captured in an annual survey. This included captures in the Centre Hills forest of single lactating females of the two most endangered species, yellow-shouldered bat *Sturnira thomasi vulcanensis* and white-lined bat *Chiroderma improvisum*, which had been feared extinct. A range of key resources for bats lie outside of the protected area boundary, and need protection to help safeguard Montserrat's bat assemblage and to ensure that it continues to play vital ecological roles in the Centre Hills forest.

The introduced and invasive brown rat *Rattus norvegicus* and black rat *R. rattus* were found to be common and widespread in the Centre Hills, with rats even reaching the highest elevations of Katy Hill. Both rat species are known to cause severe and pervasive damage to native flora and fauna in their introduced range, particularly on islands. Good evidence is revealed of a positive correlation between numbers of non-native fruiting trees and the occurrence and numbers of rats in the Centre Hills forest. This has implications for how

invasive rats and other omnivores can be managed to reduce their impact on native flora and fauna.

Based on a list of key biodiversity features and an assessment of threats, a set of conservation priorities for the management plan of the Centre Hills protected area is proposed. A number of proposed 'strict conservation zones' have been delineated to prioritise sites for protection and zone other management activities.

Highest priority conservation recommendations

1. Protection of dry and littoral forest lying to the east and north-east of the Centre Hills is vital in ensuring the protected area is representative of all habitats in the contiguous Centre Hills forest. This habitat supports globally threatened plant species, important populations of a number of endemic reptiles, restricted-range dry forest specialist birds and probably an important invertebrate assemblage.
2. Protection of habitat in a hotspot for endemic plants that lies in the northern foothills of the Centre Hills outside the protected area boundary is an urgent priority. Tree protection orders are needed to safeguard veteran mango *Mangifera indica* trees in Belham Valley supporting important populations of *Epidendrum montserratense*. *Ex-situ* conservation activities, including plant propagation and seed banking for both endemic plant species, are needed as a safety net should the worse happen in the wild. Full status assessments for both endemic plants should be conducted to further identify key sites.
3. Enforce a series of appropriate regulations, and implement an improved population monitoring scheme, to ensure hunting of mountain chickens is sustainable. Improved biosecurity controls are needed at Montserrat's borders and elsewhere to minimise the risk of the *Chytridiomycosis* fungus arriving in Montserrat and infecting mountain chickens. A co-ordinated international captive breeding programme to hold a safety net population of mountain chickens in case of a *Chytridiomycosis* outbreak on Montserrat is also required. Protection of habitat in key ghauts lying outside of the Centre Hills protected area is a priority for this species.
4. Strict protection of habitat in and around the site where galliwasps have been observed in Woodlands Spring is urgently required. A population assessment and ecological research to improve knowledge of the status and habitat requirements of the species must be conducted as soon as possible. Habitat restoration activities and lethal rat control is needed to reduce potential pressures on the galliwasp population. Captive breeding should be considered as a conservation intervention once results of population assessment are available. Awareness in the local community of the threat posed by domestic animals to the galliwasp needs to be raised.
5. Monitoring of the Montserrat oriole and other forest birds should continue to provide early warning of population declines. Habitat protection in key Montserrat oriole sites lying outside the northern boundary of the Centre Hills protected area is important.
6. Management of a variety of bat resources both inside and outside the Centre Hills forest is needed, including: maintenance or restoration of flow regimes of water courses; protection of riparian habitats; no removal of dead standing trees in the Centre Hills forest; and protection of bat colonies at Rendezvous Bluff and other key roosts. Research to understand habitat requirements and the status of the yellow-shouldered bat and white-lined bat is required as a priority. Strict protection of habitat in Bottomless Ghaut and tight regulation of public access to this ghaut should be considered.
7. Habitat restoration activities are urgently required to reduce the impact of invasive mammals and plants on native flora and fauna in the Centre Hills forest, including: island-wide pig eradication; feral cat control; and selective removal of non-native fruit trees and rat control in experimental plots in key biodiversity areas.
8. Strategic conservation planning should be conducted to engage relevant stakeholders and set out plans of conservation action for priority species and habitats.
9. The sampling framework and data collection protocols used in this biodiversity assessment (and the forest bird and bat monitoring programmes) and the baseline data it has produced should be used to catalyse the implementation of a pressure-state-response monitoring scheme for the Centre Hills forest.

1. Biodiversity of the Centre Hills: importance, key features, conservation priorities and recommended actions

R. P. Young, G. M. Hilton & L. Martin

This chapter provides an in-depth summary of the main findings of the Centre Hills Biodiversity Assessment (CHBA). The importance of the biodiversity of the Centre Hills ecosystem is evaluated in terms of species richness (the number of species at a particular site), endemicity (the number of species that are unique to a particular area, e.g. Montserrat, Lesser Antilles etc) and threat status. This evaluation allows us to identify key features (species, species assemblages, habitats and ecosystem processes) of Centre Hills' biodiversity which represent priorities for conservation. The threats to these key features are then considered to allow recommendations on appropriate management actions.

1.1. Importance of Centre Hills biodiversity at a national, regional, and global scale

1.1.1. Species richness and endemicity

The Caribbean region has been identified as one of 34 global biodiversity hotspots (Mittermeier et al., 2005) due to its high levels of plant species richness (approximately 14,000 species) and endemism, which, due to extensive human-related impacts, is highly threatened. The Caribbean is particularly rich in reptiles, the vast majority (93%) of the 502 described species being endemic to the region. It is also noted for exceedingly high levels of amphibian endemism (100% of 170 described species are endemic to the region). Although much of this biodiversity is found in the western Caribbean, the Lesser Antilles is also recognised as supporting a considerable array of unique but threatened biodiversity of global importance. For example, it is remarkably rich in reptiles and has been identified as an Endemic Bird Area (Stattersfield et al. 1998), supporting 24 endemic bird species and seven endemic genera.

Considering that the island of Montserrat is only just over 100 km2 in area, it is notable in a Lesser Antillean context for supporting a relatively large number of reptiles (eight native and one naturalised terrestrial species), bats (10 species), and as a result of the CHBA we now know that it has a very rich invertebrate assemblage. The CHBA invertebrate inventory has vastly increased the number of invertebrate species known to occur in Montserrat, from 306 to 1,241, including an incredible 718 (up from 94 previously known) beetle species. On Montserrat, the majority of these invertebrate species are probably found only in the Centre Hills, which therefore supports the majority of the island's biodiversity. The CHBA data were used to make a tentative prediction that over 4,000 animal species occur on Montserrat, with the large majority still undiscovered by science.

The plant inventory revealed that nearly 800 native plant species are now recorded from Montserrat, and most of these are likely found in the Centre Hills forest. This forest comprises a dynamic mosaic of habitats which support a wide range of plants including many species of restricted distribution as well as several globally threatened species. This would qualify the Centre Hills as an Important Plant Area (IPA) as defined by the Important Plant Area programme co-ordinated by Plantlife International and the World Conservation Union (Plantlife International 2004). The long-term protection of the Centre Hills would be an important contribution to the implementation of Target 5 of the Global Strategy for Plant Conservation – 'Protection of 50% of the most important areas for plant diversity assured' (CBD, 2003).

Montserrat is home to a range of single-island endemic plants and vertebrates, i.e. species that are unique to Montserrat, nearly all of which occur in the Centre Hills and surrounding area (Table 1.1). Three species of plant are island-endemics although one of these may now be extinct following the volcanic activity of the past decade. Six of the reptiles are unique to Montserrat at the species or subspecies level. This includes the almost unknown and rarely observed Montserrat galliwasp *Diploglossus montisserrati*, a lizard which can be considered a 'biogeographical enigma', in that it is the only member of its family (Anguidae) to occur in the Lesser Antilles. The Montserrat oriole *Icterus oberi* is the island's only endemic bird and recent research has revealed that Montserrat has an endemic subspecies of bat, the yellow-shouldered bat *Sturnira thomasi vulcanensis* (Genoways, 1998). Around 120 of the described invertebrate species, of which roughly 80 are beetles, are currently known only from Montserrat, and therefore may be single island endemics. The CHBA confirmed the continuing survival of four of the single-island endemic vertebrates and plants (*Epidendrum montserratense, Rondeletia buxifolia*, Montserrat galliwasp and *Sturnira thomasi vulcanensis*), which were previously feared to be extinct.

The Centre Hills support the vast majority of Montserrat's terrestrial plants and animals, including most of its endemic species, and therefore in terms of the conservation of the island's biodiversity it is clearly of utmost importance.

1.1.2. Threatened species

The Centre Hills forest supports significant (in some cases entire) populations of eight globally threatened (including two candidate globally threatened plants) vertebrate and plant species (Table 1.2). Consid-

Taxonomic group	Common name	Scientific name	Distribution status on Montserrat
Plants	n/a (a species of orchid)	*Epidendrum montserratense*	Restricted range; Belham Valley and northern foothills of Centre Hills
	n/a (a species of orchid)	*Rondeletta buxifolia*	Highly restricted range; mostly occurs in northern foothills of Centre Hills
	n/a (a species of small tree)	*Xylosma serratum*	Possibly extinct, known only from Soufriere Hills
Reptiles	Montserrat amelva; ground lizard	*Ameiva pluvianotata*	Relatively common in dry habitats; large loss of suitable habitat in the south of Montserrat as result of volcanic activity
	Montserrat anole; tree lizard	*Anolis lividus*	Abundant in a range of habitats across Montserrat
	Montserrat galliwasp	*Diploglossus montiserratti*	Extremely scarce, know only from western fringe of Centre Hills
	Southern leeward dwarf gecko*	*Sphaerodactylus fantasticus ligniserulus*	Abundant in a range of habitats across Montserrat
	Leeward racer*	*Alsophis antillensis manselli*	Relatively abundant in the Centre Hills and surrounding area
	Blind snake; warm snake*	*Typhlops monastus monastus*	Unknown; may be widespread but remains undetected
Birds	Montserrat oriole	*Icterus oberi*	Found only in Centre Hills and a very small isolated forest patch in the South Soufriere Hills; relatively scarce
Bats	Yellow-shouldered volcano bat*	*Sturnira thomasi vulcanensis*	Only recorded three times in Montserrat – Paradise estate in 1994 and Bottomless Ghaut in 2005 and 2006

** Indicates that Montserrat supports an endemic subspecies of a more widespread species.*

Table 1.1 Montserratian endemic plant and vertebrate species and sub-species occurring in the Centre Hills and surrounding area

erable numbers of invertebrate species in the Centre Hills are also likely to be threatened, but insufficient information is available to make a formal Red List assessment. Three species, the Montserrat galliwasp (Day, 1996), mountain chicken *Leptodactylus fallax* (Fa *et al.*, 2004) and Montserrat oriole (BirdLife International, 2004) are classified as Critically Endangered (i.e. "at extremely high risk of extinction in the wild"), the highest level of threat as assessed by the World Conservation Union (IUCN). Although they have not yet been formally Red Listed, the CHBA has produced evidence that the two endemic plants, *Epidendrum montserratense* and *Rondeletia buxifolia*, will qualify as Critically Endangered. Two of the bat species are classified as Endangered, with a further three Near Threatened. Four plant species that occur in Montserrat are considered globally threatened despite being widely distributed in the Caribbean and Americas, as they are subject to over-exploitation (mainly for timber) in many parts of their range.

The Centre Hills qualifies as an 'Important Bird Area' (Sanders, 2006) because it supports a significant assemblage of 'Restricted-range [bird] species' (see Table 6.5 for a list), including important numbers of the two globally threatened species, forest thrush *Cichlherminia lherminieri* and Montserrat oriole. In this context, restricted-range species are those that only occur in the Lesser Antilles and immediate surrounding area.

The Centre Hills also supports a number of plant and vertebrate species that, whilst not threatened globally, are considered rare or declining in the Centre Hills and are worthy of conservation attention (Table 1.3).

1.2. Key features of the Centre Hills biodiversity: species, assemblages, habitats and ecosystem

1.2.1. Species

1.2.1.a. Montserrat galliwasp

The Montserrat galliwasp is one of the most important features of the Centre Hills biodiversity and Montserrat's natural heritage. It is the only member of its family (Anguidae) in the Lesser Antilles, and is an enigmatic and Critically Endangered species. Four observations of possibly three individuals were made during the CHBA surveys in February and March 2006, con-

Taxa	Common name	Scientific name	IUCN Red List category	Global distribution	Distribution and status on Montserrat
Plants	n/a	*Epidendrum montserratense*	Candidate Critically Endangered	Endemic to Montserrat	See Table 1.1
	n/a	*Rondeletia buxifolia*	Candidate Critically Endangered	Endemic to Montserrat	See Table 1.1
	n/a	*Xylosma serratum*	?	Endemic to Montserrat	See Table 1.1
	Red Cedar; Stinking Cedar	*Cedrela odorata*	Vulnerable	Lesser Antilles; South & Central America	Locally common in dry forest and lower elevations of mesic forest of Centre Hills
	Lignum vitae	*Guaiacum officinale*	Endangered	Colombia; Venezuela; Caribbean islands	Uncommon in dry forest of Centre Hills
	West Indian mahogany	*Swietenia mahagoni*	Endangered	Colombia; Venezuela; Caribbean islands; USA	Locally common in western dry forest and lower elevations of mesic forest of Centre Hills
Amphibians	Mountain chicken	*Leptodactylus fallax*	Critically Endangered	Montserrat, Dominica	Locally common in eastern & southern Centre Hills but rarer on western flank
Reptiles	Montserrat galliwasp	*Diploglossus montisserrati*	Critically Endangered	Endemic to Montserrat	See Table 1.1
Birds	Montserrat oriole	*Icterus oberi*	Critically Endangered	Endemic to Montserrat	See Table 1.1
	Forest thrush	*Cichlherminia lherminieri*	Vulnerable	Montserrat, rare St Lucia, uncommon Guadeloupe & Dominica	Locally common in Centre Hills and small, isolated forest patch in the South Soufrière Hills
Bats*	Yellow-shouldered bat	*Sturnira thomasi vulcanensis*	Endangered	Subspecies endemic to Montserrat	See Table 1.1
	White-lined bat	*Chiroderma improvisum*	Endangered	Montserrat, Guadeloupe	Only recorded in Corbett Spring (2005) and near mouth of Belham River (1978)
	Tree bat	*Ardops nichollsi montserratensis*	Near Threatened	Northern Lesser Antilles	Locally common in Centre Hills
	Long-tongued bat	*Monophyllus plethodon*	Near Threatened	Puerto Rico, Lesser Antilles	Locally common in Centre Hills
	Brazilian free-tailed bat	*Tadarida brasiliensis*	Near Threatened	Widespread in C., N. & S. America, Caribbean	Widespread not habitat limited

*All 10 of Montserrat's bat species were last assessed by IUCN's Chiroptera Specialist Group in 1996 and all 10 assessments are listed as "out of date" (i.e. preceeding the current (2001) revision of IUCN's red list criteria). Work on Montserrat and other Eastern Caribbean islands (e.g. Pedersen et al., 1996, 2003, 2005, 2006) suggests that a re-assessment would result in the endangerment status of some of these species being revised downwards, with the probable exception of C. improvisum and S. thomasi.

Table 1.2. Globally threatened (i.e. IUCN 'red-listed') plant and terrestrial animal species occurring in the Centre Hills and immediate surrounding area

Taxa	Common name	Scientific name	IUCN Red List category	Global distribution	Distribution and status on Montserrat
Plants	Resinier Montayne	*Podocarpus coriaceus*	Least Concern	Dominican Republic; Guadeloupe; Martinique; Montserrat; Puerto Rico; Saint Kitts and Nevis	Restricted range; on Hope Ridge, Katy Hill, and Olveston Mountain in Centre Hills
Reptiles	South American skink	*Mabuya bistriata*	Not listed	South America, Jamaica, Lesser Antilles	Not recorded in Montserrat since 1980s; observed in Woodlands, western Centre Hills in 1984
Birds	Antillean Euphonia	*Euphonia musica*	Least Concern	Hispaniola & Puerto Rico; Lesser Antilles between Antigua & Grenada (except Barbados)	Rare and only occasionally recorded in Centre Hills
	Brown trembler	*Cinclocerthia gutturalis*	Least Concern	Saba, Guadeloupe, Dominica, St Christopher, Nevis, St Lucia, St Vincent, Martinique, Grenada.	Rare and possibly declining; Eastern and western flanks of Centre Hills
Bats	Bulldog bat	*Noctilio leporinus*	Least Concern	Widespread in C. & S. America; Caribbean	Rare; caught foraging in Sappit River and Belham Valley

Table 1.3. Locally rare and declining plant and vertebrate animal species (excluding those also considered globally threatened) occurring in the Centre Hills and surrounding area

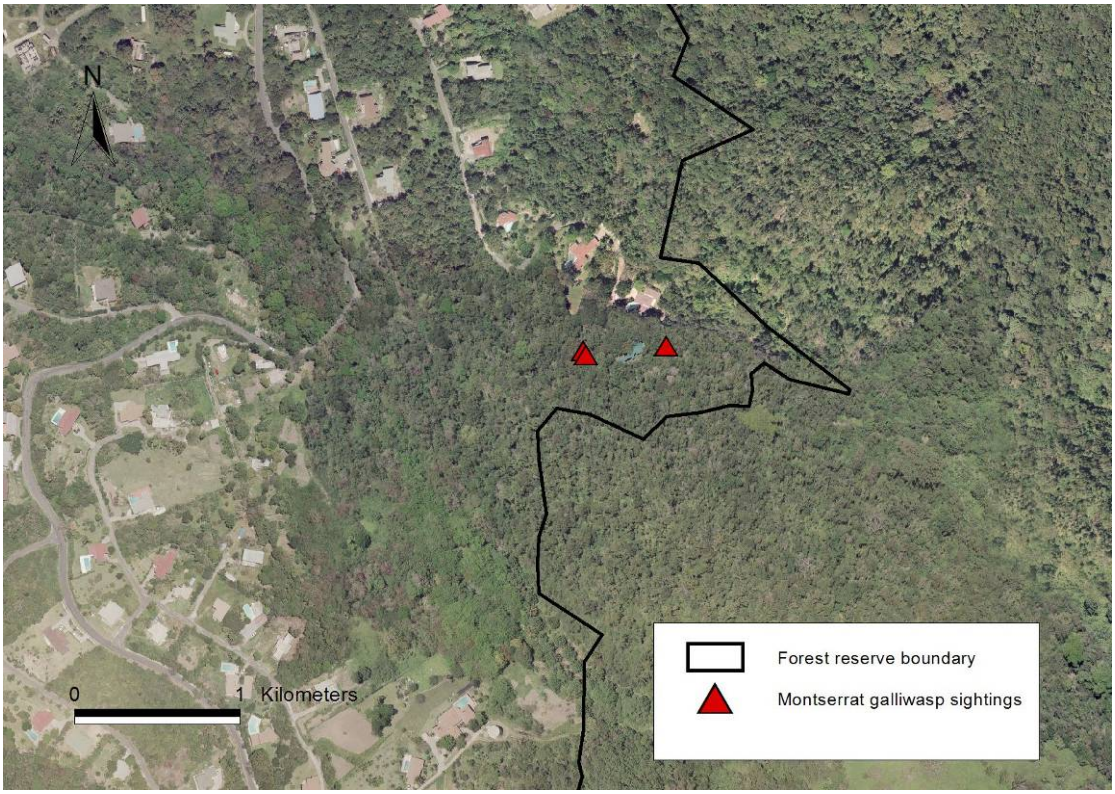


Fig. 1.1. Location of galliwasp sightings in Woodlands Spring during the biodiversity assessment (the forest reserve lies to the east of black line which represents the current boundary)

firming the continued existence of this species, which was feared extinct (Ogrodowczyk *et al*. 2007). Extensive nocturnal amphibian and reptile surveys of the Centre Hills have been conducted as part of the CHBA and by the Department of Environment, but the galliwasp has only ever been observed in a highly localised area of Woodlands Spring (see Fig. 1.1). This suggests the species has an extremely restricted range, indeed one of the smallest distributions of any vertebrate animal species in the world. We cannot discount the possibility that it is more widely distributed in the Centre Hills but very difficult to find. Nevertheless, the status of the galliwasp is undoubtedly extremely precarious.

The negative pressures on the Montserrat galliwasp are various and potentially disastrous, including predation by invasive alien mammals (e.g. rats, cats, dogs) and destruction of its forest habitat for urban and agricultural development. All known locations of the galliwasp fall just outside the forest reserve boundary (see Fig. 1.1) and therefore the species' habitat may be completely unprotected. Another major problem is our lack of understanding of the ecological and conservation requirements of this key species.

1.2.1.b. Montserrat oriole

The Montserrat oriole is arguably Montserrat's best known endemic species, and acts as a flagship species for Centre Hills biodiversity and its conservation. Despite some evidence of a recovery from a population low in 2002/3 (Fig. 1.2), its population is still very small (in the range of 400-700 pairs), with the vast majority of birds occurring in the Centre Hills, and it remains extremely threatened. Analysis of the Centre Hills Forest Bird Monitoring data shows that orioles have been increasing in number on the eastern flanks of the Centre Hills, whereas they appear to have declined on the western edge of the forest (see Fig. 1.3) [*N.B. This figure and all other interpolated maps in this report are based on an Inverse Distance Weighted interpolation of count data, and do*

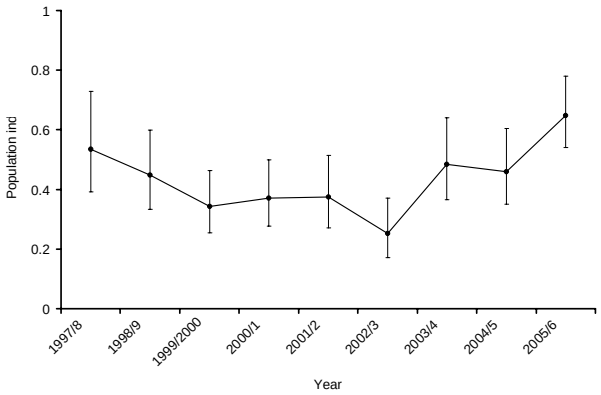
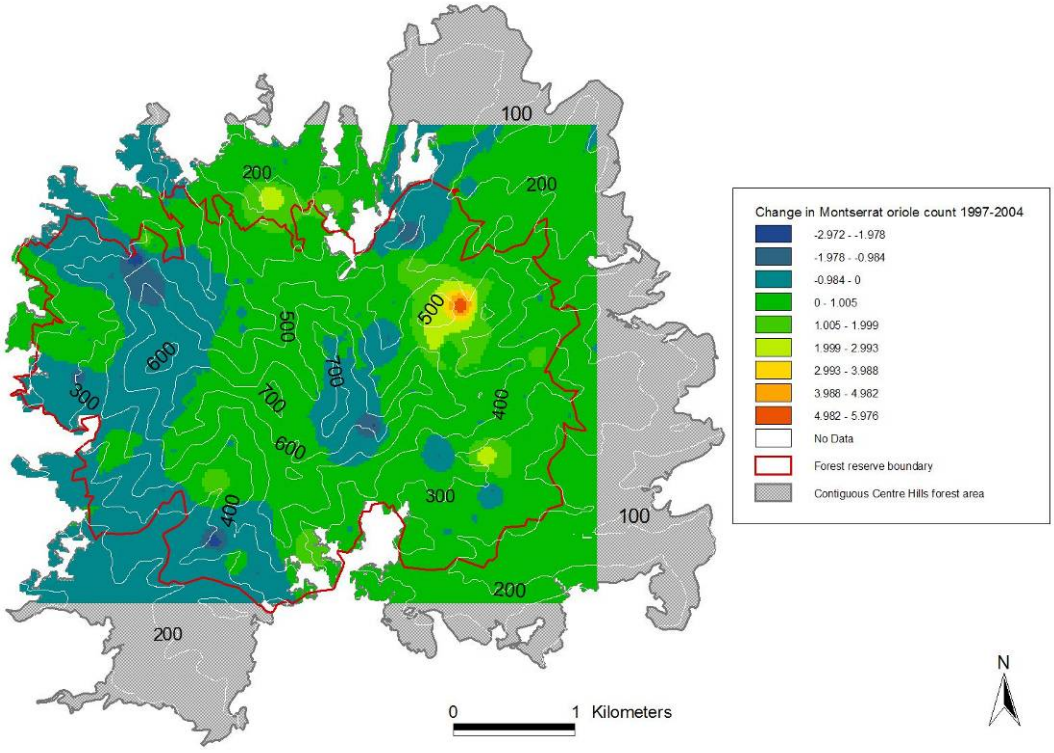


Fig. 1.2. Population trend of the Montserrat oriole between 1997/8 and 2005/6.



*Interpolations were constrained by the locations of the outer sampling points of the biodiversity surveys and then clipped by the outer boundary of the contiguous Centre Hills forest (grey polygon delineated from the Montserrat vegetation map – see chapter 3), hence the incomplete coverage of Centre Hills area by the interpolated map in this and other figures in the report.

Fig. 1.3. Interpolated map of the change in Montserrat oriole abundance between 1997 and 2004. Blue colours indicate decreases in abundance. Green, yellow, orange and red colours indicate increases in abundance of growing size.

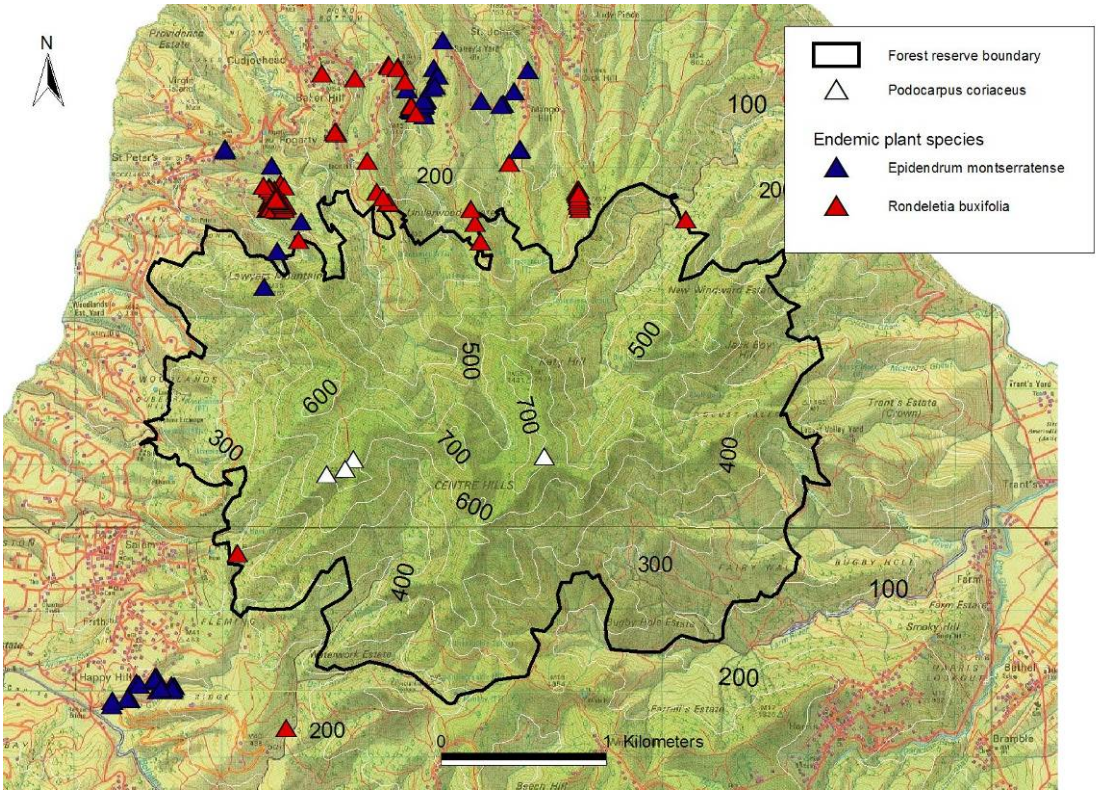


Fig. 1.4. Distribution of known locations of *Epidendrum montserratense, Rondeletia buxifolia* and *Podocarpus coriaceus* in the Centre Hills and surrounding area

not take into account other important factors such as elevation, topography, habitat type etc, and therefore should be interpreted with caution]. The 2004 monitoring data show that highest counts of Montserrat orioles occur on the eastern and southern flanks (Fig. 1.5).

The bulk of the oriole population is protected from major habitat destruction within the Centre Hills forest reserve boundary, but a range of anthropogenic pressures still pose a severe threat to the Montserrat oriole. Perhaps most important is the predation of eggs and chicks by ship rats *Rattus rattus*, and a native bird, the pearly-eyed thrasher *Margarops fuscatus*. Both of these predators occur at artificially high densities in the Centre Hills. Catastrophic natural events, while a natural feature of Caribbean islands, are also a major risk to Montserrat orioles. If more than one negative factor (e.g. unusual rainfall, hurricanes and eruptions) occurs close together in time, then populations with human-induced limited ranges are clearly vulnerable to extinction, whether these events are 'natural' or not. Population modelling indicates that such events acting in combination greatly increase extinction risk for Montserrat oriole.

1.2.1.c. Epidendrum montserratense

Epidendrum montserratense is an epiphytic orchid, endemic to Montserrat. It is largely found on veteran mango trees *Mangifera indica* and sugar mill ruins, and all of these sites fall outside the current Centre Hills forest reserve boundary (Fig. 1.4). Like *Rondeletia buxifolia* (see below) this species must also be considered extremely vulnerable, as it has a highly restricted range, and enjoys no protection at either the habitat or species level. Interestingly, virtually all orchids found so far are located on anthropogenic features, i.e. non-native mango trees and man-made structures, which therefore play a vital role in the conservation of this species. The veteran mango trees found in the Belham Valley area provide the major location for *Epidendrum montserratense*, but are threatened by ongoing volcanic activity.

1.2.1.d. Rondeletia buxifolia

Rondeletia buxifolia is a small shrub, found only on Montserrat. To date, it has only been recorded growing outside the current Centre Hills forest reserve and therefore it enjoys no legal protection (Fig. 1.4). The majority of its population occurs in the northern foothills of the Centre Hills. During the CHBA, a significant population of this plant was lost due to the clearance of forest habitat for development. This species appears to have good dispersal ability, indicative of an early succession species, which in a natural forest would likely colonise gaps created by fallen trees. If the contemporary range of *R. buxifolia* is restricted to the modified habitats in the northern foothills of the Centre Hills, the habitat of this species may need to be actively managed rather than simply protected otherwise it will succeed to climax dry and mesic forest vegetation, unsuitable for *R. buxifolia.*

1.2.1.e. Xylosma serratum

Xylosma serratum is a small tree that is only known from one location on Montserrat - Great Alps

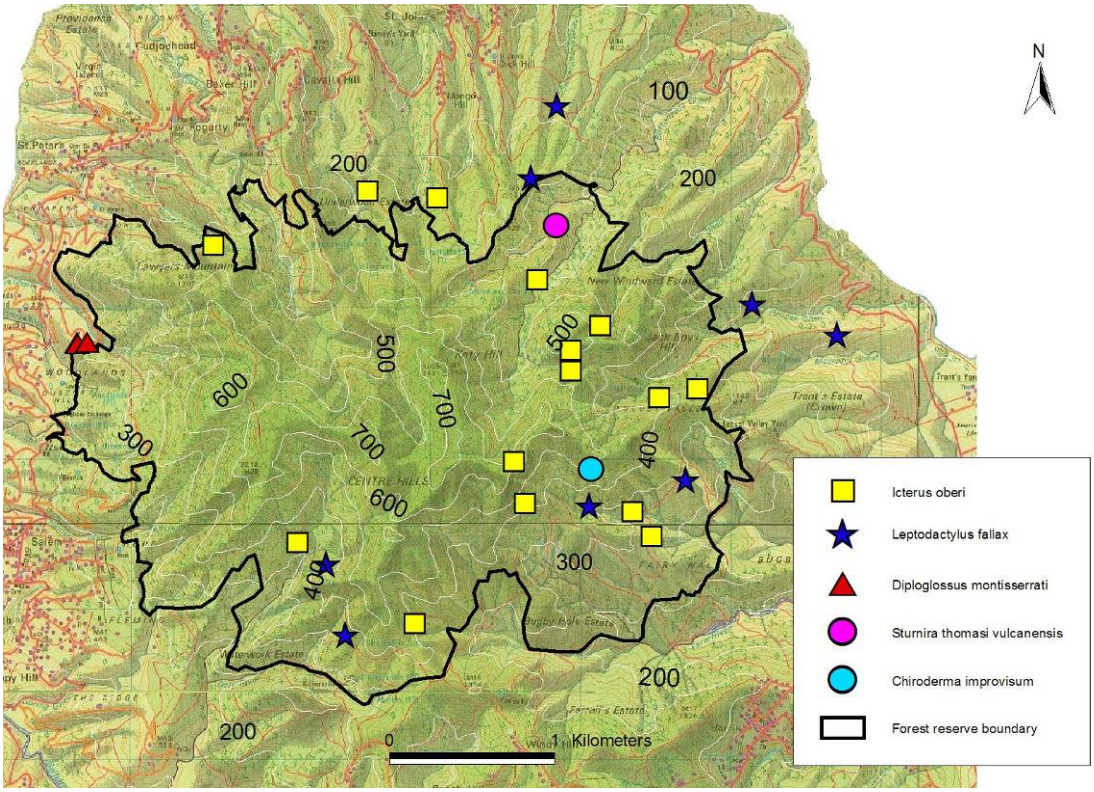


Fig. 1.5. Known locations of the Montserrat galliwasp, yellow-shouldered bat, white-lined bat and the locations of sample points producing the highest counts of two Critically Endangered species in the Centre Hills; the Montserrat oriole (n > 1 bird per point) and mountain chicken (encounter rate > 1 individual per 100m of transect)

Falls in the South Soufrière Hills, where it was last recorded by Howard in the 1970s. Since this site was destroyed by a major pyroclastic flow during the 1995-1997 volcanic eruptions, this species may have disappeared from Montserrat and become extinct. However, since there are similar habitats to Great Alps Falls in the Centre Hills it is possible that this species still survives, but explorations so far have failed to find it. No *ex situ* material of this species exists so all that currently remains are dried herbarium specimens. A campaign to raise awareness of this species around Montserrat has been started in the hope that populations unknown to botanical experts may be discovered.

1.2.1.f. Yellow-shouldered bat

The yellow-shouldered bat *Sturnira thomasi* is only known from Montserrat and Guadeloupe. The form occurring on Montserrat is considered sufficiently different to the Guadeloupe population to be classified as a separate subspecies. The Montserrat subspecies, named *Sturnira thomasi vulcanensis*, has only been recorded with certainty on Montserrat on three occasions. It is thought to be mainly frugivorous (fruit-eating), and therefore both native and non-native fruiting trees are likely to be an important resource for this species. Previously suspected to be extinct following the volcanic activity, single individuals were captured in Bottomless Ghaut in 2005 and in 2006 (Fig. 1.5). Bottomless Ghaut therefore is currently the only known site in the world for this subspecies. As a species it is listed as globally Endangered (Chiroptera Specialist Group, 1996), but

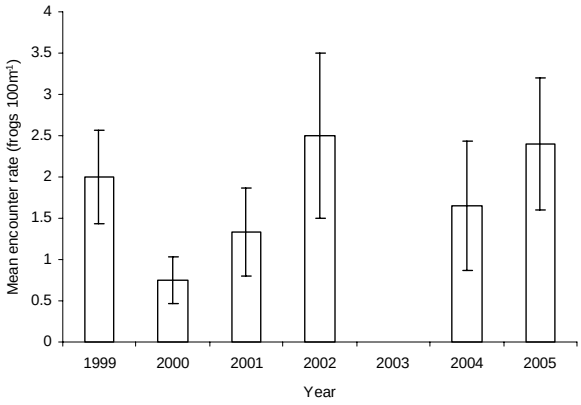


Fig. 1.6. Mean encounter rate of mountain chickens in the dry season between 1999 and 2005 (data from line transects repeated each year only). Error bars are standard errors

very little is known about its distribution and population status on Montserrat (and Guadeloupe). Both captured individuals from Bottomless Ghaut were lactating females, providing evidence that the bat is breeding in Montserrat.

1.2.1.g. Mountain chicken

Along with the Montserrat oriole, the mountain chicken is a flagship species for the Centre Hills. It occurs only on Montserrat and Dominica and is prone to a wide-range of threats, including disease, over-hunting, habitat destruction and invasive mammals, and is classified as Critically Endangered. On Dominica it has suf-

fered a catastrophic decline as a result of an outbreak of *Chytridomycosis* fungus. On Montserrat it is now restricted to the Centre Hills. All the above factors, combined with its use as a traditional food and its unusual breeding ecology, make the mountain chicken a key feature of Centre Hills biodiversity.

Mountain chickens are currently most abundant in the east and south of the Centre Hills, particularly in the Fairy Walk area (see Fig. 1.5). Data generated by the Montserrat Department of Environment mountain chicken monitoring programme suggests that overall the mountain chicken population has remained fairly unchanged between 1999 and 2005, albeit with some fluctuations during the period (Fig. 1.6). The overall picture of no population change masks some spatial patterns in population trend. There is some evidence that populations in the eastern and north-eastern ghauts are growing, whereas in the west and north-west the mountain chicken is either absent or declining (Fig. 1.7). Mountain chickens are on average larger and in better body condition in the east compared to the west (J. Fa, *unpubl. data*). The Centre Hills Project socio-economic assessment (McCauley & Mendes, 2006) revealed that mountain chicken hunting tends to happen in the west and north of the Centre Hills, which is the most plausible explanation for these spatial patterns.

1.2.1.h. White-lined bat

Like the yellow-shouldered bat, the white-lined bat *Chiroderma improvisum* was thought to be extirpated from Montserrat following the Soufrière Hills volcanic activity, but its survival was confirmed when a lactating female was captured in a patch of dry forest in Corbett Spring in 2005 during a CHBA survey (Fig. 1.5). This species has a very restricted global range, occurring only in Montserrat and Guadeloupe, and is classified as globally Endangered (Chiroptera Specialist Group, 1996). It has only been caught on Guadeloupe on three occasions and in Montserrat this species has previously been caught twice. Very little is known about this species, including its distribution and abundance in Montserrat. It is impossible to ascertain from a single capture how important Corbett Spring is for this species, but unfortunately the site has suffered damage from volcanic activity since the rediscovery. It is thought to be mainly frugivorous (fruit-eating), and therefore both native and non-native fruiting trees are likely to be an important resource for this species.

1.2.1.i. Forest thrush

The forest thrush appears to have become scarce in the other Lesser Antillean islands on which it occurs, and is classified as globally Vulnerable (BirdLife International, 2004). The Centre Hills is thus probably a global stronghold for this species, and it should be considered a key species of conservation concern. Forest thrushes are largely concentrated in lower altitude forest around the edges of the Centre Hills, with hotspots in particular in the south-west, north-west and east (Fig 1.8), some of which fall outside of the forest reserve boundary and are

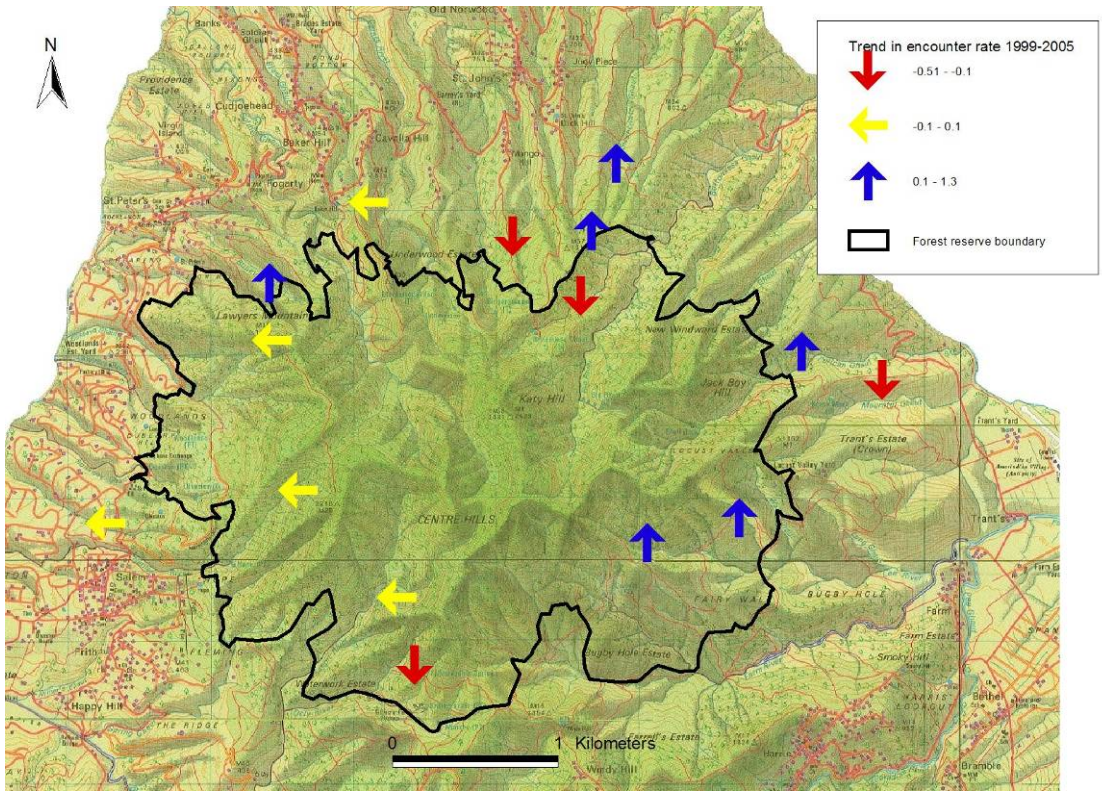


Fig. 1.7. Spatial patterns in population trend of mountain chickens in the Centre Hills (trend in encounter rate for each monitoring site is the slope of a regression line fitted to 1999-2005 dry season data). Upward blue arrows indicate a positive trend, yellow horizontal arrows indicate no change, and downward red arrows indicate a negative trend. Note the tendency of upward trends in the ghauts on the eastern flanks of the Centre Hills.

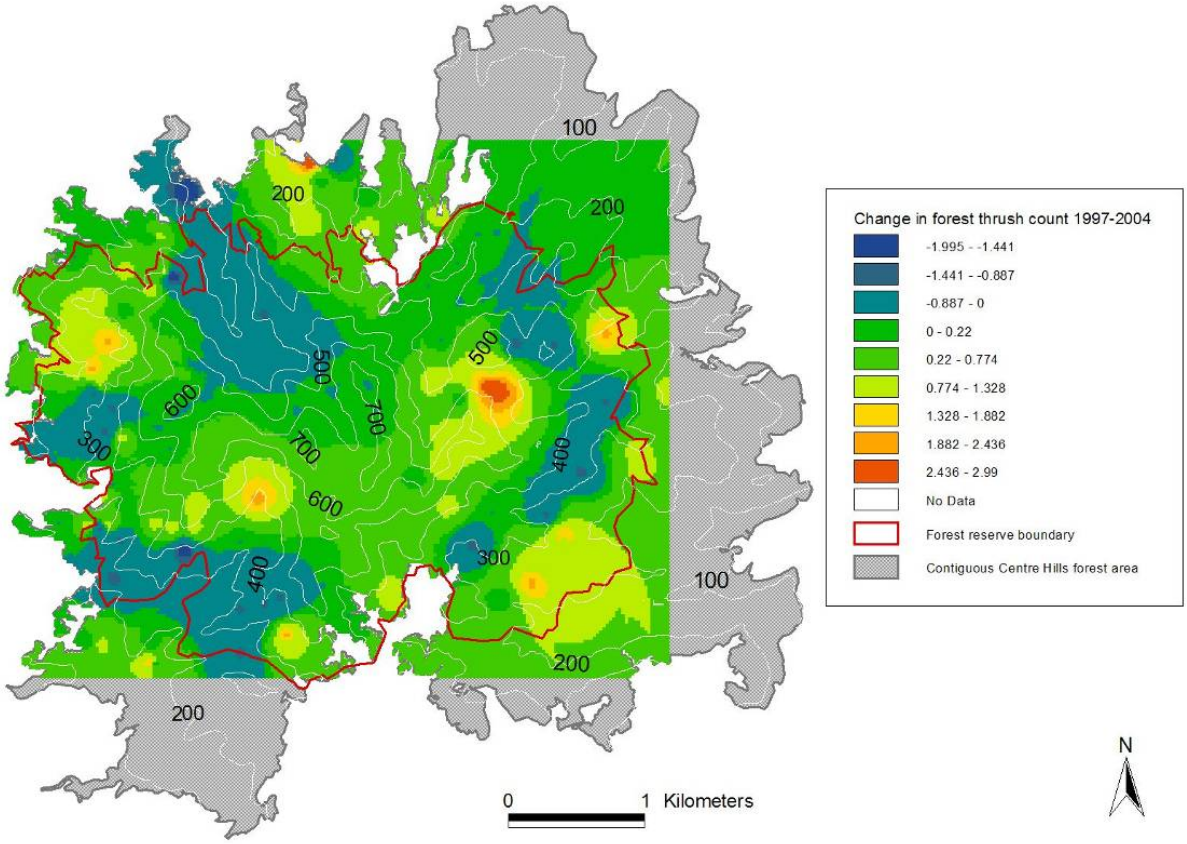


Fig. 1.8. Interpolated map of the change in forest thrush abundance between 1997 and 2004

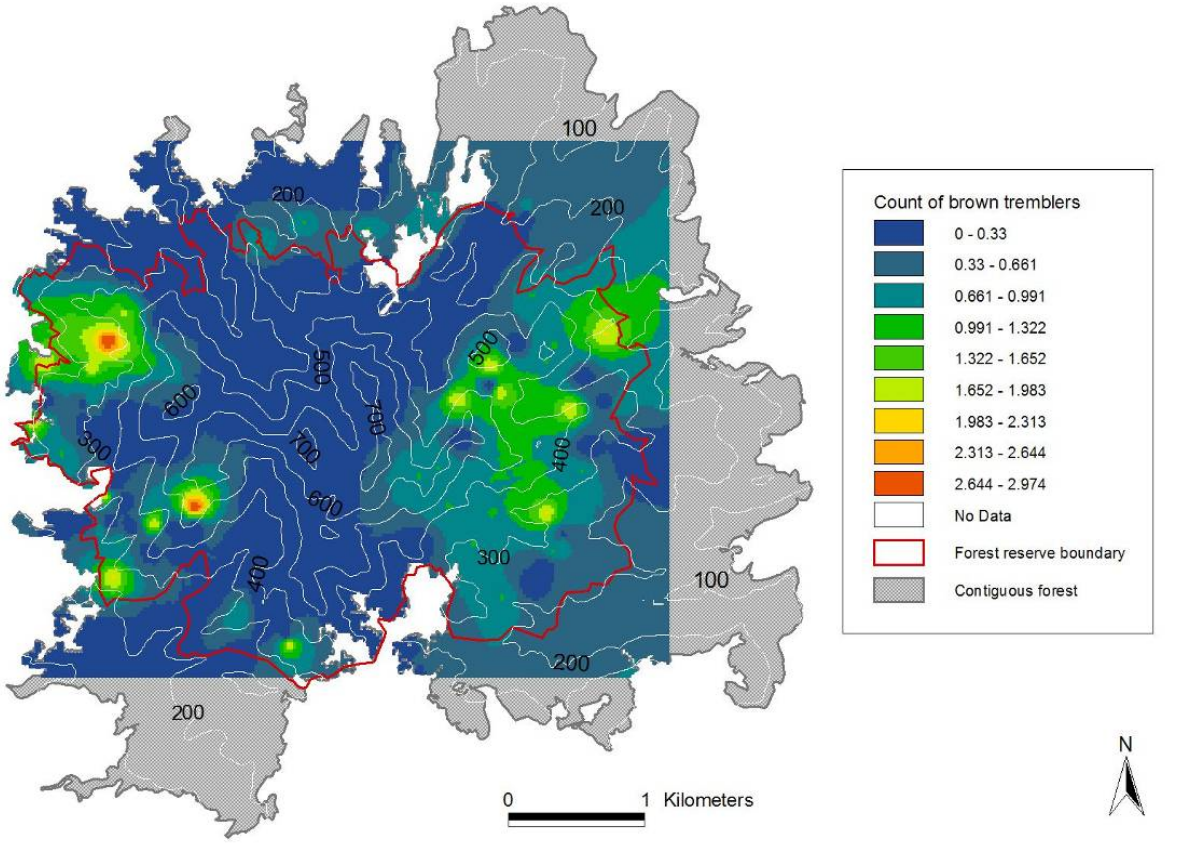


Fig. 1.9. Interpolated map of brown trembler abundance (1997, 1999 and 2004 data pooled)

therefore unprotected. The map of change in forest thrush abundance (1997-2004) shows a general increase in population density across much of the Centre Hills, but particularly in the east.

1.2.1.j. *Podocarpus coriaceus*

Montserrat's only native gymnosperm plant, *Podocarpus coriaceus*, is listed in the IUCN Red List of threatened species as Least Concern (Conifer Specialist Group, 1998) using the IUCN 1994 Red List criteria. An important stand of large mature trees has been identified on the top of Hope Ridge (see Fig. 1.4), which contains some of the oldest trees in Montserrat and therefore this species is an important feature of Centre Hills biodiversity. To date, only limited data have been collected from the high ridges of the Centre Hills between 500-700m. Therefore Fig. 1.4 under-represents the true extent of occurrence for this species. The IUCN SSC Conifer Specialist Group is currently working to reassess all the gymnosperms using the IUCN 2001 Red List criteria. Data from the Montserrat biodiversity assessment have been made available to the chair of the Conifer Specialist Group to aid the reassessment.

1.2.1.k. Brown trembler

The brown trembler *Cinclocerthia gutturalis* is a restricted-range species and is perhaps the only Montserrat bird species to have declined overall since forest bird monitoring began in 1997. It appears to be rare in Montserrat, almost entirely restricted to mesic forest, with a population size of around 400 birds, and therefore should be considered a species of local conservation concern. Brown tremblers appear to have their strongholds across a broad area of the eastern hills, plus some more localised hotspots in the western flanks, notably the Cassava Ghaut and Hope Ghaut areas (Fig. 1.9).

1.2.1.l. *Heliconia caribaea*

Heliconia caribaea is a relatively widespread clump-forming plant of mid to higher elevation forests throughout the Caribbean and is Montserrat's national flower. In Montserrat, the Centre Hills support the majority of the island's population. It is an extremely important plant in the forest ecosystem and may be considered a keystone species. It produces abundant nectar at the base of the bracts. The large upright inflorescences can hold large quantities of water which support a wide-range aquatic animal life and can provide important sources of water and food for many bird species. It is the major nesting site for Montserrat orioles who weave nests from the vascular material of old leaves and attach these to the lower side of established mature leaves.

1.2.2. Species assemblages and habitats

1.2.2.a. Invertebrates

The CHBA has vastly increased our knowledge of the diversity of Montserrat's invertebrate fauna, quadrupling the number of recognised species to 1,241 (Table 1.4). The majority of these invertebrate species are probably found only in the Centre Hills. Due to the enormity of the task of cataloguing all the invertebrate species of the Centre Hills, the CHBA concentrated on investigating one taxonomic group that is known to be mega-diverse, the beetles (Coleoptera). The known beetle fauna of Montserrat now stands at 718 species in 63 families, with at least 81 possible single-island endemics and 53 non-native species. With an average body length of just 4.5mm, the vast majority of beetles (and other

Invertebrate taxon		Number of recognised species	
Scientific name	Common name	Previous species list (from Stevens & Waldman 2001)	CHBA
Mollusca	Molluscs	5	15
Crustacea	Crustaceans	12	14+
Orthoptera	Crickets and grasshoppers	7	21
Hemiptera	True bugs (cicadas, aphids, planthoppers, shield bugs etc)	27	98
Coleoptera	Beetles	94	718
Hymenoptera	Sawflies, bees, wasps, ants	15	105+
Lepidoptera	Butterflies, moths, skippers	50	54
Diptera	True flies	47	130

Table 1.4. Selected summary of the increase in invertebrate species recorded for Montserrat as a result of the Centre Hills Biodiversity Assessment.

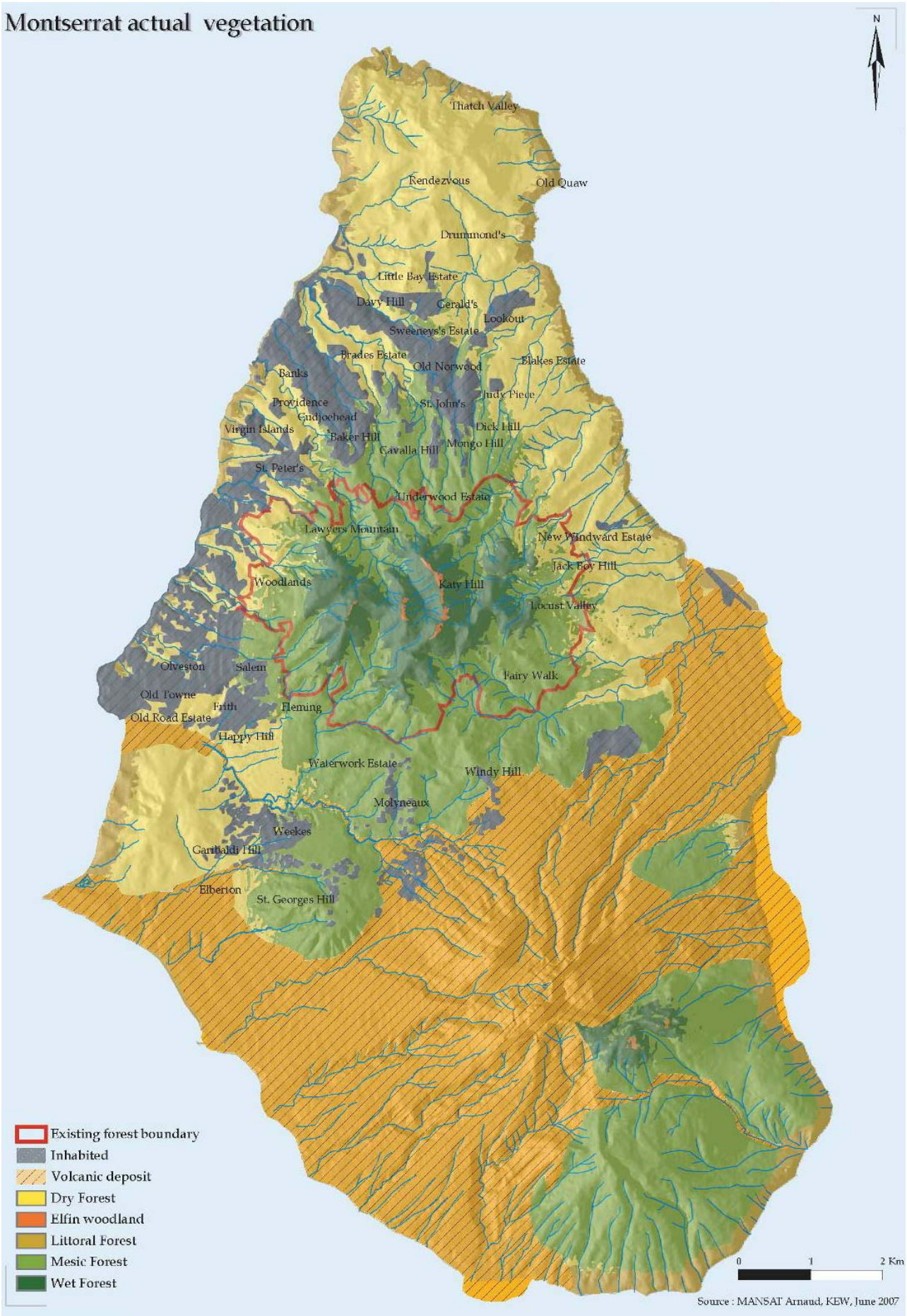


Fig. 1.10. Vegetation map of Montserrat

invertebrates) that exist within the Centre Hills go completely unnoticed except by a few experts.

In total, around 120 invertebrate species have been identified as possible single-island endemics but in reality there may be hundreds. This means that the density of endemic animal species on Montserrat is drastically higher than understood hitherto. Another 54 beetle species may well be local endemics (i.e. only occur on Montserrat and a few neighbouring islands) and a further 33 species are endemic to the Northeastern Antilles. Thus, 167 beetle species are known to occur either only on Montserrat or on this island and just a few neighbouring islands. Undoubtedly these numbers are underestimates, based on our still limited knowledge. These island and regionally endemic species should be considered the highest priority for invertebrate conservation.

Because most invertebrate diversity on Lesser Antillean islands remains virtually unknown, it is extremely difficult to evaluate the importance of the Montserratian invertebrate fauna in a wider context. Drawing cautious comparisons of the Montserrat beetle fauna with the relatively well-known faunas of Guadeloupe and Dominica suggests that Montserrat is indeed more diverse than would be expected for the size of the island and is important in a regional context. The invertebrate fauna of Montserrat is now one of the best documented of all island faunas in the Lesser Antilles. This knowledge should in itself be considered a key feature of the Centre Hills biodiversity.

There are several unique aspects of Montserrat's invertebrate fauna that elevate its importance from both a conservation and biogeographical perspective. A number of species are the only representatives of their taxonomic groups in the Lesser Antilles. For example, two very distinct beetle sister-species of the genus *Thonalmus* are endemic to Montserrat, and represent the only known Lesser Antillean members of a small, West Indian endemic lineage. Another example is the evolutionary radiation of the anobiid beetle *Trichodesma*, with five undescribed species on Montserrat. No other Lesser Antillean island is known to harbour *Trichodesma*, with the closest site being in the Virgin Islands. The very odd undescribed weevil *Prionarthrus* n. sp. belongs to a group known otherwise from only a single described species from Brazil. The unique *Eohomopterus* from Katy Hill is one of only two extant species of the subfamily Paussinae known from the West Indies. Many more examples of species of high biodiversity value are documented in the invertebrate chapter in this report.

1.2.2.b. Littoral and dry forest

There has been little anthropogenic destruction of moist forest in Montserrat in recent years but, like elsewhere in the Lesser Antilles, dry and littoral forest has been greatly impacted by agricultural and urban development and is extremely vulnerable to further degradation. Only small patches of dry forest occur in the northeast and north-west of the forest reserve, with the majority falling outside the boundary (Fig. 1.10). Most dry

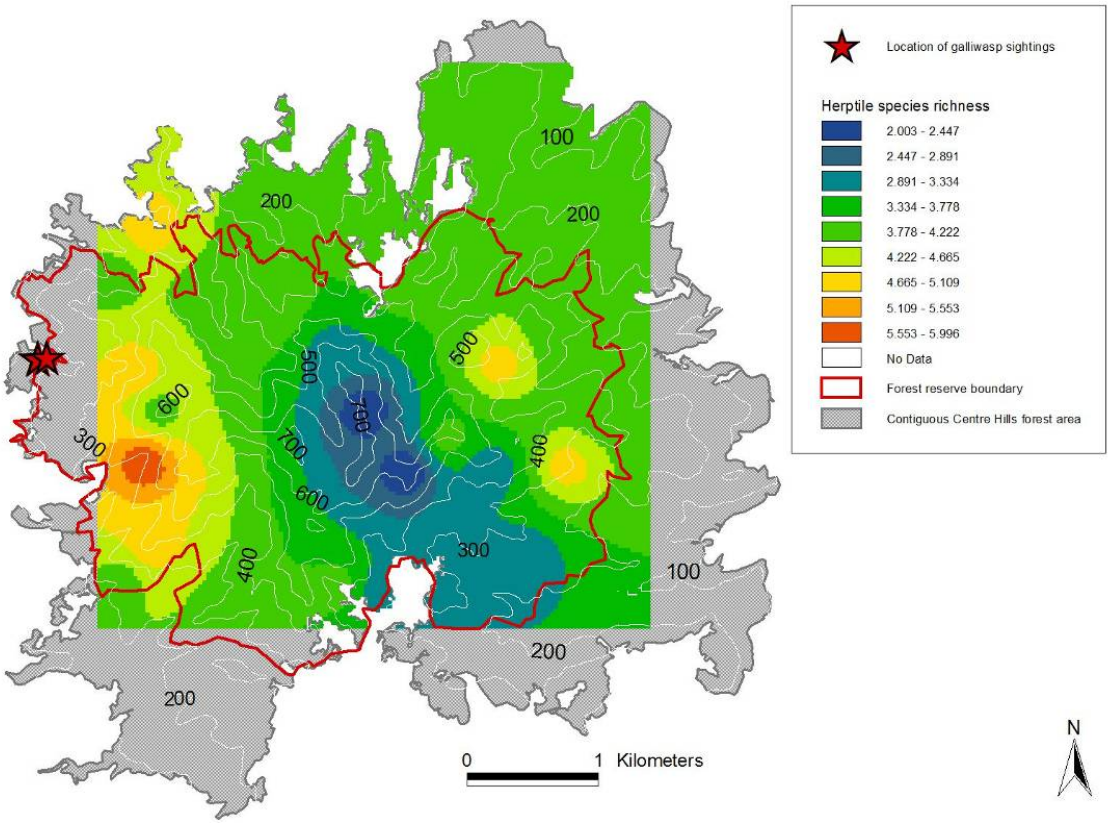


Fig. 1.11. Interpolated map of herptile (reptiles and amphibians) species richness with the location of the captured Montserrat galliwasps marked

and littoral forest in Montserrat is heavily impacted by grazing animals and and other non-native mammals, but perhaps the least degraded and largest patch lies to the east and northeast of the Centre Hills, and is largely contiguous with the main forest block within the reserve boundary (Fig. 1.10). The dry and littoral forest is a key feature of the Centre Hills biodiversity for a number of reasons, and its protection is imperative:

- Firstly, dry and littoral forest harbours high species richness of plants, invertebrates, reptiles and other biodiversity as mentioned in various sections above.
- Secondly, dry forest is a key habitat for a number of locally and globally threatened species. For, example, the locally rare Antillean euphonia is thought to be a dry forest specialist. Three of Montserrat's native globally threatened plants favour the dry forest: *Cedrela odorata (stinking cedar) (Vulnerable:* Americas Regional Workshop (Conservation & Sustainable Management of Trees, Costa Rica) 1998), West Indian mahogany *Swietenia mahagoni (Endangered:* Americas Regional Workshop (Conservation & Sustainable Management of Trees, Costa Rica) 1998), and lignum vitae *Guaiacum officinale (Endangered:* Conservation & Sustainable Management of Trees, Costa Rica) 1998). A fuller evaluation of the distribution of these species is needed, and an action plan developed, to ensure their conservation in Montserrat.
- Thirdly, incorporating the dry and littoral forest that falls to the east and northeast of the Centre Hills into the protected area would allow it to encompass a full range of connected habitats, from the coast to the top of Katy Hill, and give as comprehensive coverage of Montserrat's overall biodiversity as possible.
- Finally, if contiguous with the main Centre Hills forest block, protection of this area of dry forest would provide an important buffer zone for the eastern flanks of the Centre Hills that are so important for a number of key species.

1.2.2.c. Bats

During 2005, for the first time since an extensive programme of bat research, including annual monitoring, started on Montserrat in 1978, all 10 species of bat were caught in a single survey.

The bat fauna of Montserrat is a very important component of the Centre Hills ecosystem and is a conservation priority for three reasons:

- Firstly, bats are the only extant native mammals in the Lesser Antilles
- Secondly, they provide a number of ecological services that are key to the functioning of the Centre Hills ecosystem, particularly seed dispersal and pollination. Many fruit bats carry fruit and seeds further away from the parent plants than bird species and so are of particular importance in forest regeneration. Seed dispersal plays an important role in the regrowth of forests that have been damaged or destroyed (by volcanoes, hurricanes, clearance for agriculture, etc) and for some trees, bats are the main agents by which new areas can be reforested. Many economically important trees have closely evolved with bats as their main or only pollinators e.g. calabash *Crescentia cujete*, mango, banana *Musa acuminata*, and cashew *Anacardium occidentale.*
- Bats are sometimes considered "*keystone species*" (after the keystone that symbolically holds up an entire building) because the loss of these species from an ecosystem may cause pervasive negative effects.
- Finally, of the 10 species that occur in Montserrat, two are globally threatened and three are considered 'Near Threatened'. Over the past 10 years, all of Montserrat's bat species have been caught within or in the immediate vicinity of the Centre Hills forest.

Due to their capacity for ranging over wide areas, it is difficult to identify key sites and habitats for bats within the Centre Hills. However, from the biodiversity assessment and long-term monitoring data (S. Pedersen and team) a number of sites within the Centre Hills seem to be particularly important: the northeast region around Bottomless Ghaut; the Sappit River and Daly watershed system; Hope, Runaway, Cassava and Soldier Ghauts as well as Lawyers are other important sites for bats in the Centre Hills. The Centre Hills forest as a whole should be considered a vital habitat for bats on Montserrat, particularly frugivorous species, for foraging, roosts and nursery sites. Water bodies outside the Centre Hills boundary are also important sites for bats, for example, the Belham River is a key site for the bulldog bat *Noctilio leporinus* and funnel-eared bat *Natalus stramineus*.

However, given that some species of bat (e.g. *Brachyphylla cavernarum*) will regularly travel long distances between various resources, it is vital that conservation planning for the Centre Hills takes into account important bat resources that fall outside of the forest reserve boundary. For example, caves are important roost sites, at which large numbers of bats may congregate. Most importantly, a cave at Rendezvous Bluff next to Little Bay houses a large colony of 5,000-6,000 individuals of Lesser Antillean fruit bats *Brachyphylla cavernarum,* and is probably vital for this species on Montserrat, their other main roost at Mosquito Ghaut having been lost to the volcano. The tarrish pits south of Belham Valley house the only known roosts for funnel-eared bats on Montserrat and therefore warrant protection.

1.2.2.d. Endemic reptiles

With six reptiles endemic to Montserrat at either species or subspecies level, this group has the highest endemism of all vertebrate animal and plant taxa on the island. In total, 11 reptile species (although three may have been introduced by humans), occur on Montserrat, which therefore has high species richness for a Lesser Antillean island of its size (Ricklefs & Lovette, 1999). Compared to other vertebrate taxa, such as birds or bats, reptiles on islands tend to be habitat specialists, and therefore a range of habitat types needs to be protected for this assemblage.

The CHBA surveys revealed a potentially important area of high herptile (reptiles and amphibians) species richness on the central western flanks of the Centre Hills, as well as a possible second area on the eastern side (Fig. 1.11). There was some evidence that mesic forest was the richest habitat type for reptiles, because it is a zone where species that are characteristic of both wetter and drier forests overlap. Of the endemic reptiles, the reasonably abundant Leeward racer is important, because elsewhere in the Lesser Antilles other species (and subspecies of the same species) from this family have suffered catastrophic declines due mainly to predation by the invasive small Indian mongoose *Herpestes auropunctatus* (which was never introduced into Montserrat).

1.2.2.e. Elfin woodland

The distinctive elfin woodland occurs at the highest elevations of the Centre Hills, on the top Katy Hill and in the high altitude area at the top of Hope Ridge (Fig. 1.10), and is thought to be a restricted habitat type within the Lesser Antilles. It is possibly the most vulnerable component of Montserrat's biodiversity to the effects of global climate change.

1.2.3. Ecosystem

1.2.3.a. Shape and structure

The Centre Hills is currently favoured by being a relatively continuous forest block, with a roughly circular shape (see Fig. 1.10), so minimising the edge-effects that can be so damaging to small tropical forest blocks (Laurance *et al.*, 2002). The structure of the Centre Hills forest is relatively intact, i.e. with few large cleared areas, and therefore it will be more resistant to hurricane damage than if it were highly fragmented.

1.2.3.b. High densities of rats

One negative but important feature of the Centre Hills fauna is the presence and abundance of the invasive brown rat *Rattus norvegicus* and black rat *R. rattus*. All available evidence from the CHBA and other recent field research points to rats occurring throughout the Centre Hills, even at the high elevations, and at particularly high density. The CHBA has provided compelling

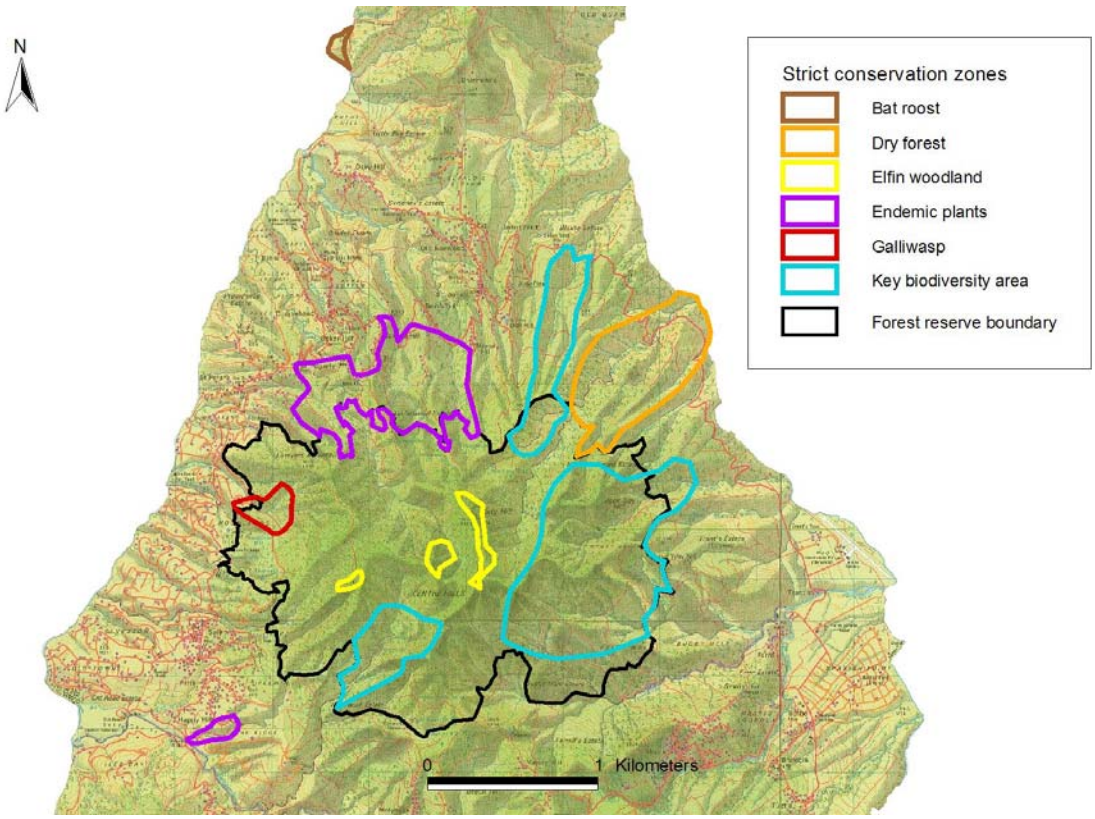


Fig. 1.12. Map showing the proposed highest priority strict conservation zones within and outside the Centre Hills protected area. Note that in order to accurately delineate a number of the zones, further surveys of key habitats and species are needed

evidence that rat density is associated with numbers of non-native fruiting trees in the local vicinity, presumably because they provide an abundance of food for rats. The negative impacts of rats on island biodiversity are well-documented, and pose a major and pervasive threat to the Centre Hills ecosystem. Rats currently have a large negative impact on some of the most important and vulnerable species in the Centre Hills, including the Montserrat oriole, and probably the galliwasp and mountain chicken.

1.3. Threats to key biodiversity features and recommended management recommendations

The main threats to each of the key biodiversity features described above are given in Table 1.5, along with recommended management actions to remove or mitigate these threats. A number of the most wide-ranging pressures on Centre Hills biodiversity are discussed in detail outside the table, with brief information on recommended management actions.

Similar to other islands in the Caribbean region and elsewhere around the world, invasive alien species pose perhaps the most severe threat to Montserrat's native biodiversity. Black rats, brown rats, feral pigs, and a number of invasive plant species are the most problematic. Pigs are capable of causing severe damage to island flora and fauna, and an island-wide eradication programme is a priority conservation action. Eliminating the negative impacts of rats through lethal control over the whole of the Centre Hills forest would be prohibitively expensive with current technology. However, the CHBA provided compelling evidence that rat numbers are highest where non-native fruiting trees are abundant, presumably because they provide an abundance of food for rats. Zoned removal of these non-native fruiting trees would be feasible (with sufficient money and expertise), and should lead to a reduction in numbers of rats and therefore the negative impacts they exert on native biodiversity. It should be noted that non-native tree management would need to be conducted simultaneously with localised lethal rat control, to ensure that rats do not temporarily increase their intake of native flora and fauna when exotic food availability is reduced. Native pearly-eyed thrashers *Margarops fuscata* also occur at artificially high density in the Centre Hills, probably because they are able to exploit abundant fruit for food. They have a negative impact on other species such as the Montserrat oriole, as well as being an agricultural pest in Montserrat.

Removal of non-native fruit trees from the Centre Hills would, however, need to take into account the needs of people who harvest fruit, and native species, such as bats, that feed on these trees. Zoning fruit tree removal in remote areas where fruit is not currently harvested and offsetting the loss in fruit productivity by the creation of community orchards and banana plantations outside the Centre Hills are potential management actions that would partially address this. It is important to note however that habitat restoration, including non-native tree weeding, is likely an essential tool in improving the status of a number of key species, which occur outside of, or just within, the Centre Hills forest reserve. The most pressing example of this is the Montserrat galliwasp.

Although habitat loss and degradation has not been widespread within the Centre Hills forest reserve boundary in recent years, destruction of vegetation does represent an existing threat to a number of biodiversity features, particularly, the galliwasp, endemic plants, and dry and littoral forest. These species and habitats are a vital component of Montserrat's natural heritage and must be protected and/or managed sustainably. We recommend establishing a network of strict conservation zones (see Fig. 1.12 for the location of suggested strict conservation zones) which encompass the most important sites for these species and habitats (N.B. futher surveys are required to accurately delineate a number of the zones), within which appropriate management activities can be implemented, including, habitat restoration, habitat protection invasive species control, intensive monitoring, etc. The network of strict conservation zones also includes areas of forest within the Centre Hills forest reserve boundary, in which various management actions are recommended to safeguard key biodiversity features. See Table 1.5 for a list of recommended activities for the strict conservation zones.

Finally, another problem hindering conservation of Centre Hills' biodiversity, particularly those species not well protected by the forest reserve, is a lack of strategic conservation planning. Funding from the Overseas Territory Environment Programme has recently been secured to conduct a project entitled 'Strengthening capacity for Species Action Planning in Montserrat'. This project was launched in September 2007 and will focus on developing the skills and resources in the Montserrat Department of Environment to conduct species action planning. By August 2009, Species Action Plans will be produced for five of Montserrat's most threatened species: Montserrat galliwasp, mountain chicken, yellow-shouldered bat, *Epidendrum montserratense* and *Rondeletia buxifolia*

Key biodiversity feature	Main threats	Recommended management actions
Montserrat galliwasp		• Extension of protected area boundary to encompass sites in Woodlands Spring where galliwasps have been observed
	Habitat loss and degradation	• Establish a strict conservation zone (see 'Montserrat Galliwasp' zone in Fig. 1.13) in the Woodlands Spring area and Cassava Ghaut water catchment within which public access can be restricted to reduce effects of human disturbance and impact of domestic animals, and to ensure strictest planning regulation of urban development in Woodlands Spring area
	Knowledge insufficient to guide management actions	• Status assessment, monitoring and autecological research
	Invasive alien species	• Island-wide feral pig eradication • Selective removal of non-native fruiting trees in concert with rat control and monitoring to reduce rat numbers within the 'Galliwasp strict conservation zone' • Public awareness campaign aimed at local residents in Woodlands Spring area to reduce potential impacts of domestic pets, e.g. locking pets in at night • Feral cat control in the 'Galliwasp strict conservation zone' and surrounding watersheds
	No coherent conservation strategy	• Develop and implement Species Action Plan
Mountain chicken	Disease	• Improve quarantine and biosecurity controls at Montserrat's borders to minimise risk of amphibians and soil infected with *Chytridiomycosis* (and spores) entering Montserrat • Establishment of biosecurity protocols for fieldworkers and ecotourists • Develop full international captive breeding population as safety net in case of arrival of *Chytridiomycosis* into Montserrat
	Unsustainable hunting	• Enforce mountain chicken hunting closed season, recommended to run between 31 November and 30 September • Establish moratorium on hunting until western and northern population recovers and harvestable quotas/bag limits can be set • Introduce licensing system for mountain chicken hunting to control number of hunters and location of hunting • Make improvements to mountain chicken monitoring scheme to increase reliability of monitoring data
	Invasive alien species	• Island-wide feral pig eradication • Removal of non-native fruiting trees, combined with short-term rat control to quickly reduce rat density, in appropriate strict conservation zones (see 'Key Biodiversity Areas' zones in Fig. 1.13).
	Habitat loss and degradation	• Establish strict conservation zones around watersheds that support high densities of mountain chickens, particularly Fairy Walk, Corbett Spring, Sappit River and Sweetwaters Ghaut (see 'Key Biodiversity Areas' zones in Fig. 1.13). Measures to protect habitat within the zones lying outside of the Centre Hills forest reserve boundary need to be identified.

Table 1.5. Key biodiversity features of the Centre Hills, main threats and recommended management actions

Key biodiversity feature	Main threats	Recommended management actions
Mountain Chicken *contd.*	Knowledge insufficient to guide management actions	• Upgrade mountain chicken population monitoring programme, to increase sampling intensity in dry season and standardise timing of surveys between years • Establish a research programme of mountain chicken ecology and field experiment into impact of rats on mountain chicken productivity, survival, and population growth
	No coherent conservation strategy	• Develop and implement Species Action Plan
Epidendrum montserratense	Habitat loss and degradation	• Establish strict conservation zones to encompass the most important sites in Belham Valley and northern foothills of Centre Hills, and other sites identified during the ongoing species assessment (see 'Endemic Plants' zones in Fig. 1.13). Measures to protect habitat within these zones need to be identified. • Tree protection orders for veteran mango trees in Belham Valley • *Ex-situ* conservation, including propagation at MNT botanic gardens and RBG-Kew and seed banking at RBG-Kew
	Knowledge insufficient to guide management actions	• Full species status assessment
	No coherent conservation strategy	• Develop and implement Species Action Plan
Rondeletia buxifolia	Habitat loss and degradation	• Establish strict conservation zones to encompass the most important sites in the northern foothills of Centre Hills, and other sites identified during the ongoing species assessment (see 'Endemic Plants' zones in Fig. 1.13). Measures to protect habitat within these zones need to be identified and implemented • *Ex-situ* conservation, including propagation at MNT botanic gar-
	Knowledge insufficient to guide management actions	• Full species status assessment
	No coherent conservation strategy	• Develop and implement Species Action Plan
Montserrat oriole	Invasive alien species	• Island-wide feral pig eradication • Removal of non-native fruiting trees, combined with short-term rat control to quickly reduce rat density, in appropriate strict conserva-
	Habitat loss and degradation	• Protection of mesic forest to the north of the Centre Hills that support hotspots of oriole density (largely falling within the Endemic Plants strict conservation zone)
	Environmental stochasticity	• Maintenance of large Centre Hills and South Soufrière populations at carrying capacity to minimise impacts of environmental stochasticity

Table 1.5 *contd.* Key biodiversity features of the Centre Hills, main threats and recommended management actions

Key biodiversity feature	Main threats	Recommended management actions
Montserrat oriole *contd.*	Knowledge insufficient to guide management actions	• Continued population monitoring
Yellow-shouldered bat	Habitat loss and degradation	• Maintain or restore flow regimes of water courses, particularly open bodies of fresh water • Protection of mesic and dry forest habitat within the 'Key Biodiversity Areas' and 'Dry Forest' strict conservation zones falling outside of the Centre Hills forest reserve • No non-native tree removal from Bottomless Ghaut until better information on resource requirements of the species is available
	Knowledge insufficient to guide management actions	• Species status assessment, population monitoring and mapping of important roost sites
	No coherent conservation strategy	• Develop and implement Species Action Plan
White-lined bat	Knowledge insufficient to guide management actions	• Species status assessment, population monitoring and mapping of important roost sites
Forest thrush	Knowledge insufficient to guide management actions	• Research project to investigate impacts of rats on nest survival
Podocarpus coriaceus	Restricted range	• Monitor productivity and population growth of existing stands
Brown trembler	Knowledge insufficient to guide management actions	• Research project to investigate impacts of rats on nest survival
Heliconia caribaea	Invasive alien species	• Island-wide feral pig eradication
Littoral and dry forest adjacent to the Centre Hills forest reserve boundary	Knowledge insufficient to guide management actions	• Conduct surveys to map least disturbed areas of littoral and dry forest
	Habitat loss and degradation	• Protection of dry and littoral forest habitat within the 'Key Biodiversity Areas' and 'Dry Forest' strict conservation zones falling outside of the Centre Hills forest reserve
Invertebrate assemblage	Lack of knowledge	• Establish a programme of research to carry out further species inventory and status assessment

Table 1.5 *contd.* Key biodiversity features of the Centre Hills, main threats and recommended management actions.

Key biodiversity feature	Main threats	Recommended management actions
Invertebrate assemblage	Habitat loss and degradation	• Protection of dry and littoral forest habitat within the 'Key Biodiversity Areas' and 'Dry Forest' strict conservation zones falling outside of the Centre Hills forest reserve
	Invasive alien species	• Island-wide feral pig eradication • Zoned removal of alien fruiting trees combined with short-term rat control to reduce rat and thrasher density
Endemic reptile assemblage	Habitat loss and degradation	• Protection of dry and littoral forest habitat within the 'Key Biodiversity Areas' and 'Dry Forest' strict conservation zones falling outside of the Centre Hills forest reserve
	Invasive alien species	• Island-wide feral pig eradication • Zoned removal of alien fruiting trees combined with short-term rat control to reduce rat and thrasher density
Ecological services provided by bats	Habitat loss and degradation	• Statutory protection of roosts, both inside and outside the Centre Hills, including key trees, caves (including Rendezvous Bluff, as highlighted by the 'Bat Roost' strict conservation zone), and roosts in buildings • Awareness programme to educate people of importance and conservation value of bats • No exploitation of timber and non-timber products from ghauts within the Centre Hills • Maintain or restore flow regimes of water courses
Elfin Woodland	Invasive alien species	• Invasive plant control (particularly *Spathoglottis plicata*) and monitoring • Island-wide feral pig eradication
	Climate change	• Annual monitoring of elfin woodland cover • Seed collection for long-term storage of component plant species
	Habitat disturbance	• Regulate visitor numbers to the Elfin Woodland strict conservation zone • Strict management of trails through the Elfin Woodland strict conservation zone; no wide trails should be established to maintain structural integrity of this habitat
Shape of protected area and forest structure	Various extrinsic factors	• Patrol of protected area boundary and forest interior to prevent clearance of vegetation • Remote-sensing monitoring of changes in forest cover
	Natural disasters	• Maintain structural integrity of forest to limit the destructive impacts of hurricanes
Overall functioning of ecosystem	Invasive alien species	• Zoned removal of non-native fruiting trees combined with short-term rat control to reduce rat and thrasher density • Ecosystem-wide monitoring programme for invasive rats • Island-wide feral pig eradication • Strengthen biosecurity measures at ports of entry to minimise likelihood of introduction of further invasive alien species

Table 1.5 *contd.* Key biodiversity features of the Centre Hills, main threats and recommended management actions

Key biodiversity feature	Main threats	Recommended management actions
Overall functioning of ecosystem	Invasive alien Species *Contd.*	• Montserrat-wide monitoring programme for spread and impacts of invasive plants within and on periphery of Centre Hills, including *Spathoglottis plicata*, an invasive ground orchid that is becoming well established within the Centre Hills and *Psidium guajava*, (guava), an escaped cultivated tree that is spreading rapidly outside the Centre Hills (e.g. Richmond Hill) and has been recorded within the forest reserve
	Human disturbance	• Regulate access by general public to strict conservation zones • Monitor visitor numbers • Offer guided walks to tourists and other visitors to Centre Hills
	Knowledge insufficient to guide management actions	• Design and implementation of a Centre Hills forest pressure-state-response monitoring scheme (the CHBA baseline data and protocols can be used as the foundation for this scheme), including remote-sensing monitoring of changes in forest cover • Ecosystem-wide monitoring programme to investigate distribution, population size and potential ecological impacts of feral cats • Develop a strategy for ecological and taxonomic research to inform management of protected area
	Climate change	• Maintenance of a healthy functioning Centre Hills ecosystem to conserve species and genetic diversity, and evolutionary processes, to maximise chances of successful adaptation to future environmental change

Table 1.5 *contd.* Key biodiversity features of the Centre Hills, main threats and recommended management actions

References

Americas Regional Workshop (Conservation & Sustainable Management of Trees, Costa Rica) (1998). *Cedrela odorata*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Americas Regional Workshop (Conservation & Sustainable Management of Trees, Costa Rica) (1998). *Guaiacum officinale*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Americas Regional Workshop (Conservation & Sustainable Management of Trees, Costa Rica) (1998). *Swietenia mahagoni*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

BirdLife International (2004). *Cichlherminia lherminieri*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

BirdLife International (2004). *Icterus oberi*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

CBD (2003). *Global Strategy for Plant Conservation (GSPC)*. Secretariat for the Convention on Biological Diversity, Montreal, Canada. [Available at: www.www.cbd.int/gspc/default.shtml]

Chiroptera Specialist Group (1996). *Ardops nichollsi*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996). *Chiroderma improvisum*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996). *Monophyllus plethodon*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996). *Sturnira thomasi*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*.

<www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996). *Tadarida brasiliensis*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Conifer Specialist Group (1998). *Podocarpus coriaceus*. In: IUCN 2006. *2006 IUCN Red List of Threatened Species*. <www.iucnredlist.org>.

Day, M. (1996). *Diploglossus montisserrati*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Fa, J., Hedges, B., Ibéné, B., Breuil, M., Powell, R. & Magin, C. (2004). *Leptodactylus fallax*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on 26 November 2007.

Genoways, H.H. (1998). Two new species of bats of the Genus *Sturnira* from the Lesser Antilles, West Indies. *Occasional Papers of the Museum, Texas Tech University*, **176**, 1-7.

Laurance, W.F., Lovejoy, T.E., Vasconcelos, H.L., Bruna, E.M., Didham, R.K., Stouffer, P.C., Gascon, C., Bierregaard, R.O., Laurance, S.G. & Sampaio, E. (2002). Ecosystem Decay of Amazonian Forest Fragments: a 22-Year Investigation. *Conservation Biology*, **16**, 605–618.

McCauley, C. & Mendes, S. (2006). *Socioeconomic Assessment Report*. Unpublished report from the Centre Hills Project, Montserrat.

Mittermeier, R.A., Gil, P.R., Pilgrim, J., Brooks, T., Mittermeier, C.G., da Fonseca, G.A.B., Ford, H. & Seligmann-Smith, P.A. (2005). *Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*. Conservation International, Washington, US. 392pp.

Ogrodowczyk, A., Murrain, P., Martin, L., & Young, R.P. (2007). Recent observations of the Montserrat galliwasp (*Diploglossus montisserratti*). *Herpetological Bulletin*, **98**, 9-11.

Pedersen, S.C., Genoways, H.H. & Freeman, P.W. (1996). Notes on the bats from Montserrat (Lesser Antilles), with comments concerning the effects of Hurricane Hugo. *Caribbean Journal of Science*, **32**, 206-213.

Pedersen S.C., Genoways, H.H., Morton, M.N., Johnson, J.W. & Courts, S.E. (2003). Bats of Nevis, northern Lesser Antilles. Acta Chiropterologica, 5, 251-267.

Pedersen, S.C., Genoways, H.H., Morton, M.N., Kwiecinski, G.G. & Courts, S.E. (2005). Bats of St. Kitts (St. Christopher), northern Lesser Antilles, with comments regarding capture rates of Neotropical bats. *Caribbean Journal of Science*, **41**, 744-760.

Pedersen, S.C., Genoways, H.H., Morton, M.N., Swier, V.J., Larsen, P.A., Lindsay, K.C., Adams, R.A. & Appino, J.D. (2006). Bats of Antigua, northern Lesser Antilles. *Occasional Papers of the Museum, Texas Tech University*, **249**, 1-18.

Plantlife International (2004). *Identifying and Protecting the World's Most Important Plant Areas*. Plantlife International, Salisbury, UK. [Available at www.plantlife.org.uk/international/plantlife-ipas-criteria.htm]

Ricklefs, R.E., & Lovette, I.J. (1999). The roles of island area *per se* and habitat diversity in the species-area relationships of four Lesser Antillean faunal groups. *Journal of Animal Ecology*, **68**, 1142-1160.

Sanders, S. (ed.), (2006). *Important Bird Areas in the United Kingdom Overseas Territories*. RSPB, Sandy, Bedfordshire, UK.

Stattersfield, A.J., Crosby, M.J., Long, A.J., Wege, D.C. (1998). *Endemic Bird Areas of the World*. Birdlife International, Cambridge, UK.

2. Background to the Centre Hills biodiversity assessment

R. P. Young & G. M. Hilton

In this chapter, brief background information on the natural history of Montserrat is given, followed by the need for, and scope of, the Centre Hills Biodiversity Assessment (CHBA) project. This includes discussion of threats to the biodiversity and ecosystem goods and services of the Centre Hills, the aims and design of the project, and the structure of the project team. Finally, details are provided on how results of this project will be used to inform a management plan for the conservation of the Centre Hills, which will help support Montserrat to meet its national and international obligations for biodiversity conservation.

2.1. A brief natural history of Montserrat

Montserrat is located in the northern part of the Lesser Antilles island arc in the West Indies (62° 12' west, 16° 45' north) (Fig. 2.1), between the islands of Nevis and Guadeloupe, approximately 60 km northwest of the latter island. It lies on the eastern edge of the Caribbean tectonic plate in the subduction zone with the Atlantic plate and is volcanic in origin, emerging from the Caribbean Sea relatively recently - around 25 million years ago. The island is mainly composed of andesitic lavas and volcaniclastic rocks produced by dome-forming eruptions. It is 102 km² in area and consists of four main volcanic centres. From oldest to youngest these are the Silver Hills in the north, the Centre Hills in the centre (the focus of the CHBA), and the active volcano of the Soufrière Hills as well as South Soufrière Hills in the south (see Fig. 2.2 and 2.3). Average annual daytime temperature is 28°C with annual rainfall varying between 1,100mm at the coast to 2,100mm at higher elevations. Montserrat has a humid tropical climate with a wet season from around July to December, with a drier season in the intervening period, although large seasonal and annual variation in rainfall does occur.

Montserrat falls in the Lesser Antilles biogeographical province. Its terrestrial flora and fauna is influenced strongly by South America and to a lesser extent by Central and North America. Like other Lesser Antillean islands, Montserrat is an oceanic island and has never been connected to the mainland. Therefore all its fauna and flora have colonised by crossing the sea, both northwards from South America up the Lesser Antillean island chain and also southwards from the Greater Antilles. This has a number of implications for Montserrat's assemblage of animals and plants. For example it explains the dominance of species with good dispersal ability in the vertebrate species assemblage, such as bats, birds and reptiles, and the absence of terrestrial mammals, freshwater fish and the scarcity of amphibian species. Flying vertebrates (i.e. bats and

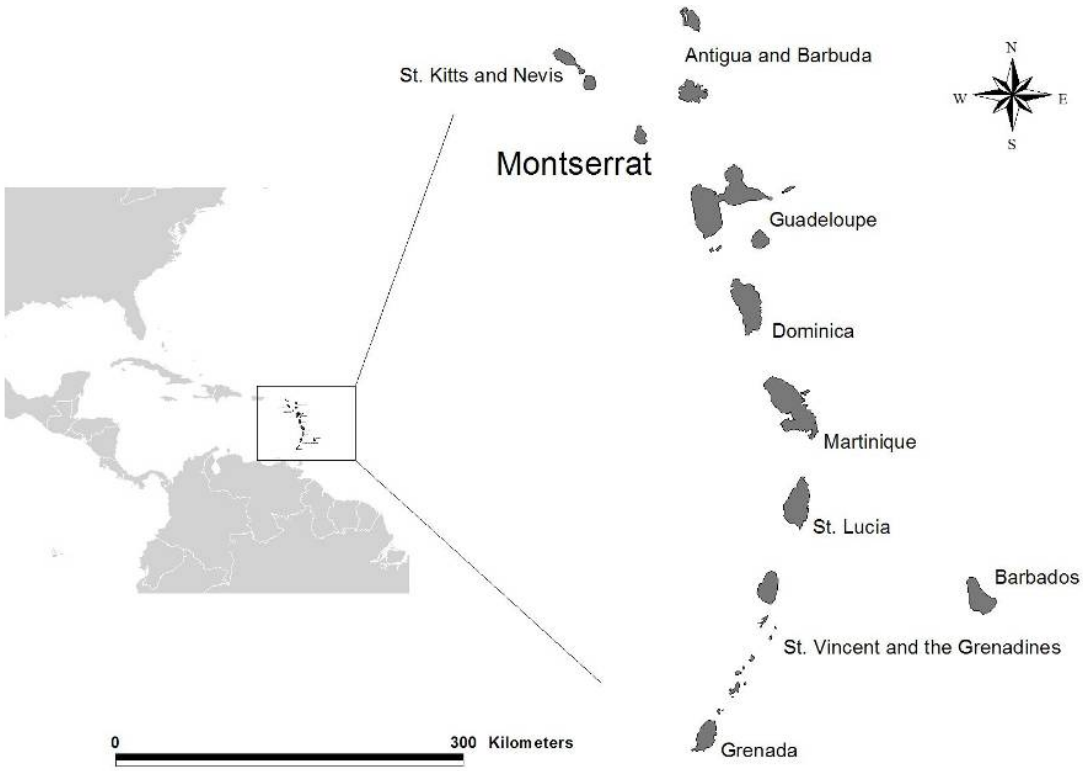


Fig. 2.1. Location of Montserrat in the Lesser Antilles

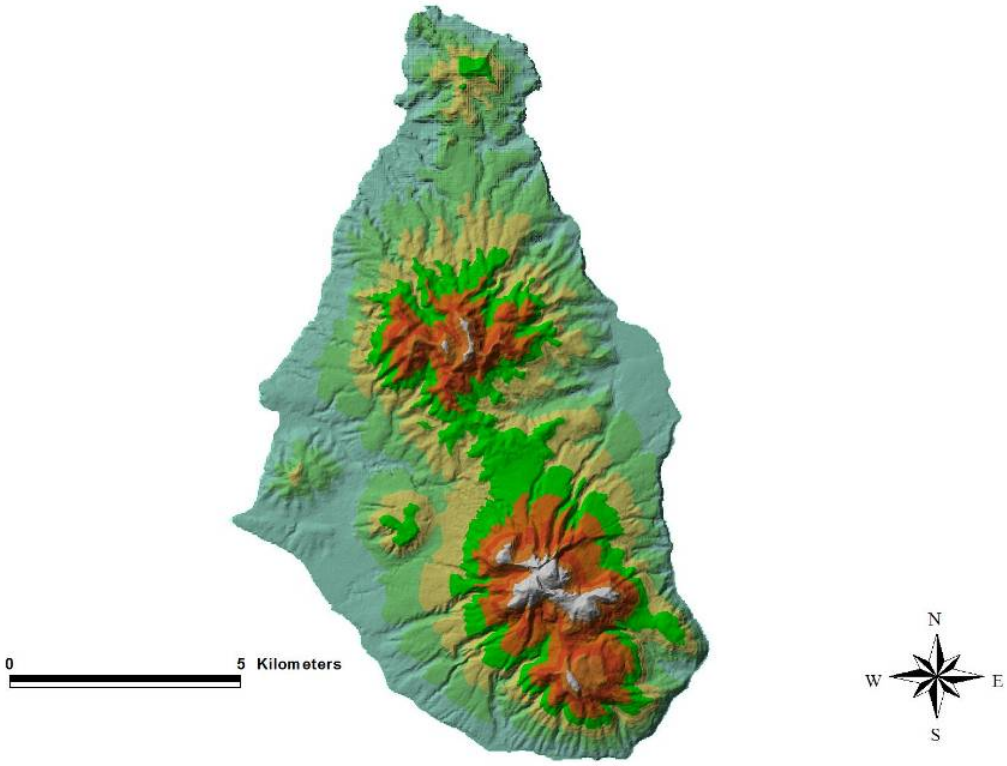


Fig. 2.2. Topographical map (pre-volcanic crisis) of Montserrat, with the Centre Hills in the middle of the island

birds) in the Lesser Antilles tend to show ties with Central and North as well as South America. The non-flying vertebrates in the Lesser Antilles, such as amphibians and reptiles which passively disperse, display a very strong South American influence. It is thought the prevailing south-east to north-west current in the Caribbean Sea carried much of the passively-dispersing fauna on flotsam from the mouths of major rivers in South America.

The wider Caribbean has high levels of diversity and endemicity, particularly in plants, amphibians and reptiles, and the region has been identified as a 'biodiversity hotspot' (Myers *et al.*, 2000). However much of this diversity is found in the Greater Antilles. The Lesser Antillean islands tend to be relatively species-poor in relation to a similar size region in the Greater Antilles or on mainland America at similar latitudes. The number of species that occur on Lesser Antillean islands is related to a number of factors (some of which are correlated), including island size, topography, diversity of habitat, and distance from the mainland or other islands. Due to its small size and remoteness from mainland South America, Montserrat is not the most biodiverse Lesser Antillean island. However, given its small size, it does support a large number of island and regionally endemic species, and is rich in reptile and bat species. The Caribbean as a whole has very high reptile diversity and endemicity, with large evolutionary radiations of groups such as the anole lizards (Anolis), dwarf geckos (Sphaerodactylus), and racer snakes (Alsophis), which is reflected in Montserrat's relatively large reptile assemblage, with six island endemics at species or subspecies level.. The level of island endemism in the plants on Montserrat is low, with three recognised endemic plant species. Lower levels of island endemicity also occur in the volant groups of bats and birds, with one endemic bird species (Montserrat oriole *Icterus oberi*) and one endemic subspecies of bat (yellow-shouldered bat *Sturnira thomasi vulcanensis*). Far less is known about the biogeography of invertebrates and reliable data with which to evaluate endemicity levels in this group do not exist, but it is the subject of investigation as part of this project (see Chapter 4).

Fig. 2.3. View of the Soufrière Hills, looking north from the southern coast of Montserrat, with the densely vegetated Centre Hills and the more arid Silver Hills in the background and the surviving forest patch in the South Soufrière Hills in the right foreground (Photo: Montserrat Volcano Observatory, www.mvo.ms)

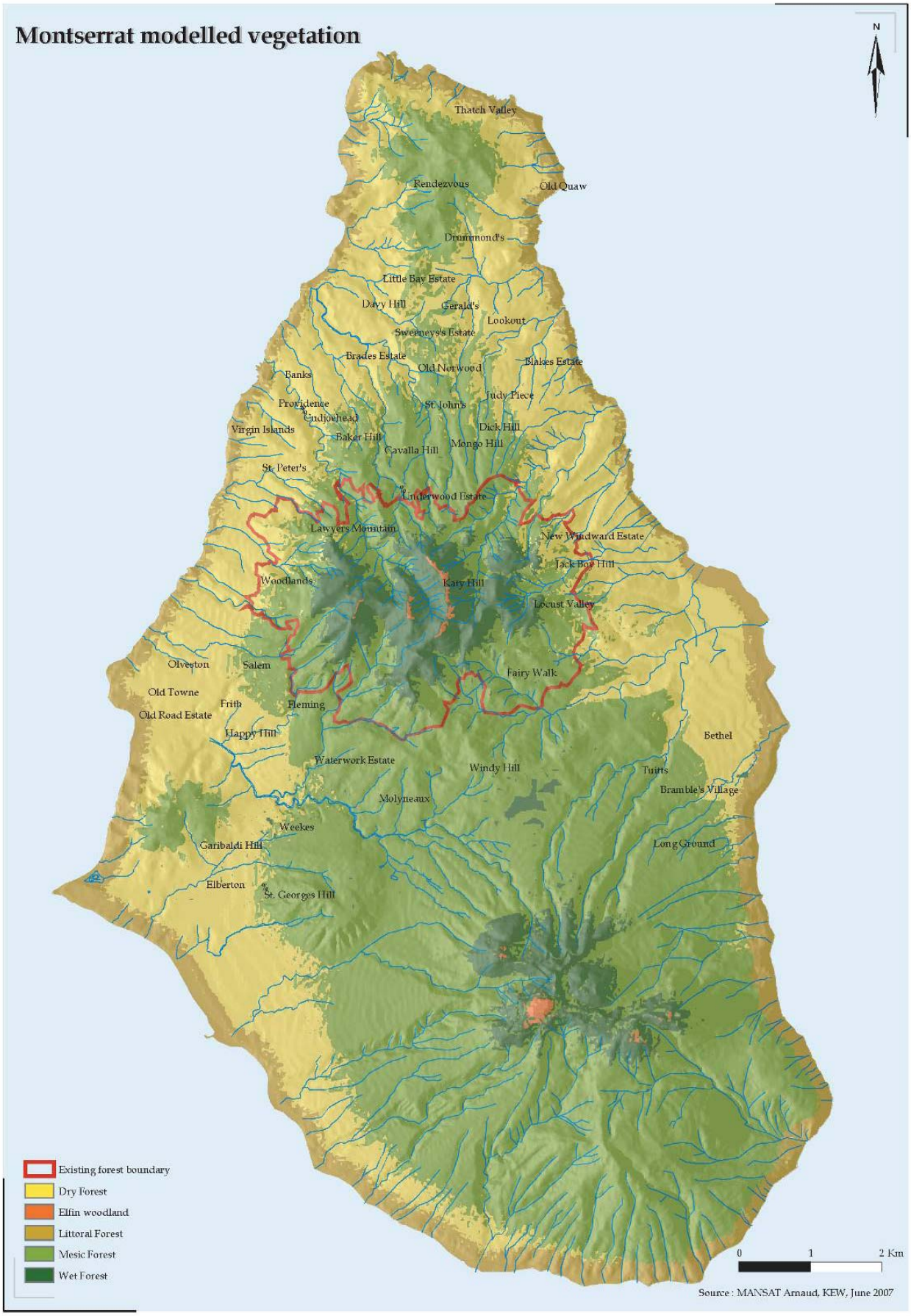


Fig. 2.4. A map of the predicted vegetation cover on Montserrat before the arrival of humans

Fig. 2.5. Eruption of the Soufrière Hills on 3rd March 2004 (Photo: Montserrat Volcano Observatory, www.mvo.ms)

Fig. 2.6. A view of the Centre Hills. (Photo: R. P. Young, Durrell)

A range of habitat types occur on Montserrat, with vegetation communities largely determined by the amount of rain, and to a lesser extent exposure, which is in turn closely linked to elevation. In lowland areas, where the least rain falls, dry scrub and forest tends to dominate. In certain coastal areas which are affected by sea spray, a thin band of littoral forest is found. Wetter riparian forests are found along the many ravines, or ghauts, that run down from the mountains to the coast. As elevation increases, so does rainfall, and the forest changes from dry to mesic and eventually wet forest at the higher altitudes. Elfin woodland occurs at the exposed peaks of the highest mountains. The Centre Hills are predominantly covered by mesic and wet forest, with small areas of elfin woodland at the peaks and dry forest at lower elevations. See Fig. 2.4 below for a map of the predicted pre-human vegetation cover on Montserrat (also excluding any impacts from volcanic activity).

The majority of Montserrat's natural vegetation has been heavily modified following the arrival of Europeans in the 17th century. Only small fragments of pristine habitat at the highest elevations and on the steepest slopes of the Soufrière and Centre Hills remain after centuries of intensive exploitation. Forest was cleared mostly for the cultivation of sugar cane, and other cash crops such as cotton, banana and tobacco. The large scale forest clearance has resulted in a number of environmental problems, such as changes to water catchments, flooding, and significant loss of topsoil through erosion in areas such as the Silver Hills. Agricultural production declined during the 20th century, which allowed forest in the Soufrière and Centre Hills to regenerate naturally, and this has been supplemented by private and public reforestation efforts in these areas. However, many alien trees and other plant species remain in the secondary forest, so in terms of plant species composition, it is considerably modified from the original native forest. Natural lowland habitats in Montserrat remain very restricted in extent and are generally limited to narrow areas along steep sides of ghauts and small areas of littoral and dry scrub.

Montserrat's indigenous flora and fauna has also been modified through the introduction of non-native mammals. Amerindians are believed to have introduced vertebrate species for food such as agouti *Dasyprocta antillensis*, red-footed tortoises *Geochelone carbonia*, and probably green iguanas *Iguana iguana*, but the unintentional introduction of black *Rattus rattus* and brown rats *R. norvegicus* by European settlers is highly likely to have had much more wide-ranging impacts on Montserrat's biota. Other invasive alien species include marine toads *Bufo marinus*, house mice *Mus musculus*, feral cats *Felis catus* and pigs *Sus scrofa* and various plant taxa.

On 18th July 1995, following a three-year period of increased seismic activity, the Soufrière Hills volcano began erupting. The eruption has been characterised by the repeated growth and collapse of a lava dome with associated pyroclastic flows, vulcanian explosion and debris flows, similar to the activity that produced the ancient deposits making up the rest of the island. Since 1995, pyroclastic and mud flows and rock and ash falls have destroyed the capital Plymouth and other southern settlements, with the loss of 19 lives. The southern 60% of the island has been completely evacuated and an exclusion zone established. A large number of Montserratians relocated abroad, resulting in the population falling from 11,000 to around 4,000 people, with approximately 5,000 people currently living on the island. At the time of writing the volcano remains highly active and continues to affect the lives of Montserratians.

The volcano has had a major impact on the forest and other habitats in the south of Montserrat, with most vegetation completely destroyed, including the pristine habitats at the peaks of the Soufrière Hills. Only a small forested area on the south-eastern flanks of the South Soufrière Hills remains, which due its topography escaped pyroclastic flow. The rapid destruction of

vegetation resulted in large scale habitat loss for a number of Montserrat's endemic and endangered species and has presumably resulted in large population declines for many. As a result of habitat destruction in the south, approximately 60% of forest cover in Montserrat was lost.

2.2. Need for project

The Centre Hills now supports the largest remaining tract of forest in Montserrat and consequently supports the majority of its biodiversity, including a large number of island endemic species. It is also a key site for numerous globally threatened species. For example, the Centre Hills area is the only known site on earth for the extremely rare and almost unknown Montserrat galliwasp *Diploglossus montisserrati*, a sub-species of the yellow-shouldered bat, as well as an endemic orchid *Epidendrum montserratense* and species of shrub *Rondeletia buxifolia* which both occur in the foothills. The Centre Hills supports the world's largest population of the endemic Critically Endangered Montserrat oriole and very possibly of the Critically Endangered mountain chicken frog *Leptodactylus fallax* and Vulnerable forest thrush *Cichlerminia lherminieri*. The contiguous forest of the Centre Hills encompasses the largest and least disturbed areas of all the major terrestrial vegetation types that occur in Montserrat.

The Centre Hills is also now by far the most important site in terms of the provision of ecosystem services for Montserrat. It is the most important water catchment and supplies the vast majority of Montserrat's human water supply. The forest cover is essential to the regulation of the water supply and prevention of flooding at lower elevations. The forest also prevents soil erosion, which would lead to the siltation of streams and localised marine habitats. Being the largest forested area it is also extremely important for carbon sequestration and local climate regulation. It is noteworthy that the services provided by the Centre Hills and their economic value have never been studied and quantified. Nevertheless, the Centre Hills forest is undoubtly of great importance both for Montserrat and for its international environmental obligations. It needs to be protected and sustainably managed to conserve its biodiversity and ecosystem services.

The Centre Hills also provides Montserrat with a range of aesthetic, cultural and recreational values. For example, it supports the main populations of the national bird, the Montserrat oriole, and the national plant, *Heliconia caribaea,* and has a network of trails which are used by Montserratians and visitors. It also has financial value, generating income from tourism, and also on a smaller scale from the extraction of non-timber forest products, for example, mountain chicken hunting.

2.2.1. Threats to Centre Hills biodiversity

Habitat destruction

Currently, habitat destruction in the Lesser Antilles is primarily driven by pressure for tourist and urban development, and for agricultural land. In the Centre Hills of Montserrat, however, forest destruction has been minimal in recent years. Since 2000, the core area of the Centre Hills forest at mid to upper elevations has received statutory protection under the Protected Forest Order and Forest Reserve Order of the Forestry, Wildlife, National Parks and Protected Areas Act. The boundary of the forest reserve was demarcated in 2002 encompassing an area of 11.3 km^2. Land within the reserve is owned by private individuals and estates (60%) and by the Crown (40%). Through the Orders, restrictions are placed on activities within the forest boundary, including on clearing of land, cutting trees, grazing livestock and littering, and there are provisions for the establishment of management agreements with landowners. However no management plan has ever been implemented for the Centre Hills and the Department of Environment, which has a mandate over protected areas, has no regulations or enforcement codes under which to effectively manage activities within the forest boundary. Furthermore, much of the contiguous area of the Centre Hills forest at lower elevations lies outside of this forest reserve boundary, particularly on the eastern flank of the hills. Due to lower rainfall at these elevations, this tends to be dry forest which is vulnerable to further clearance and over-grazing. Across the Lesser Antilles, dry forests occur in the lowlands nearer to the coast, and are therefore more susceptible to development pressure than higher altitude and relief rainforest areas. This is true of Montserrat, where mesic and wet forest are subject to relatively little pressure for clearance, because they are typically on steep slopes that are difficult to access and vital for watershed protection, but dry forest has been largely destroyed.

Minor incursions for building development during the post-volcano reconstruction have caused relatively small-scale forest loss on the west and north-west flanks of the hills outside of the reserve boundary, as have agricultural clearances. Conversely, there has been considerable forest regeneration (reverting from agricultural land) in the east of the Centre Hills during the last ca.20 years (J. Daley & P. Murrain *pers. comm.*). It is important to point out that there has hitherto been no monitoring of landcover in the Centre Hills area, so there is no quantitative information on changes in forest cover.

Forest patch configuration

The Centre Hills is currently favoured by being a relatively continuous forest block, with a roughly circular shape (see Chapter 3 for vegetation map). This minimises the edge-effects that can be damaging to

small tropical forest blocks (Laurance *et al.*, 2002; Watson *et al.*, 2004).

We do not know anything about patterns of movement of animals and plants between the larger, now destroyed, southern forest block and the surviving Centre Hills forest. One can speculate that some species in the Centre Hills existed as sink populations that were maintained by immigration from the larger, higher and possibly more natural southern forests. Any such sinks would now be 'exposed' by the loss of the southern forests. Current forest bird monitoring data indicates that this is not likely to have been the case to a major extent for any of the forest bird species, since none have shown consistent declines since the loss of the southern forests. Nevertheless, both brown trembler and Montserrat oriole have shown apparent declines during parts of the 1997-2006 period, and it is possible that immigration from the south would have boosted their populations in earlier periods.

In any event, the existence of two largely separate, substantial sized forest blocks in Montserrat – the Centre Hills and the Soufrière/South Soufrière Hills - likely reduced the extinction risk for many species, by reducing the probability that a single catastrophic or stochastic event could eliminate the whole-island population. This is particularly so if the negative factors that affected the two forest blocks – for example rat population explosions, hurricanes, droughts and volcanic eruptions – did not occur simultaneously at both sites.

Isolation and edge-effects are likely to be most severe for the degraded dry forest areas that are contiguous with the main Centre Hills forest block, predominantly in the north-east of the island.

Invasive alien animals

Both black (ship) rats and brown (Norway) rats occur in the Centre Hills, having been introduced since European settlement. Rat numbers appear to vary greatly between years, but are generally high, often exceptionally high, even up to the summits of the hills (Montserrat Centre Hills Project, *unpubl. data*). In other island ecosystems, rats are known to reduce tree regeneration, greatly reduce macro-invertebrate and small herptile abundance and to predate birds' eggs and chicks (Allen *et al.*, 1994; Wilson *et al.*, 2003; Towns *et al.*, 2006). Recent research work in the Centre Hills has confirmed that rats (apparently mostly black rats) are major predators of Montserrat oriole nests, and also predate forest thrush nests (G.A.L. Gray *pers. comm.*). Population models show that rat predation is sufficient to drive a decline in the Montserrat oriole population in the Centre Hills in some years.

The status of feral cats in the Centre Hills is unclear. Signs of cats have been found in remote areas of the Centre Hills, as has evidence of cat predation on forest thrush and bridled quail-doves *Geotrygon mystacea* (G.M. Hilton *pers. obs.*). It has not been definitively demonstrated that there is a true feral population, rather than just wandering domestic animals, though the former seems probable. There is no information on the cat population density or impacts of cats on Centre Hills' biodiversity, but it is a cause for concern. The dense rat (and house mouse) population seems likely to be capable of sustaining a relatively large cat population, which could in turn have a significant predatory impact on native birds, reptiles and amphibians. Fortunately, the small Indian mongoose *Herpestes auropunctatus*, which is a major conservation problem on some West Indian islands (Stattersfield *et al.*, 1998; Kairo *et al.*, 2003), is not present on Montserrat.

Feral pigs are thought to be a relatively new problem on Montserrat, having appeared in the Centre Hills since 2000, following the escape of domestic stock from abandoned agricultural areas in the south of the island. They spread through much of the Centre Hills with astonishing speed until a major control effort in 2003-4 pushed them back to the south-eastern edges of the hills. Since the relaxation of control, populations are recovering, and pig-sign was once again recorded near the summit of Katy Hill – relatively northward in the hills - during 2005. Hitherto, the impact of pigs has been relatively slight, because they have not had time to reach high densities. In some island forests, such as in Hawaii, pigs have had catastrophic impacts, effectively destroying forests by preventing regeneration. In other islands, they have less massive, but still important impacts as predators and herbivores (Kessler, 2001; Schuyler *et al.*, 2001; Sweitzer & Van Vuren, 2004). Their ultimate impact on the Centre Hills if the population is not checked is unclear. They are likely to be effective predators of ground-nesting birds and we speculate that they could have a disastrous predatory impact on larger terrestrial herptiles, such as mountain chicken and Montserrat galliwasp (Kessler, 2001; GISD, 2006a). Their rooting activities may significantly deplete riparian *Heliconia* stands (G.M. Hilton *pers. obs.*), which could cause loss of Montserrat oriole nests and nesting territories. Whether they become significant ecosystem engineers, changing habitat structure and even, ultimately, destroying the forest remains to be seen.

Agoutis and house mice are widespread and abundant in the Centre Hills, the former probably introduced by Carib Indians (Blankenship, 1990) and the latter presumably by Europeans. Their impacts are unknown. They may have some indirect effects, for example by affecting plant community composition through herbivory, and, in the case of mice, reducing invertebrate populations through predation (GISD, 2006d).

Large domestic grazing mammals regularly make incursions into the Centre Hills, especially goats *Capra hircus* and cattle *Bos taurus*. The former are a concern. As with cats, it is not clear whether there is a true feral population, or simply poorly controlled domestic stock, and it is not clear whether they are currently increasing. Both species can have major effects on forest vegetation structure (GISD, 2006c, b).

Fig. 2.7. Destruction of vegetation along one of the ghauts in the southern Centre Hills by ash and mud flow in 2006 (Photo: DOE, MALHE)

Alien fruit trees and opportunistic generalists

In parts of the Centre Hills, alien fruit trees such as bananas *Musa acuminata* and mangos *Mangifera indica* are relatively abundant, a consequence of a long history of agriculture within and around the site. Most native fruit species produce relatively small fruits, whereas some of the alien species produce large fruits that are highly profitable to vertebrate frugivores. It is notable that in the Centre Hills opportunistic generalists (e.g. rats and pearly-eyed thrashers *Margarops fuscata*) are extremely abundant. The density of pearly-eyed thrashers in the Centre Hills is among the highest in their range (Arendt, 2006). This may simply reflect the fact that Montserrat is a relatively species-poor island ecosystem that is subject to periodic catastrophic disturbance; this situation tends to lead to communities that are species-poor, supporting high densities of a few adaptable species (MacArthur *et al*., 1972). Another (not mutually exclusive) hypothesis is that the abundance of alien fruit trees (and perhaps other anthropogenic food sources such as small agricultural plots) permits these opportunists to reach very high densities. Both as competitors and predators, rats and thrashers can have important detrimental effects on a wide range of native flora and fauna. They are notable predators of other small vertebrates, including birds' nests, and major consumers of large invertebrates (Arendt, 2006; Towns *et al*., 2006). Thus it is possible that anthropogenic changes to the plant community composition in the Centre Hills, have led to an ecosystem which favours opportunistic-generalists to an excessive degree, with negative consequences for other fauna. Direct evidence for such a syndrome is currently lacking and further research is needed.

Catastrophic disturbance

Montserrat is subject to both hurricanes and volcanic eruptions. Both of these are of course natural events, which have occurred throughout Montserrat's history, and one would therefore expect the fauna and flora to be resilient. However, such events now occur in an anthropogenically modified landscape. For example, much of Montserrat's forest (though relatively little of the hill ranges) has been cleared for human activities, so the natural habitat blocks are smaller and more isolated. This may make populations more vulnerable to extinction because they are smaller and less able to move between refugia. Secondly, a number of invasive alien plant and animal species have been introduced to the island since human colonisation. Typically, successful alien species are opportunists, adept at exploiting disturbed areas. Thus, the disturbances caused by hurricanes and eruptions may enhance the spread of alien species in modern Montserrat, with detrimental effects on native wildlife.

Hurricane Hugo, one of the most powerful storms in Caribbean history, passed directly over the island in October 1989, with massive impacts on human society. There were also enormous ecological effects, with defoliation of forests, and substantial tree-fall. Interestingly, there was some anecdotal evidence that the steeply incised valleys of the hill ranges served as refugia because defoliation in these more sheltered areas was less severe.

The ongoing eruption of the Soufrière Hills volcano since 1996 has caused many major ash-falls in the Centre Hills, as well as acid rain. During late 1996 to early 1998, ashfalls were very frequent. After this period, ash-falls tended to be more infrequent one-off events (e.g. in July 1998, 2001 and 2003), although absolute quantities of ash deposited were vast. Forest bird monitoring data indicates that many bird species showed substantial declines in the months following major ash-falls (Dalsgaard *et al*., 2007). However, these declines were neither catastrophic nor long-lived, with recovery in subsequent years. Overall, most forest bird populations were at least as numerous in 2005 as in the early stages of the eruption in 1997 (though pre-eruption densities are not known). There is good evidence that arboreal arthropod populations are significantly depleted by ash-falls (Marske, 2004). However, these effects are short-lived – perhaps of the order of a few months. This suggests a mechanism for the observed declines in bird species following ash-falls: a marked but short-lived reduction in arthropod food availability.

Climate change

The specific risks posed by anthropogenic climate change to the Centre Hills ecosystem are largely unknown. However, the predicted significant and rapid shifts in temperature and precipitation patterns clearly could have a major impact on the Centre Hills. As has been observed elsewhere, the impacts of climate change are likely to first occur in animal and plant communities at higher elevations. This is a particular concern, since the area of land at high elevations is naturally small. The potential increase in frequency and strength of extreme weather events, such as hurricanes, poses another obvious risk.

Threats – Conclusions

In refreshing contrast to many forest areas in the tropics, Montserrat's Centre Hills do not appear to be in imminent danger of conversion for human use. Of much greater immediate concern is historic, ongoing and perhaps accelerating degradation by alien invasive species. Urgent attention to the potentially catastrophic threat to the forest from feral pigs is required.

Catastrophic natural events, while a natural feature of Caribbean islands, are also a major risk to biodiversity. If more than one negative factor (unusual precipitation, hurricanes and volcanic eruptions) occurs close together in time, then populations with limited ranges are clearly vulnerable to extinction.

A crucial point to note is that any assessment of threats to the Centre Hills is severely limited by lack of monitoring data. There are no historical data-sets, or current monitoring programmes which permit changes in forest cover, forest habitat types, or alien species to be detected. Even weather data, which might elucidate the relationships between climate and population trends, are scarce due to the disruption caused by the volcanic crisis. This lack of monitoring is a significant threat in itself, since any negative population trends in key species cannot be diagnosed and rectified. An integrated pressure-state-response monitoring scheme is urgently required.

2.2.2. The Centre Hills management plan project

Since its inception, the CHBA has become a major component of the Centre Hills Project (CHP), a UK Government Darwin Initiative-funded project which is working to achieve the goal of "enabling the people of Montserrat to effectively manage the Centre Hills and associated resources" for biodiversity conservation and sustainable natural resource use. The key activities of the project include institutional capacity building, training, a socioeconomic assessment, legislative review, outreach programme, ecological research as well as the CHBA. The CHP commenced in June 2005 and is due to run to March 2008. It is a collaboration of the Ministry of Agriculture, Lands, Housing and The Environment (MALHE), Royal Society of the Protection of Birds (RSPB), Royal Botanic Gardens, Kew (RBG-Kew), Montserrat National Trust (MNT), Durrell Wildlife Conservation Trust (Durrell) plus the Montserrat Tourist Board. Information on how biodiversity is distributed, the status of species of conservation concern, and threats to biodiversity is needed to help set conservation priorities and inform the design of a Management Plan and Protected Area for the Centre Hills.

2.2.3. National and international obligations to biodiversity conservation

The CHBA (and CHP) will help Montserrat meet its national and international obligations for biodiversity conservation and sustainable natural resources use. These obligations include Montserrat's Environmental Charter obligation "*To safeguard and restore native species, habitats and landscape features, and control or eradicate invasive species*". It will also help achieve one of the 'St. Georges' Declaration Of Principles for Environmental Sustainability in the Organisation of Eastern Caribbean

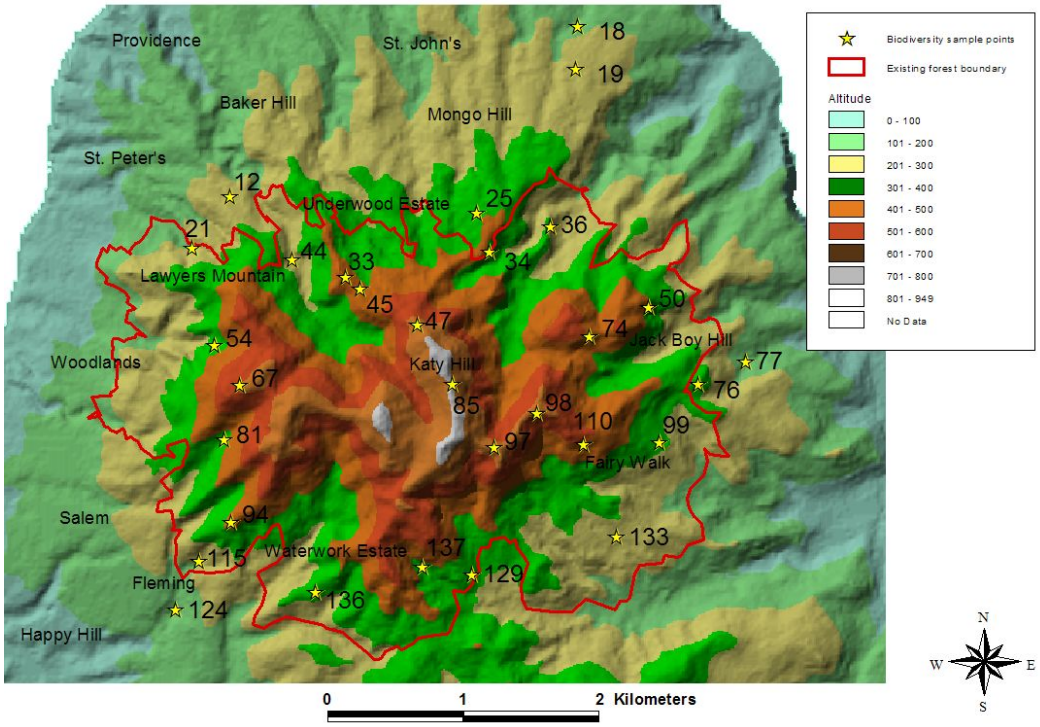


Fig. 2.8. Topographical map of the Centre Hills showing the existing forest reserve boundary and the location of the 30 CHBA points.

States' to protect plant and animal species; "*The flora and fauna and the ecosystems of the region will be conserved and protected. At the same time, the people and authorities must prevent the introduction of alien and modified species which may have a negative impact on the environment and their health. Endangered species and their habitats will be secured and protected*." The Convention on Biological Diversity (CBD) obliges countries to adopt a National Biodiversity Strategy and produce Action Plans for the conservation of biodiversity and the sustainable use of the components of biodiversity. Scientifically robust information on the status, value and endangerment of biodiversity of the Centre Hills will underpin the development of such strategies, targets and action plans. Although Montserrat has to date not yet acceded to the CBD, the MALHE expects completion of this process in the near future and it is one of the highest priorities of the newly established Department of Environment (DoE).

2.3. Scope of the project

2.3.1. Project objectives

The primary objectives of the CHBA project were to:

- inventory the biodiversity of the Centre Hills, Montserrat, by collating existing data and sampling a number of indicator taxa, including:
  - plants and habitats
  - invertebrates, with emphasis on beetles (Coleoptera)
  - amphibians
  - reptiles
  - birds
  - bats
- evaluate the status of species of particular biodiversity value and conservation concern,
- map spatial patterns in biodiversity and important sites for key species to identify 'key biodiversity areas',
- produce a classified habitat map of the Centre Hills,
- assess the threats posed by invasive plants,
- assess the status of introduced black and brown rats and their potential impact on indigenous flora and fauna,
- provide a baseline biodiversity dataset and data collection protocols for future monitoring,
- make recommendations for conservation priorities within the Centre Hills, and the management requirements of species and habitats of biodiversity value and conservation concern, and,
- build capacity in MALHE for the design, implementation and analysis of biodiversity assessments and ecological surveys.

2.3.2. Research design

The indicator taxa outlined above were sampled at 28 sample points (CHBA points) distributed randomly across the Centre Hills (randomly selected from the 149 sample points used for the Montserrat Forest Bird Monitoring Programme), but stratified by altitude so that each 100m altitude band was sampled in proportion to its area (Fig. 2.8). Two additional points were established outside of the immediate vicinity of the Centre Hills, in order to increase the sampling effort in dry forest habitat. This 'stratified random design' was employed to obtain an unbiased and representative sample of the biodiversity of the Centre Hills. This formal study was supplemented by the collation of historical data, analysis of previous plant and insect collections, recording incidental observations and *ad-hoc* surveys of areas of particular interest. The teams of experts visited each CHBA point on one or more occasions to carry out data collection; methods for different taxonomic groups are outlined in the relevant chapters. A number of additional sample points were established and visited as part of the plant survey to collect data in order to ground-truth a habitat map (see Chapter 3). Plants, amphibians and reptiles were surveyed in the wet season of 2005 and the dry season of 2006. Invertebrates, bats and rats were surveyed during the wet season of 2005 only.

Data on bird diversity was supplied from the MALHE/RSPB-led Montserrat Forest Bird Monitoring programme. This programme has run since 1997 and has produced a large body of information on the avifauna of the Centre Hills. Details of the design of the Montserrat Forest Bird Monitoring programme and associated data collection protocols are given in *Box 5*. Additionally, the CHBA project was also able to utilise information collected by Scott Pedersen and team from South Dakota State University (SDSU) as part of a long term (1978-) bat monitoring programme on Montserrat.

2.3.3. Project outputs

The outputs of the CHBA project will be as follows:

- A published technical report
- A biodiversity database linked to the Montserrat's national Geographical Information System (GIS) held on the MALHE computer network
- A vegetation map of Montserrat
- A minimum of two articles published in peer-reviewed scientific journals
- Strengthened biodiversity assessment and monitoring skills in MALHE and MNT

References

Allen, R.B., Lee, W.G., & Rance, B.D. (1994). Regeneration in indigenous forest after eradication of Norway rats, Breaksea Island, New Zealand. *New Zealand Journal of Botany*, **32**, 429-439.

Arendt, W.J. (2006). *Adaptations of an avian supertramp: distribution, ecology, and life history of the pearly-eyed thrasher (Margarops fuscatus)*. Gen. Tech. Rep. 27. U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry, San Juan, Puerto Rico, p. 404.

Blankenship, J. (1990). *The Wildlife of Montserrat*. Montserrat National Trust, Plymouth, Montserrat, West Indies.

Dalsgaard, B., Hilton, G., Gray, G., Aymer, L., Boatswain, J., Daley, J., Fenton, C., Martin, J., Martin, L., Murrain, P., Arendt, W., Gibbons, D. & Olesen, J. (2007). Impacts of a volcanic eruption on the forest bird community of Montserrat, Lesser Antilles. *Ibis*, **149**, 298-312.

GISD (2006a). Global Inasive Species Database - *Sus scrofa*. IUCN SSC Invasive Species Specialist Group.

GISD (2006b). Global Invasive Species Database - *Bos taurus*. IUCN SSC Invasive Species Specialist Group.

GISD (2006c). Global Invasive Species Database - *Capra hircus*. IUCN SSC Invasive Species Specialist Group.

GISD (2006d). Global Invasive Species Database - *Mus musculus*. IUCN SSC Invasive Species Specialist Group.

Kairo, M., Ali, B., Cheesman, O., Haysom, K. & Murphy, S. (2003). *Invasive Species Threats in the Caribbean Region*. Report to The Nature Conservancy. CAB International, Curepe, Trinidad & Tobago.

Kessler, C.C. (2001). Eradication of feral goats and pigs and consequences for other biota on Sarigan Islands, Commonwealth of the Northern Mariana Islands. In: Veitch, C.R., Clout, M.N. (Eds.), *Turning the tide: the eradication of invasive species*. IUCN, Gland, Switzerland & Cambridge, UK, pp. 132-140.

Laurance, W.F., Lovejoy, T.E., Vasconcelos, H.L., Bruna, E.M., Didham, R.K., Stouffer, P.C., Gascon, C., Bierregaard, R.O., Laurance, S.G. & Sampaio, E. (2002). Ecosystem Decay of Amazonian Forest Fragments: a 22-Year Investigation. *Conservation Biology*, **16**, 605–618.

MacArthur, R.H., Diamond, J.M. & Karr, J.R. (1972). Density compensation in island faunas. *Ecology*, **53**, 330-342.

Marske, K.A. (2004). Effects of volcanic ash on the insect food of the Montserrat Oriole *Icterus oberi* Lawrence 1880. Montana State University, Bozeman, Montana, p. X + 178.

Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. & Kent, J. (2000) Biodiversity hotspots for conservation priorities. *Nature*, **403**, 853-858.

Schuyler, P.T., Garcelon, D.K. & Escover, S. (2001). Eradication of feral pigs (*Sus scrofa*) on Santa Catalina Island, California, USA. In: Veitch, C.R., Clout, M.N. (Eds.),

Turning the tide: the eradication of invasive species. IUCN SSC Invasive Species Specialist Group, Gland, Switzerland & Cambridge, UK, pp. 274-286.

Stattersfield, A.J., Crosby, M.J., Long, A.J. & Wege, D.C. (1998). *Endemic Bird Areas of the World*. Birdlife International, Cambridge, UK.

Sweitzer, R. & Van Vuren, D. (2004). *Effects of wild pigs in oak woodland ecosystems in California*. Ecological Society of America 2004 Annual Meeting, Portland, Oregon.

Towns, D.R., Atkinson, I.A.E. & Daugherty, C.H. (2006). Have the harmful effects of introduced rats on islands been exaggerated? *Biological Invasions*, **8**, 863-891.

Watson, J.E.M., Whittaker, R.J. & Dawson, T.P. (2004). Habitat structure and proximity to forest edge affect the abundance and distribution of forest-dependent birds in tropical coastal forests of southeastern Madagascar. *Biological Conservation* **120**, 311-327.

Wilson, D.J., Lee, W.G., Webster, R.A. & Allen, R.B. (2003). Effects of possums and rats on seedling establishment at two forest sites in New Zealand. *New Zealand Journal of Ecology*, **27**, 147-155.

3. Plants and habitats of the Centre Hills and Montserrat

M. A. Hamilton, C. Clubbe, S. K. Robbins & S. Bárrios

3.1. A brief history of botanical collection in Montserrat

Compared to other islands in the Caribbean, Montserrat has received little botanical exploration. The earliest botanical collections made in Montserrat were by John Ryan in the late eighteenth century. He lived and worked on the island as a physician and a plantation owner for several years. During this time, Ryan collected the type specimen of the small tree *Xylosma serratum*, endemic to Montserrat. Most of his collections are held in the Copenhagen Herbarium in Denmark, his home country.

The West Indies received notable botanical studies in the form of two important Floras between the late eighteenth and mid nineteenth centuries – Swartz's *Flora Indiae Occidentalis* (1797) and Grisbach's *Flora of the British West Indian Islands* (1859-1864). Although these works were important in the context of the West Indies and specifically for the British Territories, they lack detailed botanical information pertaining to the flora of Montserrat.

The 20th century brought new botanical explorers to Montserrat; however, the majority of these explorers spent little time on the island. Based on the collections held in the Kew Herbarium, the following botanists collected in Montserrat during this era: Robson, W. between 1907-1911; Squire, F.A in 1937; Beard, J.S. in 1944; Proctor, G.R. in 1959; Price, W.R. in 1969; Adams, Bryan R. in 1976-1977; and Brussel, D. A. in 1977.

It was not until 1979 that an extensive checklist was produced of the flora of Montserrat. This was achieved as part of Richard Howard's work to produce the *Flora of the Lesser Antilles* (1979). This is currently the most important and comprehensive botanical inventory of Montserrat and the other islands in the Lesser Antilles.

During the current effort to record Montserratian collection information held at Kew, and Howard's collections recovered from the old Botanical Station in Plymouth, in the UK Overseas Territories Species and Specimens Database [BRAHMS software, http://herbaria.plants.ox.ac.uk/bol/home/], only a few examples from the Centre Hills were noted. The majority of herbarium specimen collections over the years appear to have been made in the southern part of the island. This is a useful record of what may have been lost to the volcano; however, it highlights the lack of botanical knowledge for the rest of the island, particularly the Centre Hills.

3.2. Data collection methods and progress

The aim of the plant survey within the biodiversity assessment was to gather baseline information on the flora of Montserrat (to supplement Howard's checklist), map the major vegetation types that occur across the island and investigate patterns in plant diversity within the Centre Hills. This is being achieved though the collection of plant specimens and seeds, site records, and vegetation surveys throughout the Centre Hills, including at the 30 CHBA points. Different habitats are visited to develop a wider knowledge of plant species composition. Additionally time is spent in other areas of the island, such as the Silver Hills, so as to increase the understanding of the island's different ecosystems and species that occupy these areas.

Herbarium specimen collections are made according to the methods outlined in *The Herbarium Handbook* (Bridson & Forman, 1998). In general, specimens in flower and/or fruit are collected to increase the likelihood of a fully determined specimen. Where a species has been previously collected and determined, a "Site Record" is made. In this case no plant material is collected; however, locality notes, GPS coordinates, and habitat details are recorded. This provides a better idea of particular habitats that are preferred by certain species and enables calculation of a species extent of occurrence. Site Records are also important in tracking the spread of invasive species.

Special collections can be made, such as germplasm collections. For example, seeds were collected of two endemic species from Montserrat for long-term storage. Seed collection procedures follow the Millennium Seed Bank guidelines. The full publication can be found at www.kew.org/msbp/internat/fieldmanual.html.

All of the records that are made in the field are directly entered into a PDA-GPS (http://www.garmin.com/products/iQueM5/) and later uploaded to the UKOTs Species and Specimens Database. Plant species collections, site records and habitats are, in general, photographically documented. All data collected are repatriated to Montserrat through the Physical Planning Department (PPD) as part of the national GIS.

The initial assessment of plant diversity has provided baseline data on species composition, habitat structure, and given clues to habitat preferences of some species and allowed vegetation and habitat indicators to be identified. Many of the plant species recorded at CHBA points were not in flower or fruit when the initial assessments were undertaken. The presence of flowering and/or fruiting material is vital for accurate

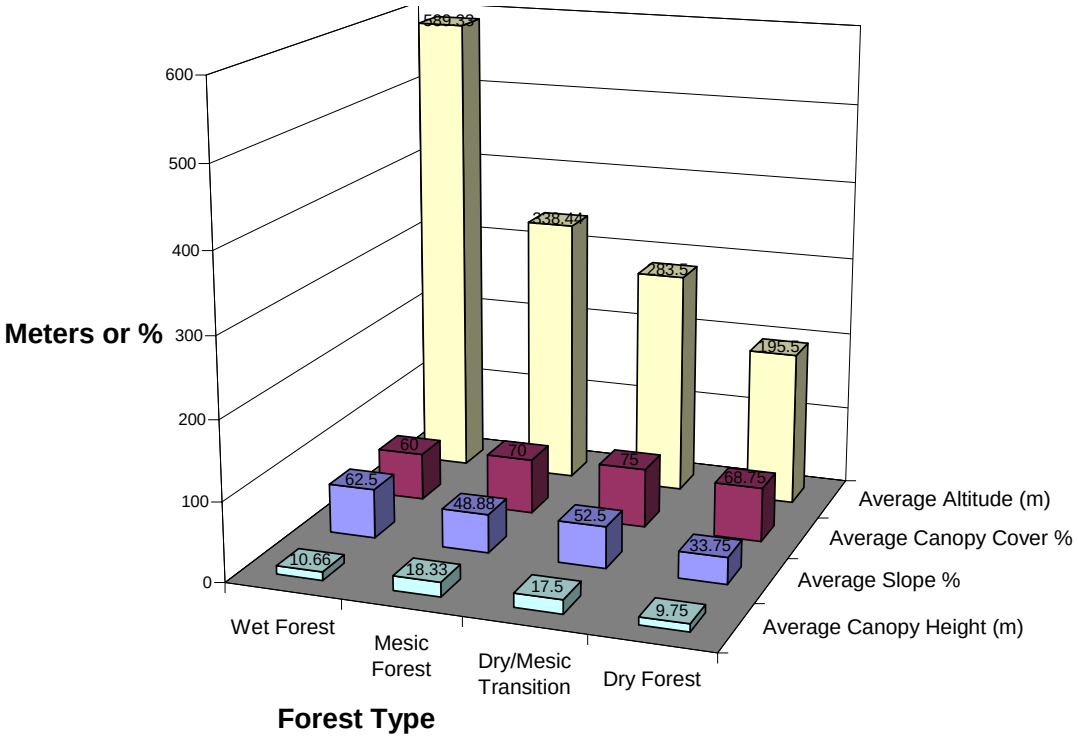


Fig. 3.1. Average values of canopy, slope, & altitude recorded at the Montserrat CHBA points.

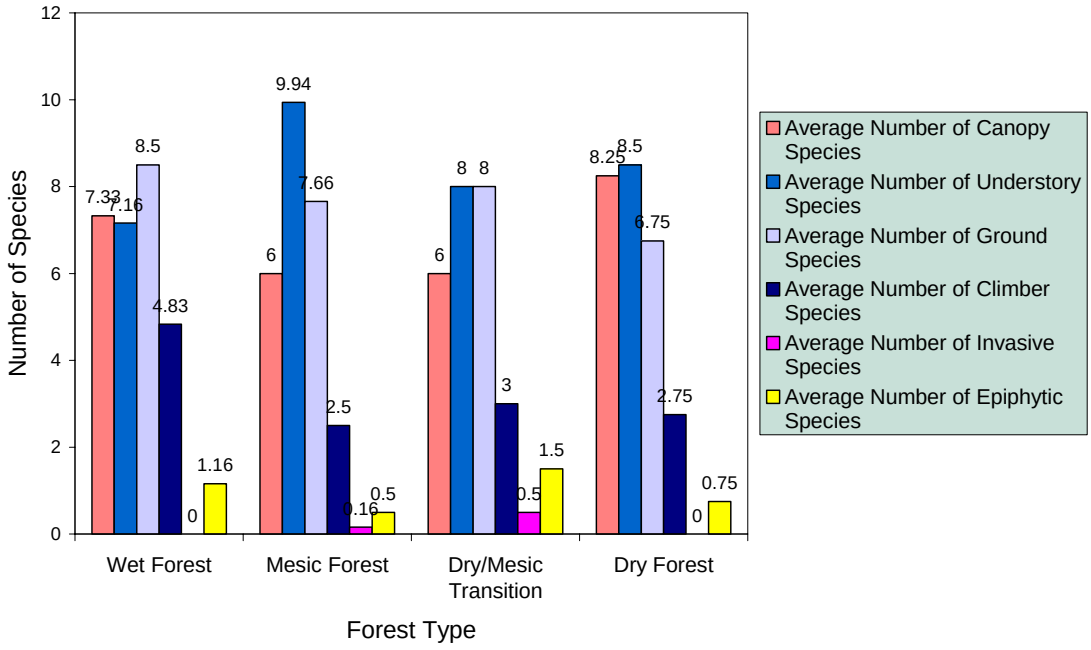


Fig. 3.2. Average number of species recorded at the Montserrat CHBA points across the different forest types broken down into forest type structural elements.

identification to the species level. Consequently many plant taxa remain identified to family or genus level only. In some cases identification was not possible even to the family level and these taxa remain unknown. Monitoring of the CHBA points will continue until firm identifications are possible.

At each of the CHBA points, data on a number of variables were recorded. These data have been analysed to determine the structure (e.g. species presence at ground layer, understory and canopy) of the different forest types (see section 3.3 for description of forest types), species composition and richness within forest types, and to determine differences in elevation and slope amongst the forest types. Summary data are shown in Figures 3.1 and 3.2.

Three major collecting field trips have been undertaken since the CHBA started (November 2005, February 2006 and May 2006). Data from the database,

Field Work Date	Collected within the Centre Hills	Collected outside the Centre Hills	Total Number of Records
Nov-05	256	58	314
Feb-06	145	34	179
May-06	27	2	29
TOTAL RECORDS	**428**	**94**	**522**

Table 3.1. Number of database entries made, within and outside the Centre Hills during 3 field visits in 2005-2006. Note that "database entries", in this context, is used to describe an individual record (independent of the collection type) and not a different species.

Field Work Date	Type of Collection				
	Herbarium Sheet	Spirit	DNA	Sight Record	Carpological
Nov-05	303	33	7	0	7
Feb-06	117	12	8	53	1
May-06	20	9	5	7	0
COLLECTION TOTALS	**440**	**54**	**20**	**60**	**8**

Table 3.2. Number of database entries for each type of collection made during 3 field visits in 2005-2006. Note that "database entries", in this context, is used to describe an individual record and not a different species or different collection.

presented in tables 3.1 and 3.2, show preliminary numbers of the collections made during these months.

Depending on the type of plant, special collections are sometimes necessary to ensure appropriate material is available for taxonomists trying to name species. Special collections such as Carpological and Spirit Collections are made for plants with bulky fruits and delicate flowers, respectively. DNA collections can also be made for species of particular interest so that researchers can compare similar species or determine genetic diversity amongst populations. Leaf samples for DNA analysis are collected into silica gel to preserve the DNA.

3.3. Diversity and status of plants in Montserrat

3.3.1. The Montserrat plant species checklist

To meet the need for baseline data on Montserrat's plant diversity, a working species checklist for the island has been produced (see Appendix 1). A wide range of information sources have been consulted to make use of existing information including floras (in particular Howard's *Flora of the Lesser Antilles*), checklists, monographs, and via personal communications. Species that have been verified to occur on Montserrat (i.e. via determined herbarium specimens) were added to the species checklist. Sightings by Kew's UKOTs Programme staff and records from other sources indicating the possibility of a species occurring on Montserrat were added as 'candidate' species to the list. These species will be confirmed on the checklist once herbarium specimens have been collected from the island and been positively determined. All data will be added to the UKOTs Species and Specimens Database (UKOTs Database). The full checklist will also be made available through the UKOTs website on the main Kew server (www.kew.org) and through BRAHMS On-Line (www.herbaria.plants.ox.ac.uk/BOL/).

All plant voucher specimens are deposited in the Kew Herbarium (K). Duplicates have been collected that can be repatriated to Montserrat once facilities have been established to house them.

Species list categories

Accepted plant Family, Genus, and Species names (including subspecies, varieties etc.) are used at all times. Species names are qualified by their appropriate authors. Common names are listed but emphasis is given to 'local', Montserratian, names. Common names are derived from published sources e.g. Howard (1979) whilst local names have been gathered from Montserratians during the current fieldwork programme. Information regarding species life-form and

dimensions is provided along with, in some cases, key identification features. Species habitat information is entered into the list if available. A notes field is added to capture other relevant information (e.g. useful historical information, known localities, etc.). All information sources are referenced accordingly for each species entry. In general, the species list categories follow the layout of any standard species checklist. However, there are a number of important categories (listed below) that need special mention in this case.

Plant category

Each species is given an identification code and is assigned to one of the following categories: Dicotyledons (Dicots), Monocotyledons (Monocots), Pteridophytes, or Gymnosperms. This is particularly useful for the production of field lists.

Biogeography

The bio-geographical categories are as follows:

- Endemic to Montserrat: species range restricted to Montserrat.
- Endemic to the Lesser Antilles: species range restricted to the Lesser Antilles (as defined by Howard (1979) the islands from Anguilla in the north to Grenada in the south and Barbados in the east).
- Restricted range: species range exceeds Lesser Antilles but is restricted to a small area outside the Lesser Antilles.
- Caribbean: species range does not exceed the Caribbean Islands: i.e. Greater and Lesser Antilles, Bahamas archipelago, Trinidad and Tobago.
- Peri-Caribbean: species range exceeds Caribbean but is restricted to a small continental area.
- Wider distribution: species range exceeds all of the above geographical categories.
- Introduced: denotes that a species is introduced, i.e. ornamental/ food crop/ invasive, etc.

'Lesser Antilles Distribution' and 'Distribution' Fields

The Biogeography of a species is generated from information held in the fields *Lesser Antilles Distribution* and *Distribution* and they provide further information for the red-listing and conservation planning process. The Lesser Antillean Island chain are listed north to south in the following order: Anguilla, St. Martin, St. Barthelemy, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Montserrat, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados. The field *Distribution* is used if a species range exceeds that of the Lesser Antilles.

Cultivated

A cultivation category is provided if a species is under cultivation on Montserrat (i.e. ornamental, food plant, medicinal herb, culinary herb, environmental use [sand stabilization, wind break], etc). This information may lead to and assist in further ethno-botanical study or for targeting potentially invasive species.

Category	Dicots	Monocots	Ferns	Conifers	Total
Endemic to Montserrat	2	1	0	0	3
Endemic to Lesser Antilles	51	9	10	0	70
Restricted range	19	7	5	1	32
Caribbean	84	15	10	0	109
Peri-Caribbean	23	3	5	0	31
Wider distribution	380	85	85	0	550
Introduced	126	17	3	0	146
VERIFIED SPECIES TOTALS	**685**	**137**	**118**	**1**	**941**
Candidate native	2	1	0	0	3
Candidate introduced	43	4	0	1	48
CANDIDATE SPECIES TOTALS	**45**	**5**	**0**	**1**	**51**

Table 3.3. Total numbers of plant species in Montserrat by plant category & biogeography

Invasiveness

Information is being compiled on known and so far unreported introduced (non-native) plant species occurring in Montserrat. These species are being monitored by Kew's UKOTs Programme staff and local project partners during field trips and are rated according to the degree to which they threaten native plant species and habitats. The following categories are used to rate species' invasiveness:

- Naturalized
- Naturalized and spreading
- Invasive

Summarised totals

The total number of verified species for Montserrat is 941 (see Table 3.3). Of these, three are known endemics to Montserrat, 70 are endemic to the Lesser Antilles, and another five species' ranges exceed the Lesser Antilles but are restricted to a small area outside the Lesser Antilles. Potentially, Montserrat is home to 78 plant species of global conservation concern. These 78 restricted-range species comprise the Candidate Red List (*see Box 1*) and will be the focus of investigation in the next phase of botanical work following the CHBA.

3.3.2. Threats to Montserrat's flora

Threats to the flora of the Centre Hills are mainly restricted to feral mammals. Both pigs and rats are of major concern due to rooting up of vegetation by pigs and loss of seeds/seedlings to rats. On the periphery of the Centre Hills, clearance of vegetation for rural and urban development is a potential threat as this disturbance often breaks the contiguous forest, alters water tables/courses, causes erosion/silting, and allows access for non-native species.

Invasive alien species (IAS) are a major threat to the native biodiversity throughout the world and a recent review has highlighted their impacts in UK Overseas Territories (Varnham 2006). This review also highlighted the gaps in our knowledge of the current status of IAS and their impacts at a local level. Little information exists on the nature of the invasive plant threats in Montserrat and this situation is being addressed within the current project. An invasiveness field has been introduced to the Montserrat Species Checklist. Data to populate this field are being drawn from several sources:

- Published species information to highlight species that are known to be non-native to Montserrat
- Published sources of known invasive species (e.g. The Global Invasive Species Programme (www.gisp.org); the Invasive Species Specialist Group (www.issg.org); Florida Exotic Pest Plant Council (www.fleppc.org)).
- Personal knowledge of invasive species in other Caribbean islands

149 plant species are verified as having been introduced to Montserrat. There are another 45 species that are candidates, but not yet verified through herbarium specimens (*See Appendix 3 for a full list of all non-native species recorded from Montserrat*). These species are being examined to determine which category of invasiveness they are best assigned to.

The major invasive plant threats on Montserrat are currently outside the Centre Hills (as defined by the current 11.16 km^2 forest feserve boundary) with relatively little evidence of invasive plants presenting a major threat within the core areas of the Centre Hills. However, in areas outside the Centre Hills several aggressive invasive plant species have established themselves and are negatively impacting the native biodiversity. The main effects are the replacement of native biota.

Within the Centre Hills forest reserve

Two key alien species have been identified that are being monitored by RBG-Kew & MALHE Staff:

- *Spathoglottis plicata*, an invasive ground orchid that is becoming well established within the Centre Hills and has been recorded in several forest types, including in Elfin Woodland at the top of Katy Hill. Originally from Asia this species is thought to have escaped from cultivation in Puerto Rico and is gradually spreading throughout the Caribbean. No major negative impacts have been observed yet, but this species has the potential to crowd out native species especially in fragile habitats like Elfin Woodland.
- *Psidium guajava*, (guava), an escaped tree of cultivation that is spreading rapidly outside the Centre Hills (e.g. Richmond Hill) and has been recorded within the Centre Hills. This plant is a major invasive species in many parts of the World. It has the potential to become a major threat to the habitats of the Centre Hills where abandoned plots of guava can quickly spread into other disturbed areas caused by feral mammals and volcanic activity.

Outside the Centre Hills forest reserve

Three key alien species have been identified and are being monitored:

- *Casuarina equisetifolia* (Australian pine), a large tree originally from Australia and the Indo-Pacific. It has been planted throughout the tropics as a shade tree and is a major invasive problem. It grows particularly well and is free-seeding along the coast and in recently deposited volcanic ash deposits.

- *Cryptostegia madagascariensis* (known locally as purple allamanda), a vigorous scrambling shrub and escapee of cultivation. Originally from Madagascar, it is widely planted for ornamental purposes, especially as an effective and colourful hedge. This species is covering large tracts of land in the Silver Hills where it grows almost as a monoculture at the expense of all other species.
- *Psidium guajava*, (guava) – see above.

3.4 Patterns in plant diversity within the Centre Hills: Implications for biodiversity conservation

3.4.1. Island endemic species

Three plant species have been identified as strictly endemic to Montserrat: *Rondeletia buxifolia*, *Epidendrum montserratense* and *Xylosma serratum* and as such represent the most important plant species of global conservation concern and require the most stringent conservation protection measures.

- *Rondeletia buxifolia* Vahl (Fig. 3.3) is a small shrub in the Rubiaceae that has so far only been found outside the current Centre Hills forest reserve boundary. This species must currently be considered as extremely vulnerable as it enjoys no protection at either the habitat or species level. During the course of this project significant populations of this plant have been lost to clearance of forest habitat for development. Although a formal red listing has yet to be completed, its candidate status is Critically Endangered, the highest level of threat of extinction recognized by IUCN. An initial seed collection was undertaken in May 2006 and the seeds are stored in the Millennium Seed Bank at Kew – Wakehurst Place. Cuttings have been established in *ex situ* cultivation in the conservation nursery at the Montserrat National Trust.
- *Epidendrum montserratense* Nir (Fig. 3.4), an epiphytic orchid that seems to be largely found on veteran mango *Mangifera indica* trees and sugar mill ruins outside the current Centre Hills forest feserve boundary. Like *R. buxifolia* this species must also be considered as extremely vulnerable as it also enjoys no protection at either the habitat or species level and as such also has a candidate red list status of Critically Endangered. An initial seed collection was undertaken in May 2006 and the seeds are stored in the Millennium Seed Bank at Kew – Wakehurst Place. Plants rescued from dead mango trees in the Belham Valley have been established in *ex situ* cultivation in the botanic garden at the Montserrat National Trust.
- *Xylosma serratum* Urb is a small tree in the Salicaceae that is only known from one location

Fig. 3.3. Flowering branch of *Rondeletia buxifolia*. (Photo: Martin Hamilton RBG-Kew)

Fig. 3.4. *Epidendrum montserratense* inflorescence. (Photo: Martin Hamilton, RBG-Kew)

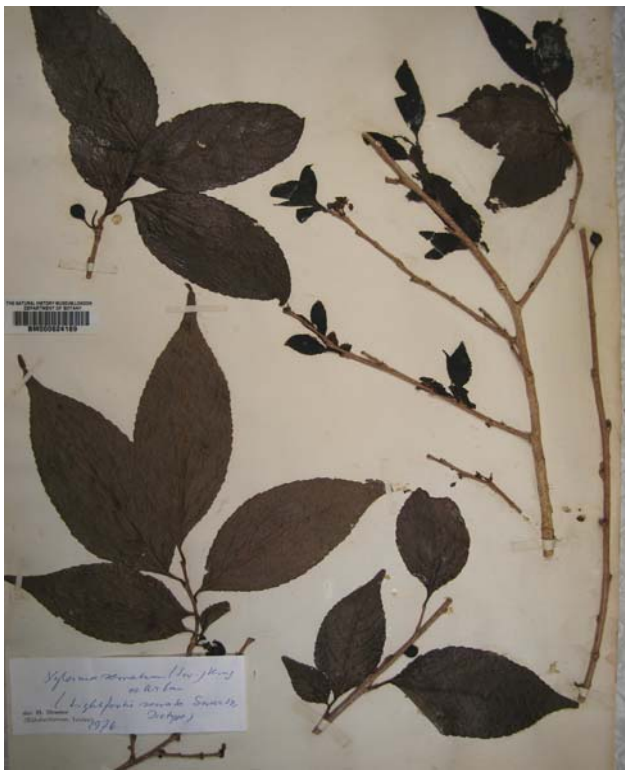


Fig. 3.5. Herbarium specimen of *Xylosma serratum*. (Photo: Martin Hamilton, RBG-Kew)

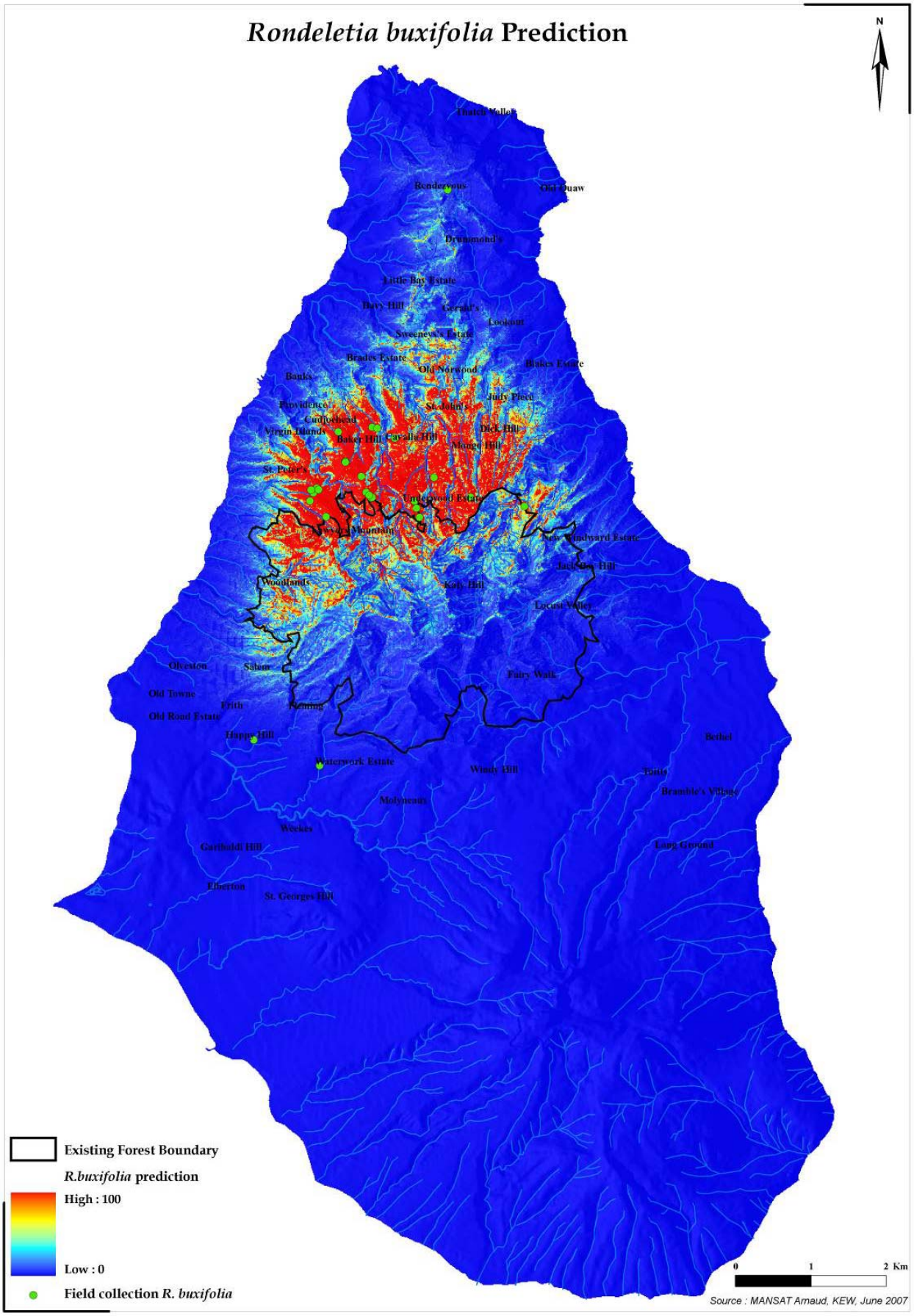


Fig. 3.6. *Rondeletia buxifolia* Vahl recorded locations as of September 2006 and predicted distribution

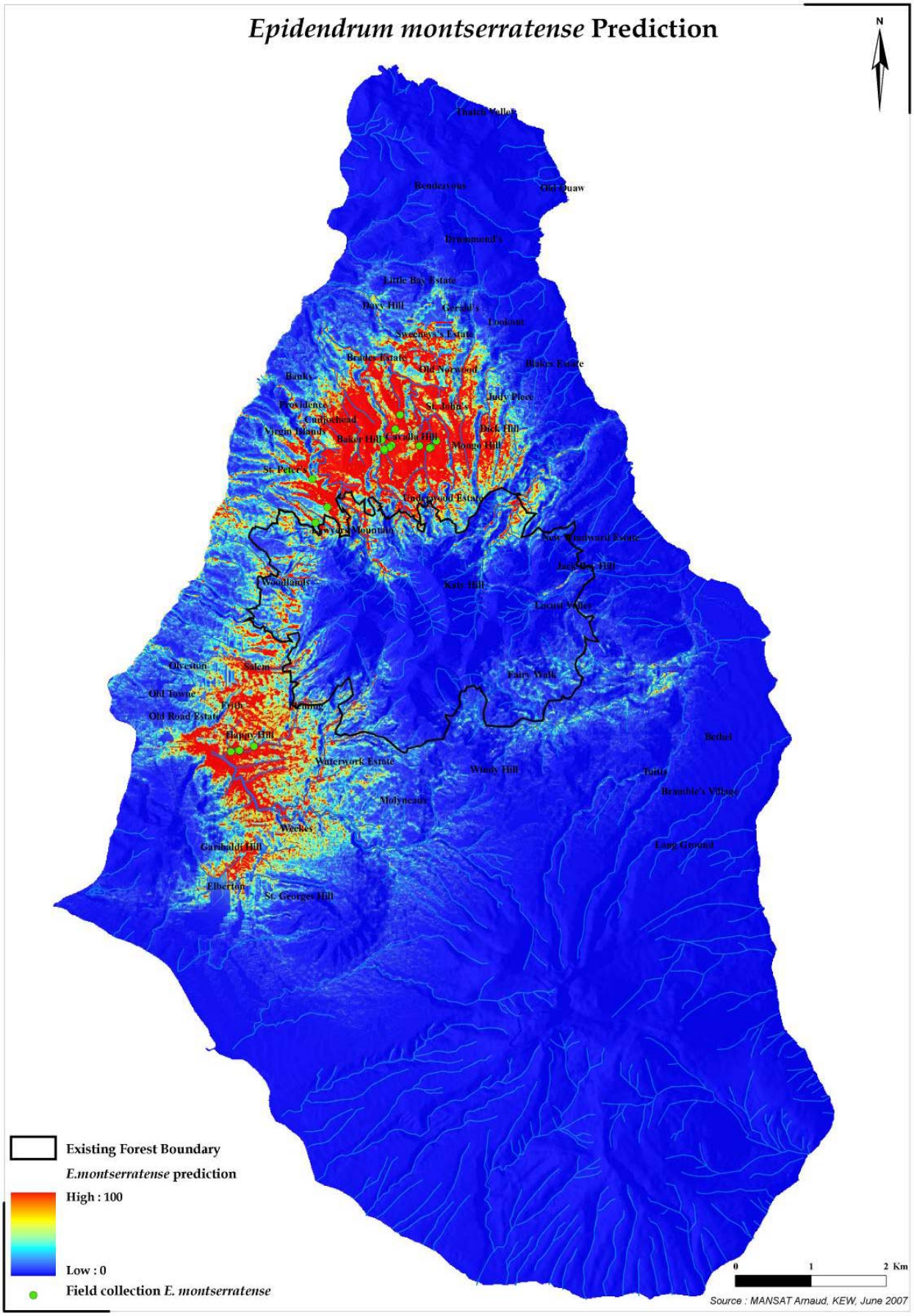


Fig. 3.7. *Epidendrum montserratense* Nir recorded locations as of September 2006 and predicted distribution

on Montserrat, Great Alps Falls in the South Soufrière Hills, where it was last recorded by Howard in the 1970s as collection number 19733 (Grisebach 1859-1864; Howard 1979). Since this site was destroyed by a major pyroclastic flow during the 1995-1997 volcanic eruptions we consider this species to be Extinct. However, since there are similar habitats to Great Alps Falls in the Centre Hills it is possible that this species exists there, but explorations so far have failed to find it. No *ex situ* material of this species exists so the only evidence we have are herbarium specimens.

3.4.2. Other important plant species

The on-going fieldwork and analysis of these data has identified a number of other plant species of potential conservation concern. Three notable examples are:

- Veteran mango trees (*Mangifera indica*), particularly in the Belham Valley area which provide the major location of the endemic *Epidendrum montserratense*. Careful consideration needs to be given to the long-term protection of these trees
- Montserrat's only native gymnosperm, *Podocarpus coriaceus*, is listed in the IUCN Red List of threatened species as Lower Risk (Conifer Specialist Group, 1998). More information is required to re-assess this species which is on the Candidate Red List. An important stand of large mature trees has been identified on the top of Hope Ridge highlighting the conservation value of this ridge within the Centre Hills.
- Three tree species that have been widely utilised for timber throughout the region are native to Montserrat: *Cedrela odorata* (stinking cedar), *Swietenia mahagoni* (West Indian mahogany), and *Guaiacum officinale* (lignum vitae). In many countries in the region these species have been over-exploited and as a consequence are all listed as threatened species by IUCN-The World Conservation Union (Oldfield et al 1998). S. mahagoni and G. officinale are Endangered and listed on Appendix II of CITES; C. odorata is Vulnerable and listed on Appendix III of CITES (www.cites.org). A fuller evaluation of the distribution of these species needs to be undertaken and an action plan for their conservation developed.

3.4.3. Habitat diversity

A survey of the island's vegetation has been underway since November 2005. Field data collection has taken many forms. Most notable are herbarium specimen collections with associated habitat data, CHBA surveys, and Vegetation Assessment Point surveys. Herbarium specimen collections are made when a new

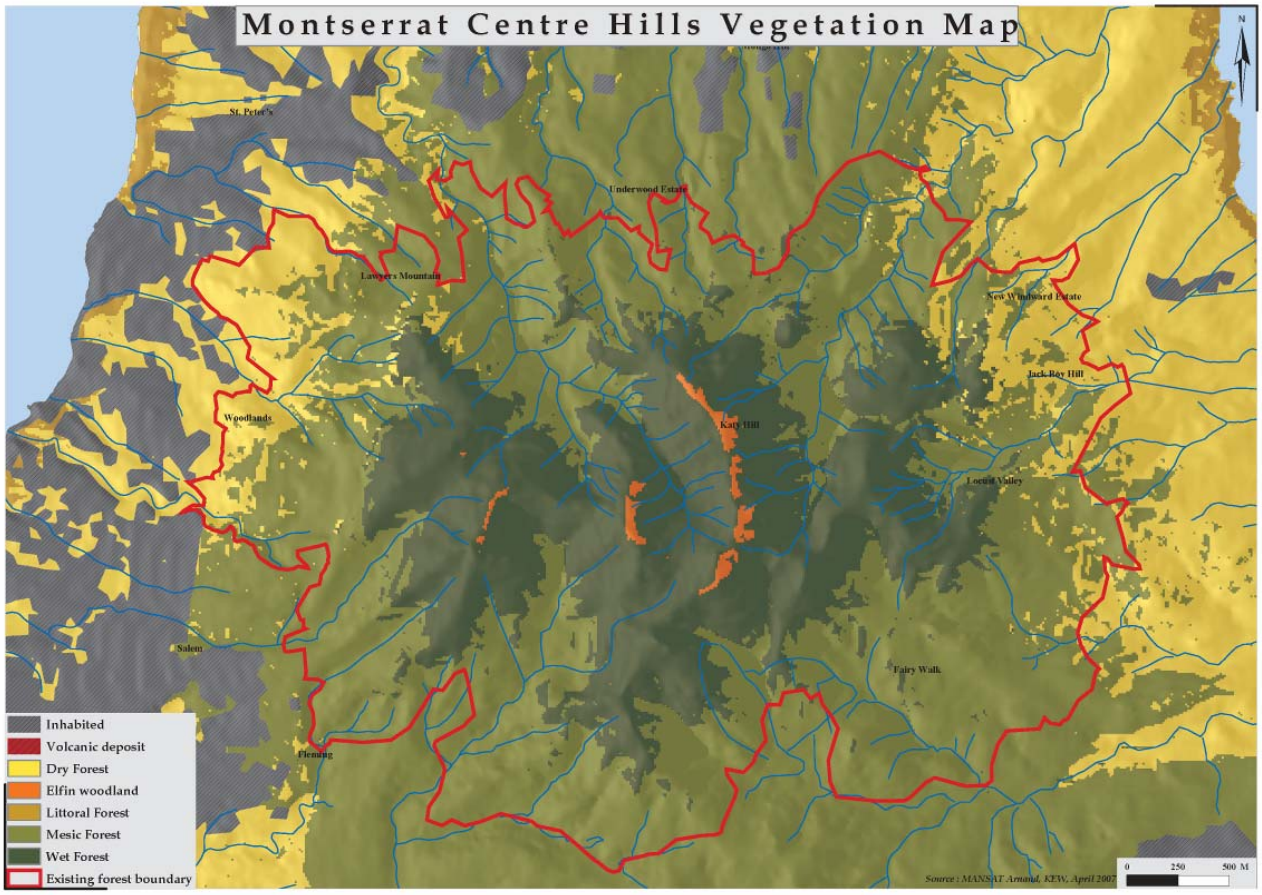


Fig. 3.8. Montserrat Centre Hills Vegetation Map

species is encountered or a previously observed species is found exhibiting new characteristics (e.g. fruiting). The CHBA Point surveys are undertaken at 30 agreed points within the Centre Hills at least once within the first year of the project. Vegetation Assessment Point surveys are undertaken in the field when a transition of habitat is noticed (e.g. Dry Forest changes to Mesic Forest) or land use changes (e.g. abandoned agriculture plot, area cleared for development). A series of standardised forms have been produced by Kew's UKOTs Programme staff to record habitat and vegetation data directly into a database file held on a PDA-GPS. These files are later uploaded, compiled, and used in association with Maxent prediction software

Dry Forest Types	Description
Littoral	Coastal Vegetation influenced by wind and salt spray. Typical taxa: *Cordia sebestena, Argusia gnaphaloides, Ipomoea pes-caprae, Coccoloba uvifera, Ernodea littoralis, Strumpfia maritima, Suriana maritima.*
Dry Scrub	Shrubby vegetation 0.5-2.5m tall in lower elevations with low rainfall Typical taxa: *Comocladia dodonaea,* Agavaceae, *Croton* spp., *Galactia* spp., *Acacia* spp., *Malpighia linearis, Stigmaphyllon* spp., *Tetramicra canaliculata, Melochia* spp., *Jacquinia armillaris, Corchorus aestuans.*
Dry Scrub (Cacti Dominated)	Shrubby vegetation 0.5-2.5m tall in lower elevations with low rainfall that is dominated by cacti and succulent plants. Typical taxa: Cactaceae, *Oncidium urophyllum.*
Dry Thicket	Large shrub/small tree dominated vegetation 2.5-5m tall in lower elevations with low rainfall Typical taxa: *Cordia* spp., *Bourreria succulenta, Oplonia microphylla, Cassine xylocarpa, Piscidia carthagenensis, Pithecellobium unguis-cati, Pisonia* spp., *Coccoloba* spp., Verbenaceae.
Dry Forest	Medium/Large tree dominated vegetation >5m tall in lower elevations with low rainfall. Typical taxa: *Capparis* spp., *Bursera simaruba, Tabebuia* spp., Apocynaceae, *Casearia* spp., *Hymenaea courbaril, Samanea saman, Bunchosia* spp., *Swietenia* spp., *Chiococca alba, Guaiacum officinale, Cedrela odorata.*
Dry/Mesic Transition	Medium/Large tree dominated vegetation >5m tall in low to mid elevations with low to medium rainfall. Typical taxa are a mix of Dry and Mesic Forest species.
Mesic Forest Types	**Description**
Mesic Forest	Medium/Large tree dominated vegetation >5m tall in mid elevations with medium rainfall. Typical taxa: *Begonia obliqua*, Araceae, Lauraceae, *Inga laurina, Eugenia* spp., *Piper* spp.
Mesic Forest (Disturbed)	Medium/Large tree dominated vegetation >5m tall in mid elevations with medium rainfall that has been disturbed through human activity. Typical taxa: *Mangifera indica, Thunbergia* spp., *Sida* spp., *Solanum* spp., *Stachytarpheta* spp.
Dry/Mesic Transition	Medium/Large tree dominated vegetation >5m tall in low to mid elevations with low to medium rainfall. Typical taxa are a mix of Dry and Mesic Forest species.
Wet Forest Types	**Description**
Wet Forest	Medium/Large tree dominated vegetation >5m tall in high elevations with high rainfall. Typical taxa: Elaeocarpaceae, *Phyllanthus* spp., *Podocarpus coriaceus, Asplundia* spp., Orchidaceae, *Marcgravia umbellate,* Arecaceae.
Wet Forest (lower)	As Wet Forest description, tendency to be dominated by Large tree vegetation with greater abundance of the following taxa: *Sloanea* spp., *Phyllanthus mimosoides, Asplundia insignis.*
Wet Forest (upper)	As Wet Forest description, tendency to be dominated by Medium tree vegetation with greater abundance of the following taxa: *Marcgravia umbellata, Podocarpus coriaceus, Asplundia rigida*, Orchidaceae.
Elfin Woodland	Shrubby vegetation 0.5-2.5m tall in high elevations with high rainfall and greater abundance of the following taxa: *Wercklea tulipiflora*.

Table 3.4. Land Cover descriptors detailing habitat types and indicator species

Other Land Cover Types	Description
Anthropogenic	Landscape modified and maintained through human activity.
Cultivated Area	Land currently under cultivation. Typical taxa: *Cocos nucifera, Mangifera indica, Carica papaya, Manihot esculenta, Psidium* spp., Poaceae.
Roadside Verge (Disturbed)	Landscape modified and maintained through human activity of road building. Typical taxa: *Catharanthus roseus, Calotropis procera,* Crassulaceae, *Gossypium barbadense, Azadirachta indica, Argemone mexicana, Eryngium foetidum,* Poaceae.
Ash/Mud	Land covered with volcanic ash or mud. Typical taxa: Poaceae, Cyperaceae.
Abandoned Farmland	Cultivated land that has been left derelict or fallow. Typical taxa: *Thunbergia* spp., *Wedelia trilobata, Cocos nucifera, Mangifera indica, Carica papaya, Manihot esculenta, Psidium* spp., Poaceae.
Fern Break	Habitat dominated by tree ferns. Typical taxa: Cyatheaceae.
Mangrove	Coastal area dominated by mangrove species. Typical taxa: *Avicennia germinans, Conocarpus erectus, Laguncularia racemosa, Hippomane mancinella, Rhizophora mangle.*
Pond	Freshwater pond (usually man-made). Typical taxa: *Nymphaea ampla, Lemna valdiviana.*
Riparian Remnants	Area that once supported a riparian habitat but is no longer viable through disturbance. Typical taxa: *Mangifera indica, Casuarina equisetifolia, Terminalia catappa.*
Riparian	Habitat heavily influenced by moving fresh water supporting characteristic plant species. Typical taxa: *Phytolacca rivinoides, Heliconia caribaea,* Salicaceae, Ferns.

Table 3.4 Contd. Land Cover descriptors detailing habitat types and indicator species

(http://www.cs.princeton.edu/~schapire/maxent/) to generate potential vegetation distribution maps.

The production of an island wide vegetation map will allow for a better understanding of the distribution of Montserrat's plant species. This will be part of the final map production for the Centre Hills project and will include maps showing forest types, habitat disturbance, threatened species and invasive species distributions, and major land features (e.g. roads, trails, boundaries, water courses). Accompanying the maps will be a detailed description of the process undertaken to generate those maps and the data gathering and analysis.

The vegetation of Montserrat is extremely varied due to the volcanic origin of the island. Several micro-climates are found on the island due to geology, aspect, elevation, precipitation, and land use (mainly historic). These micro-climates give rise to several different vegetation types. The different vegetation types are often home to plants that have adapted to these micro-climates and are very specialized. The converse of this scenario is much more common where plant species are found growing across several different vegetation types; therefore, the structure and composition becomes very important in determining the type of vegetation/land cover. Table 3.4 is derived from observations made whilst undertaking field work on Montserrat.

Once the Land Cover Descriptors were keyed and defined they were used to record the vegetation types on the island. For the Centre Hills, only forest types are of concern for the first draft of the vegetation map and these will need to be ground truthed to confirm boundaries before the map has more detail added (e.g. abandoned farmland, ponds, *etc*). Figure 3.8 is a map of the Centre Hills vegetation cover showing the distribution of the various forest types identified.

The Centre Hills ecosystem provides a range of habitats that are suitable for most of the species currently recorded on the Montserrat species checklist. In principle once the project is complete the Centre Hills species checklist could look very similar to the current Montserrat species checklist. However, the current forest boundary encompasses very little dry forest and no littoral forest. This means that threatened species that are restricted to dry forest (e.g. *Swietenia mahagoni and Guaiacum officinale)* currently have little protection and species restricted to littoral forest (e.g. *Rhizophora mangle*) currently have no protection. In addition to the under-representation of dry and littoral forest types within the existing forest reserve boundary, reference has already been made to the fact that all documented populations of the *E. montserratense* and *R. buxifolia* are outside the current reserve designation (Figs. 3.6 & 3.7).

A key management objective for plant diversity in the Centre Hills is to ensure that all forest types and species occurring in those forest types are adequately represented within the protected/managed area. Steps need to be taken either to bring the locations supporting populations of *E. montserratense* and *R. buxifolia* within the protected area or for alternate species level

protection measures to be introduced. Other management measures that need to be introduced include: active conservation for threatened species; control of invasive plant species, especially in fragile habitats like Elfin Woodland; control of feral mammals, especially pigs and rats; and limiting the spread of abandoned crops (e.g. guava, mangos, bananas, coconuts).

There is no doubt that the Centre Hills comprise a dynamic mosaic of habitats which support a wide range of plant species including many species of restricted distribution, two single island endemics as well as several threatened species. As such this would qualify the Centre Hills as an Important Plant Area (IPA) as defined by the Important Plant Area programme co-ordinated by Plantlife International and IUCN-The World Conservation Union (Plantlife International 2004). The long-term protection of the Centre Hills would be an important contribution to the implementation of Target 5 of the Global Strategy for Plant Conservation – 'Protection of 50% of the most important areas for plant diversity assured' (CBD, 2003).

Acknowledgements

The UK Overseas Territories Programme at Royal Botanic Gardens, Kew would like to thank everyone who has contributed to the plant components of the Montserrat Biodiversity Assessment. It's been a remarkably collaborative and enjoyable journey. In particular we would like to pay special thanks to our field colleagues in Montserrat: Calvin "Blacka" Fenton, Jervain Greenaway, Phillemon "Mappie" James "Scriber" Daley, James "Boatswain" Boatswain, Lloyd "Lloydie" Martin, & John "Gamby" Martin. Without their in depth knowledge of the Centre Hills and commitment to fieldwork this assessment would have not been possible.

Special mention goes to Carole McCauley, Darwin Project Manager, and Steven Mendes, Darwin Project Counterpart for all their logistical support and facilitation which ensured that all our visits to Montserrat were both successful and enjoyable. Thanks to Gerard Gray, Director, Department of Environment, for all his support since the establishment of the Department; to Claude Gerard, former Director of Agriculture, for making the initial assessment work possible; to Lady Eudora Fergus, Executive Director Montserrat National Trust for enabling Mappie to participate in the fieldwork and to Lavern Rogers, Physical Planning Unit, for her assistance with GIS related issues. Thanks to the Governor and staff of the Governor's Office on Montserrat for their continuing support for all our work in Montserrat.

Thanks to Richard Young for his tireless efforts to edit and chase contributors for their input. Many thanks to all our colleagues at RBG Kew, particularly in the Herbarium, who have given of and are still giving their time to identify and verify our Montserrat plant specimens and to the completion of the plant species checklist.

And finally many thanks to the many friends, accommodation providers and restaurateurs who made our stays in Montserrat so agreeable.

References

Bridson, D., Forman, L. (eds) (1998). *The Herbarium Handbook*. Royal Botanic Gardens, Kew, Richmond, UK.

Conifer Specialist Group (1998). *Podocarpus coriaceus*. In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* <www.iucnredlist.org>.

CBD (2003). *Global Strategy for Plant Conservation (GSPC).* Secretariat for the Convention on Biological Diversity, Montreal, Canada. [Available at: www.www.cbd.int/gspc/default.shtml]

Grisebach, A. H. R. (1859-1864). *Flora of the British West Indian Islands.* London, UK.

Howard, R. A. (1979). *Flora of the Lesser Antilles: Leeward and Windward Islands*. Jamaica Plain, Massachusetts, Arnold Arboretum, Harvard University, US.

IUCN (2001). *IUCN Red List Categories and Criteria Version 3.1* IUCN Species Survival Commission. IUCN Gland, Switzerland and Cambridge. [Available at www.iucn.org/themes/ssc/redlist.htm]

Oldfield, S., Lusty, C. & MacKinven, A. (compilers) (1998). *The World List of Threatened Trees*. World Conservation Press, Cambridge, UK

Plantlife International (2004). *Identifying and Protecting the World's Most Important Plant Areas*. Plantlife International, Salisbury, UK. [Available at www.plantlife.org.uk/international/plantlife-ipas-criteria.htm]

Swartz, O. (1797). *Flora Indiae Occidentalis*. Erlangen, Germany, Jo. Jacobi Palmii.

Varnham, K. (2006). *Non-native species in UK Overseas Territories: A Review*. JNCC, Joint Nature Conservation Committee, Peterborough, UK.

Table 3.5. Candidate Red List for the plants of Montserrat. All species occur at 9 locations (i.e. islands) or less.

Number of locations	Family	Genus	Species name 1	Author	Rank	Species name 2	Author
1	Orchidaceae	Epidendrum	montserratense	Nir			
1	Rubiaceae	Rondeletia	buxifolia	Vahl			
1	Salicaceae	Xylosma	serratum	Urb.			
2-5	Leguminosae-mim	Acacia	glauca	(L.) Moench			
2-5	Agavaceae	Agave	dussiana	Trel.			
2-5	Begoniaceae	Begonia	oblique	L.			
2-5	Blechnaceae	Blechnum	insularum	Morton & Lellinger			
2-5	Melastomataceae	Charianthus	nodosus	(Desr.) Triana			
2-5	Boraginaceae	Cordia	reticulata	M. Vahl			
2-5	Asteraceae	Chromolaena	dussii	(Urb.) R.M. King & H. Rob			
2-5	Bromeliaceae	Glomeropitcairnia	penduliflora	(Griseb.) Mez			
2-5	Melastomataceae	Henriettea	lateriflora	(Vahl) R.A. Howard & E.A. Kellog			
2-5	Hernandiaceae	Hernandia	sonora	L.			
2-5	Campanulaceae	Lobelia	digitalifolia	(Griseb.) Urb.			
2-5	Apocynaceae	Marsdenia	macroglossa	Schltr.			
2-5	Melastomataceae	Miconia	coriacea	(Sw.) DC.			
2-5	Melastomataceae	Miconia	globuliflora	(Rich.) Cogn.	var.	dominicae	R.A.Howard & E.A.Kellogg
2-5	Melastomataceae	Miconia	globuliflora	(Rich.) Cogn.	var.	globuliflora	

Table 3.5. Contd.

Number of locations	Family	Genus	Species name 1	Author	Rank	Species name 2	Author
2-5	Lauraceae	Nectandra	dominicana	(Meisn.) Mez			
2-5	Lauraceae	Ocotea	martinicensis	Mez			
2-5	Euphorbiaceae	Phyllanthus	mimosoides	Sw.			
2-5	Orchidaceae	Psychilis	kraenzlinii	(Bello) Sauleda			
2-5	Elaeocarpaceae	Sloanea	dentata	L.			
2-5	Rubiaceae	Spermacoce	berteroana	Howard			
2-5	Orchidaceae	Tetramicra	canaliculata	(Aubl.) Urb.			
2-5	Melastomataceae	Tibouchina	ornata	(Sw.) Baill.			
2-5	Bromeliaceae	Werauhia	guadelupensis	(Baker) J.R. Grant			
2-5	Malvaceae	Wercklea	tulipiflora	(Hook.) Fryxell			
6-10	Marcgraviaceae	Marcgravia	umbellata	L.			
6-10	Asteraceae	Mikania	latifolia	Sm.			
6-10	Begoniaceae	Begonia	Retusa	O.E. Schulz			
6-10	Bignoniaceae	Tabebuia	pallida	(Lindl.) Miers			
6-10	Blechnaceae	Blechnum	binervatum	(Poir.) C.V. Morton & Lellinger			
6-10	Blechnaceae	Blechnum	ryanii	(Kaulf.) Hieron.			
6-10	Bromeliaceae	Aechmea	smithiorum	Mez			
6-10	Bromeliaceae	Guzmania	megastachya	(Baker) Mez			
6-10	Bromeliaceae	Guzmania	plumieri	(Griseb.) Mez			
6-10	Bromeliaceae	Tillandsia	antillana	L.B.Sm.			
6-10	Clusiaceae	Marila	racemosa	Sw.			

Table 3.5. Contd.

Number of locations	Family	Genus	Species name 1	Author	Rank	Species name 2	Author
6-10	Cyatheaceae	Cyathea	muricata	Willd.			
6-10	Cyatheaceae	Cyathea	grandifolia	Willd.			
6-10	Cyclanthaceae	Asplundia	insignis	(Duchass. ex Griseb.) Harling			
6-10	Cyclanthaceae	Asplundia	rigida	(Aubl.) Harling			
6-10	Dryopteridaceae	Ctenitis	meridionalis	(Poir.) Ching			
6-10	Dryopteridaceae	Polystichopsis	muscosa	(Vahl) Proctor			
6-10	Elaeocarpaceae	Sloanea	massoni	Sw.			
6-10	Euphorbiaceae	Sapium	caribaeum	Urb.			
6-10	Gesneriaceae	Gesneria	ventricosa	Sw.			
6-10	Grammitidaceae	Grammitis	eggersii	(Baker ex Hook.) Proctor			
6-10	Hymenophyllaceae	Hymenophyllum	hirsutum	(L.) Sw.	var.	Gratum	(Fée) Proctor
6-10	Hymenophyllaceae	Hymenophyllum	macrothecum	Fée			
6-10	Lauraceae	Aniba	bracteata	(Nees) Mez			
6-10	Lauraceae	Licaria	salicifolia	(Sw.) Kosterm.			
6-10	Leguminosae-pap	Andira	sapinoides	(DC.) Benth.			
6-10	Leguminosae-pap	Galactia	rubra	(Jacq.) Urb.			
6-10	Lomariopsidaceae	Elaphoglossum	impressum	(F,e) T. Moore			
6-10	Melastomataceae	Blakea	pulverulenta	Vahl			
6-10	Melastomataceae	Charianthus	purpureus	D. Don			

Table 3.5. Contd.

Number of locations	Family	Genus	Species name 1	Author	Rank	Species name 2	Author
6-10	Melastomataceae	Clidemia	umbrosa	(Sw.) Cogn.			
6-10	Melastomataceae	Miconia	cornifolia	(Desr.) Naudin			
6-10	Melastomataceae	Miconia	striata	(M. Vahl) Cogn.			
6-10	Orchidaceae	Epidendrum	pallidiflorum	Hook.			
6-10	Orchidaceae	Tetramicra	canaliculata	(Aubl.) Urb.			
6-10	Passifloraceae	Passiflora	rotundifolia	L.			
6-10	Piperaceae	Peperomia	trifolia	(L.) A. Dietr.			
6-10	Piperaceae	Piper	dussii	C. DC.			
6-10	Poaceae	Isachne	disperma	(Lam.) D"ll			
6-10	Podocarpaceae	Podocarpus	coriaceus	Rich. & A. Rich.			
6-10	Rubiaceae	Guettarda	crispiflora	Vahl			
6-10	Rubiaceae	Psychotria	urbaniana	Steyerm.			
6-10	Sapindaceae	Paullinia	vespertilio	Sw.			
6-10	Selaginellaceae	Selaginella	flabellata	(L.) Spring			
6-10	Sterculiaceae	Sterculia	caribaea	R. Br.			
6-10	Styracaceae	Styrax	glaber	Sw.			
6-10	Theaceae	Freziera	undulata	(Sw.) Willd.			
6-10	Theaceae	Ternstroemia	elliptica	Sw.			
6-10	Thelypteridaceae	Thelypteris	clypeolutata	(Desv.) Proctor			
6-10	Verbenaceae	Stachytarpheta	urticifolia	Sims			

4. Invertebrates of the Centre Hills and Montserrat, with an emphasis on beetles

M. A. Ivie, K. A. Marske, I. A. Foley, K. A. Guerrero & L. L. Ivie

4.1. Introduction

About three quarters of the world's known organisms are animals (Fig. 4.1). Invertebrate animals alone make up the vast majority of the world's biodiversity, the Arthropoda make up the vast majority of the invertebrates, the Insecta the vast majority of the arthropods, and the beetles the major portion of the insects (Fig. 4.1). In fact, one in 4 described animal species, and one in 5 organisms, is a beetle.

The remainder of the animals, the vertebrates and their relatives, are a minor, tiny slice of the total biodiversity pie, and if the terrestrial vertebrates (i.e. non-fishes) are treated separately, they would virtually disappear. Although, because of their size and economic importance as food, tourist attractions and pets, they are the animals most familiar to the public, on a biodiversity scale, they are nearly insignificant.

The number of terrestrial animal species native to Montserrat is probably several thousands, but the most extensive summary of the fauna to date (Stevens and Waldmann 2001) records only 53 tetrapods and 318 specific records for invertebrates on Montserrat (Table 4.1). Unfortunately, the vast majority of species present on Montserrat, and especially those populations of global conservation importance in terms of unique, endemic elements, are either poorly or not at all documented. The biodiversity of Montserrat is undoubtedly vastly more expansive than one would expect from a quick glance at a globe, but the scientific literature does nothing to indicate this fact, which under-values Montserrat's biodiversity.

This chapter will attempt the near impossible task of documenting the terrestrial invertebrate fauna of Montserrat, focusing on the Centre Hills. The data we have assembled and present below will show that the invertebrate fauna of Montserrat, concentrated mostly in the Centre Hills, ranks the island globally as among the most important areas in terms of density of unique, rare, valuable and endangered biodiversity. We hope to provide the jumping-off point for a discussion of this amazing, and still mostly unknown biodiversity, and the impact that increased knowledge can have on the status of a small but biotically rich territory. We also give a general discussion of the historical data available, the history of exploration of Montserrat's fauna (*see Box 3*), and some of the challenges faced whilst conducting the invertebrate inventory (*see Box 2*). We concentrated much of the effort of the inventory on the Coleoptera (beetles) as the primary example to illustrate the importance of the Centre Hills and the need for its recognition as a conservation priority.

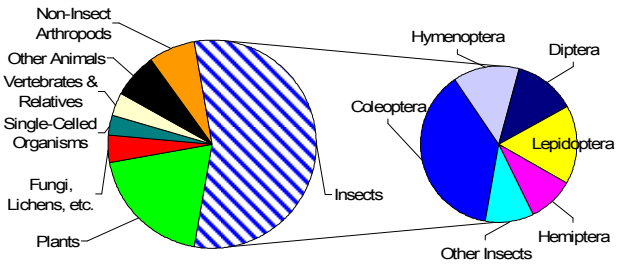


Fig. 4.1. Relative species richness of described taxa (Data from Chapman 2006)

In an appendix to this report, we provide species lists of, and notes on, the beetles, the non-beetle hexapods (Insects), and the non-hexapod invertebrates of Montserrat. Also provided is a full Coleoptera checklist.

4.2. Diversity of the Montserrat invertebrate fauna

4.2.1. Results from pre-2000 collecting

In all historical collections (*see Box 3 for detailed discussion*), except Bass and Stevens and Waldmann, the vast majority of specimens originated from south of the Belham Valley. It was clear that the big draw for most visitors was the Soufrière, and the high areas there, plus the area around Plymouth and the road to the south which were the most heavily sampled. The little bit of material coming from north of the Belham was from Woodlands. For instance, Blackwelder's northernmost sites are at Woodlands and Trant's beach. The Baranowskis made three long visits to Montserrat, making theirs perhaps the single greatest effort of any entomologist before 2000, but Slater & Baranowski (2005) report not a single specimen from the Centre Hills. Only the Aitken group, and possibly Fennah, spent much if any time in the north and only Fennah seems to have actually penetrated the mid-to-high elevations of the Centre Hills.

The problem with this approach is that while the highest, wettest and most fertile point on the island before the volcanic crisis was in the southern mountain series, that area was in fact, secondary forest, which has relatively recently regenerated from both agricultural and historical volcanic activity. This fact was not obvious to earlier collectors who followed Darlington's (1943) instruction to head to the tops of the highest peaks. Although we now know that the Centre Hills' old forests are rich, possibly only a single one of the insect collectors who visited Montserrat between 1894 and 2000 went to the specialized higher elevation forests of the Centre Hills, and that was Fennah.

The only previous published summary of the fauna of Montserrat (Stevens and Waldmann 2001), provided a list of invertebrates totalling 455 species, which is summarised in Table 4.1. It is noteworthy, however,

Taxon	N listed	N unrecorded	N corrected	Notes
Protoctista	3	0	3	Disease causing organisms
Plathelminthes	1	0	1	Disease causing organisms
Nemathelminthes	3	0	3	Disease causing organisms
Mollusca	5	0	5	
Onychophora	1	0	1	
Scorpiones	2	0	2	Medically important
Amblypygi	2	1	1	
Araneae	4	0	4	
Acari	6	2	4	Medically & agriculturally important
Crustacea	12	0	12	Some species important as food
Chilopoda	2	0	2	Medically important
Collembola	1	0	1	
Odonata	4	0	4	
Dermaptera	3	0	3	
Blattaria	5	2	3	Pest species
Isoptera	15	0	15	Economically important
Orthoptera	8	1	7	Economically important
Thysanoptera	11	11	0	Economically important
Hemiptera-- Heteroptera	27	21	6	Economically important
Hemiptera -- Homoptera	49	28	21	Economically important
Coleoptera	120	17	94	9 duplicate taxa removed
Hymenoptera	25	10	15	
Trichoptera	1	0	1	
Lepidoptera	87	33	54	
Diptera	58	11	47	Medically important
TOTAL	**455**	**137**	**318**	

Table 4.1. Summary of pre-2000 Montserrat invertebrate records in Stevens and Waldmann (2001). "N Listed" indicates number of species listed in Stevens and Waldmann (2001), "N unrecorded" refers to the number of those species that had never actually been reported specifically from Montserrat, and "N corrected" is the difference between the two.

that Stevens and Waldmann included records of species for Montserrat on the basis of extrapolation. For instance, not one of the 11 records of Thysanoptera (thrips) they list has actually been recorded from Montserrat - they are simply recorded to be widespread in the Lesser Antilles. Fully 30% of the invertebrates listed by Stevens and Waldmann are not accompanied by a record specific to Montserrat (Table 4.1), reducing their recorded total confirmed species by 136. That number is further reduced by their inclusion of erroneous records and double-listings (see below). Of those species listed, most are of medical, veterinary, or economic importance (Table 4.1), and hence the list includes a disproportionate number of widespread, exotic and pestiferous species. However, this is no fault of Stevens and Waldmann, but is an accurate depiction of our unbalanced knowledge of the various groups of animals. Erroneous listings and double listings as alternative scientific names are simply

unavoidable in a broad general work such as theirs, but their frustration at finding no published records of groups obviously present on the island understandably lead to their use of non-specific records from neighbouring islands or the region in general. To the extent possible, we have listed all the additions and corrections to Stevens and Waldmann (2001) that we have found, but undoubtedly many remain.

From what we have learned whilst reviewing the historical data, it is possible that another 100 species' records for Montserrat lie buried in the world's primary taxonomic literature, but given factors such as level of taxonomic uncertainty and the low sampling effort of the Centre Hills, the recorded fauna of Montserrat is clearly but a small fraction of reality.

4.2.2. Post-2000 collecting history

In 2000, our group, from the West Indian Beetle Fauna Project at Montana State University, began to work on Montserrat. Initially, a visit at the invitation of the Montserrat Department of Agriculture and the Royal Society for the Protection of Birds in June, 2000 included Michael Aaron Ivie and Kelvin Antonio Guerrero. The impetus was the question of whether Montserrat oriole chicks were starving because of the effects of volcanic ash on their insect food. Several nesting sites in the Centre Hills were visited, although the visit came in an extensive dry period, and relatively little was collected. Our initial impressions lead to a multi-year project, and a return visit in January 2002, by Ivie, Katharine Ann Marske and Kenneth Patrick Puliafico. On that visit, in anticipation of a return, Bridget Beatty, Ann Krakower and her mother, Rosalie Burrows, were recruited to run Malaise and ultraviolet-light traps on a bi-weekly schedule, from January through July 2002. In May, June, and July 2002, Marske, accompanied for part of the time by Ivie, began establishing long-term research sites in the Centre Hills. Monthly canopy fogging samples were taken from 4 sites in the Centre Hills in May-August 2002, then bimonthly from October 2002 through August 2003, by staff of the Montserrat Department of Environment, including Lloyd Martin, James Boatswain, John Martin, James Daley, and Lloyd Aymer. Marske and Ivie, accompanied by LaDonna Lynn Ivie, returned to the island in May and June, 2003 to continue work. A small amount of material was collected in May 2004 during a visit by Ivie for a workshop. On most of these trips, Philemon Murrain and/or Calvin Fenton worked with our collectors, providing access, guidance and advice to maximize the collections.

Most of this work had been concentrated on the mid-elevation forest of the Centre Hills, with repeated samples at Hope Ghaut, Fogarty, Cassava Ghaut and Underwood Ghaut. Other samples were taken around Woodlands, at the Beatty house in Cassava Ghaut, Lawyer Mountain, Gunn Hill, Jack Boy Hill and various other locations around the Centre Hills, as well as by trapping at each of the houses used as residences. The Beatty house and Riverside House in Woodlands were

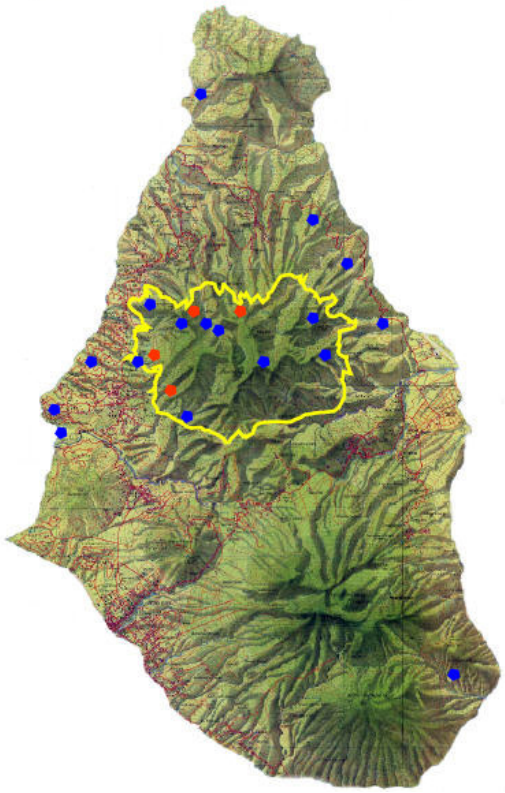


Fig. 4.2. Primary West Indian Beetle Fauna Project collecting localities 2000-2005. Red indicates major long-term canopy fogging sites, blue major trapping localities. Yellow line indicates the boundary of the Centre Hills forest reserve

of particular importance in this regard. Ivie and Marske made separate visits of a few hours each by helicopter into Roaches, with traps left for the week between. This represented the total of our collecting in the south. A helicopter lift to the flanks of Katy Hill gave Ivie an overnight collecting opportunity in June 2003, followed by a hike over the actual top and out via the ridge to the north. This gave the first look at the highest and wettest elevations on the island.

With the goal of expanding the area sampled, the Ivies brought a new team of students to the island in July and August 2005. This team included graduate student Ian Andrew Foley, and undergraduates Vincent Goodwin Martinson, Patrick Edward Hughley, Levi James Lehfeldt, and Robert Anthony Semplet. They placed Malaise and ultraviolet traps in areas both wetter (Big River, Killicrankie, Jack Boy Hill, Bottomless Ghaut, Katy Hill, Fairy Walk) and drier (Furlong, Cedar Ghaut, Rendezvous Bay) than those previously sampled. [Material collected by this group is labelled "WIBF Group" for the West Indian Beetle Fauna Project, rather than listing individual names.] At the end of this field work, a week was spent by Ivie on Guadeloupe, studying pre-volcano collections in INRA.

The last collecting to be reported here was the result of a visit by the American orithologists/ odonatologists Fred Charles Sibley (1933-) and Margaret Pries Sibley (1936-) in October, 2006. Their collections of damselflies and dragonflies are in their private collec-

Taxon	Stevens & Waldman 2001 (Adjusted)	Ivie *et al.* (2007)
Protocitsta	3	3
Plathelminthes	1	2
Nematoda	3	4
Annelida	0	0
Mollusca	5	15
Onychophora	1	1
Scorpiones	2	2
Amblypygi	1	1
Schizomida	0	1
Araneae	4	6+
Acari	4	4+
Pseudoscorpiones	0	1
Crustacea	12	14+
Chilopoda	2	4+
Diplopoda	0	4+
Symphyla	0	1
Colembola	1	Many
Microcoryphia	0	1
Thysanura	1	2
Ephemeroptera	0	1
Odonata	4	16
Dermaptera	3	8
Blattaria	3	7
Phasmida	0	1
Orthoptera	7	21
Isoptera	15	15
Psocoptera	0	Present
Hemiptera – Homoptera	21	40
Hemiptera—Heteroptera	6	58
Thysanoptera	0	Present
Coleoptera	94	718
Neuroptera	0	11
Hymenoptera	15	105+
Trichoptera	1	7
Lepidoptera	50	54
Diptera	47	130
TOTAL	**306**	**1241**

Table 4.2. Summary of increase in Montserrat invertebrate records 2000-2007. The figures from Stevens & Waldman are adjusted according to Table 4.1

tion, with excess material deposited at the University of Texas, the International Odonata Research Institute at Gainesville, Florida, and/or the NMNH.

4.2.3. Results of post-2000 collecting

The result of all of these collection activities was approximately 1 million specimens of arthropods in bulk samples. The goal of the biodiversity assessment work was more an inventory than an ecological association, and establishing within-island distributions for the various species will require future work. From these samples, a selection of ca. 15,000 specimens was mounted and labelled, representing an attempt to extract individuals of all the Coleoptera and Orthoptera species, and representatives of other Orders as time and space allowed. Among 13,044 mounted specimens of beetles, there were 696 species (this is lower than the total of 718 beetles because of 22 previously collected species were not collected in our survey, discussed below). The other specimens were scattered among other Orders, and mostly remain unstudied.

During the taxonomic work, we strongly concentrated on the Coleoptera, enumerating 81 probable single-island endemic beetles. We also managed to add many other groups to the known fauna of the island (Table 4.2), providing both some specific and general records here as well as material of many more for specialists to study. Much of the non-beetle material was sent to other systematises appropriate to the group. For instance, over a kilogram of samples of both spiders and ants were sent to specialists for study, none of which are reported on here. Already, 31 beetle records, 2 sawfly records, 2 scorpion records, and a fly record have appeared in the scientific literature based on our material (Valentine 2003, de Armas 2005, Chalumeau & Touroult 2005, Smith 2005, Kung & Brown 2006), and many more will do so in the future. We have already raised the number of invertebrate species on Montserrat, either through our own collections, the study of others, or the discovery of previously missed literature records, from Stevens & Waldmann's (2001) 306 to 1,241. Nearly 60% of these species are Coleoptera. Among the non-beetle Hexapods, which are an order of magnitude less-well studied than the beetles, we tallied 32 additional single-island endemics, and a few among the even-more-poorly-known non-hexapod invertebrates. Together, this compares ten-fold to the 12 endemic invertebrates enumerated by Stevens & Waldmann (2001) just 6 years ago. A summary of the total known number of species of a range of invertebrate taxa is given in Table 4.2.

Even with a quadrupling of the total invertebrates known from Montserrat to over 1,240 species, the majority of animal species on the island remain unknown. In order to generate such a prediction, we took the numbers of species predicted to exist globally

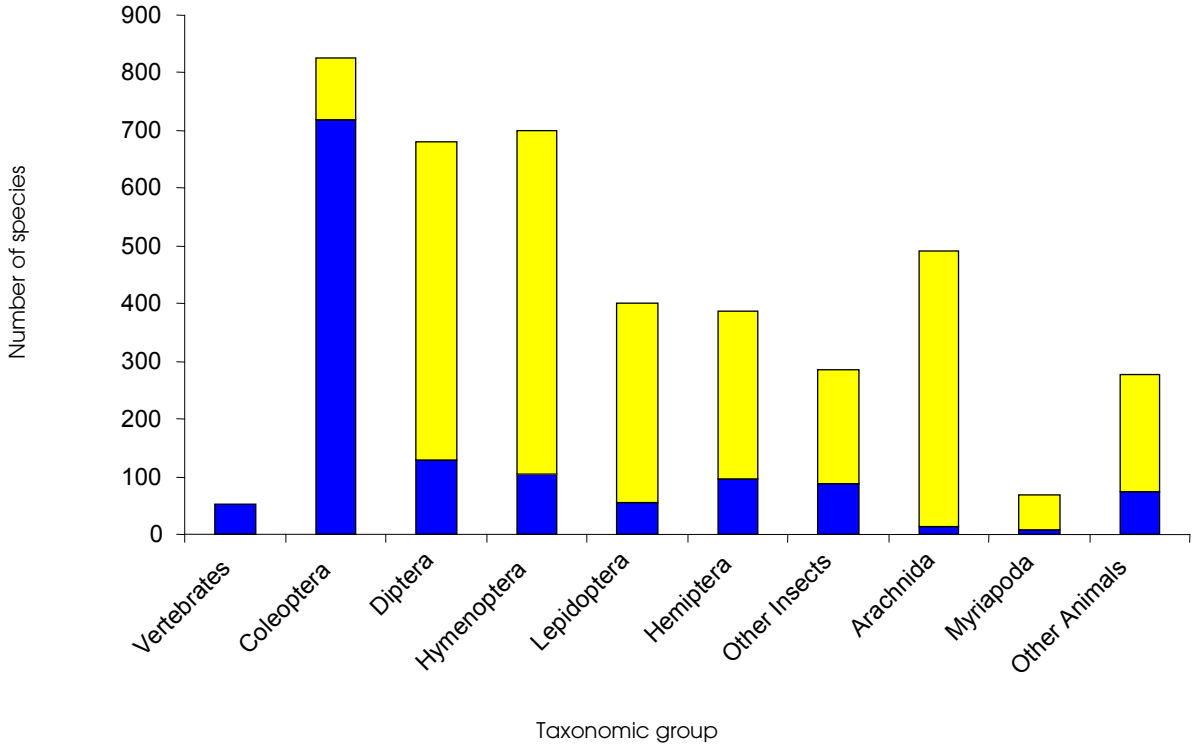


Fig. 4.3. Known and expected species richness of animals in Montserrat. Blue represents the recorded number of species and yellow represents predicted number of species awaiting documentation. For explanation of data source see text.

(Chapman 2006), extracted the data for terrestrial animals, and proportioned the insect portion of those numbers into 6 groups according to the only nearby well-known insect fauna, that of North America (Triplehorn & Johnson 2004). Those numbers provided a percentage-of-the-whole for each group. We then used the mean Chao-1 indicator for total expected beetles, and worked backwards from there to find what would be expected number of each group if Montserrat's total fauna fit the global proportional model. Obviously this is not an exacting analysis, but should be relatively good at making broad predictions of what is still missing. At the least, it provides a hypothesis for future testing.

Considering the total list of beetle species for Montserrat by number of observed specimens as a single collection (Appendix 2), and subjecting it to the Chao-1 estimator: $S^*_1 = S_{obs} + (a^2/2b)$, where "$S_{obs}$" is the number of species observed, "a" is the number of singletons, and "b" is the number of doubles (Chao 1984, Colwell 2005), gives an estimate of a mean expected 827 beetle species, with a 95% CI of 792-876 (Calculated with EstimateS 7.5.1, Colwell 2005). This indicates that the current count of 718 species is probably about 87% of the expected total number of beetles, with a 95% chance that it is between 82 and 91% of the total.

Using this estimate of the total number of beetle species, to extrapolate to the entire Kingdom Animalia, we predicted a total of 4,146 animal species occur on Montserrat. Fig. 4.3 shows the known and predicted number of species of animals, broken down into 10 groups. Only the vertebrates have a full census, and of the invertebrates, only the Coleoptera have a majority of the expected species discovered. A simple glance at the extent of the yellow on the graph gives an excellent feel for just how much work remains to be done on Montserrat. Given that the majority of rare and endemic species are usually discovered in the last half of an inventory, the need for further work on Montserrat's fauna is obvious.

4.2.4. Results of post-2000 collections - beetles

The Coleoptera are the largest and most diverse Order of living things. The other megadiverse Orders are very heavily biased to one or a few trophic levels (Lepidoptera as herbivores, Diptera as saprophages, Hymenoptera as predators/parasitoids). There are exceptions in all of these cases, but the vast majority of their species do relatively similar things. Not so for the Coleoptera, which are divided among herbivores, fungivores, predators, parasites, parasitoids, lignivores, saprophages, detritovores, and all the other "vores" you can think of, including mosses, algae, slimemolds, carrion, dung and more. Their lifestyles include living just about everywhere -- at the tops of the forest canopy, in leaf litter and the soil; in human houses, bird nests, and bee hives; in and on fresh water; inside other animals; on salt water beaches and in warm springs; under rocks, in the lichens on rocks and where there are no rocks. Therefore, the beetle assemblage reaches farther into the entire ecosystem than any other group. Plus, we believe they are the most beautiful, fascinating and frustrating animals on earth. Therefore, we explored them as the

primary representative of the invertebrate fauna of Montserrat.

As was shown above, the total known, vouchered or validly recorded beetle fauna of Montserrat now stands at 718 species in 63 families, with at least 81 single-island endemics and 53 exotics. An estimate of 827 species has been proposed for the true total. How does this compare to other islands of the West Indies? It is difficult to know, because there are so few comprehensive treatments, the types of data reported vary greatly, and the degree of completeness is so very different. To date, 97 families of beetles are known from the West Indian Bioregion (Ivie 2007), but no species total is available – not even as a wild guess. Island lists of beetles published in the last 25 years include those for Cuba, Dominica, Grenada and Guana. As expected, giant Cuba leads the pack with 2,673 species in 87 families (Peck 2005). The other islands all have fewer recorded species than Montserrat: Grenada with 507 species of 51 families (Woodruff *et al*. 1998), Guana Island, British Virgin Islands, with 405 species in 55 families (Valentine & Ivie 2005); Dominica with 361 species of 42 families (Peck 2006); and Barbados with 239 species of 32 families (Bennett and Alam 1985). Thus, Cuba has less than 4

Family	Species	Status	First Year	Notes on Habitat and Biology
Carabidae	Glyptolennus chalybaeus (Dejean)	EIS	1981	Anthropophilus
Staphylinidae	Apocellus ustulatus (Erichson)	NEC	1936	In seaweed on beach
Staphylinidae	Cafius (Euremus) bistriatus (Erichson)	WN	1936	In seaweed on beach
Staphylinidae	Cafius subtilis Cameron	WIE	1936	In seaweed on beach
Staphylinidae	Neohypnus illucens (Erichson)	WN	1936	In domestic animal dung
Staphylinidae	Espeson moratus Schaufuss	WN	1894	No information
Staphylinidae	Oxytelus incisus Motschulsky	WN	1894	In domestic animal dung
Staphylinidae	Philonthus discoideus (Gravenhorst)	WN	1936	In domestic animal dung
Staphylinidae	Philonthus longicornis Stephens	WN	1894	In domestic animal dung
Staphylinidae	Thinobius exasperatus Blackwelder	WIE	1894	Under stones along lower Belham R.
Staphylinidae	Nacaeus foveolus (Blackwelder)?	IE	1894	Under bark of red cedar
Staphylinidae	Sepedophilus interruptus (Erichson)?	WN	1894	In fungi, under moss and dirt on a rock
Anobiidae	Gibbium aequinoctiale Boieldieu	EIS	1894	Anthropophilus
Nitidulidae	Conotelus conicus (Fabricius)	WIE	1894	In Convolvulaceae flowers on beach
Silvanidae	Telephanus nodicornis	LE	1894	Local endemic, fungivore
Meloidae	Tetraonyx quadrimaculatus (Fabricius)	WN	1894	Widespread parasitoid
Tenebrionidae	Neomida lecontei (Bates)	WN	1894	Widespread fungivore
Tenebrionidae	Cyrtosoma n.sp.	IE	1894	Single Island endemic
Salpingidae	*Serrotibia* sp. poss. *partita* Olliff?	LE	1894	Subcortical fungivore
Chrysomelidae	Omophoeta albicornis Fabricius	WN	1975	Pest in gardens and waste areas
Curculionidae	Proeces depressus (Wollaston)	EIS	1894	Invasive, associated with Royal Palm
Curculionidae	Metamasius quadrisignatus (Gyllenhaul)	LIE	1894	Bores in *Tillandsia,* local island endemic

Table 4.3. Beetle species recorded or collected pre-volcano, not found in post-volcano collections

times as many beetle species as Montserrat, and Montserrat has more than any other recently reviewed island.

However, not much can be made of these figures. Tiny Guana (300 hectares) is one of the most intensively studied islands in the world (Lazel 2005), and is very close (ca. 500 meters) to much larger Tortola. Guana was joined by land to all of the northern Virgin Islands as well as Puerto Rico 18,000 years ago, so of course, it is expected to have more species per hectare than an island like Montserrat, which has always been isolated by the surrounding sea. Peck's (2005) Cuban book is a summary of the existing literature rather than the result of an inventory effort, and cannot be expected to be nearly as complete as the Montserrat work. So it should not really surprise anyone if the total number of beetles on Cuba were to be considerably above only 29% of the current total. Likewise, the Dominica and Grenada figures reflect mostly published records, not an attempt to work up the entire fauna in the way Guana or Montserrat have been done. Barbados is perhaps at an intermediate level of knowledge, with a simplified geography, highly modified environment, and considerable work on the fauna. Just where Montserrat would settle out if all islands were well known is hard to discern, but given what we know today, it seems likely that it would be found to be on the high side of what would be expected based simply on area.

Another way to look at the expectations of diversity is to compare the beetle fauna to the vascular plant flora. Plants are in general more completely censused than invertebrates, and give another base for comparison. A reasonable expectation is that the number of beetle species in any given fauna should approximate the number of vascular plants. This correlation holds broadly, at the global (Chapman 2006 cf. Grimaldi & Engel 2006), the continental (BONAP 1994 cf. Marske & Ivie 2003), local (Lesica 1985 cf. Ivie unpublished data) and insular (Eldredge & Evenhuis 2003, Acevedo-Rodríguez 1996 cf. Ivie unpublished data) scales. There are an estimated 13,000 vascular plants in the West Indies (M. Smith 2005), but no list of the beetles for the whole region. Guana's beetle fauna is 120% of its 339 species of vascular plants (Proctor 2005). At the other end of the scale, Dominica has only 29% as many beetle species as its 1,226 vascular plants (Nicolson 1991). In the same general range, Barbados' beetles total 38% of her 625 native plants (Gooding *et al*. 1965) and Cuba's 40% of its estimated 6,550 vascular plants. At 76% of Montserrat's 941 verified species of plants, (Hamilton *et al*., this volume), the 718 species of beetles is double the ratio reported for Cuba, Dominica and Barbados, but considerably below that of Guana. This might suggest that Montserrat is simply better sampled than the other islands, but the disparity remains unexplained.

A special effort was made to see which, if any, of the species of beetles either recorded or collected from Montserrat before the volcanic crisis were not recollected after the eruptions. Because of the small number of published records, this might seem an easy task. However, in far too many cases, this proved very difficult. To our best estimate, there are 106 published prevolcanic records for Montserrat beetles that seem to be valid. Of these, 22 were not recollected. That 21% of the beetles previously known from Montserrat were not recollected in such an extensive effort seems alarming, but because of the different parts of the island where sampling efforts were concentrated, and our bias away from certain habitats, it may not be of as much concern (Table 4.3).

The most common case of a recorded species not recollected is a widespread species from habitats that we did not emphasize. Since our efforts were initially confined to the habitat of the Montserrat oriole, and later to the Centre Hills, missing 13 widespread, often invasive species associated with human stored products (*Gibbium aequinoctiale* Boieldieu), human gardens or farms [*Glyptolennus chalybaeus* (Dejean), *Proeces depressus* (Wollaston), *Omophoeta albicornis* Fabricius], sea beaches [*Apocellus ustulatus* (Erichson), *Cafius bistriatus* (Erichson), *Cafius subtilis* Cameron, *Conotelus conicus* (Fabricius)], under stones along the lower Belham River (*Thinobius exasperatus* Blackwelder) or dung of domestic animals [*Neohypnus illucens* (Erichson), *Oxytelus incisus* Motschulsky, *Philonthus discoideus* (Gravenhorst), *Philonthus longicornis* Stephens] is not unexpected.

Of the 9 species remaining, one case remains taxonomically unresolved. The single known specimen of *Nacaeus foveolus* was taken by Hubbard, under bark of a Red Cedar (*Cedrela odorata* L., Meliaceae) on Montserrat in 1894. It may well prove to be the same as our *Nacaeus* sp. #1, which differs from the published description only in colour and a possible difference in interpretation of the word "fovae." Until a specialist resolves this in consultation with the type specimen (NMNH), the status of this species is uncertain.

Four widespread species may indeed have been lost on Montserrat: *Espeson moratus* Schaufuss, *Sepedophilus interruptus* (Erichson), *Tetraonyx quadrimaculatus* (Fabricius) and *Neomida lecontei* (Bates). The tiny (1.2-1.5 mm) staphylinid *Espeson moratus* may simply have been overlooked. Apparently never common, Blackwelder (1943) reported only 17 specimens from 11 collecting events spread among 9 islands. Very little is known about this species. Blackwelder (1943) records specimens taken flying in Jamaica, in a rotten banana stem in St. Lucia, and deep in an unspecified cave, probably in Trinidad or Cuba. A specimen taken in a rotten log from the type locality, St. Thomas, was available for comparison.

Another widespread but uncommonly collected staphylinid, *Sepedophilus interruptus*, is a fungivore that should have been recollected if it was present, but was not found. It was taken on Montserrat by Hubbard in 1894, but not found by staphylinid specialist Blackwelder 30 years later. There is not enough known about its biology to speculate as to why we did not find it.

The meloid *Tetraonyx quadrimaculatus* presents an interesting situation. This large (6-12 mm) and showy-

orange-and-black meloid is widespread, known from North Carolina to Trinidad. In reports from the early twentieth century, it apparently was common on many islands, but in the past 30 years of collecting on some 40 West Indian islands, we have collected it only on Hispaniola. Whether this represents a real, region-wide decline or simply bad luck is not known, but the fact that the larvae are parasitoids of bees, and that many studies show a post-WWII decline in native bees throughout the world, is worth noting. If its loss or rarity on Montserrat is simply a post-volcano issue, it may be due to the effects of ash on the phoretic larvae, which ride on the plumose setae of adult bees back to the nest. Volcanic ash is well known to accumulate among these setae (Marske 2004) and could be involved in this loss.

Hubbard took a series of 18 specimens of the moderately large (6 mm) tenebrionid *Neomida lecontei* (Bates) on Montserrat in 1894. This species feeds on shelf fungi on trees and occurs widely from Mexico to Brazil, but is recorded only sporadically among the West Indies. We collect it regularly in Hispaniola. Our failure to collect it on Montserrat post-volcano may well reflect extirpation.

None of the Montserrat populations of these species is of global importance, as they are widespread, and if they are truly extirpated, could be easily reintroduced. The same is not true for the remaining 4 species.

These 4 species reported from Montserrat, but not recollected, represent more critical conservation issues. All are known from either several of the Lesser Antilles {*Metamasius quadrisignatus* (Gyllenhaul)], only Montserrat and Guadeloupe (*Serrotibia* n.sp.), only Montserrat, Guadeloupe and Dominica (*Telephanus nodicornis* Neverman), or Montserrat only [*Cyrtosoma* n.sp.]. Their loss from Montserrat could represent either a major reduction in range or even global extinction.

The handsome black and red weevil *Metamasius quadrisignatus* is the most widespread and largest (up to 17 mm including the beak) of these species, known from Montserrat, Guadeloupe, Dominica and Martinique (Vaurie 1966). Its larva bores in *Tillandsia* (Bromeliaceae), which are among the most likely of all plants to accumulate volcanic ash and acidity. It is never commonly collected, but would have been expected to be taken in canopy fogging samples. We had specimens from Dominica available for comparison.

Leng & Mutchler (1917) recorded the Guadeloupean tenebrionid *Cyrtosoma lherminieri* (Chevrolat) from Montserrat, based on 2 Hubbard specimens in the NMNH. Marcuzzi (1984) has recorded it from several islands from Montserrat to Grenada. We have studied Hubbard's Montserrat specimens, and compared them to specimens of both Guadeloupe *Cyrtosoma* species, *C. lherminieri* and *C. picea* Laporte & Brullé, determined by T. J. Spillman. Our conclusion is that the Montserrat specimens represent an as-yet undescribed species, apparently endemic to Montserrat. The genus is known to be associated with fungi in moist forests, and would be expected to occur in the Centre Hills, within the areas

Fig. 4.4. *Thonalmus* sp. (Photo: M. Ivie, Montana State University)

Fig. 4.5. *Trichodesma* sp. (Photo: M. Ivie, Montana State University)

most intensively surveyed by our projects. Yet, we did not locate this species. At 13 mm in length, this is the second-largest, and only Montserrat single-island endemic, species certainly not recollected post-volcanic crisis.

The silvanid *Telephanus nodicornis* Neverman was described from Montserrat and Guadeloupe. It was recently recorded from Dominica (Peck 2006). Hubbard collected at least 8 specimens on Montserrat in 1894, indicating that it was not rare when he visited the island. Although no biological information is recorded about this species, it belongs to a group of fungivores whose adults (and perhaps larvae) live on the surface of dead, withered and hanging leaves and branches, probably feeding on surface fungi. This expected habitat is among the most exhaustively sampled in our survey, yet we did not detect it. We have not seen any specimens of this species, from any islands.

Serrotibia n. sp. is a still-undescribed species that has been taken at least twice on Montserrat. Again, nothing specific is known about its biology, but based on other members of the subfamily, it is probably a subcortical fungivore. Hubbard's collections at the NMNH were the source of Leng and Mutchler's (1917) record of this species, under an Ecuadorian name which had been recorded from Guadeloupe. The species name was then synonymised with a Columbian species, and the Guadeloupe and Montserrat records went with it. In the Chalumeau collection at INRA, we found a single Montser-

rat specimen of this genus, representing an apparently undescribed native species that is not the same as the South American species. It has not been compared with specimens from Guadeloupe, so it is unknown whether 1 or 2 species are involved. This is a beautiful, orange and black species, whose loss would be unfortunate.

An intensive effort should be made to determine the fate of these last three species. Because of the general survey nature of our work on Montserrat, we did not specifically target these species, and they may still exist on the island, but if so, they may be very restricted and rare. A search of the remaining forest remnant at Roache's is critical, as this is the closest remaining habitat to where all 3 were probably last seen. Considering the *Cyrtosoma* and *Serrotibia*, the very idea that two such elegant species might go extinct before even being described, is simply sad.

4.3. An evaluation of the importance of Montserrat and the Centre Hills for invertebrate diversity

4.3.1. The importance of Montserrat's invertebrate fauna

Montserrat is certainly special because it harbours endemic species found nowhere else on earth and because it represents the major portion of the range of many other species. However, this can be said of virtually every vegetated West Indian island. Montserrat is, after all, only one small component of the Caribbean Biodiversity Hotspot, so Montserrat is certainly special, but is this kind of "special" really important?

There are several unique things about Montserrat that we believe make it absolutely more important than other special places in the region. Unlike endemic species that are part of a group occurring as closely related species on many Lesser Antillean islands, of which there are very large numbers on all the islands, there are also groups that are significant evolutionary outliers in the Lesser Antilles that occur only on Montserrat, or on Montserrat and a few neighbouring islands are important at a higher, regional level. Examples from the vertebrates are the Montserrat Galliwasp and Mountain Chicken discussed at length in other chapters. It is in this hosting of endemic groups otherwise absent from the region that Montserrat is important from both a conservation and scientific perspective. Two very distinct sister-species of the genus *Thonalmus* (Fig. 4.4) are similar in importance to the Montserrat Galliwasp. They are single-island endemics that represent the only Lesser Antillean members of a small, West-Indian-endemic lineage, otherwise present only in the Greater Antilles and Bahamas. This group is so colourful, abundant and obvious that it seems very unlikely that it has been missed on other Lesser Antillean islands. Further, *Thonalmus* have been on the island long enough to produce other single-island endemics that are mimetic associates, for instance *Strangalia benitiespinali* Chalumeau.

Fig. 4.6. *Eohomopterus* sp. (Photo: M. Ivie, Montana State University)

Another example of the importance of Montserrat is the radiation of the anobiid *Trichodesma* (Fig. 4.5), with five undescribed species on the island. These are the largest, or among the largest, species of the family in the West Indies, and are by far the most strikingly coloured. Guadeloupe has had its Anobiidae reviewed twice, and has never had a member of this genus reported. No other Lesser Antillean island is known to harbour *Trichodesma.* The closest island known to have *Trichodesma* is in the Greater Antillean Virgin Islands, and those species are very different from the Montserratian species. There are many more examples of this kind of "importance" scattered through this report, but again, a majority of the larger islands in the Antilles can make similar claims to importance, even if based on different details.

So, Montserrat is special and important, but is it an island of such high biodiversity as to be on a unique scale? It is virtually impossible to establish this as fact at any credible level, because virtually any comparison with other islands is not valid due to a number of reasons. Differences in effort, emphasis and reporting make it very difficult to compare any two samples, if and when they exist. Even within Montserrat, different groups of collectors find different things. Comparing the various collections of Montserrat rove beetles (Staphylindae; Appendix 2, Table E), butterflies and flower flies (Syrphidae) shows this very clearly.

There are many examples of groups with new and apparently endemic species on Montserrat scattered though this report that represent apparent outliers, but are members of groups so poorly studied that the reality of the gap cannot be evaluated. The very odd undescribed weevil *Prionarthrus* n. sp. belongs to a group known otherwise from only a single described species from Brazil. The unique *Eohomopterus* (Fig. 4.6) from Katy Hill is one of only 2 extant species of the subfamily

Paussinae known from the West Indies, and with its sister-species from Guadeloupe, are related to fossils in Dominican Amber. Both of these Montserrat endemics are known only from single specimens, and appear to be so rare that only extensive inventory efforts would find them. Are their lineages absent from other islands, or simply undetected? Most of the real biodiversity of islands in the Lesser Antilles remains virtually unknown, so that even though Montserrat has so many more known species per hectare than other islands in the region, it would be foolhardy to assert that this is evidence of Montserrat's special stature.

For the beetles the exception in the Lesser Antilles is Guadeloupe, which is reasonably well-known. Guadeloupe is, however, not an island but an archipelago of many islands that together have an area of 1,706 km². Many, if not most, of the records are for the Department, not an individual island within it, making use of the data an unfair comparison. No Order-level checklist is available for the beetles of Guadeloupe, much less for its individual islands, so only a few groups can be examined. However, examples such as the Anobiidae mentioned above, where well-collected and twice-reviewed Guadeloupe has 25 known species compared to Montserrat's 32, gives one pause. On the face of it, comparison of Montserrat to Guadeloupe gives enough support to the idea of Montserrat's uniqueness that we are still tempted to be amazed.

One possibility of an independent data-set with which to evaluate Montserrat's unique status may be Dominica. In the mid-1960s the Archbold-Bredin-Smithsonian Survey of Dominica (ABS) sent the most richly equipped and well-supported expeditions ever seen in the region to that island. Together, the participants formed the largest pool of expertise ever to collect on any island east and south of Puerto Rico (Peck 2006). Their material was assembled at the Smithsonian, and reviews of many groups were published, giving us the best modern reviews of any Lesser Antillean island. Montserrat, on the other hand, has had far less expertise devoted to it. Of the many collectors that participated in our work, only the Ivies were fully trained collectors before arriving on the island. The others, productive and hard-working as they were, received their advanced training on-island during their stay(s). It seems that under these conditions, it is reasonable to expect the relative efforts on the 2 islands should be somewhat comparable, or for Dominica to be a bit better collected than Montserrat.

Dominica is more than 7 times the area of Montserrat, and nearly 1.5 times as high. During our work, the vegetated extent of Montserrat was reduced to half of its area and removed the highest areas from the habitable area for insects, making Dominica nearly 15 times as large and twice as high as functional Montserrat. Thus, if Montserrat were just a normal "special and important" Lesser Antillean island, larger, wetter and higher Dominica would be expected to have many more species than Montserrat – at least twice the number under Darlington's Rule of Thumb (MacArthur & Wilson 1967).

Yet, for the taxon best sampled by our group, Montserrat has 718 beetle species of 63 families, while 40 years after the ABS, 361 species of 42 families are now reported from Dominica (Peck 2006), even though 3 of the ABS participants and 5 other contributors were professional research coleopterists (*loc. cit.*). Perhaps this is an unfair comparison, as we have worked up all the Montserrat beetles, but this has not been done for the Dominica samples. However, even for subgroups of beetles that have been fully worked, the totals do not tell the expected story. For instance, the 26 Scarabaeoidea we record from Montserrat is significantly below the 42 reported from Dominica, but still more (62%) than the less-than-half expected. Another well-worked family is the Cerambycidae, where Montserrat's 33 species, at 79%, is again well above the one/half-level of Dominica's 42 species. For other fully-worked groups the story is also not so different as expected (numbers indicate Dominica and Montserrat respectively): Leiodidae (3,3), Buprestidae (7,7), Scydmaenidae (2,3), Carabidae 40,29).

Moving to another Order, we did not actively seek out aculeate wasps, which hymenopterist Howard Evans targeted on Dominica, yet for the 6 families whose species have been identified from both projects, the expert on Dominica was equalled by the incidental on Montserrat at 29 and 29 species. There were 4 dipterists on the ABS, while we made no special effort to obtain flies on Montserrat, yet Dominica has only 23 reported flower flies, compared to 22 for Montserrat. The 46 Montserrat species of Dolichopodidae is about what is expected compared with Dominica's 113, until you consider that Harold Robinson is a dolichopodid specialist who personally conducted very directed collecting on Dominica, and we only took what fell incidentally into our traps. Further, Dolichopodidae are most diverse in wet habitats, of which Dominica has far, far more than Montserrat.

Our studies on the invertebrate fauna of Montserrat point towards the true number of endemics being in the hundreds of species. There are 81 probable single-island endemics in just the Coleoptera (Section 2), which comprises only one-third of the described Insecta. If local endemics are added in, i.e. those occurring on only a few neighbouring islands, another 54 species are added. Yet another 33 Leeward Island or Northeastern Antilles Endemics are represented. Thus, Montserrat is home to some 167 beetle species that occur either only on Montserrat or on it and a few neighbouring islands. Undoubtedly these numbers are all underestimates, because over 1/3 of the species of beetles are too poorly known to even rank their distribution status. Thus, that 167 species of known conservation concern is nearly 40% of the pool of 445 that have an assigned distribution ranking. Keep in mind that the easiest species to identify are the widespread ones, so the proportion of endemics among the 270+ species still unranked may be higher than in the first 500, indicating that there are probably

more than 100 species of beetles of conservation concern to be added to the total above.

Moving beyond the beetles, there is no reason to expect that the Coleoptera are any more likely to evolve endemics than the rest of the Insecta. We know of 32 more non-beetle single-island endemics, and 3 among the non-insect invertebrates, with nearly again as many local island, Leeward Island and Northeastern Antillean endemics. This means that the density of endemics and species of conservation interest is already so high that it should be measured in endemic species per hectares rather than endemic species per square kilometre on 105 km² Montserrat. This density of endemism is a far better indicator of the importance of Montserrat than the number of endemics. With such a density of globally important species, a hectare of development on Montserrat may potentially have a far greater impact on global biodiversity than on Cuba, or Brazil, or Madagascar.

Thus, we have to seriously consider the hypothesis that Montserrat is truly more diverse than expected, particularly when compared to Dominica and other Lesser Antillean islands. Again, we caution that these bits of information are highly suspect due to differences in collecting effort, expertise, technique and reporting, but they at least are strong enough to raise the issue of Montserrat's uniqueness to a level that requires consideration of the possibility that it is more than just another "special and important" West Indian island. Thus, at the current state of knowledge, biodiversity managers can choose to consider these indications of uniqueness to be artefacts, or indications of reality. The consequences of being wrong, however, are very different for these two choices. There is no negative effect of protecting this "special and important" island, even if it is not unique, but to fail to do so and then discover that it was a globally unique place would be unforgivable. Thus, managers responsible for biodiversity would do well to proceed with caution before considering Montserrat an average "special and important" island, and, until data become available to show otherwise, proceed under the assumption that it is also a "uniquely biodiverse island."

4.3.2. The importance of the Centre Hills for Montserrat's invertebrates

It is well known that the only high-quality forest habitat left on Montserrat at this time is in the Centre Hills. What is less well-known is that this area is also the one most likely to harbour endemic species that evolved on the island (versus those that were once widespread and are now extinct elsewhere, similar to the Mountain Chicken). It is clear from the number of sibling species on Montserrat and Guadeloupe that a pattern of on-island evolution has indeed happened repeatedly. Darlington (1943) correctly pointed out that the oldest elements of a fauna, and usually the most specialized, will be expected on the tops of the highest peaks of islands. However, in this case "highest" assumes the mountain has been habitable for a long time. On Montserrat, a volcanic eruption in the early seventeenth century laid the southern mountain top bare, much as in the current volcanic crisis, forcing any forest and associated animal communities to later recolonise the south, far too short a time to produce the number of endemic species we see. The Centre Hills, on the other hand, has high-elevation montane forest that is old in evolutionary time. If specialized high-elevation species were to evolve on Montserrat, it is in the Centre Hills that they would be found. The great increase in the number of known endemic species we have documented on Montserrat is attributable in large part to increased sampling intensity, but is also the result of the concentrating on this evolutionarily old and biodiversity-rich set of hills.

The exact number of the known species of Montserrat that occur in the Centre Hills is still unknown. However, because our collecting effort was concentrated on the Centre Hills, we tentatively estimate that some 90% of Montserrat's invertebrate species we detected occur there. All but a handful of the known Island Endemics occur in the Centre Hills, and a majority of them are only recorded from that area. Those species not yet known from the Centre Hills are mostly widespread inhabitants of beaches, dry coastal scrub, or invasive species associated with human habitations (stored food or gardens). None of these species are of conservation importance.

In summary, the Centre Hills clearly supports that vast majority of Montserrat's invertebrate fauna, and given the dominance of this group in overall biodiversity it therefore supports the majority of the total biodiversity of Montserrat. If we were to select a species to represent Montserrat's modern fauna, we would choose a globally rare, 3mm-long beetle first discovered in 2002, known only from the Centre Hills from a single individual, and which is either undescribed or cannot be named with certainty. Since this theoretical representative species is a stand-in for literally hundreds of others, and given that the Centre Hills is such a small area, they are therefore perhaps one of the very most critical areas on earth in terms of the density of unique biodiversity per hectare. This is the message in the invertebrate signal on Montserrat that most needs to be addressed.

Box 2. Challenges of conducting the invertebrate inventory

There are a wide range of large challenges to conducting an invertebrate inventory. Lack of collection data is one problem (more on this later), but the taxonomic impediment is the major factor. The fact is that any knowledgeable amateur naturalist with a single book and binoculars can identify every species of resident breeding bird on the island without ever touching one. The same is true for the amphibians and reptiles. A few hours of training are necessary to be sure of the bat and rat species, and some of them have to actually be held in the hands in order to identify them, but a pair of gloves and a hand lens are the extent of the additional equipment needed. There are significant numbers of people who could identify every resident breeding species of 4 Classes of Montserratian terrestrial vertebrates (Amphibia, Reptilia, Aves, Mammalia). However, no single person alive can authoritatively identify all of the species of any of the major Classes of Invertebrates on Montserrat. Even identifying the major Orders of arachnids and insects is out of the question. There are just too many of them, they are too small, and the literature that does exist is huge, scattered, and of a widely varying quality, with an often convoluted and confusing nomenclature.

The simple numbers of species of invertebrates is the first reason for the imbalance. The 44 native and 9 introduced terrestrial tetrapods on Montserrat contrast with over 718 known beetle species, (plus the 109 or more expected to still be discovered), with probably 2-5 times that number combined in flies, moths, bugs, mites, spiders and wasps/ants/bees. The number of nematodes (undoubtedly huge) is totally up for grabs, but there is no one who could identify them to a level that would allow us to count them anyway. Thus, the simple number of invertebrate species to be determined overwhelms any single naturalist.

Size is the next factor contributing to the problem. Virtually everyone can spot and identify the Soldier Crab or the White Land Crab, but these are the giant outliers of the invertebrates on Montserrat. The smallest tetrapod, the Cotton Ginner (*Sphaerodactylus fantasticus lingniservulus*) would rank among the largest 2% of beetle species on the island. Few people do not find it easier to identify an eagle species than a warbler, and size is an important part of that equation. Think about that when considering that the average beetle species on Montserrat is 4.55 mm long, and 70% of the species are 4.5 mm or smaller (Fig. 4.7).

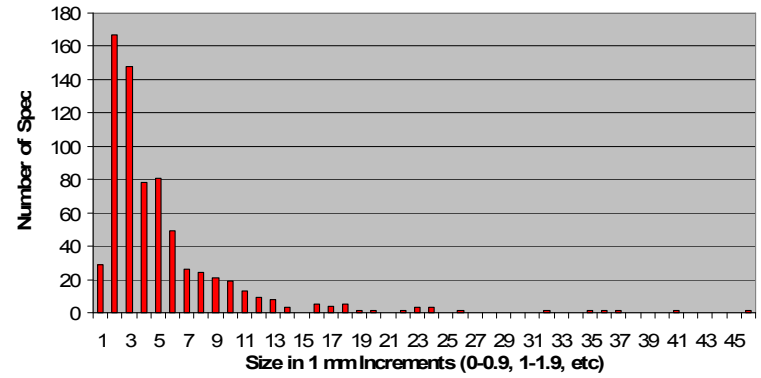


Fig. 4.7. Montserrat beetle species by size class. Includes 705 Species for Which Data Were Available (excludes 13 Scolytinae). Data were taken from a representative Montserrat specimen of each species, or, if not available, for a specimen from another island or the literature

Invertebrates, as an aggregate of individuals, average even smaller. Fig. 4.8 shows the size distribution of all arthropods taken from a 10 meter by 10 meter section of forest canopy in the Centre Hills (from Marske 2004). The Fogarty sample, taken 21 June 2002, contained 2,450 arthropods. A month earlier, one from Hope Ghaut taken 16 May 2002, included a stunning 18,916 individual arthropods. Yet, 12,000 of those were in the 1 mm range. It is no wonder that although the number of individuals in this 100 square meters is huge (nearly 190 individuals per square meter), they are seldom noticed by the casual observer.

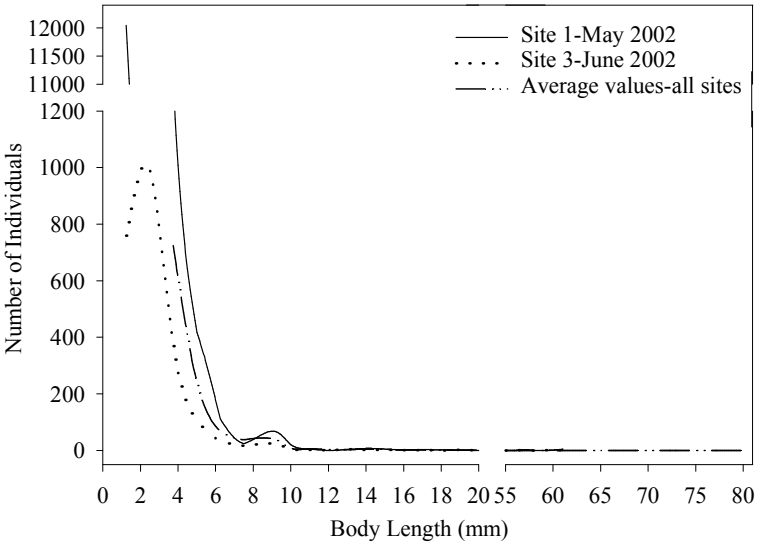


Fig. 4.8. Abundance of arthropods by size in Centre Hills canopy samples. Sites 1 (Hope Ghaut) and 3 (Fogarty) include all Arthropods from representative samples. Average values includes data from 34 samples, and arthropods ≥ 2.5 mm (from Marske 2004, N = 46,683 individuals).

Tiny species can live in tiny places, and so it takes huge efforts by very knowledgeable specialists in hundreds of very specialized habitats, using equally specialized equipment, to find more than 20% of the invertebrate species in a given area. Seasonality plays a much larger role in the variation in the numbers of invertebrate species than it does in the generally longer-lived tetrapods, and many visits and much

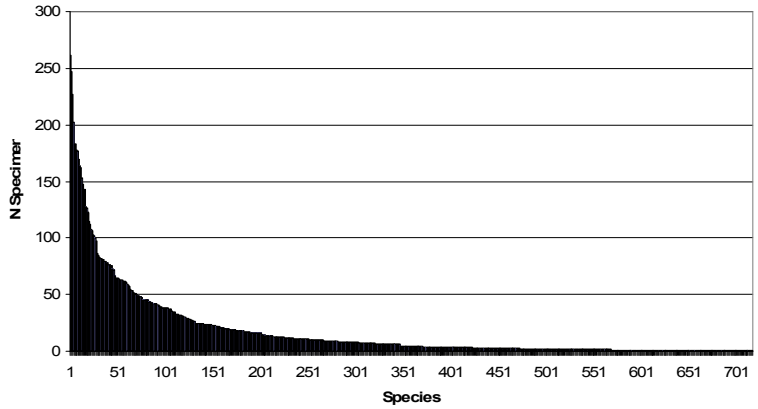


Fig. 4.9. Abundance of each species in the data set.

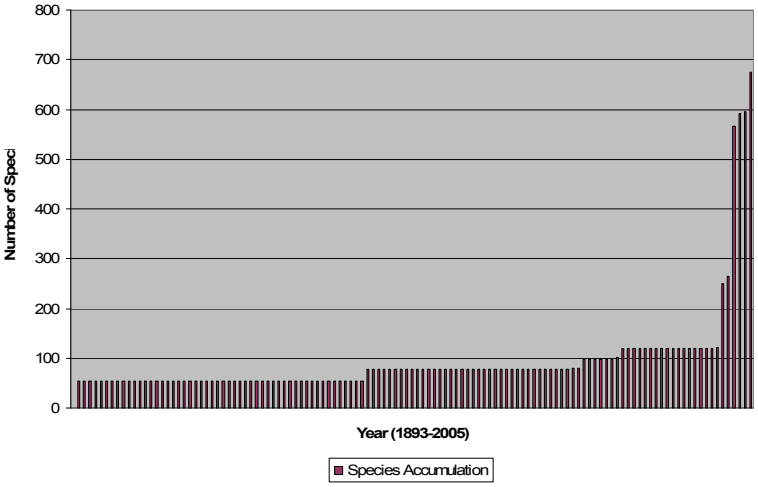


Fig. 4.10. Accumulation of beetle species discovered on Montserrat from 1893 to 2005.

work is needed to find even 50% of the species in a given area. True or perceived rarity is the result, making it a long-term numbers game to encounter the tiny, the specialized, the seasonal and the truly rare. Of the 718 species of beetles now known from Montserrat, more than half are known from 5 or fewer specimens, 149 from only one, another 40 from only 2 (Fig. 4.9).

Keep in mind that these numbers were collected after obtaining and searching through approximately 1 million specimens of arthropods. The effort expended to reach this point has been huge. A reasonably competent amateur can find and identify half the species of tetrapods on Montserrat in the course of a week of concentrated field work, but obviously that is not at all true for invertebrates. Fig. 4.10 shows that it took 98 years to reach the 50% point in discovery of beetles on Montserrat. This is, in large part, because most of the visits to Montserrat by invertebrate zoologists were in the range of a few days, with a few spending a week or two and very few staying for a month or more. Short visits mean that one is most likely to find the same relatively moderate-sized, abundant, and often invasive, anthropophilus and pestiferous species over and over again, without ever really getting to the core of the fauna. This is why the vast majority of records come from only a handful of investigators. This can be seen very graphically in the pattern of discovery of beetles on Montserrat (Fig. 4.10). There are 5 collectors or groups whose efforts added the vast majority of beetle species over the period starting in 1894 and ending 2005: Hubbard (1894), Blackwelder (1936), Cooter (1975), Chalumeau (1982-1984) and Ivie *et al*. (2000-2005).

Thus, it takes a huge amount of time and effort to find the large number of small species of invertebrates. Identifying them is another major problem. Compounding problems of numbers and size is that fact that there are simply too few invertebrate systematists to do the work, and in general, funding for them is very low. Even after specimens are collected, often there is no one to identify them. Table 4.4 lists the 62 families of beetles known from Montserrat, arranged by numbers of species found. Note that for 2 of the 5 most speciose families, no living specialists exist who can identify the West Indian members of the family, and for only 3 of the 10 largest are there specialists who can deal effectively with the entire fauna. There are no specialists with taxonomic expertise available for 39 of the 62 families of beetles known from Montserrat. In addition, the availability of coleopterists is far better than for specialists who work on mites, spiders, nematodes, flies or parasitic wasps.

Lack of literature resources is the third taxonomic impediment. Even where no specialist is available, the existence of good papers would allow the identification of much collected material by non-specialists. However, while single books or references allow authoritative identification of any bird, amphibian, reptile or mammal on Montserrat, the same is not true for any Class of arthropod. In fact, only for a few small Orders, namely the Dermaptera (earwigs), Odonata (dragonflies and damselflies) and Isoptera (termites), are such works available, and they require the expertise of a specialist in order to use them. Even for the lower taxonomic unit of Family the situation does not become much easier, as very few comprehensive works are available, and most of them are only usable by a specialist. Among the entire Montserrat invertebrate fauna, only the butterflies, a mere 43 species, have an identification guide usable by the lay naturalist.

The quality of the literature that is available is another factor. Unlike a bird field guide, the literature that does exist is very difficult to use. In assembling the list of Coleoptera below, references were consulted that were written in

Table 4.4. Families of Montserrat beetles by number of species, with indication of availability of taxonomic specialists. Yes = specialist(s) available who can identify all species from the West Indies to either named species or state that it is undescribed. Some = specialist(s) available who can identify at least a majority of the species from the West Indies to either named species or state that it is undescribed. Few = specialist(s) available who can identify a minor portion of the species from the West Indies to either named species or state that it is undescribed. No = no specialist available who specializes in the West Indian fauna, although specialists concentrating on other regions may be able to do some determinations. Classification follows Lawrence & Newton (1995) as modified by Ivie (2002).

Family	N species	Expertise available	Family (cont.)	N species	Expertise available
Curculionidae	146	Few	Oedemeridae	4	No
Staphylinidae	125	No	Brentidae	4	No
Chrysomelidae	36	Some	Scydmaenidae	3	No
Cerambycidae	33	Yes	Leiodidae	3	Yes
Anobiidae	32	No	Cleridae	3	No
Carabidae	29	Some	Cantharidae	3	Yes
Tenebrionidae	29	Some	Silvanidae	3	Yes
Scarabaeidae	24	Yes	Phalacridae	3	No
Coccinellidae	24	Yes	Mycetophagidae	3	No
Hydrophilidae	13	Some	Meloidae	3	No
Nitidulidae	12	No	Zopheridae	3	Yes
Attelabidae	12	Yes	Scirtidae	2	No
Elateridae	11	No	Dermestidae	2	No
Laemophloeidae	11	Yes	Melyridae	2	No
Histeridae	10	No	Lycidae	2	Yes
Colydiidae	10	No	Bothrideridae	2	No
Corylophidae	9	No	Latridiidae	2	No
Ciidae	9	No	Rhysodidae	1	Yes
Anthicidae	9	No	Hydraenidae	1	No
Dytiscidae	8	No	Passalidae	1	Yes
Bostrichidae	8	No	Trogidae	1	Yes
Languriidae	8	No	Jacobsoniidae	1	No
Buprestidae	7	Yes	Lymexylonidae	1	Yes
Ptiliidae	6	No	Ptilodactylidae	1	No
Ostomidae	6	No	Lampyridae	1	Yes
Cerylonidae	6	No	Sphindidae	1	No
Eucnemidae	5	No	Smicripidae	1	Yes
Monotomidae	5	No	Cryptophagidae	1	No
Mordellidae	5	Some	Melandryidae	1	No
Salpingidae	5	No	Rhipiphoridae	1	No
Endomycidae	4	No	Mycteridae	1	No

English, Latin, French, German, Spanish, Portuguese and Russian. Some were over 200 years old, and written at a time when the standards for description of a species were very different from today, yet for many groups, nothing more recent has been published. Often the publication has only a description of a single species, and lists nothing comprehensive for the group that would allow one to understand whether the specimen being examined is the same as, or different from, a species reported only from Guadeloupe, or Puerto Rico, or Grenada. These publications include illustrations for fewer than 5% of the Montserrat beetle species, and many of these are of limited use. Most frustrating is that after assembling all these papers, reading and translating all these descriptions, consulting with a whole raft of

specialists, and comparing the specimens with the largest collection of West Indian beetle specimens in existence (Fig. 4.11), only a relative few species can be confidently associated with an existing scientific species name. A few more can with certainty be determined as undescribed, but a huge portion remains in limbo.

Montserrat has been visited by entomologists and invertebrate zoologists since at least 1894. However, no 2 collectors ever find exactly the same things. Because of the incomplete and constantly changing level of work on the taxonomy of invertebrates, the correct names change with further information. It sometimes takes a massive amount of work in the library and museum in order to know whether the species you have just collected is the same species as that recorded from Montserrat 100 years ago, and again recorded under a different name 50 years ago. The voucher specimens that are the key to this system may be in London, UK, for one record, and in Washington, DC, USA, for the second, while we are working in Bozeman, MT, USA, so actual comparison is not practical in the short time available.

Dealing only with literature records is far more difficult than if a voucher specimen is at hand. A few records are clear mistakes, and can be rejected. Other records are suspected, with a high degree of probability, to be misidentifications, and can be placed with confidence under species we collected. Far too many records can neither be associated with species we collected, or confidently excluded as something we did not collect.

Montserrat's plight in this regard is not unique; in fact it is the global norm. As an example of how these factors play out in the real world, we will take the example of the Montserrat Staphylinidae, one of the two most diverse families of beetles (Table 4.4). Unlike most of the more speciose families of West Indian beetles, a large portion of the Staphylindae (excepting the Aleochorinae, Pselaphinae, and Scaphidiinae) were revised as a whole in modern times, and there are descriptions and keys to the species for the entire West Indian fauna known at that time (Blackwelder 1943). As such, the Staphylinidae is a best-case study, with most other families of beetles scattered on a scale of less optimal conditions. The reviser, Richard E. Blackwelder, assisted by his wife, Ruth, spent 2 weeks collecting on Montserrat, from 13-27 July 1936. Blackwelder reported that they collected 15 species of the group to be revised. Interestingly, and as a harbinger of things to come, in the text we find 16 species reported as collected by the Blackwelders on Montserrat. Blackwelder worked at the Smithsonian in Washington, DC, where he had access to the other large collection of Montserrat beetles of his day – that of Henry Guernsey Hubbard, who spent parts of February, March and April of 1894 on the island. Although Blackwelder was a specialist in the Staphylinidae, was on the island specifically to collect Staphylinidae, and was assisted by his wife, the generalist collector Hubbard bested them, and collected 18 species of the groups of Staphylinidae under revision. Most surprisingly, the two collections had only 2 species in common. So, Blackwelder had a total of 32 species recorded from Montserrat, a 78% increase by the second expedition over the first.

Fig. 4.11. One representative drawer (of 20) from the Montserrat collection in the WIBF. (Photo: M. Ivie, Montana State University).

Only a single additional species was recorded from Montserrat between 1943 and the review of the fauna by Stevens and Waldmann (2001), but some already recorded species were treated by various workers, moved from the names used by Blackwelder to other nomenclatural combinations and synonyms. Stevens and Waldmann recorded 34 species of Staphylinidae from Montserrat - all dating to the Blackwelder (1943) revision. It turns out that the increase was due to double reporting of 2 species which had been moved to other genera subsequent to Blackwelder's work, with Stevens and Waldmann then using both the new combination and the one Blackwelder used. So, the real number of recorded species was 33 (Blackwelder's 32 plus one missed by Stevens and Waldmann), not the reported 34 (Table 4.5).

Our work on Montserrat began in 2000, and has involved several person-years of collecting, and trap-years of passive collecting. This represents many times the collecting effort by Hubbard and the Blackwelders, and, not surprisingly, we have again doubled the number of species of Staphylindae (excepting the Aleochorinae, Pselaphinae,

Table 4.5. Comparison of historic collections and nomenclature with current collections and names for Montserrat Staphylinidae (excepting Pselaphinae, Scaphidiinae, and Aleocharinae).

Name in Blackwelder (1943)	Name in Stevens & Waldmann (2001)	Current Name	Hubbard 1894	Blackwelder 1936	WIBF Group
Anacyptus testaceus (LeConte)	*Anacyptus testaceus* (LeConte)	*Anacyptus testaceus* (LeConte)	y	n	Y
Oxytelus insignitus Gravenhorst	*Anotylus insignitus* (Erichson)/ *Oxytelus insignus* Gravenhorst*	*Anotylus insignitus* (Gravenhorst)	n	y	Y
Apocellus ustulatus (Erichson)	*Apocellus ustulatus* (Erichson)	*Apocellus ustulatus* (Erichson)	n	y	N
Belonuchus gagates Erichson	Belonuchus gagates Erichson	*Belonuchus gagates* Erichson	y	n	Y
Bledius caribbaenus Blackwelder	*Bledius caribbaenus* Blackwelder	*Bledius caribbaenus* Blackwelder	n	y	Y
Cafius bistriatus (Erichson)	*Cafinus bistriatus* (Erichson)	*Cafius* (*Euremus*) *bistriatus* (Erichson)	n	y	N
Cafius subtilis Cameron	*Cafinus subtilis* Cam.	*Cafius subtilis* Cameron	n	y	N
Carpelimus croceipes (Flauvel)	*Carpelimus croceipes* (Flauvel)	*Thinodromus croceipes* Fauvel	y	n	Y
Conosomus interruptus (Erichson)	*Conosomus interruptus* (Erichson)	*Sepedophilus interruptus* (Erichson)	y	n	?
Coproporus rutilus (Erichson)	*Coproporus rutilus* (Erichson)	*Coproporus rutilus* (Erichson)	y	y	Y
Coproporus sharpi Cameron	*Coproporus sharpi* Cam.	*Coproporus sharpi* Cameron	y	n	Y
Echiaster microps Blackwelder	*Echiaster microps* Blackwelder	*Echiaster microps* Blackwelder	y	n	Y
Espeson crassulus Fauvel	*Espeson crassulus* Fauvel	*Pseudepeson crassulus* (Fauvel)	y	n	Y
Espeson moratus Schaufuss	*Espeson moratus* Schaufuss	*Espeson moratus* Schaufuss	y	n	N
Lispinus insularis Fauvel	*Lispius insularis* Fauvel	*Lispinus insularis* Fauvel	y	n	?
Lithocharis dorsalis Erichson	*Lithocharis dorsalis* Erichson	*Lithocharis dorsalis* Erichson	y	n	Y
Lithocharis secunda Blackwelder	*Lithocharis secunda* Blackwelder	*Lithocharis secunda* Blackwelder	n	y	Y
Lithocharis sororcula Kraatz	*Lithocharis sorocula* Kraatz	*Lithocharis sororcula* Kraatz	n	y	Y
Xantholinus illucens Erichson	*Neohypnus illucens* (Erichson)/ *Xantholinus illucens* Erichson**	Neohypnus illucens (Erichson)	n	y	N
Oligolinus hubbardi Blackwelder	*Oligolinus hubbardi* Blackwelder	*Neoxantholinus hubbardi* (Blackwelder)	y	n	Y

Table 4.5 contd.

Name in Blackwelder (1943)	Name in Stevens & Waldmann (2001)	Current Name	Hubbard 1894	Blackwelder 1936	WIBF Group
Oxytelus incisus Motschulsky	*Oxytelus incisus* Motschulsky	*Oxytelus incisus* Motschulsky	y	y	N
Philonthus discoideus (Gravenhorst)	*Philonthus discoideus* (Gravenhorst)	*Philonthus discoideus* (Gravenhorst)	n	y	N
Philonthus hepaticus Erichson	*Philonthus hepaticus* Erichson	*Philonthus hepaticus* Erichson	n	y	Y
Philonthus longicornis Stephens	*Philonthus longicornis* Steph.	*Philonthus longicornis* Stephens	y	n	N
Philonthus ventralis (Gravenhorst)	*Philonthus vernalis* (Gravenhorst)	*Philonthus ventralis* (Gravenhorst)	n	y	Y
Pseudolispinodes impar (Cameron)	*Pseudolispinodes impar* Cam.	*Nacaeus impar* (Cameron)	y	n	Y
Pseudolispinodes foveolus Blackwelder	*Pseudolispinodes foveola* Blackwelder	*Nacaeus foveolus* (Blackwelder)	y	n	?
Pseudolispinodes nigrifrons (Fauvel)	*Pseudolispinodes nigrifrons* (Fauvel)	*Nacaeus nigrifrons* Fauvel	y	n	Y
Thinobius exasperatus Blackwelder	*Thinobius exasperatus* Blackwelder	*Thinobius exasperatus* Blackwelder	n	y	N
Thoracophorus simplex Wendeler	*Thoracophorus simplex* Wendeler	*Thoracophorus simplex* Wendeler	y	n	Y
Xantholinus attenuatus Erichson	*Xantholinus attenuatus* Erichson	*Neohypnus attenuatus* (Erichson)	n	y	Y
Xantholinus humeralis Erichson	*Xantholinus humeralis* (Erichson)	*Neohypnus humeralis* (Erichson) New Comb.	n	y	Y

*Stevens & Waldmann used both of the duplicate names *Oxytelus insignus* Gravenhorst and *Anotylus insignitus* (Erichson), but these names refer only to a single species. The spelling of the species name in the first combination is a *lapsus calami,* as is the attribution to Erichson in the second.

**Stevens & Waldmann used both of the duplicate names *Xantholinus illucens* Erichson and *Neohypnus illucusens* (Erichson), but these names refer only to a single species.

and Scaphidiinae) to 77 or more, up to 80. Although we can say that we have collected 67 species of this group on Montserrat, we cannot say for certain how many of the previously reported 33 species we have collected, nor how many of our species are not among the 33 that were included in the 1943 treatment of the whole West Indian fauna, because the literature is simply inadequate. The 1943 paper is 658 pages long, includes keys to 468 species, but includes only 8 illustrations. Given the nature of a key, each of our specimens is likely to key out to some species, but if that species is known from Puerto Rico, how can we know whether it is the same species as the one we have, or something unique and different?

This discussion illustrates 3 points: the fauna of Montserrat is poorly documented, allowing the near doubling of the known species between the first visit by a beetle specialist and the second, and again by our group; that a simple listing by a non-specialist of all the names ever used for a fauna will be prone to a great deal of error; and that summary works (including this one) must be checked against the original literature and voucher specimens before being used for significant management decisions.

Box 3. A history of invertebrate collection in Montserrat

Until recently, invertebrate collections from Montserrat were themselves small, scattered and even today they are incomplete. No comprehensive history documenting the discovery process for invertebrate zoology on Montserrat exists, but by carefully noting the label data on specimens we have seen, and those recorded in the primary literature, some of the more important visits can be reconstructed. This listing is incomplete, and biased towards the collectors of groups we have studied, but it gives some picture of the situation. Most of the information concerns entomologists, with a few references to other disciplines extracted from Stevens and Waldmann's (2001) review of the fauna or the odd record. The impact of these workers on our knowledge of the beetle fauna is particularly noted. No attempt has been made to include unicellular groups, nor parasites of medical or veterinary importance, as that literature is of an entirely different character and beyond our expertise.

The first person known to have collected invertebrates from Montserrat for scientific study is assumed to be Sir Rawson William Rawson (1812-1899), who sent 5 species of terrestrial snails from Montserrat to Thomas Bland for determination prior to 1875. Sir Rawson was Governor of Barbados and Governor-in-Chief of the Windward Islands (1868-1875), which did not include Montserrat (Anon. 1900). Exactly if and when he personally visited Montserrat is uncertain, but from this material, Bland (1875) described *Amphibulimus rawsonis* Bland, the first invertebrate we know of to be named from the island.

The first entomologists to collect on Montserrat were apparently the head of the United States Department of Agriculture's Division of Entomology, Charles Valentine Riley (1834-1895) and his assistant Henry Guernsey Hubbard (1850-1899). Riley's work on biological control of citrus pests seems to be the basis for the earliest reports of specific insects from the island. Montserrat had begun exporting lime juice in the 1850's and production peaked in 1884. Shortly after, an outbreak of scale insects attacked the lime trees, affecting the island's lime juice industry. Riley was the most famous economic entomologist of his day, and had directed the successful control of the cottony cushion scale on California citrus using a ladybird beetle. Probably as a result of this fame, Riley received a letter dated 10 May 1890 from the Montserrat Company in Birmingham, England, asking him to send some of the ladybirds to control a scale said to be related to the cottony cushion scale. Because of the very specific nature of the food habits of the ladybird in question, Riley requested that a sample of the scales be sent to him by the Company's attorney in Montserrat, Mr. H. de C. Hamilton. When the specimens arrived, those from lime included the recently described snowy citrus scale [*Unaspis citri* (Comstock, 1883), then called *Chionaspis citri* Comstock] and the purple scale [*Mytilaspis citricola* (Packard)]. However, in the same package was indeed a new species of the same genus as the cottony cushion scale, albeit from *Chrysophyllum* leaves, not lime. Riley and H. C. Howard described this new cottony cushion scale as *Icerya montserratensis* Riley & Howard. This trio of records may be the earliest insect report from Montserrat (Riley & Howard 1890). Whether the ladybird beetle that was the original reason for the correspondence was ever sent to Montserrat seems to remain unreported, and we did not find that species on the island, nor any records of it from the intervening years. Correspondence between Riley and agriculturalists in the region continued, and in 1893 Riley published a note listing scale insects collected by Mr. C. L. Barber (cited as C. A. Barber in some sources), Superintendent of Agriculture in the Leeward Islands, including 6 species from Montserrat (Riley 1893).

By 1894 the scale problems on lime trees were becoming very serious (Innanen 1998). Following up on the initial relationships, Riley and Hubbard visited Montserrat in February, March and April of 1894, officially looking for parasitoids of citrus pests (Smith and Smith 1996). Interestingly, a lack of official authorization for this trip led to Riley's resignation from his post, ending the career of one of the most celebrated entomologists of all time (Smith and Smith 1996). Riley and Hubbard material is deposited at the Smithsonian's National Museum of Natural History, Washington (NMNH).

Only a few Montserrat specimens with Riley's collection labels survive, but Hubbard was prodigious in his efforts, and hundreds, if not thousands, of specimens bear his collecting label. Even today, this is the second largest collection of Montserrat insect specimens in existence. Hubbard did not describe any of the species himself, but his material has formed the basis for the majority of published records of Montserratian beetles to date. He concentrated mainly on beetles, and records of at least 57 of the 107 species of beetles previously recorded in the literature from Montserrat date to his material (Table 4.6).

The first 27 beetle species records in the literature for Montserrat (Hopkins 1915, Leng & Mutchler 1917) seem to be totally derived from Hubbard's material, but his material has continued to be studied, so that another 32 (or 33, origin of one is uncertain) first reports of Montserrat beetles have appeared in 19 papers by 16 different authors over the years, one as recently as 2006 (Table 4.6). It is likely, even certain, that more, perhaps many more, first collections remain undiscovered, scattered through the tens of thousands of drawers of beetles at the Smithsonian. For practical reasons, it would be impossible to effectively search them all to reassemble exactly everything Hubbard found, but his records will continue to appear in the literature as groups are revised. Hubbard's contribution has been honoured with four Montserrat insects that bear the species epithet *hubbardi* (Stevens and Waldmann 2001). Although this was Hubbard's only trip to Montserrat, the literature sometimes incorrectly reported a specimen from 1923 (e.g. Vaurie 1966). In fact, the label on these specimens reads "Mar. 19-23" and lacks a year, leading to the misinterpretation.

Table 4.6. Beetle records from Montserrat pre-2000, including records based on synonyms that proved to be the same species (does not included unsubstantiated Stevens & Waldmann 2001 records)

Current Name	Published Name	Source of Specimen	First Citation
Mioptachys sp.	*Mioptachys autumnalis* Bates	H. G. Hubbard 1894	Leng & Mutchler 1917
Pentagonica flavipes (LeConte)	*Pentagonica flavipes* (LeConte)	prob. Hubbard or Blackwelder	Bell 1985
Glyptolennus chalybaeus (Dejean)	*Glyptolennus chalybaeus* (Dejean)	R. S. Miller 1981	Liebherr 1997
Aeletes lissosternus Wenzel	*Aeletes lissosternus* Wenzel	H. G. Hubbard 1894	Wenzel 1944
Enochrus bartletti Short	*Enochrus* (*Methydrus*)	H. G. Hubbard	Short 2004
Dactylosternum abdominale (F.)	*Dactylosternum abdominale* (F.)	H. G. Hubbard 1894	Leng & Mutchler 1917
Atholus confinus (Erichson)	*Atholus confinus* (Erichson)	J. & J. Cooter 1975	Cooter 1983
Tropisternus chalybeus Laporte	*Tropisternus chalybeus* Laporte	H. G. Hubbard 1894	Leng & Mutchler 1917
Oligota minuta Cameron	*Oligota minuta* Cameron	F. D. Bennet 1973	Frank, Bennet, Comroy 1992
Anacyptus testaceus (LeConte)	*Anacyptus testaceus* (LeConte)	H. G. Hubbard 1894	Blackwelder 1943
Anotylus insignitus (Gravenhorst)	*Oxytelus insignitus* Gravenhorst	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Apocellus ustulatus (Erichson)	*Apocellus ustulatus* (Erichson)	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Belonuchus gagates Erichson	*Belonuchus gagates* Erichson	H. G. Hubbard 1894	Blackwelder 1943
Bledius caribbaenus Blackwelder	*Bledius caribbaenus* Blackwelder	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Cafius (*Euremus*) *bistriatus* (Erichson)	*Cafius bistriatus* (Erichson)	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Cafius subtilis Cameron	*Cafius subtilis*	R. E. & R. M.	Blackwelder 1943
Thinodromus croceipes Fauvel	*Carpelimus croceipes* (Flauvel)	H. G. Hubbard 1894	Blackwelder 1943
Sepedophilus interruptus (Erichson)	*Conosomus interruptus* (Erichson)	H. G. Hubbard 1894	Blackwelder 1943
Coproporus rutilus (Erichson)	*Coproporus rutilus* (Erichson)	H. G. Hubbard 1894	Blackwelder 1943
Coproporus sharpi Cameron	*Coproporus sharpi* Cameron	H. G. Hubbard 1894	Blackwelder 1943
Echiaster microps Blackwelder	*Echiaster microps* Blackwelder	H. G. Hubbard 1894	Blackwelder 1943
Pseudepeson crassulus (Fauvel)	*Espeson crassulus* Fauvel	H. G. Hubbard 1894	Blackwelder 1943
Espeson moratus Schaufuss	*Espeson moratus* Schaufuss	H. G. Hubbard 1894	Blackwelder 1943
Lispinus insularis Fauvel	*Lispinus insularis*	H. G. Hubbard	Blackwelder 1943

Table 4.6 contd.

Current Name	Published Name	Source of Specimen	First Citation
Lithocharis dorsalis Erichson	*Lithocharis dorsalis* Erichson	H. G. Hubbard 1894	Blackwelder 1943
Lithocharis secunda Blackwelder	*Lithocharis secunda* Blackwelder	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Lithocharis sororcula Kraatz	*Lithocharis sororcula* Kraatz	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Neohypnus illucens (Erichson)	*Xantholinus illucens* Erichson	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Neoxantholinus hubbardi (Blackwelder)	*Oligolinus hubbardi* Blackwelder	H. G. Hubbard 1894	Blackwelder 1943
Oxytelus incisus Motschulsky	*Oxytelus incisus* Motschulsky	H. G. Hubbard 1894	Blackwelder 1943
Philonthus discoideus (Gravenhorst)	*Philonthus discoideus* (Gravenhorst)	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Philonthus hepaticus Erichson	*Philonthus hepaticus* Erichson	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Philonthus longicornis Stephens	*Philonthus longicornis* Stephens	H. G. Hubbard 1894	Blackwelder 1943
Philonthus ventralis (Gravenhorst)	*Philonthus ventralis* (Gravenhorst)	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Nacaeus impar (Cameron)	*Pseudolispinodes impar* (Cameron)	H. G. Hubbard 1894	Blackwelder 1943
Nacaeus foveolus (Blackwelder)	*Pseudolispinodes foveolus* Blackwelder	H. G. Hubbard 1894	Blackwelder 1943
Nacaeus nigrifrons Fauvel	*Pseudolispinodes nigrifrons* (Fauvel)	H. G. Hubbard 1894	Blackwelder 1943
Thinobius exasperatus Blackwelder	*Thinobius exasperatus* Blackwelder	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Thoracophorus simplex Wendeler	*Thoracophorus simplex* Wendeler	H. G. Hubbard 1894	Blackwelder 1943
Neohypnus attenuatus (Erichson)	*Xantholinus attenuatus* Erichson	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Neohypnus humeralis (Erichson) New Comb.	*Xantholinus humeralis* Erichson	R. E. & R. M. Blackwelder 1936	Blackwelder 1943
Ateuchus insulare (Fleutiaux & Sallé)	*Choerisium insulare* Chevrolat	H. G. Hubbard 1894	Leng & Mutchler 1917
Aphodius pseudolividus Balthasar	*Aphodius lividus* (Olivier)	R. E. & R. M. Blackwelder 1936	Chapin 1940
Aphodius nigrita (F.)	*Aphodius cuniculus*Chevrolat	R. E. & R. M. Blackwelder 1936	Chapin 1940
Ataenius scutellaris Harold	*Ataenius frater* Arrow	R. E. & R. M. Blackwelder 1936	Chapin 1940
Ataenius howdeni Chalumeau	*Ataenius luteomargo* Chapin	R. E. & R. M. Blackwelder 1936	Chapin 1940
Phyllophaga montserratensis Arrow	*Phyllophaga montserratensis* Arrow	H. G. Hubbard 1894	Arrow 1920
Phyllophaga cneda Saylor	*Phyllophaga cneda* Saylor	H. G. Hubbard 1894	Saylor 1940

Table 4.6 contd.

Current Name	Published Name	Source of Specimen	First Citation
Ligrus cuniculus (Fabricius)	*Ligrus cuniculus* (Fabricius)	J. & J. Cooter 1975	Cooter 1983
Rutela s. striata (Olivier)	*Rutela s. striata* (Olivier)	F. Chalumeau 1982 or 1984	Chalumeau 1985
Chalcolepidius n. sp.	*Chalcolepidius obscurus* (Laporte)	H. G. Hubbard 1894	Leng & Mutchler 1917
Heteroderes amplicollis Gyllenhal	*Heteroderes* sp.	J. & J. Cooter 1975	Cooter 1983
Tylocerus picipennis Leng & Mutchler	undetermined cantharid	J. & J. Cooter 1975	Cooter 1983
Aspisoma ignitum Linneaus	*Aspisoma ignitum* Linneaus	J. & J. Cooter 1975	Cooter 1983
Thonalmus hubardi Leng & Mutchler	*Thonalmus hubardi* Leng & Mutchler	H. G. Hubbard 1894	Leng & Mutchler 1922
Thonalmus sinuaticostis Leng & Mutchler	*Thonalmus sinuaticostis* Leng & Mutchler	H. G. Hubbard 1894	Leng & Mutchler 1922
Trogoderma ornatum Say	*Trogoderma ornatum* Say	J. & J. Cooter 1975	Cooter 1983
Xylomeira tridens (Fabricius)	*Xylomeira torquata* (Fabricius)	H. G. Hubbard 1894	Fisher 1950
Gibbium psylloides Czempinski	*Gibbium aequinoctiale* Boieldieu	H. G. Hubbard 1894	Leng & Mutchler 1917
Carpophilus dimidiatus (Linneaus)	*Carpophilus dimidiatus* (Linneaus)	H. G. Hubbard 1894	Leng & Mutchler 1917
Contotelus conicus (Fabricius)	*Contotelus conicus* (Fabricius)	H. G. Hubbard 1894	Leng & Mutchler 1917
Macrostola vertraci Grouvelle	*Macrostola lutea* Murray	H. G. Hubbard 1894	Leng & Mutchler 1917
Telephanus nodicornis Neverman	*Telephanus nodicornis* Neverman	H. G. Hubbard 1894	Nevermann 1932
Philothermus puberulus Schwarz	*Philothermus puberulus* Schwarz	H. G. Hubbard 1894	Leng & Mutchler 1917
Cycloneda sanguinea limbifer Casey	*Cycloneda sanguinea limbifer* Casey	J. & J. Cooter 1975	Cooter 1983
Scymnus floralis (Fabricius)	*Scymnus loewii Mulsant*	H. G. Hubbard 1894	Leng & Mutchler 1917
Coccidophilus cariba Gordon	*Coccidophilus cariba* Gordon	H. G. Hubbard 1894	Gordon 1978
Neaptera viola Gordon	*Neaptera viola* Gordon	R. E. & R. M. Blackwelder 1936	Gordon 1991
Litargus balteatus LeConte	*Litargus balteatus* LeConte	H. G. Hubbard 1894	Leng & Mutchler 1917
Tetraonyx quadrimaculatus (Fabricius)	*Tetraonyx quadrimaculatus* (Fabricius)	H. G. Hubbard 1894	Leng & Mutchler 1917
Synchita sp. #1	*Synchita laticollis LeConte*	H. G. Hubbard 1894	Leng & Mutchler 1917

Table 4.6 contd.

Current Name	Published Name	Source of Specimen	First Citation
Monoedus lecontei Fleutiaux & Sallé	*Monoedus lecontei* Fleutiaux & Sallé	H. G. Hubbard 1894	Leng & Mutchler 1917
Rhipidandrus cornutus (Arrow)	*Eutomus cornutus*Arrow	R. E. & R. M. Blackwelder 1936	Blackwelder 1945
*Neomida lecontei*Bates	*Neomida lecontei*Bates	H. G. Hubbard 1894	Triplehorn 2006
Gondwanocrypticus sp.	*Crypticus* sp.	J. & J. Cooter 1975	Cooter 1983
Phaleria fulva Fleutiaus & Sallé	*Phaleria fulva* Fleutiaus & Sallé	J. & J. Cooter 1975	Cooter 1983
Cyrtosoma n.sp.	*Cyrtosoma lherminieri* (Chevrolat)	H. G. Hubbard 1894	Leng & Mutchler 1917
Uloma retusa (Fabricius)	*Uloma retusa* (Fabricius)	R. E. & R. M. Blackwelder 1936	Blackwelder 1945
Ulomoides ocularis Casey	*Palembus ocularis* Casey	H. G. Hubbard 1894?	Triplehorn 1965
Serrotibia n. sp.	*Parlindria partia* Olliff	H. G. Hubbard 1894	Leng & Mutchler 1917
Neolema dorsalis (Olivier)	*Lema* sp.	J. & J. Cooter 1975	Cooter 1983
Charidotella sexpunctata (Fabricius)	*Metronia trisignata*	J. & J. Cooter 1975	Cooter 1983
Acalyma innubum (Fabricius)	*Diabrotica melanocephala* (Fabricius)	H. G. Hubbard 1894	Leng & Mutchler 1917
Diabrotica ochreata Fabricius	*Diabrotica ochreata* Fabricius	H. G. Hubbard 1894	Leng & Mutchler 1917
Neolochmaea obliterata (Olivier)	*Galerucella tropica*	J. & J. Cooter 1975	Leng & Mutchler 1917
Exora encaustica (Germar)	*Exora detritum* (F.)	H. G. Hubbard 1894	Leng & Mutchler 1917
Cyrsylus montserrati Blake	*Cyrsylus montserrati Blake*	H. G. Hubbard 1894	Blake 1949
Omophoeta albicornis Fabricius	*Omophoeta albicornis* Fabricius	J. & J. Cooter 1975	Cooter 1983
Chlorida festiva (Linneaus)	*Chlorida festiva* (Linneaus)	H. G. Hubbard 1894	Leng & Mutchler 1917
Eburia decemmaculata (F.)	*Eburia decemmaculata* (F.)	J. & J. Cooter 1975	Cooter 1983
Elaphidion glabratum (F.)	*Elaphidion* sp.	S. T. Danforth 1935	Danforth 1939
"	*Elaphidion tomentosum*	R. E. & R. M. Blackwelder 1936	Blackwelder 1945
Strangalia benitiespinali Chalumeau	*Strangalia benitiespinali* Chalumeau	F. Chalumeau 1982	Chalumeau 1985
Adetus lherminieri Fleutiaux & Sallé	*Adetus lherminieri* Fleutiaux & Sallé	H. G. Hubbard 1894	Leng & Mutchler 1917
Cyrtinus hubbardi Fisher	*Cyrtinus hubbardi* Fisher	H. G. Hubbard 1894	Fisher 1926

Table 4.6 contd.

Current Name	Published Name	Source of Specimen	First Citation
Brentus anchorago Linneaus	*Brentus anchorago* Linneaus	H. G. Hubbard 1894	Leng & Mutchler 1917
Sitophilus linearis (Herbst)	*Sitophilus linearis* (Herbst)	J. & J. Cooter 1975	Cooter 1983
Metamasius hemipterus (Linneaus)	*Metamasius hemipterus(Linneaus)*	S. T. Danforth 1935/H. G. Hubbard 1894	Danforth 1939, Vaurie 1966
Metamasius quadrisignatus (Gyllenhaul)	*Metamasius quadrisignatus* (Gyllenhaul)	H. G. Hubbard 1894	Vaurie 1966
Pseudopentarthrum sp. #1	*Pseudopentarthrum* sp.	H. G. Hubbard 1894	Champion 1909
Proeces depressus (Wollaston)	*Eucoptus depressus* Wollaston	H. G. Hubbard 1894	Buchanan 1947
Pseudomus sp. #1	*Pseudomus* sp.	J. & J. Cooter 1975	Cooter 1983
Diaprepes abbreviatus (Linneaus) *sensu lat.*	*Diaprepes abbreviatus* (Linneaus)	J. & J. Cooter 1975	Cooter 1983
Diaprepes famellicus (Olivier) sensu Pierce	*Diaprepes famelicus* (Olivier)	J. & J. Cooter 1975	Cooter 1983
Lachnopus curvipes (Fabricius)	*Lachnopus villosipes* (Boheman)	?	Ingram 1981
"	*L. curvipes*-group	J. & J. Cooter 1975	Cooter 1983
Litostylus pubens (Boheman)	*Litostylus pubens* (Boheman)	P. C. Drummond	Ingram 1981
"	*Litostylus strangulatus* (Chevrolat)	7-May-1968	O'Brien and Wibner 1982
Coccotrypes cyperi (Beeson)	*Coccotrypes hubbardi* Hopkins	H. G. Hubbard 1894	Hopkins 1915

Several other entomologists are known to have followed Riley and Hubbard after the turn of the century, most for only a short period of time and collecting only a few specimens, or specializing on a particular narrow group. The English entomologist Harold Maxwell Lefroy (1877-1925) collected on Montserrat in August, 1901, before achieving fame as the entomologist to the Government of India (Rehn 1905), and Henry Arthur Ballou (1872-1937), the Entomologist of the Imperial Department of Agriculture based in Barbados, collected on Montserrat in January, 1904 (Rehn 1905, Rehn and Hebard 1927) around the time (1905) another scale, the green shield scale (*Coccus viridus* Green) was recorded attacking young lime trees (Ballou 1912, Innanen 1998). The specimens of Lefroy and Ballou are scattered among the collections of specialists. Another USDA entomologist, the Lepidopterist August Busck (1870-1944) has been reported to have been on the island in June 1905 (Thompson 1981, specimens in NMNH). However, these specimens were actually collected at Montserrat, Trinidad (see label data cited in Stone & Knight 1957).

In 1906, the Curator of the Montserrat Botanic Station, W. Robson, sent 2 species to the Imperial Commissioner of Agriculture in Bridgetown, which formed the basis of a published record (Robson 1906). Rounding out the first decade of the twentieth century, Thompson (1981) reports fly specimens in the NMNH from an unnamed collector on the island in March of 1910.

Amos Peaslee Brown (1864-1917), Professor of Geology and Mineralogy at the University of Pennsylvania, was, among other things, an avid malacologist interested in both paleontology and land snails (Stone 1918). The fact that he collected snails on Montserrat in 1913 is documented only through the existence of his specimens in the Academy of Natural Sciences, Philadelphia. He is known to have visited Antigua in July and August of that year, and he published a paper on the geology of that island (Brown 1913). Exactly what his purpose was on Montserrat, be it pursuit of his interest in malacology, paleontology, geology, or some other reason is unknown.

From 1910 to 1922, we find no records of visits to Montserrat that yielded insect specimens. Stuart T. Danforth (1900-1938) of the University of Puerto Rico is best known as an ornithologist, but was also an accomplished entomologist. He visited Montserrat on 4 short visits in July 1922, July 1931, June 1935, and August 1935. Finally, in February 1937, he made a more extended visit. He collected insect and avian specimens on the island, and performed several bird stomach dissections that yielded insect and snail records (Danforth 1939, Thompson 1981). His insect collection is now at the Museum of Comparative Zoology, Harvard University.

The Montserrat resident, historian and naturalist T. W. Savage-English collected the first Onychophorans known from Montserrat in April 1924. His specimens are in the NMNH and BMNH (Clark 1929, Read 1988). Brooks (1998) reports a bee in the NMNH collected on Montserrat on 13 September 1925, but the collector is not reported, and this date does not match any of the known collectors. In July, 1929, William A. Hoffman of the School of Tropical Medicine in San Juan, and his assistant José Oliver-Gonzáles (later of the University of Puerto Rico) bred several species of mosquitoes from a crab hole which found their way to Belkin and Heinemann (1975) (see below). These specimens became the source of the original mosquito records for the island (Belkin and Heinemann 1975). No report of other material Hoffman and Oliver-Gonzáles may have collected has been found.

Richard Eliot Blackwelder (1909-2001), assisted by his wife Ruth MacCoy Blackwelder (1910-1989), spent 2 weeks in July, 1936 collecting on Montserrat, under a W. R. Bacon Fellowship (1935-1938) at the Smithsonian Institution. He published a detailed list of his localities and collecting efforts (Blackwelder 1943). Although the Blackwelders were concentrating on Staphylinidae, they picked up numerous other groups as well, most of which can be found in the NMNH. Their collecting has been the basis for the second largest group of published beetle records for the island (Table 4). Later in his career, he produced the most recently published checklist and bibliography of Neotropical beetle species (Blackwelder 1944-57), and still later became one of the foremost scholars of J. R. R. Tolkien! His efforts on Montserrat are described in more detail above.

The famous Homopterist Ronald Gordon Fennah (1910-1987) spent much of his career in the British West Indies, first as Lecturer in Zoology (1935), then the Citrus Entomologist for the Windward and Leeward Islands (1937-1942), and finally Officer-in-Charge for the Food-Crop Investigation for the Windward and Leeward Islands (1942-1948), all three at the Imperial College of Agriculture in Trinidad (now University of West Indies). His visits to Montserrat ended when he became Entomologist of the Department of Agriculture for Trinidad (1948). Originally from the Welsh Marches, he left Trinidad after 22 years in the West Indies (1958), and joined the Commonwealth Institute of Entomology in London, where he finished his career as Director. His 1937 hire required him to investigate a mysterious die-off of lime trees in Montserrat (Lapointe 2000). He visited the island several times, starting in January 1938 (and at least in September, 1939 and May, 1941). He reported numerous Fulguroidea from the island in the 17 papers he published on the Homoptera of the West Indies. He described 10 of the 12 species of Fulguroidea known from the island today, including all 6 of the single-island endemics. In addition, Fennah recorded several economically important species in his agricultural papers, and provided specimens of many groups to others (Thompson 1981). Type material from his West Indian period is deposited in the NMNH, and his later material is mostly deposited in The Natural History Museum, London (Wilson 1988).

Botanist George R. Proctor (1920-) collected a specimen of dung beetle (Matthews 1966), a ground beetle (G. Ball pers. com.), and perhaps other specimens, in February, 1959. His material is deposited at the Science Museum, Institute of Jamaica, Kingston. The Smithsonian-Bredin Caribbean Expedition, on the Research Vessel Freelance, apparently made a port call at Montserrat in April, 1959, yielding specimens of Crustacea collected by Thomas Elliot Bowman III (1918-1995) on the beach at Fox's Bay. Several records of marine species undoubtedly date to this voyage. Other specimens of Crustacea at the NMNH date to an M. S. Carson, collected in December, 1963.

Reference to a single Montserrat lygaeid in the Leiden Museum, Netherlands (Slater & Baranowski 2005), collected 15 July 1965 by a Mrs. E. Geijskes, indicates a potentially unstudied collection at that museum. Ester "Ettie" Sollewijn Gelpke (1909-1994) was the wife of Dutch Odonatologist Dirk Cornelis Geijskes (1907-1985), famous for his work in Suriname. To our knowledge, that single specimen is the only indication of a visit by one or both of them to Montserrat.

In October, 1966, a team visited Montserrat led by the well-known Yale University medical entomologist Thomas Henry Gardiner Aitken (1912-), who was then at the Trinidad Regional Virus Laboratory (TRVL). Aitken, along with TRVL staffers Ambrose Guerra and Raymond Martinez, surveyed Montserrat's mosquitoes for the Mosquitoes of Middle America Project (Belkin and Heinemann 1975, 1976). They visited 134 localities (Belkin and Heinemann 1976), covering the island better than any other invertebrate collectors. Their thoroughness is the reason the mosquitoes, along with the butterflies, are the best known group of invertebrates on the island. After a few stops along the way, the collections from this project are now at the NMNH.

Dutch zoologist Pieter Wagenaar Hummelinck (1907-2003) collected for a single day, 20 July, 1967 (not August as reported in Stevens & Waldmann 2001), as part of an area-wide survey of various animal groups (Wagenaar Hummelinck 1981). His insect collections are deposited mostly in the Leiden Museum.

The Charles W. O'Brien collection contains weevil specimens collected in May 1968 and October 1971 by Peter Call Drummond (1937 -), an isopod specialist from Santa Fe Community College, Florida. These specimens were submitted to O'Brien for identification by M. Sommeijer (presumably the Dutch entomologist Marinus J. Sommeijer, who worked for the UN Food and Agriculture Organization in Trinidad from 1971-1974) (C. W. O'Brien, in lit.).

Montserrat specimens collected in November 1967 and July-August 1971 by Hawaiian biocontrol specialist Noel Louis Hilmer Krauss (1910-1996) are in the NMNH (Brooks 1998, Thompson 1981, Kung and Brown 2006). Fred D. Bennett, another biological control specialist based at the Commonwealth Institute of Biological Control in Trinidad, collected on Montserrat in February 1964, November 1973 and May 1974 yielding specimens of biological control agents (Gordon 1978, Frank *et al*. 1992). A citation of an unpublished report from a survey of plant parasitic nematodes (Braithwaite 1973) indicates that someone collected these common but oft-overlooked animals on Montserrat in the early 1970's, most likely someone named C. W. D. Braithwaite from Trinidad. An original copy of this paper has not been located, but it contains the earliest records of non-medical nematodes from Montserrat.

Montserrat has benefited from its proximity to the French Antilles, with several French scientists visiting Montserrat while working on Guadeloupe. The French entomologist Jacques Bonfils reported on some Montserrat species (Bonfils 1969), and he may have collected on the island during one of his visits to the French West Indies (Bonfils 1969). Specimens collected by Pére (Father) R. Pinchon and P. Enrico in December 1967 formed the basis for the first list of butterflies for the island (Pinchon & Enrico 1969). Malacologist Jean-Pierre Pointier, of the Université de Perpignan, collected aquatic snails in 1974 (Pointier 1975), apparently on a side trip from work in the French Antilles. His work was focused on the intermediate hosts of schistosomiasis. Fortuné Chalumeau of the Institut de Récherches entomologiques de la Caraïbe in Guadeloupe, collected insects, mostly beetles, on Montserrat in March 1982, December 1983 and March 1984. His material is now in the collection of the Conseil Général de la Guadeloupe at the Institut National de la Recherche Agronomique (INRA), Petit-Borg, Guadeloupe. Also from Guadeloupe, the husband/wife team of entomologists Bernard LaLanne-Cassou and Jeanne le Duchat d'Aubigny collected on Montserrat in December 1983. Their Montserrat material is also at INRA-Guadeloupe. The collections at INRA constitute the third largest insect collections from Montserrat.

Following the schistosomiasis work of Pointier, M. A. Prentice collected aquatic snails in 1977 [identified as "Prantice" in Stevens and Waldmann 2001] (Prentice 1980) as a Rockefeller Foundation staffer based in St. Lucia.

The English coleopterist Jonathan Cooter (1949-) published (Cooter 1983) a brief report on a collection he made with his father (the designer of postage stamps, including many for Montserrat) John Edward Cooter (1913-2001) in August, 1975. He listed 20 species of beetles, 19 of them first records (Table 4). This represented only a portion of their specimens, all of which are deposited in the Natural History Museum, London (pers. com. J. Cooter). These collections, combined with others in London, are probably fifth in size among Montserrat insect collections. Coleopterist Robert Eugene Woodruff (1933 -) of the Florida State Department of Agriculture visited the island in June of 1977, and ran an ultraviolet light trap at Fox's Bay. His collections in the Florida State Collection of Arthropods (Gainesville), (along with records from Baranowski and Walker, below) form the basis for several Montserrat records included in Woodruff *et al*. (1998). Another coleopterist, Richard Stuart Miller (1945 -) collected a few specimens while vacationing on Montserrat in July 1981. Most of his material is now in the West Indian Beetle Fauna Project collection in Bozeman, with some remaining in his private collection.

One of the few synthetic works specifically on the invertebrates of Montserrat was published by Schwartz and Jimenéz (1982) on the island's butterflies. The new material was based mainly on collections made between June 1980 and February 1981 by Peter L. Richel and Geoffrey L. Blattin, who were resident on Montserrat at the time, attending medical school at the American University of the Caribbean. Additions to the butterfly fauna were made by Schwartz (1991), based on collections by herpetologist Robert W. Henderson in November 1987, and José Escobio in May 1990. This material is now deposited in the Milwaukee Public Museum.

Hemipterist Richard Matthew Baranowski (1928-) of the University of Florida, accompanied by his wife Helen B. Venn Baranowski, collected on Montserrat in June-July 1991, July-August 1992, and June 1993 as part of the work that led to a major volume on the Lygaeidae of the West Indies (Slater and Baranowski 2005). This material is largely housed in his private collection, with some in the Charles W. O'Brien collection and perhaps some at the FSCA. Baranowski's collection also contains Montserrat material collected at ultraviolet lights run by P. Jeffers at Brades, in October 1992 and April-May 1993, as well as at Groves, in June 1993. No further information is available for Jeffers.

Thomas J. Walker, University of Florida, visited Montserrat to collect Orthoptera in 1992. His material is in his private collection in Gainesville, and may be the source for some of the Montserrat records in Woodruff *et al*. (1998). In

August, 1992 and again in August 1993, another husband/wife team, Lee Denmar Miller (1935 -) and Jacqueline Yvonne Miller (1944 -), collected butterflies on the island, and included their records in their book (Smith *et al*. 1994). Their specimens are in the Florida Museum of Natural History, Gainesville.

Canadian entomologist Christopher Kenneth Starr, Senior Lecturer at the St. Augustine campus of the University of the West Indies (Trinidad) collected briefly on the island in July 1994, and his small batch of material is in the UWI collection. [This collection may also house unreported specimens from Ballou, Fennah, Bennett or others.]

While serving as a Fulbright Scholar at the University of the West Indies (Cave Hill) T. David Bass (1956 -) of the University of Central Oklahoma (UCO) visited Montserrat in June 1996 to collect aquatic invertebrates. He obtained the first, and to date, the only, known mayfly in Lawyer's River. That specimen is deposited at Texas A&M University (Baumgardner *et al*. 2003), but material of 24 more species he collected, including snails, decapods, ephemeropterans, odonates, hemipterans, trichopterans, coleopterans and dipterans are in the Caribbean Invertebrate Freshwater Invertebrate Collection at UCO (Bass 2003).

Germans Michael Stevens and George Waldmann, from the Heinrich-Heine-Universität (Germany) and University of Coventry (United Kingdom) respectively, collected more extensively on the island in 1999, preparing their checklist of the fauna of Montserrat (Stevens and Waldmann 2001). They were assisted by several residents, including Bridgett Beatty and Ingrid Rapuano. Much of their insect material was donated to the West Indian Beetle Fauna Project, reported below, while other portions were distributed to specialists.

Acknowledgements

The number of people who have helped with this project is very large, and perhaps it is best to start by thanking the People of Montserrat, who as a whole so graciously welcomed us, helped us, and encouraged us in our work. Never have we worked with such a pleasant population of wonderful people. If we leave someone out below, it is because of the limitations of space, not for lack of gratitude. To all the people who opened their homes, businesses offices and even their cars to us, provided hospitality and forbearance, we say Thank You.

This project built upon our initial work on the effects of volcanic ash on the food of the Montserrat oriole. That first multi-year project was the idea of, and because of the commitment by, Geoff Hilton of the Royal Society for the Protection of Birds. He filled a variety of roles, including funding manager, project advocate, field companion and helper, friend and colleague, and we thank him for everything he has done to make this project possible.

The project would not have been physically possible without the Montserrat Department of Agriculture and its Forestry Division, especially Lloyd Martin, James Boatswain, John Martin, James Daley, Lloyd Aymer and Gerard Grey. They cut red tape, made things happen, toted the fogger out to every site, every time, ran the fogging, and generally kept us going with good cheer and encouragement, not to mention belief in what we were doing. Philemon Murrain and Calvin Fenton were part of this cadre of field support as well. This group of men who work so hard to protect Montserrat's biodiversity became our good friends, and we dedicate this chapter to them.

The Montserrat National Trust provided critical logistic support and transportation, and we thank Lady Eudora Fergus, Jean White, Donna Henry, Stephen W. Macnamera, and Ann-Marie Graham. The Montserrat Volcano Observatory staff helped with helicopter time, advice, and general good ideas, especially, Simon Young, Peter Dunkley, Gill Norton, and Racquel Syers. Ann Krakower faithfully ran traps for us, helped by her mother Rosalie Burrows and Bridgett Beatty. Chris Bowden, Joah Madden, Bo Dalsgaard, Richard Allcorn, Mark Hulme, and Sarah Sanders of The Royal Society for the Protection of Birds all helped with the field work and other aspects of this project. Thomas Burkett of The Community College of Baltimore County accompanied MAI to the summit of Katy Hill, and brought him down in one piece. Montana State University students Kelvin Guerrero, Kenneth Puliafico, Vincent Martinson, Patrick Hughley, Levi Lehfeldt, and Robert Semple helped with extensive field work, while Sarah Jackson mounted a very large number of the specimens.

Bridget Beattie, Nancy Hermany, Carol and Cerdic Osborne, Susan & Eddie Edgecombe, Betty Dix, Ingrid Rapuano, and Gerry and Helen Cooper gave us permission to collect and/or run traps on their properties, as well as other courtesies too numerous to detail here. Advice, encouragement, information and good company were provided by Sir Howard Fergus of the University of the West Indies, Anthony Hill of DFID, Elivina Farrell of Montserrat Forestry, Trevor Howe of Montserrat Environmental Health, and Robert Krakower of Palm Loop. Governor Anthony and Mrs. Jane Longrigg, and Governor Deborah Barnes Jones, and members of their staffs Geoff Patton and David Hume facilitated many aspects of our work, including permission to work in the exclusion zone.

In addition to the assistance while on Montserrat, many more people helped from off-island. Fortune Chalumeau and Bernard Brochier of Guadeloupe opened their homes and knowledge of West Indian

collectors, and facilitated study of the Montserrat material at IREC. For permission to use their photographs, thanks to Kenneth Puliafico, Quentin Bloxam, and Gerardo Garcia. For reviews of parts of the manuscript, discussions of techniques, and help with literature: Richard Hurley, Richard Miller, Kevin O'Neill, Christopher Marshal, Andrew Cline and the interlibrary loan staff of MSU's Renné Library. Michael Stevens, of Heinrich-Heine-Universität, kindly donated material from his own field work on Montserrat.

The following people helped by determining material, providing corrections of nomenclature and/or reviewing or providing historical information: Robert Anderson, Luis de Armas, George Ball, David Bass, Charles Bellamy, Donald Bright, Brian Brown, Fortunè Chalumeau, Shawn Clark, Andrew Cline, Jonathan Cooter, Thomas Donnelly, Catharine Duckett, Michael Engel, Terry Erwin, Zachary Falin, Durland Fish, Christine von Hayek, Sylvain Hugel, Richard Hurley, Robert Gordon, Mary Liz Jameson, James Johnson, Norman Johnson, James Liebherr, Jay McPherson, Charles Michener, Jacqueline Miller, Richard Miller, Wendy Moore, Geoffrey Morse, Luciana Musetti, Eugenio Nearns, Alfred Newton, Charles O'Brien, Lois O'Brien, Westin Opitz, Daniel Otte, Stewart Peck, Norman Platnick, Alistair Ramsdale, David Rider, David Robinson, Gary Rosenberg, Justin Runyan, Fred Sibley, Adam Ślipiński, Danny Shpeley, Robert Sites, Paul Skelley, David Smith, Christopher Starr, Warren Steiner, Margaret Thayer, Michael Thomas, Christian Thompson, Jan van Tol, Julien Touroult, Charles Triplehorn, Barry Valentine, Thomas Walker, and Edward Wilson.

Several people from the Durrell Wildlife Conservation Trust deserve a great round of thanks for their efforts on our behalf: John Fa for inviting us into this project; Richard Young for managing it and for his patience waiting for the manuscript, as well as the editing of this volume; Sarah Seymour and Quentin Bloxam have acted as effective advocates for this project's initiation and completion.

Funding for this project was provided by the Durrell Wildlife Conservation Trust, the Montana Agricultural Experiment Station of Montana State University and MSU's Undergraduate Scholars Program, in cooperation with the Montserrat National Trust and Montserrat Forestry and Environment Division of the Montserrat Department of Agriculture. Earlier work that contributed so strongly to this project was funded by the Montserrat Forestry and Environment Division of the Montserrat Department of Agriculture, the United Kingdom Foreign and Commonwealth Office, The Royal Society for the Protection of Birds, and the Montserrat National Trust.

References

Anonymous. (1900). Obituary. Sir Rawson William Rawson, K.C.M.G., C.B. *The Geographical Journal*, **15**, 74-75.

de Armas, L.F. (2005). Antillean scorpions deposited at the Montana State University (Arachnida: Scorpiones). *Euscorpius*, **18**, 1-4.

Arrow, G.J. (1920). Some new West Indian species of the melolonthid genus *Lachnosterna*. *Bulletin of Entomological Research*, **11**, 189-193.

Ballou, H.A. (1912). Insect pests of the West Indies. *Imperial Department of Agriculture for the West Indies Pamphlet Series 71*: 1-ix + 1-210.

Ballou, H.A. (1910). Introduction of the St. Vincent "Jack Spaniard" into Montserrat. *Agriculture Newsletter, West Indies, Barbados*, **9**, 378.

Ballou, H.A. (1915). West Indies wasps. *Agriculture Newsletter, West Indies, Barbados*, **14**, 298.

Bass, T.D. (2003). Comparison of freshwater macroinvertebrate communities from small Caribbean islands. *BioScience*, **53**, 1094-1100.

Baumgardner, D.E., Burian, S.K. & Bass, D. (2003). Life stage descriptions, taxonomic notes, and new records for the mayfly family Leptohyphidae (Ephemeroptera). *Zootaxa*, **332**, 1-12.

Belkin, J.N. & Heinemann, S.J. (1975). Collection of the Project "Mosquitoes of Middle America: 3. Bahama Is. (BAH), Cayman Is. (CAY), Cuba, Haiti (HAC, HAR, HAT) and Lesser Antilles (LAR). *Mosquito Systematics*, **7**, 367-393.

Belkin, J.N. & Heinemann, S.J. (1976). Collection of the Project "Mosquitoes of Middle America: 4. Leeward Islands: Anguilla (ANG), Antigua (ANT), Barbuda (BAR), Montserrat (MNT), Nevis (NVS), St. Kitts (KIT). *Mosquito Systematics*, **8**, 123-162.

Bell, R.T. (1985). *Pentagonica* of the West Indies (Coleoptera: Carabidae). *Coleopterists Bulletin*, **39**, 321-327.

Ben-Dov, Y. (1994). *A Systematic Catalogue of the Mealybugs of the World (Insecta: Homoptera: Coccoidea: Pseudococcidae and Putoidae) with Data on Geographical Distribution, Host Plants, Biology and Economic Importance.* Intercept Limited, Andover, UK. 686 pp.

Bennett, F.D. & Alam, M.M. (1985). *An annotated checklist of the insects and allied terrestrial arthropods of Barbados.*

Caribbean Agricultural Research and Development Institute , Bridgetown, Barbados. 81 pp.

Blackwelder, R.M. (1944). Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. Part 1. *Bulletin of the United States National Museum*, **185**, 1-188.

Blackwelder, R.M. (1944). Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. Part 2. *Bulletin of the United States National Museum*, **185**, 189-341.

Blackwelder, R.M. (1944). Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. Part 3. *Bulletin of the United States National Museum*, **185**, 343-550.

Blackwelder, R.M. (1944). Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. Part 4. *Bulletin of the United States National Museum*, **185**, 551-763.

Blackwelder, R.M. (1944). Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. Part 5. *Bulletin of the United States National Museum*, **185**, 764-925.

Blackwelder, R.M. (1944). Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. Part 6. *Bulletin of the United States National Museum*, **185**, 926-1492.

Blake, D.H. Notes on some West Indian Chrysomelidae. *Journal of the Washington Academy of Sciences*, **39**, 367-371.

Bland, T. (1875). Note on certain terrestrial mollusks, with description of a new species of the genus *Amphibulima*. *Annals of the Lyceum of Natural History of New-York*, **11**, 197-200.

Biota of North America Program (BONAP) (1999). *Synthesis of the North American Flora ver. 1.0*. North Carolina Botanical Garden, US.

Bonfils, J. (1969). Catalogue raisonné des insects des Antilles françaises. Dictyoptera: Blattaria et Mantida. *Annales de Zoologie Écologie animale,* **1**, 107-120.

Borgmeier, T. (1969). Bredin-Archbold-Smithsonian biological survey of Dominica: The Phoridae of Dominica. *Smithsonian Contributions to Zoology*, **23**, 1-69.

Botosaneanu, L. (1973). Notes sur quelques Trichoptères des Petites Antilles. *Studies on the Fauna of Curaçao and other Caribbean Islands*, **141**, 42-49.

Botosaneanu, L. (1994). Les Trichoptères de la Guadeloupe. *Annales de la Société entomologique de France (n.s.)*, **30**, 33-54.

Botosaneanu, L. (2002). An annotated checklist of caddisflies from the Caribbean islands, with distribution and bibliography (Insecta, Trichoptera). *Bulletin de la Société entomologique de France*, **107**, 79-108.

Braithwaite, C.W.D. (1973). *A survey of plant parasitic nematodes associated with some economic crops in Montserrat and preliminary recommendations for their control.* University of the West Indies, Department of Crop Science, Departmental Paper No. 8. [not seen]

Breure, A.S.H. (1974). Caribbean land molluscs: Bulimulidae. I. *Bulimulus*. *Studies on the Fauna of Curaçao and Other Caribbean Islands*, **45**, 1-80.

Brignoli, P.M. (1984). Some remarks on myrmecomorph spiders. *Newsletter of the British Arachnological Society*, **41**, 3-4.

Brindle, A. (1971). Bredin-Archbold-Smithsonian biological survey of Dominica: the Dermaptera (earwigs) of Dominica. *Smithsonian Contributions to Zoology*, **63**, 1-25.

Brignoli, P.M. (1984). On some West Indian *Mimetus* and *Lyssomanes* (Araneae: Mimetidae, Salticidae). *Bulletin of the British Arachnological Society*, **6**, 200-204.

Brooks, R.W. (1999). Bees of the genus *Anthophora* Latreille 1803 (Hymenoptera: Apidae; Anthophorini) of the West Indies. *Tropical Zoology*, **12**, 105-124.

Brown A.P. (1913). Notes on the Geology of Antigua. *Proceedings of the Academy of Natural Sciences of Philadelphia*, **65**, 584-616.

Breure, A.S.H. (1974). Caribbean land molluscs: Bulimulidae. I. *Bulimulus*. *Studies on the Fauna of Curaçao and Other Caribbean Islands*, **45**, 1-80.

Buchanan, L.L. (1947). Notes on Cuban Curculionidae with descriptions of new genera and species. *Memorias de la Sociedad Cubana de Historia Natural "Felipe Poey"*, **19**, 43-51.

Casari, S.A. (2002). Review of the genus Chalcolepidius Eschscholtz, 1829 (Coleoptera, Elateridae, Agrypninae). *Revista Brasileira de Entomlogia*, **46**, 263-428.

Carson, H.L. (1967). Three flies, three islands: parallel evolution in Drosophila. *Proceedings of the National Academy of Sciences*, **71**, 3517-3521.

Chalumeau, F. (1983). *Les Coleopteres Scarabaeides des Petites Antilles (Guadeloupe a Martinique)*. Editions Lechevalier, Paris. 295 pp.

Chalumeau, F. (1985). Quelques Cerambycidae (Coleoptera) mimétiques des Petites Antilles et description d'une espèce nouvelle. *L'Entomologiste*, **41,** 147-152.

Champion, G.C. (1909). Insecta. Coleoptera. Rhynchophora. *Biologia Centrali Americana*, **4**, 1-78.

Chapin, E.A. (1940). A revision of the West Indian beetles of the scarabaeid subfamily Aphodiinae. *Proceedings of the United States National Museum*, **89,** 1-41.

Chao, A. (1984). Nonparametric estimation of the number of classes in a population. *Scandinavian Journal of Statistics*, **11**, 265-270.

Chapman, A.D. (2006). *A Report for the Department of the Environment and Heritage, September 2005*. Australian Biodiversity Information Services, Toowoomba, Australia <*http://www.deh.gov.au/biodiversity/abrs/publications/other/species-numbers/pubs/number-living-species-report.pdf*>

CIE (Commonwealth Institute of Entomology). (1962). *Unaspis citri* (Comst.). *Distribution Maps of Insect Pests, Series A (Agricultural)*, **149**, 1-2. London, UK: Commonwealth Agricultural Bureaux.

Clark, A.H. (1929). *Peripatus* from the island of Montserrat. *Proceedings of the Entomological Society of Washington*, **31**, 139.

Cockerell, T.D.A. (1893). Notes on *Lecanium*, with a list of the West Indian species. *Transactions of the American Entomological Society*, **20**, 49-56

Colwell, R.K. (2005). *EstimateS: Statistical estimation of species richness and shared species from samples. Version 7.5*. User's Guide and application published at: http://purl.oclc.org/estimates.

Cooter, J. (1983). A few insects from Montserrat, West Indies. *Entomologists Record and Journal of Variation*, **95**, 185-186.

Coquillett, D.W. (1899). New genera and species of Nycteribiidae and Hippoboscidae. *Canadian Entomologist*, **31**, 333-36.

Coquillett, D.W. (1900). Report on a collection of dipterous insects from Puerto Rico. *Proceedings of the United States National Museum*, **22(1198)**, 249-70.

Danforth, S.T. (1939). Birds of Guadeloupe and adjacent islands. *Journal of Agriculture of the University of Puerto Rico*, **23**, 9-46.

Darlington Jr., P. J. (1943). Carabidae of mountains and islands: data on the evolution of isolated faunas, and on atrophy of wings. *Ecological Monographs*, **13,** 37-61.

Davies, N. & Smith, D.S. (1998). Munroe revisited: a survey of West Indian butterfly faunas and their species-area relationship. *Global Ecology and Biogeography Letters*, **7**, 285–294.

Dirsh, V.M. (1974). Genus *Schistocerca* (Acridomorpha, Insecta). *Series Entomologia*, **10**, i-vi + 1-238.

Donnelly, T.W. (In press). More on the Caribbean Islands: odonates taken during Mike Ivie's beetle survey of Montserrat. *Argia*.

Eldredge, L.G. & Evenhuis, N.L. (2003). Hawaii's Biodiversity: A Detailed Assessment of the Numbers of Species in the Hawaiian Islands. Records of the Hawaii Biological Survey for 2001-2002. *Bishop Museum Occasional Papers*, **76**, 1–28.

Erwin, T.L. & Sims, L.L. (1984). Carabid beetles of the West Indies (Insecta: Coleoptera): a synopsis of the genera and checklists of tribes of Caraboidea, and of the West Indies species. *Questiones Entomologicae*, **20**, 351-466.

Evans, H.E. (1972). Bredin-Archbold-Smithsonian biological survey of Dominica: aculeate wasps (Hymenoptera: Scolioidea, Vespoidea, Pompiloidea, Sphecoidea). *Smithsonian Contributions to Zoology*, **115**, 1-19.

Fennah, R.G. (1947). *The insect pests of food-crops in the Lesser Antilles. Departments of Agriculture for the Windward and Leeward Islands*. St. George's, St. John's Ii-ii + 207 + Corrigenda

Fisher, W.S. (1926). Descriptions of new West Indian longicorn beetles of the subfamily Lamiinae. *Proceedings of the United States National Museum*, **68**, 1-40.

Fisher, W.S. (1950). A revision of the North American species of beetles belonging to the family Bostrichidae. *Miscellaneous Publications of the United States Department of Agriculture*, **698**, 1-157.

Flint Jr., O.S. & Sykora, J.L. (1993). New species and records of caddisflies (Insecta: Tricoptera) from the Lesser Antilles, with special reference to Grenada. *Annals of the Carnegie Museum*, **62**, 47-62.

Frank, J.H. (1972). The genus *Oligota* Mannerheim in the Caribbean region (Coleoptera: Staphylinidae). *Coleopterists Bulletin*, **26**, 125- 146.

Frank, J.H., Bennett, F.D. & Cromroy, H.L. (1992). Distribution and prey records for *Oligota minuta* (Coleoptera: Staphylinidae), a predator of mites. *Florida Entomologist*, **75**, 376-380.

Gooding, E.G.B., Loveless, A.R. & Proctor, G.R. (1965). *Flora of Barbados*. Her Majesty's Stationery Office, London, UK. 486 pp.

Gordon, R.D. (1978). West Indian Coccinellidae. 2. (Coleoptera): Some scale predators with keys to genera and species. *Coleopterists Bulletin*, **32**, 205-218.

Gordon, R.D. (1991). West Indian Coccinellidae 4 (Coleoptera): new genera and species of Sticholotidini. *Proceedings of the Entomological Society of Washington*, **93**, 298-316.

Grimaldi, D.A. (1988). Relicts in the Drosophilidae (Diptera), pp. 183-213, *in* J. K. Liebherr (ed.) *Zoogeography of Caribbean Insects*. Cornell University Press, Ithaca, NY, US.

Grimaldi, D.A. & Engel, M.S. (2006). *Evolution of the Insects*. Cambridge University Press, New York, US. 755 pp.

Hoffman, W.A. (1930). From San Juan to Aruba. *Puerto Rico Journal of Public Health and Tropical Medicine*, **5**, 357-369.

Hopkins, A.D. (1915). Classification of the Cryphalinae, with descriptions of new genera and species. Report. *Office of the Secretary United States Department of Agricrulture*, **99**, 1-75.

Hurd, P.D. (1978). *An annotated catalog of the carpenter bees (Genus Xylocopa Latreille) of the western hemisphere (Hymenoptera: Anthophoridae)*. Smithsonian Institution Press, Washington, US. 106 pp.

Ingram, W.R. (1981). *Pests of West Indian sea island cotton*. Natural Resources Institute. 34 pp. [London? Publisher also listed as Centre for Overseas Pest Research]

Innanen, W. (1998). *A Condensed History of Montserrat*. http://www.innanen.com/montserrat/history/

Irish, J. (1995). New data on Lepismatidae, mainly from Italy and north east Africa, with notes on the status of *Ctenolepisma rothschildi* Silvestri. (Insecta: Thysanura). *Annali del Museo Civico di Storia Naturale "Giacomo Doria"*, **90**, 559-570.

Irving (1978). *Report on the Antigua, Montserrat, and St Kitts-Nevis-Anguilla Entomology Programme 1975-1977*. Centre for overseas Pest Research, unpublished report. London, UK. 55 pp. [not seen, from Stevens & Waldmann 2001]

Ivie, M.A. (2002). Key to Families of Beetles in America North of Mexico. Pp. 816- 835. In: Thomas, M. C., R. H. Arnett, Jr., P. E. Skelley, and J. H. Frank (eds.). *American Beetles, Volume II: Polyphaga: Scarabaeoidea through Curculionoidea*. CRC Press.

Ivie, M.A. (2007). *West Indian Beetle Fauna Project, Checklist of Families of West Indian Coleoptera*. http:// virgin.msu.montana.edu/westindies/

Kung, G.-A. & Brown, B.V. (2006). Review of the Caribbean species of *Dohrniphora* Dahl (Diptera: Phoridae). *Journal of Natural History*, **40**, 1931-1945.

Lapointe, S.L. (2000). *History and Importance of Diaprepes to Agriculture in the Caribbean Region*. http:// www.fcprac.ifas.ufl.edu/citrustopics/pest%20control/ Diaprepes/Diaprepes%20Proceedings/ lapointe.historyimportance.htm

Lawrence J.F. & Newton A.F. (1995). Families and subfamilies of Coleoptera (with selected genera, notes, references and data on family-group names), pp. 779-1006. *In* J. Pakaluk and S.A. Slipinski *eds.*

Biology, Phylogeny, and Classification of Coleoptera. Eds. Warszawa.

Lesica, P. (1985). *Checklist of the vascular plants of Glacier National Park, Montana, U.S.A*. Monograph No. 4, Montana Academy of Sciences, Supplement to the Proceedings, Volume 44.

Lazel, J. (2005). *Island: Fact and Theory in Nature*. xx + 382 pp. University of California Press, Berkeley, US.

Leng, C.W. & Mutchler, A.J. (1917). Supplemental to the preliminary list of the Coleoptera of the West Indies. *Bulletin of the American Museum of Natural History*, **37**, 191-220.

Leng, C.W. & Mutchler, A.J. (1922). The Lycidae, Lampyridae, and Cantharide (Telophoridae) of the West Indies. *Bulletin of the American Museum of Natural History*, **46**, 413-499.

Levi, H.W. (2005). Identity and placement of species of the orb weaver genus *Alcimosphenus* (Araneae, Tetragnathidae). *Journal of Arachnology*, **33**, 753-757.

Liebherr, J.K. (1997). Review of the Antillean *Glyptolenus* Bates, with description of a new species endemic to St. Vincent. *Studies on the Neotropical Fauna and Environment*, **32**, 89-99.

Lourenço, W.R. (1987). Les scorpions des Petites Antilles. *Approche biogéographique. Bulletin de la Société Zoologique de France*, **112(23–24)**, 355– 362.

Marske, K.A. (2004). *Effects of volcanic ash on the insect food of the Montserrat Oriole Icterus oberi Lawrence 1880*. Master's thesis, Montana State University, Bozeman, US. X + 178 pp.

Marske, K.A. & Ivie, M.A. (2003). Beetle Fauna of the United States and Canada. *Coleopterists Bulletin*, **57**, 495-503.

Matthews, E.G. (1966). A tzxonomic and Zoogeographic survey of the Scarabaeinae of the Antilles (Coleoptera: Scarabaeidae). *Memoirs of the American Entomological Society*, **21**, 1-134.

Menke, A.S. (1986). A new *Pachodynerus* from Mayaguana Island, Bahamas, and a key to the West Indian species of the genus (Hymenoptera: Vespidae: Eumeninae). *Proceedings of the Entomological Society of Washington*, **88**, 650-665.

Mikkelsen, Bieler & Petit (1993). A bibliography of Caribbean malacology 1826-1993. *American Malacological Bulletin*, **10**, 267-290.

Miller, D., Ben-Dov, Y. & Gibson, G. (2001). *ScaleNet*. http://www.sel.barc.usda.gov/scalenet/scalenet.htm

Mittermeier, R.A., Gil, P. R., Pilgrim, J., Brooks, T., Mittermeier, C.G., da Fonseca, G.A.B., Ford, H. & Seligmann-Smith, P.A. (2005). *Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*. Conservation International, Washington, US. 392pp.

Nevermann, W.H.F. (1932). Beitrag zur Kenntnis der *Telephanus* (Col. Cucujidae). *Stettiner Entomologische Zeitung*, **93**, 1-35.

New, T.R. (1995). Onychophora in invertebrate conservation: priorities, practice and prospects. *Zoological Journal of the Linnean Society*, **114**, 77-89.

Nicolson, D.H. (1991). Flora of Dominica, Part 2*:* Dicotyledoneae. *Smithsonian Contributions to Botany*, **77**, 1-274.

O'Brien, C.W. & Wibner, G.J. (1982). Annotated checklist of the weevils (Curculionidae *sensu lato*) of North America, Central America, and the West Indies (Coleoptera: Curculionidae). *Memoirs of the American Entomological Institute*, **34**, 1-382.

Oliver-Gonzales, J., Bauman, P.M. & Benenson, A.S. (1956). Effect of the snail, *Marisa cornuarietis* on *Australorbis glabratus* in natural bodies of water in Puerto Rico. *Journal of Agriculture, University of Puerto Rico*, **46**, 241-242.

Oliver-Gonzales J., Santiago-Stevenson D. & Malonado. (1949). Treatment of *Filariasis bancrofti* with Hetrazan. *Journal of the American Medcal Association*, **139**, 308-309.

Peck, S.B. (1975). A review onf the New World Onychophora with the description of a new cavernicolous genus and species from Jamaica. *Psyche*, **82**, 341-358.

Peck S.B. (2005). *A checklist of the beetles of Cuba with data on distributions and bionomics (Insecta: Coleoptera)*. Arthropods of Florida and Neighboring Land Areas. vol. 18: i-iv + 1-241.

Peck, S.B. (2006). The beetle fauna of Dominica, Lesser Antilles (Insecta: Coleoptera): diversity and distribution. *Insecta Mundi*, **20**, 165-209.

Pegram, R., Indar, L., Eddi, C. & George, J. (2004). The Caribbean *Amblyomma* program: some ecologic factors affecting its success. *Annals of the New York Academy of Sciences*, **1026**, 302-311.

Pinchon, R. & Enrico, P. (1969). *Faune des Antilles Françaises, Les Papillons*. M. M. Ozanne et Cie, Fort de France, Martinique. 258 pp.

Pocock, R.I. (1903). On some genera and species of South American Avicullariidae. *Annals and Magazine of natural History*, **(7) 11**, 81-115.

Pointier, J.-P. (1975). Sur la presence de Biomphalaria glabrata (Say, 1818) et de Physea cubensis Pfeiffer, 1839 dans l'ile de Montserrat (Petites Antilles). *Nouvelles agronomiques des Antilles et de la Guyane*, **1**, 242-245.

Prentice, M.A. (1980). Schistosomiasis and its intermediate host in the Lesser Antillean islands of the Caribbean. *Bulletin of the Pan-American Health Organization*, **14**, 258-268.

Prentice, M.A. (1983). Displacement Of Biomphalaria Glabrata By The Snail Thiara Granifera In Field Habitats In Santa Lucia, West Indies. *Annals of Tropical Medicine and Parasitology*, **77(1)**, 51-59.

Proctor, G.R. (2005). Florae Guanae, pp. 158-170. *In* J. Lazell, *Island: Fact and Theory in Nature*. xx + 382 pp. University of California Press, Berkeley, US.

Quintero Jr., D. (1981). The amblypygid genus *Phrynus* in the Americas (Amblypygi, Phrynidae). *Journal of Arachnology*, **9**, 117–166.

Read, V.M.S. (1988). The Onychophora of Trinidad, Tobago and the Lesser Antilles. *Zoological Journal of the Linnean Society*, **93**, 225-257.

Rehn J.A.G. (1905). Notes on a small collection of Orthoptera from the Lesser Antilles, with the description of a new species of *Orphulella*. *Entomological News*, **16**, 173-182.

Rehn, J.A.G. & Hebard, M. (1927). The Orthoptera of the West Indies. Number 1. Blattidae. *Bulletin of the American Museum Natural History*, **54**, 1-320.

Richards, O.W. (1978). *The social wasps of the Americas, excluding the Vespinae*. British Museum (Natural History) [publication 785] vii + 580 pp, 4 plates.

Riley, C.V. & Howard, H.C. (1890). Some new *Icerya*. *Insect Life*, **3**, 92-106.

Riley, C.V. (1893). Leeward Islands Coccidae. *Insect Life*, **6**, 50-51. [N.B. this article is not attributed in the text nor index, and could be considered to be Anonymous, but the notes seem to be by the editor, who was C. V. Riley, and he was known to be in correspondence with persons in the Lesser Antilles regarding scale insects, so Riley seems to be the proper attribution. The use of C. L. Barber as author is a clear error, as he was the collector, but neither identified the specimens nor reported the species in the first person. It has also been cited as Riley and Howard 1893, but there is no support for Howard's inclusion.]

Robinson, H. (1975). Bredin-Archbold-Smithsonian biological survey of Dominica, the family Dolichopodidae with some related Antillean and Panamanian species (Diptera). *Smithsonian Contributions to Zoology*, **185 i–iv**, 1–141.

Robson, W., in Anonymous (1906). Insects from Montserrat. *Agricultural News*, **December 29, 5**, 410.

Ryckewaert P. & Alauzet, C. (2001). The natural enemies of *Bemisia argentifolii* in Martinique. *BioControl*, **47**, 115-126.

Savage-English, T.W. (1928). A Diary of the Nesting of *Microlyssa exilis*, the Crested Hummingbird of Montsterrat. *W.I. Ibis (XII Series)*, **4**, 13-16.

Saylor, L.W. (1940). Ten new West Indian scarab beetles of the genus *Phyllophaga*, with two new names. *Journal of the Washington Academy of Sciences*, **30**, 305-314.

Schwartz, A. (1991). New records of butterflies from Montserrat, West Indies. *Florida Scientist*, **54**, 103-105.

Schwartz, A. & Jimenez, C.J. (1982). The butterflies of Montserrat, West Indies. *Bulletin of the Allyn Museum*, **66**, 1-18.

Short, A.E.Z. (2004). Review of the *Enochrus* Thomson of the West Indies (Coleoptera: Hydrophilidae). *Koleopterologische Rundschau*, **74**, 351-361.

Slater, J.A. & Baranowski, R.M. (2005). *The Lygaeidae of the West Indies.* Florida Agricultural Experiment Station Bulletin 402: x + 266 pp.

Sissom, W.D. & Franke, O.F. (1983). Redescription of *Centruroides testaceus* (DeGeer) and description of a new species from the Lesser Antilles (Scorpions: Buthidae). *Occasional Papers of the Museum of Texas Tech University*, **88**, 1-13.

Smith, D.R. (2005). Review of the genus *Acordulecera* Say (Hymenoptera: Pergidae) of the West Indies, and the first records of Symphyta from Montserrat and St. Kitts. *Proceedings of the Entomological Society of Washington,* **107**, 99-107.

Smith, D.S., Miller, L.D. & Miller, J.Y. (1994). *The Butterflies of the West Indies and South Florida*. Oxford University Press, Oxford, UK. 346 pp.

Smith, E.H. & Smith, J.R. (1996). Charles Valentine Riley: The Making of the man and his achievements. *American Entomologist*, **42**, 228-233.

Smith, M.L., Hedges, S.B., Buck, W., Hemphill, A., Inchaustegui, S., Ivie, M.A., Martina, D. Maunder, M. & Ortega, J.F. (2005). Caribbean Islands, pp. 112-118 In: Mittermeier, R.A., Gil, P. R., Pilgrim, J., Brooks, T., Mittermeier, C.G., da Fonseca, G.A.B., Ford, H. & Seligmann-Smith, P.A. (2005). *Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*. Conservation International, Washington, US. 392pp.

Snelling, R.R. (1983). Taxonomic and nomenclatural studies on American polistine wasps (Hymenoptera: Vespidae). *Pan-Pacific Entomologist*, **59**, 267-280.

Stevens, M. & Waldmann, G. (2001). *Animal biodiversity of the Lesser Antillean Island of Montserrat (British West Indies): an annotated checklist of terrestrial and freshwater animals.* Archiv zoologischer Publikationen [Martna Galunder-Verlag, Nümbrecht] Band 6: i-viii +1-145.

Stone, A., & Knight, K.L. (1957). Type specimens of mosquitoes in the United States National Museum: IV, The genus *Culex* (Diptera: Culicidae). *Journal of the Washington Academy of Sciences*, **47**, 42-59.

Stone, W. (1918). Obituary notices of members deceased. Amos Peaslee Brown. *Proceedings of the American Philosophical Society*, **57(7)**, iii-xv.

Sturtevant, A.H. (1916). Notes on North American *Drosophila* with descriptions of twenty-three new species. *Annals of the Entomological Society of America*, **9**, 323-343.

Thompson, F.C**.** (1981). The Flower Flies of the West Indies (Diptera: Syrphidae). *Memoirs of the Entomological Society of Washington*, **9**, 1-200

Triplehorn C.A. (1965). Revision of the Diaperini of America north of Mexico with notes on extralimital species (Coleoptera:Tenebrionidae). *Proceedings of the United States National Museum,* **117**, 349–458.

Triplehorn, C.A. (2006). Studies in Neotropical *Neomida*: A synopsis of the genus *Neomida* (Coleoptera: Tenebrionidae: Diaperini) from America north of Columbia with notes on other Western Hemisphere species. *Proceedings of the Entomological Society of Washington*, **108**, 312-334.

Triplehorn, C.A. & Johnson, N.F. (2004). *Borror and Delong's Introduction to the Study of Insects, 7th edition*. Thomson Brooks/Cole. X + 864 pp.

Valentine, B.D. & Ivie, M.A. (2005). Beetles: Coleoptera. pp.274 – 282. *In* J. Lazell, *Island: Fact and Theory in Nature*. xx + 382 pp. University of California Press, Berkeley, US.

Vaurie, P. (1966). A revision of the Neotropical genus *Metamasius* (Coleoptera, Curculionidae, Rhynchophorinae). Species groups I and II. *Bulletin of the American Museum of Natural History*, **131**, 213-337.

Vaurie, P. (1970). Weevils of the tribe Sipalini (Coleoptera, Curculionidae, Rhynchophorinae). Part 1, The genera *Rhinostomus* and *Yuccaborus*. *American Museum Novitates*, **2419**, 1-57.

Vaurie, P. (1979). Weevils of the tribe Sipalini (Coleoptera, Curculionidae, Rhynchophorinae). Part 1, The genera *Rhinostomus* and *Yuccaborus*. *American Museum Novitates*, **2419**, 1-57.

Wagenaar Hummelinck, P. (1981). Land and freshwater localities. *Studies on the Fauna of Curaçao and Other Caribbean Islands*, **63**, 1-133.

Wenzel, R.L. (1944). On the classification of the histerid beetles. *Field Museum of Natural History Zoological Series*, **28**, 51-151, plates 1-9.

Wheeler, W.M. (1923). Report on the ants collected by the Barbados-Antigua Expedition from the

University of Iowa in 1918. *University of Iowa Studies in Natural History*, **10**, 3-9.

Williams D.J. (1985). *Australian mealybugs*. British Museum (Natural History) London 431 pp.

Wilson (1988). Obituary, Roland Gordon Fennah (1910-1987). *Entomologist's Monthly Magazine*, **124**, 167-175.

Wolcott, G.N. (1951). The insects of Puerto Rico. Coleoptera. *Journal of Agriculture of the University of Puerto Rico*, **32**, 225-416 [1948].

Woodruff, R.E., Beck, B.M., Skelley, P.E., Schotman, C.Y.L. & Thomas, M.C. (1998). Checklist and Bibliography of the Insects of Grenada and the Grenadines. *Memoirs of the Center for Systematic Entomology*, **2**, 1-286.

5. Amphibians and reptiles of the Centre Hills

R. P. Young & A. Ogrodowczyk

5.1. Diversity and status of amphibians and reptiles in Montserrat

Three species of amphibian and 11 terrestrial reptiles have been recorded on Montserrat (see Table 5.1) (Schwartz & Henderson, 1991; Malhotra & Thorpe, 1999), although five of these species are thought to be human-sponsored introductions. The native species assemblage is generally typical of the Lesser Antillean region, with two species of frog, two species of snake and five species of lizard. Six island endemics at species or subspecies level occur, including a tree lizard (*Anolis lividus*), ground lizard (*Ameiva pluvianotata*), dwarf gecko (*Sphaerodactylus fantasticus ligniservulus*), galliwasp (*Diploglossus montisserrati*) (Fig. 5.1), racer (*Alsophis antillensis manselli*) (Fig 5.3) and blind snake (*Typhlops monastus monastus*). The regionally endemic mountain chicken (*Leptodactylus fallax*) (Fig. 5.2), and a tree frog endemic to the Lesser Antilles (*Eleutherodactylus johnstonei*) also occur in Montserrat. The final native species is the turnip-tailed gecko (*Thecadactylus rapicauda*), which has a widespread range in Central and South America. The high level of endemism in Montserrat's amphibians and reptiles is typical of this taxonomic group across the Lesser Antilles. The number of species is higher than expected given the size of the island, as predicted by species-area curves for the Lesser Antilles (Ricklefs & Lovette, 1999), and therefore, within the region, Montserrat can be considered to have high herptile species richness per unit area. This is probably due to high habitat diversity, thought to be the main driver of species richness in this taxonomic group in the Lesser Antilles (Ricklefs & Lovette, 1999).

All the native species occur within the Centre Hills which, with the exception of the *A. pluvianotata* (which tends to occur in open and dry habitats), probably represents the most important site for the island endemics globally and the other native species at the national level. The amphibian and reptile species assemblage of the Centre Hills is of high conservation value due to its high endemicity and the occurrence of two Critically Endangered species, *D. montisserrati* (Day, 1996) and *L. fallax* (Fa *et al*., 2004). *D. montisserrati* was until recently only known from a single specimen collected from the Woodlands area of the Centre Hills in the 1960s. After the volcanic activity in the mid 1990s it was thought to be potentially extinct. However, in 1998 a second *D. montisserrati* was observed in the same locality by a member of the Montserrat Department of Environment. In 2004, a third individual was also spotted in Woodlands and three unconfirmed observations by local residents have been subsequently reported (Ogrodowczyk *et al*., 2007). The concentration of these sightings in this small area of moist forest has led to the assumption that *D. montisserrati* is highly restricted in range (possibly < 1 km^2) and therefore extremely rare, although this assumption needs testing with a systematic survey. Over the past few years search effort at this site has probably been disproportionately high compared with other Centre Hills sites. It is thought to be semi-fossorial and cryptic in behaviour and therefore extremely difficult to detect even when present. *D. mon-*

Fig. 5.1. Montserrat Galliwasp, *Diploglossus montisserrati*. (Photo: A. Ogrodowczyk, Durrell)

Fig. 5.2. Mountain Chicken *Leptodactylus fallax*. (Photo: A. Ogrodowczyk, Durrell)

Fig. 5.3. *Alsophis antillensis manselli*. (Photo: A. Ogrodowczyk, Durrell)

Fig. 5.4. *Typhlops monastus monastus.* (Photo: A. Ogrodowczyk, Durrell)

Fig. 5.5. Probable rat bites on the leg of an adult *L. fallax.* (Photo: G. Garcia. Durrell)

tisserrati is the only member of the Anguidae family in the Lesser Antilles, with its closest relatives occurring in the Greater Antilles, and therefore represents a biogeographical enigma (Malhotra & Thorpe, 1999).

L. fallax, one of the largest frogs in the western hemisphere, once occurred on six islands in the Lesser Antilles but is now only found on Montserrat and Dominica. The population on Dominica has undergone dramatic decline due to a disease outbreak of *Chytridiomycosis* in the early 2000s, and is severely threatened with extirpation. The recent eruptions of the Soufrière volcano in Montserrat is thought to have destroyed roughly 60% of Montserrat's wetter forest habitats. It is unclear how much of this forest was occupied by *L. fallax* but some population decline in Montserrat is likely following the volcano. *L. fallax* is now probably only found in the Centre Hills, which probably supports the largest and globally most important population as despite recent extensive sampling, no evidence of *Chytridiomycosis* has been found (Garcia *et al*., 2007). Anecdotal evidence suggests that within the Centre Hills the *L. fallax* population is not overall in major decline (*see Box 4: Mountain chicken monitoring*) and it appears relatively widespread in the mesic and wet forest. However, there is evidence of severe localised declines of mountain chickens in the Centre Hills, possibly due to over-exploitation. No quantitative data on the actual size of the *L. fallax* population in the Centre Hills exist.

E. johnstonei is ubiquitous in Montserrat and is very abundant in the moist forests of the Centre Hills in particular. *S. fantasticus ligniservulus* and *A. lividus* are also widely distributed and abundant in the Centre Hills and occur in the dry as well as moist forest. *T. rapicauda* is less well known but not considered to be locally threatened and is associated with forest and scrub habitats. As mongooses have not been introduced to Montserrat *A. antillensis manselli* is thought to be generally abundant, particularly in the Centre Hills. Mongooses have extirpated other species of racer on other Lesser Antillean islands, e.g. *Alsophis antiguae* on mainland Antigua. *A. pluvianotata* has also probably benefited from the absence of this invasive mammal but is thought to have undergone a severe population decline as a result of habitat destruction after the volcanic eruption (Malhotra & Thorpe, 1999). It is considered to be relatively abundant in remaining dry open habitats, including the dry forest in the Centre Hills. *T. monastus monastus* (Fig. 5.4) is fossorial and highly cryptic and therefore information on its abundance and distribution is scant.

Common to other taxonomic groups, amphibians and reptiles face a number of threats typical of Caribbean islands, mainly from invasive mammals and habitat destruction (through both natural events and urban development and agriculture) which have been outlined in more detail in the Introduction. Both the Critically Endangered mountain chicken and galliwasp possess behavioural and morphological traits that predispose them to being vulnerable to the effects of rat predation, as well as pigs and cats. It is suspected that rats will predate juvenile *L. fallax* and even attack adults, which have been seen with wounds that appear to have been inflicted by rats (see Fig. 5.5).

However, amphibians, and *L. fallax* in particular, also face a number of unique threats. Firstly, as amphibians have permeable skin they may be susceptible to the toxic effects of volcanic ash which has regularly fallen on the Centre Hills since 1995. Under certain climate conditions (i.e. no rain), falling ash can lead to potentially damaging increases in environmental acidity levels which may have both short and long term effects on mountain chickens. Secondly, *L. fallax* have historically been extensively hunted (legally) for food on Montserrat. At present it appears that few people regularly hunt mountain chickens (McCauley & Mendes, 2006) but no quantitative data exist on the number of frogs hunted. It is suspected that hunting activities can result in the near complete removal of adult frogs from localised areas. However, perhaps the most severe threat to the persistence of mountain chickens in the Centre Hills, and more widely, is *Chytridiomycosis*. This disease can be transmitted between geographical regions via the human sponsored movement of amphibians and fungal spores contained in soil on boots, equipment and unwashed produce. Currently fruit is transported to Montserrat by boat from Dominica and this cargo is likely to contain small amphibians such as tree-frogs. If *Chytridiomycosis*-infected tree-frogs survive the journey and escape from the shipment containers there is a high risk this disease will be introduced into the amphibian populations in Montserrat, which would have extremely se-

Species scientific name	Species common name	Centre Hills	IUCN Red List category	Global distribution
Bufo marinus	Marine toad	Yes	Least concern	Native to C. and S. America; introduced on to numerous Caribbean (including Montserrat) and Pacific islands, Papua New Guinea, Australia
Eleutherodactylus johnstonei	Lesser Antillean tree frog	Yes	Least concern	Lesser Antilles
Leptodactylus fallax	Mountain chicken	Yes	Critically Endangered	Montserrat and Dominica
Geochelone carbonaria	Red-footed tortoise	No	Not listed	Native to South America; introduced on to several Caribbean islands, including Montserrat
Ameiva pluvianotata	Montserrat ameiva	Yes	Not listed	Endemic to Montserrat
Anolis lividus	Montserrat anole	Yes	Not listed	Endemic to Montserrat
Diploglossus montisserrati	Montserrat galliwasp	Yes	Critically Endangered	Endemic to Montserrat
Hemidactylus mabouia	Amerafrican house gecko	?	Not listed	Native to sub-Saharan Africa, introduced to S., C. and N. America, several Indian Ocean and Caribbean islands (including Montserrat)
Iguana iguana	Green iguana	Yes	Not listed	Native to C. and S. America and several Caribbean islands; possibly introduced to Montserrat; introduced to Florida and Hawaii
Mabuya bistriata	South American skink	?	Not listed	Widespread in C. and S. America and Lesser Antilles
Sphaerodactylus fantasticus ligniservulus	Southern leeward dwarf gecko	Yes	Not listed	Subspecies endemic to Montserrat
Thecadactylus rapicauda	Turnip-tailed gecko	Yes	Not listed	Widespread in C. and S. America and Lesser Antilles
Alsophis antillensis manselli	Leeward racer	Yes	Not listed	Subspecies endemic to Montserrat
Typhlops monastus monastus	Blind snake	?	Not listed	Subspecies endemic to Montserrat

Table 5.1. Checklist of the amphibians and reptiles of Montserrat, with information on their occurrence in the Centre Hills, conservation status and global distribution

vere consequences for mountain chickens in particular. An assessment of the risk of transmission of this disease through the shipment of fruit and other items from Dominica, and other locations, is urgently required along with implementation of appropriate biosecurity measures to reduce these risks.

5.2. Patterns in amphibian and reptile diversity within the Centre Hills: Implications for biodiversity conservation

The reptile and amphibian survey of the Centre Hills forest was conducted between June-July 2005 (wet season) and January-March 2006 (dry season). Line transects (100m in length) were established at each of the 30 CHBA sample points and surveyed once at night and

Species	Total number of registrations		Mean encounter rate (registrations 100m^{-1})	
	Wet	Dry	Wet	Dry
Eleutherodactylus johnstonei	2647	1453	111.29	55.88
Leptodactylus fallax	93	3	3.88	0.12
Anolis lividus	35	70	1.25	2.33
Sphaerodactylus fantasticus ligniservulus	140	220	5.00	7.33
Thecadactylus rapicauda	3	2	0.05	0.03
Alsophis antillensis manselli	7	1	0.13	0.02

Table 5.2. Total number of visual or acoustic registrations and mean encounter rate of native amphibian and reptile species recorded during the line transect survey of the Centre Hills in the wet (n=28 transects) and dry (n=30 transects) season

once during the day. These surveys included intensive searching through leaf litter and refugia as well as visual inspection of the ground and vegetation. In total, approximately 400 and 390 man hours of diurnal and nocturnal fieldwork respectively was conducted. Incidental observations of all species except *E. johnstonei* and *S. fantasticus* away from line transects were recorded.

All amphibian and reptile species known from Montserrat, except *Mabuya bistriata* and *Geochelone carbonaria* (these two species are suspected to have now disappeared from Montserrat), were observed during the CHBA (i.e. during line transect surveys, dedicated searches and incidental observations). The number of sightings and encounter rate of amphibian and reptile species recorded during the line transect survey are given in Table 5.2.

From the survey data it is clear that by far the most abundant species in the Centre Hills is *E. johnstonei*, which was recorded at all sample points and constituted 90% of all herptile observations in the wet season (see Table 5.2). *S. fantasticus* was the second most frequently observed species and occurred at 77% of sample points. *A. lividus* was widely distributed (recorded at 93% of sample points) but was not as abundant in the Centre Hills as expected. Anoles typically occur at very high density in forests in the Lesser Antilles. For example, in St Lucia, *Anolis luciae* was encountered at a rate of 18.7 anoles 100m^{-1} in a patch of dry forest and at 90.9 anoles 100m^{-1} in xeric scrubland on a small offshore island (K. Varnham, *unpubl. data*). The dry season encounter rate of 2.3 anoles 100m^{-1} in the Centre Hills is an order of magnitude lower than these estimates. Populations of anoles are likely to fluctuate widely in size and so these estimates of relative abundance may represent a low point in a longer term trend. However, as they are so low, it does raise suspicions that the species is being held well below carrying capacity by a pressure such as predation by rats and we recommend this requires further investigation. Anoles are important prey species for a number of predators, such as *A. antillensis*, and therefore any reduction in their numbers could have knock-on effects at higher trophic levels.

L. fallax were frequently heard along nearly all line transects surveyed at night during the wet season which coincides with their breeding season when males call regularly. They were however rarely seen along the line transects. In the dry season *L. fallax* are congregated in ghauts and not regularly calling and were therefore recorded very infrequently at this time of year (for more information on *L. fallax* see *Box 4: Montserrat mountain chicken monitoring programme*). Relatively few observations of *A. antillensis* (n = 8) and *T. rapicauda* (n = 5) were made during the line transect survey, which probably reflects their low detectability rather than their scarcity. A further 12 and 7 incidental observations were made of *A. antillensis* and *T. rapicauda* respectively during the CHBA. Racers are highly threatened in the Lesser Antilles (e.g. Antigua, St Lucia) so a healthy population of *A. antillensis* in the Centre Hills would be of conservation importance. A single incidental observation of the highly cryptic *T. monastus monastus* was made during the wet season phase of the CHBA in the Fogarthy area of the Centre Hills (with a second incidental observation of two individuals in the National Trust office grounds). *T. monastus* across the Lesser Antilles are typically difficult to locate without specialized search techniques (e.g. digging) so it is impossible to draw any conclusions on the status of the species in the Centre Hills.

Only 10 observations of the exotic *B. marinus* were recorded during the line transect survey, which was far lower than expected as they were previously thought to be widespread in the Centre Hills forest. They appeared to be relatively scarce in the forest interior but were frequently seen along trails and tracks and also in ghauts. Four incidental observations of *Iguana iguana* were made in the Fairy Walk/Jack Boy Hill area

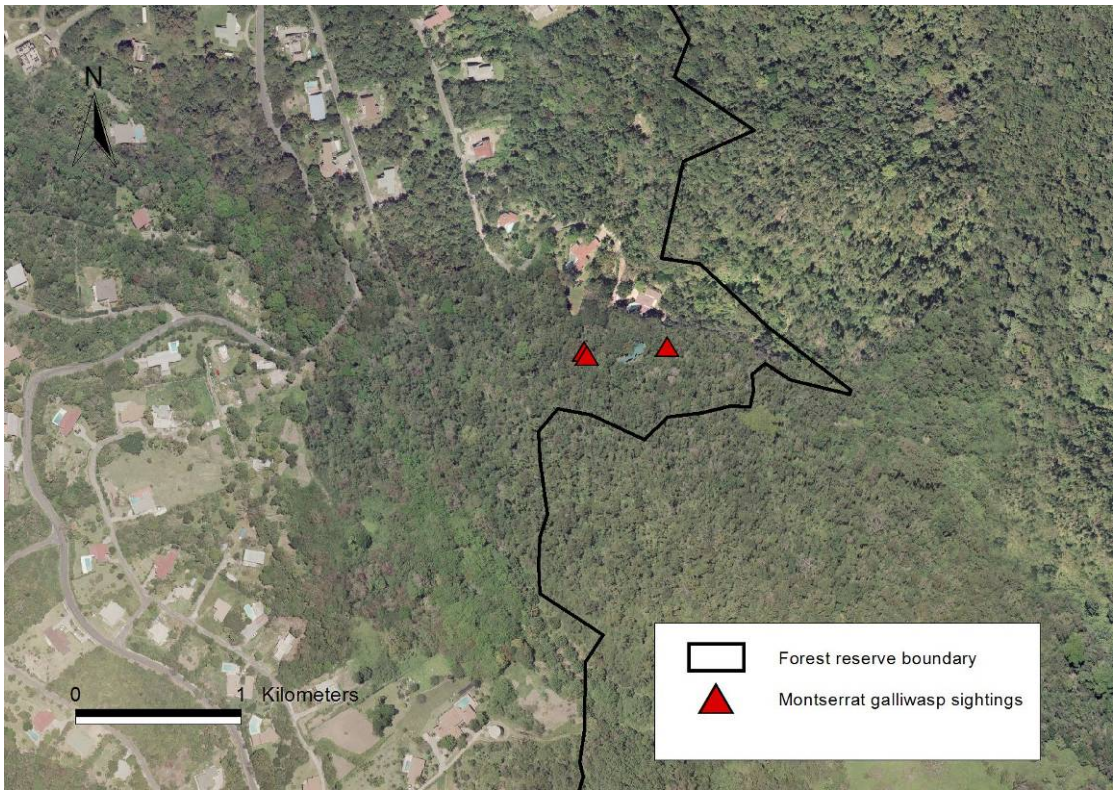


Fig. 5.6. Location of galliwasp sightings (red triangles) in Woodlands Spring (the forest reserve lies to the east of black line which represents the current boundary)

with one further sighting in Fogarthy. *I. iguana* was regularly seen away from the Centre Hills, particularly near to the coast. *Hemidactylus mabouia* was not observed in the Centre Hills but was widespread and common in areas of human habitation.

Following the historical sightings of *D. montisserrati* in the Woodlands area of the Centre Hills a series of dedicated searches of the site were made during the dry season survey of the CHBA. On 26th January (1915 hours), an adult *D. montisserrati* was observed, only the fourth confirmed sighting of this species, providing evidence of its continued existence. Woodlands Springs is approximately 10 hectares of mesic forest interspersed with a small number of houses, large gardens and agricultural plantations (see Fig. 5.6), and thus people and domestic animals, including cats and dogs, are present in the area. Topography is steep and rocky (approximately 240 metres asl), and recorded annual rainfall is roughly 1500 mm. The galliwasp was found under a stone and caught by hand, examined briefly, then measured and weighed. It had a snout-vent length of 18 cm, a tail length of 23 cm and was 170 g in weight.

A second adult *D. montisserrati* was seen in Woodlands Springs on the 5th February (1830 hours), approximately 20-30 m from the location where the first individual was found. The animal was found within the roots of a tree with only its head visible but immediately retreated out of sight into the root system. It was observed again shortly afterwards and was followed for approximately 20 minutes walking across the forest floor in an attempt to examine its behaviour and to identify potential cues to aid its detection. The *D. montisserrati* appeared to be very sensitive to disturbance and would cease moving in response to any movement or noise made by the observer. Another sighting of what was presumed to be the same individual was made in exactly the same location on the 8th March (1800 hours). It is noteworthy that all of the recent and most of the historical sightings have occurred around dusk, despite searching at all times of day and night, which suggests *D. montisserrati* may be crepuscular.

The CHBA survey covered the whole Centre Hills and this represents the first multi-species systematic survey of reptiles and amphibians dedicated to this area. Furthermore, the Montserrat Department of Environment has conducted regular nocturnal fieldwork throughout the area since 1998 as part of the mountain chicken monitoring programme. However, *D. montisserrati* has only ever been recorded in one site. This lends weight to the hypothesis that *D. montisserrati* does indeed have a highly restricted range and is therefore extremely rare. As Woodlands Springs does not appear to be markedly different in terms of topography, climate and habitat structure to other nearby forest areas, it is not clear why *D. montisserrati* would be restricted to such a small site. The rocky terrain may provide sufficient refuge from rat (and cat and pig) predation for a population to persist.

Data on the ecology and natural history of *D. montisserrati* are sparse. As a first priority, quantitative information on distribution and population abundance is required to evaluate its status and inform conservation action. An effective and systematic survey technique needs to be developed and tested. Although the species is detectable by sight (and the noise of them moving through leaf litter provides a cue to their pres-

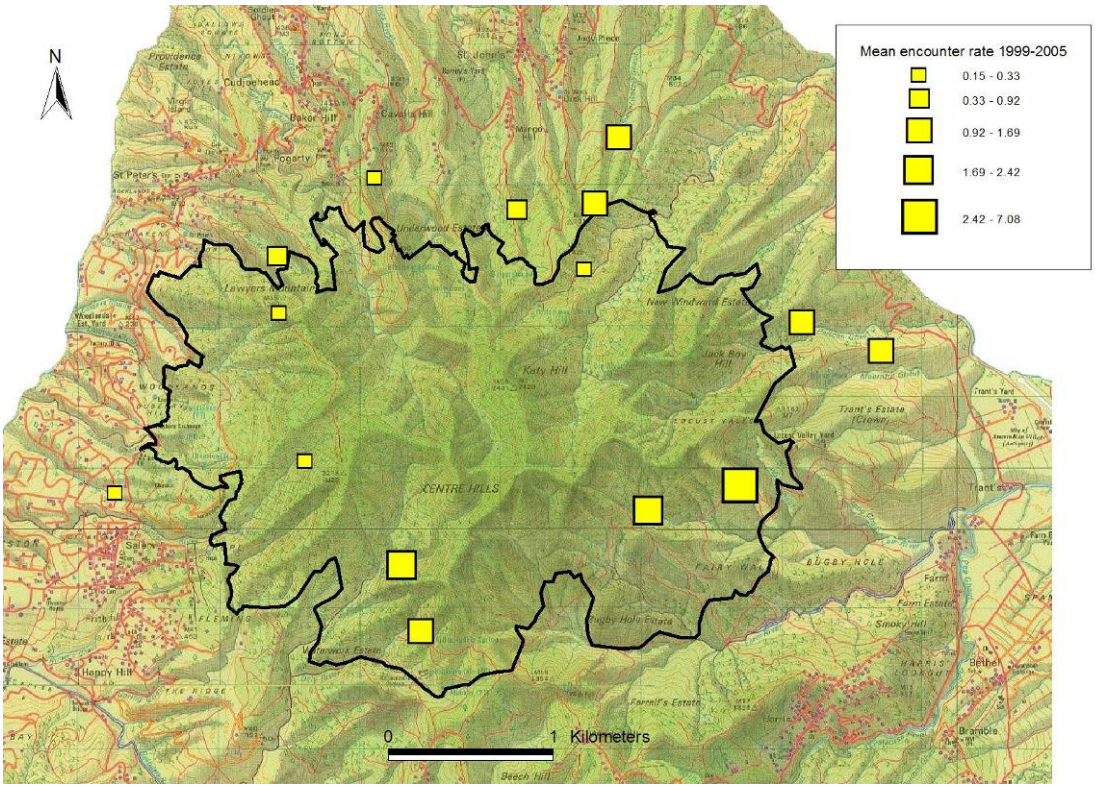


Fig. 5.7. Map of the mean dry season encounter rate of *L. fallax* between 1999 and 2005

ence), the cryptic nature of *D. montisserrati* and their apparent sensitivity to human presence will result in low encounter rates, thus potentially precluding meaningful sample sizes. Pit fall trapping has been used in surveys of other galliwasp species, e.g. *Celestus crusculus* and *C. duquesneyi* in Jamaica (Wilson & Vogel 2000), but in the current field site, such capture methods may be problematic because of the presence of rats (*Rattus rattus* and *R. norvegicus*) and domestic cats and dogs, which may predate upon any trapped animals.

Given the likely scarcity and vulnerability of *D. montisserrati* a Species Action Plan needs to be developed and implemented, including a programme of field research, habitat protection and potentially invasive mammal control. Rats are common in the Centre Hills (see *Chapter 8: Rats in the Centre Hills)* for more information) and may strongly limit the population growth of *D. montisserrati* and an experiment to quantify their impact would likely to prove informative for the design of control programmes. Protection of the forest in the Woodlands Spring site from further development is required and provision for this should be incorporated within the Centre Hills management plan along with other required conservation initiatives. However, the galliwasp sightings fell outside the existing forest reserve boundary and therefore currently the site has no protection (see Fig. 5.6). The Woodlands site should be considered as a strict conservation zone to safeguard this species whilst data on its abundance and distribution are gathered. However, given the probable vulnerability of *D. montisserrati* direct intervention to save the species, such as captive breeding, may be necessary.

The number of native herptile species recorded at sample points varied between two and six. Only at one sample point (#81) in the west of the Centre Hills, between Woodlands and Salem, were all six regularly occurring native species recorded (i.e. those listed in Table 5.2). Five species were recorded at five sample points, which were situated on the western and eastern flanks of Centre Hills. These high species richness sample points were all positioned in mesic forest and near the boundaries with wet forest and dry forest (at intermediate altitudes between 240 and 476m). There was a tendency for recorded species richness to be lower at the high altitudes (Fig. 5.8: NB. due to health and safety reasons it was not possible to survey four of the high altitude sample points at night, so therefore survey effort at these points was reduced which may have resulted in lower species richness). The CHBA data suggested the existence of some species habitat associations. *S. fantasticus* appeared to be at much higher densities in dry forest (an order of magnitude higher) than in mesic and wet forests. *A. lividus* was at higher density in dry and mesic forests. All observations of *T. rapicauda* were in mesic forest and all *A. antillensis* sightings were in wet and mesic forests (> 310m asl). There was no suggestion that *E. johnstonei* was associated with any particular habitat and was highly abundant in all three major forest types.

L. fallax are traditionally thought to show a preference for mesic and wet forest in Montserrat. Figure 5.7 shows how the encounter rate of L. fallax along monitoring transects varies across the Centre Hills. Fairy Walk has the highest recorded encounter rate of *L. fallax* and is likely to represent the most important site for this spe-

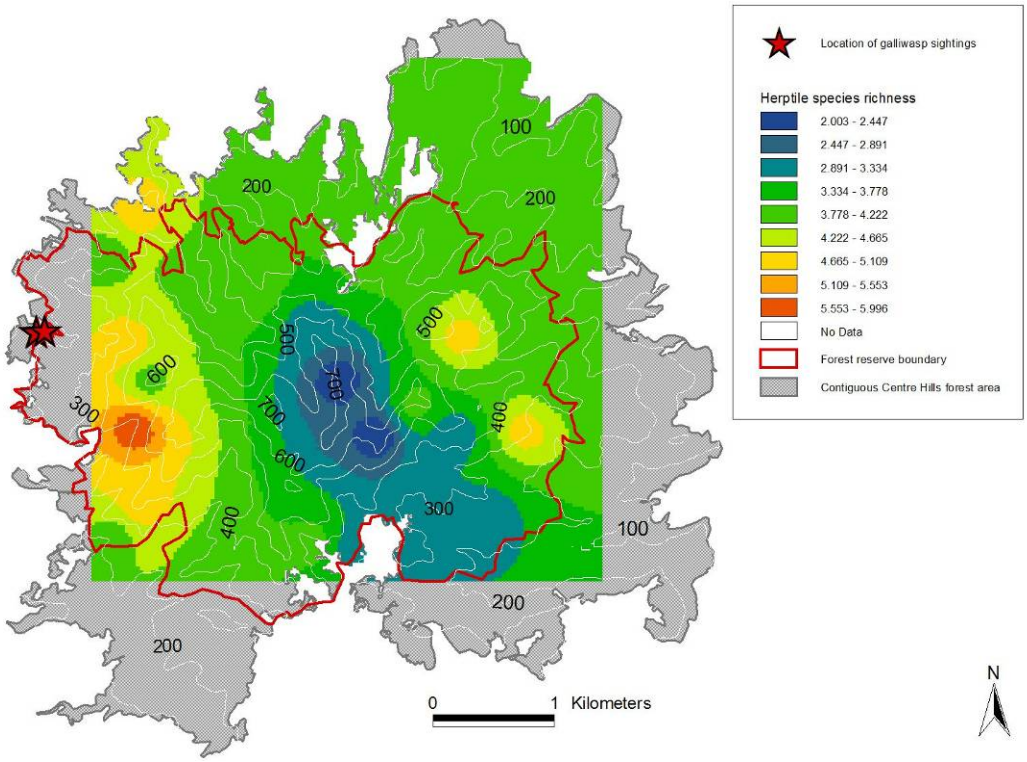


Fig. 5.8. Interpolated map of herptile species richness with the location of the captured Montserrat galliwasps marked

cies in the Centre Hills. *L. fallax* encounter rate was also high in Corbett Spring, Sappit River, Killiecrankie, Bunkum River and Pelican Ghaut. It appears to be most abundant in the east and south of the Centre Hills. Analysis carried out elsewhere (J. Fa, *pers. comm*.) revealed that the body condition of *L. fallax* tended to be higher in the east of the Centre Hills than in the west. This would suggest that the *L. fallax* population in the east is in better condition, both in terms of population size and individual growth rates. It is not understood why this would be the case, but may be due to the increased difficulty of accessing the eastern sites for hunting compared to the west. For more information on *L. fallax* see *Box 4: Montserrat mountain chicken monitoring programme*

In summary, the mesic forest appears able to support both the species that favour the dry and also the wet forest and is therefore likely to be the most valuable habitat type for amphibians and reptiles within the Centre Hills. However, it is noteworthy that the wet and dry forests were both under-sampled in comparison to the mesic forest. We have tentatively identified two sites of high amphibian and reptile species richness in the Centre Hills (see Fig. 5.8). Firstly, there appears a relatively large area of high richness in the west and northwest of the Centre Hills, particularly in the forest directly to the east of Salem and Woodlands. The Woodlands site where the *D. montisserrati* individuals were found is located near to the western site of high richness (see Fig. 5.8) which further increases the potential value of this area for amphibians and reptiles. Secondly, there appears to be a site of high richness in the Jackboy Hill and Fairy Walk area to the east of the Centre Hills. Relative to other taxa, such as birds or bats, herptiles on islands tend to have more specific habitat requirements and therefore a range of habitats needs to be managed for conservation to protect the herptile community. This should include substantial areas of the least disturbed dry forest which is under-represented in the region delineated by the historical forest reserve boundary, as well as mesic and wet forest. If an area running from the elfin woodland at the peaks of the Centre Hills in an eastward direction down to the dry forest at sea-level was designated for biodiversity conservation, this would ensure all elevations and therefore a complete range of habitats be represented in the protected area. Such an area would encompass the Jack Boy Hill-Fairy Walk area of high richness, and the sites of highest *L. fallax* abundance.

Acknowledgements

Agnieszka Ogrodowczyk is grateful to the Montserrat Department of Environment for providing so much support during the amphibian and reptile survey. Especially, I want to thank Lloyd Martin for organising my work schedule so perfectly, and Philemon Murrain and Calvin Fenton for spending many hours in the field with me. I also want to thank James Daly, John Martin, James Boatswain, Lloyd Amer and Jervain Greenaway for teaching me how to work in Montserrat. I am grateful to Carole McCauley for caring for me during my stay in Montserrat and to Matt Morton for his ever-friendly support.

Box 4. The Montserrat mountain chicken monitoring programme

Since 1998 the Montserrat Department of Environment have monitored the Centre Hills mountain chicken population, using a scheme originally designed by Flora and Fauna International. From 2003 onwards, Durrell Wildlife Conservation Trust has provided assistance to the Montserrat Department of Environment on the design and implementation of the monitoring programme, training on wildlife disease sampling and the analysis of monitoring data.

The monitoring programme (which is separate to the CHBA) consists of approximately 20 line transects of 200m in length subjectively placed along ghauts and trails to provide a reasonable spatial coverage of the Centre Hills. The number of frogs seen along each transect is recorded, along with data on each individual including, weight, snout-vent-length, sex and condition. An encounter rate (number of frogs seen per 100m of line transect) is calculated, which serves as an index of abundance. Surveys are carried out between two and four times per year. A preliminary analysis of the field data is reported here along with a number of brief recommendations for improving the reliability of the monitoring programme.

Some concern had been raised that small juvenile frogs (< 10 cm SVL) were not recorded on the data recording forms before 2003, and were recorded thereafter, and therefore a change in data collection protocol may have lead to the interpretation of misleading trends. Fig. 5.10 shows the distribution of snout-vent length (SVL) data in the dry season before and after 2003. In both time periods, only a very small proportion of observations (1.6% each) were made of frogs <10 cm SVL (i.e. juveniles). Further, there is little notable difference between the distributions before and after 2003 and therefore we conclude that it is valid to use the monitoring data from 1999 in order to explore any potential population trends.

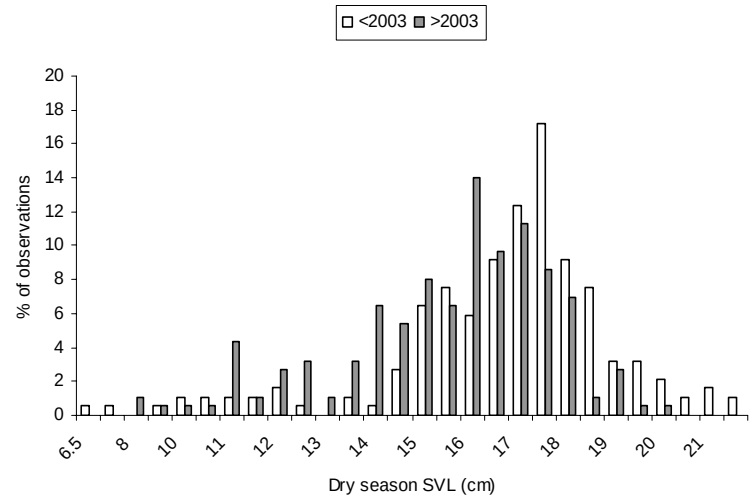


Fig. 5.10. Proportion of observations of varying snout-vent length (SVL) before and after 2003

There is strong seasonality in the number of frogs found along the line transects (Fig. 5.11). Clearly, the highest encounter rate of mountain chickens is between January and March, in the dry season. At this time of year, mountain chickens congregate close to the water sources in the ghauts, whereas in the wet season they are distributed more widely throughout the forest. In terms of maximising the probability of mountain chickens being present on the line transect, and the number of individuals on each transect, carrying out the survey during the dry season is clearly optimal. We believe the dry season data provides the most reliable data with which to investigate any potential trends as they are most closely related to actual population size.

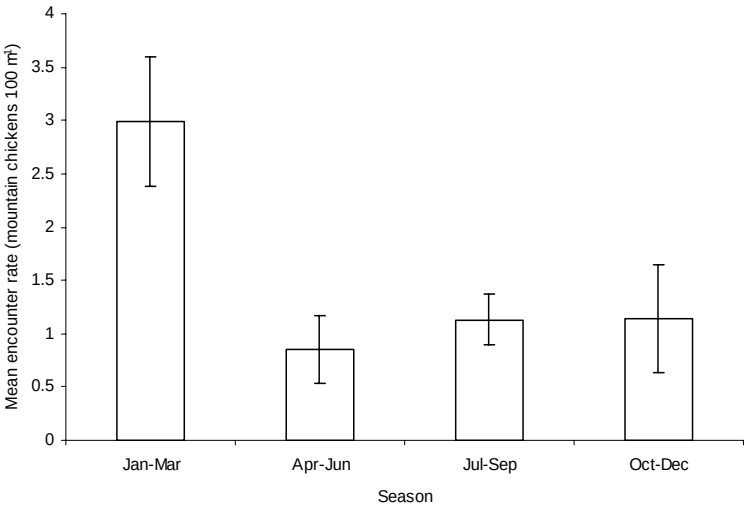


Fig. 5.11 Mean encounter rate (between 1999 and 2005) of mountain chickens along monitoring transects in the four quarters of the year. Error bars are standard errors

A dry season survey was carried out in each year, except 2003, between 1999 and 2005. Fig. 5.12 shows the mean encounter rate along ghauts in the dry season over this time period. The mean values fluctuate but the line of best fit suggests an overall increase. However, a linear regression of the mean encounter rate with year revealed that the slope was not significantly different to zero ($F_{1,5} = 0.99$; $P = 0.38$) and therefore there is no statistical evidence of an increase, or decrease, in the index of mountain chicken abundance in the Centre Hills between 1999 and 2005.

However this overall trend masks some interesting spatio-temporal patterns in the Centre Hills mountain chicken

population. Figure 5.13 shows the spatial variation in the trend of the mountain chicken population between 1999 and 2005. There are five sites where there is a positive trend (slope of linear regression line) across this time period in the recorded encounter rate. The most positive trend is found in Fairy Walk followed in order by Corbett Spring, Bunkum River, Pelican Ghaut and Bottomless Ghaut. Four of these sites are in the east and north east of the Centre Hills. This underlines the importance of the east of the Centre Hills for mountain chickens where populations are larger and growing, and individual frogs are in better condition. Conversely, mountain chicken populations appear to be less abundant in the west, not increasing in size and in some ghauts seem to have disappeared. It is not certain whether this is due to the impact of hunting, predation by invasive mammals, difference in habitat quality or some other factor. A questionnaire survey of mountain chicken hunters in Montserrat revealed that a single individual is responsible for the majority of hunting and that he most frequently hunts in the western ghauts (McCauley & Mendes, 2006). This does suggest that the east-west difference in abundance, population trend and body condition of mountain chickens may be due to the offtake from hunting. Given the range and severity of threats to the mountain chicken, and its low reproductive potential, we recommend that unregulated hunting of mountain chickens be actively discouraged until a positive trend in population size is detected with certainty or quantitative data on the vital rates of mountain chickens exist with which to reliably estimate quotas for sustainable harvesting.

Further analysis of the monitoring data is needed to estimate the power of the monitoring programme to detect trends of certain magnitudes over certain time periods and to make recommendations to improve its sensitivity. A data collection protocol is needed to standardised methods of data collection to maximise data reliability. It should be noted that detection probability of mountain chickens is not estimated as part of the mountain chicken monitoring programme. Hence there is the potential for unquantified variation in detection probability resulting in changes in the index of abundance even when population size remains constant. This is a problem common to the majority of monitoring schemes relying on indices of abundance.

However, we believe that given the level of threats to the mountain chicken in the Centre Hills it is vital that monitoring is continued for the foreseeable future. The current monitoring programme is likely to be able to detect any sharp declines in abundance through a potential outbreak of *Chytrid* fungus. Monitoring is also important so the impact of the Centre Hills management plan on this species can be quantified but changes to improve its sensitivity will need to be made to enable this. We recommend a minimum effort of one survey in the dry season and one in the wet season per year. It is imperative that surveys are conducted at the same time of year to remove the confounding effects of seasonal changes in behaviour on the estimates of encounter rate.

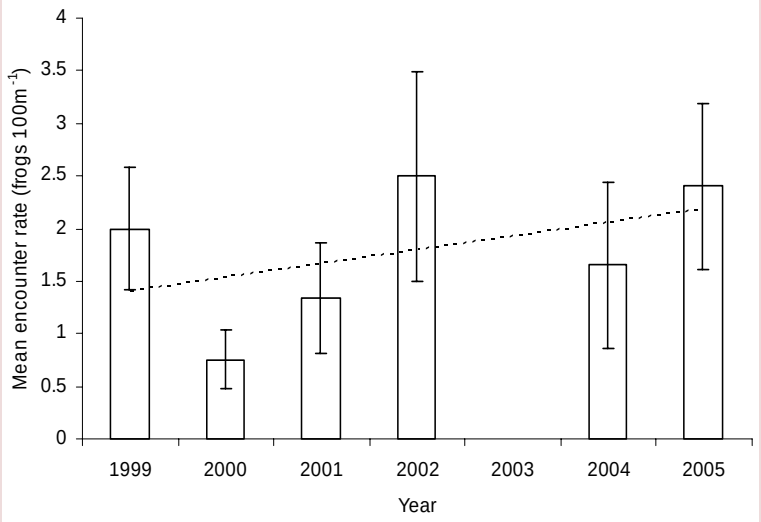


Fig. 5.12. Mean encounter rate of mountain chickens in the dry season between 1999 and 2005 (data from line transects repeated each year only). Line of best fit is fitted by linear regression ($F_{1,4} = 0.99$; $P = 0.38$); error bars are standard errors

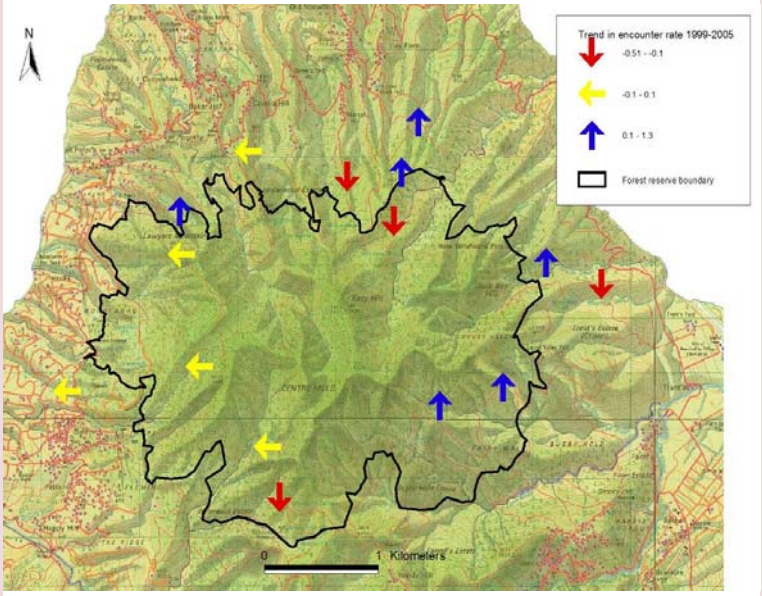


Fig. 5.13. Map of the trends (derived from the slope of linear regression line) in encounter rate of mountain chickens at occupied sites in the Centre Hills between 1999 and 2005.

References

Day, M. (1996). *Diploglossus montisserrati*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 26 November 2007.

Fa, J., Hedges, B., Ibéné, B., Breuil, M., Powell, R. & Magin, C. (2004). *Leptodactylus fallax*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 26 November 2007.

Garcia, G., Cunningham, A.A., Horton, D.L., Garner, T.W.J., Hyatt, A., Hengstberger, S., Lopez, J., Ogrodowczyk, A., Fenton, C. & Fa, J.E. Mountain chickens *Leptodactylus fallax* and sympatric amphibians appear to be disease free on Montserrat. *Oryx*, **41**, 398-401.

McCauley, C. & Mendes, S. (2006). *Socioeconomic Assessment Report*. Unpublished report from the Centre Hills Project, Montserrat.

Malhotra, A. & Thorpe, R.S. (1999). *Reptiles and amphibians of the Eastern Caribbean*. Macmillan Education Ltd, UK.

Ogrodowczyk, A., Murrain, P., Martin, L., & Young, R.P. (2007). Recent observations of the Montserrat galliwasp (*Diploglossus montisserratti*). *Herpetological Bulletin*, **98**, 9-11.

Ricklefs, R.E., & Lovette, I.J. (1999). The roles of island area *per se* and habitat diversity in the species-area relationships of four Lesser Antillean faunal groups. *Journal of Animal Ecology*, **68**, 1142-1160.

Schwartz, A., & Henderson, R.W. (1991). *Amphibians and reptiles of the West Indies: descriptions, distributions, and natural history*. Univ. Florida Press, Gainesville, US. xvi + 720 pp.

Wilson, B.S., and P. Vogel (2000). A survey of the dry forest herpetofauna of the Hellshire Hills, Jamaica, including the re-discovery of the Blue-tailed Galliwasp (*Celestus duquesneyi* Grant). *Caribbean Journal of Science*, **36**, 244-249.

6. Birds of the Centre Hills

G. M. Hilton

6.1. Diversity and status of birds in Montserrat

6.1.1. The Centre Hills avifauna

The bird community of the Centre Hills is species-poor, but of high conservation value. The avifauna comprises resident and wintering neotropical landbirds. There are no waterbirds of any kind, except for a small number of striated herons *Butorides striatus* along the larger ghauts.

Taxonomically, the forest bird community is typical of Lesser Antillean islands. Pigeons and doves (Columbidae), hummingbirds (Trochilidae) and mimic thrushes (Mimidae) are particularly conspicuous. Raptors (Falconiformes) are scarce, owls (Strigidae) and woodpeckers (Picidae) are absent. Parrots (Psittacidae) are also absent, although it is likely that an endemic *Amazona* parrot species, similar to those surviving on Dominica and St Lucia, occurred at one time and is now extinct (Reis and Steadman, 1999)

Figure 6.1. Antillean euphonia *Euphonia musica.* (Photo: G. Hilton, RSPB)

Figure 6.2. Pearly-eyed thrasher *Margarops fuscata.* (Photo: G. Hilton, RSPB)

Resident landbirds

In general, and in common with other Antillean island bird communities (Raffaele *et al*., 1998), the bird species tend to be habitat (and dietary) generalists, relative to tropical forest birds in mainland Central and South America (Table 6.1).

The avifauna is dominated by omnivores. The majority of the resident bird species eat a combination of fruit and insects, plus, variously, nectar, seeds and small vertebrates. The predominance of generalists may be a response to environmental conditions on Montserrat. The island's small area means that populations that occur at low density are likely to be very small, and hence prone to stochastic extinction. Furthermore the relatively frequent catastrophic disturbances – notably hurricanes and volcanic eruptions - mitigate against developing specialist habitat or diet selection: opportunism is likely to be strongly selected.

Predatory birds are rare in the Centre Hills. The two characteristic hawks of the Antilles are both absent in the Centre Hills: the broad-winged hawk *Buteo platypterus*, which is common in most of the Lesser Antilles, occurs only as a rare passage migrant on Montserrat (despite being abundant in Antigua); the red-tailed hawk *Buteo jamaicensis*, common in the Greater Antilles, reaches its southern limit in St Christopher/Nevis (Raffaele *et al*., 1998). The only resident terrestrial raptor in Montserrat is American kestrel *Falco sparverius*, which is essentially an open country species and is scarce in the Centre Hills. It is rarely seen in closed forest, although observations have been made of this species pursuit-hunting Montserrat orioles *Icterus oberi* (unsuccessfully) under closed canopy woodland in the Centre Hills. Both merlins *Falco columbarius* and peregrines *Falco peregrinus* do occur in the Centre Hills as winter visitors, but are uncommon. As in most of the Lesser Antilles, owls are absent. Pearly-eyed thrashers *Margarops fuscata*, which are super-abundant throughout the Centre Hills may predate small passerines (Arendt, 2006), though they are more known as nest predators.

Species	Abundance in Centre Hills	Body mass[1]	Diet[2]	Feeding zone[2]
Scaly-naped pigeon *Columba squamosa*	common	288	Frugivore/ Herbivore	Arboreal (terrestrial)
Bridled quail-dove *Geotrygon mystacea*	infrequent	221	Granivore/ Insectivore	Terrestrial
Mangrove cuckoo *Coccyzus minor*	frequent	64	Insectivore	Understory
Purple-throated carib *Eulampis jugularis*	frequent	9	Nectarivore/ Insectivore	Understory
Green-throated carib *Eulampis holosericus*	scarce	5.6	Nectarivore/ Insectivore	Understory
Antillean crested hummingbird *Orthorhyncus cristatus*	common	3.8	Nectarivore/ Insectivore	Understory
Caribbean elaenia *Elaenia martinica*	common	22.6	Insectivore/ Frugivore	Aerial
Scaly-breasted thrasher *Margarops fusca*	common	72	Frugivore/ Insectivore	Canopy
Pearly-eyed thrasher *Margarops fuscata*	abundant	105	Frugivore/ Insectivore/ Carnivore	Canopy
Brown trembler Cinclocerthia gutturalis	infrequent	53	Insectivore	Terrestrial & understory
Forest thrush Cichlherminia lherminieri	common	100	Insectivore/ Frugivore	Terrestrial (understory & canopy)
Lesser Antillean bullfinch *Loxigilla noct*	scarce	15	Granivore/ Frugivore/ Insectivore	Understory
Bananaquit Coeroba flaveola	abundant	10	Nectarivore/ Insectivore	Understory
Montserrat oriole *Icterus oberi*	common	35	Insectivore	Understory

Table 6.1. Characteristics of the main breeding bird species in the Centre Hills

Expanded and adapted from (Dalsgaard et al., 2007).

1: Mist-net capture data from Montserrat (RSPB/MALHE, unpubl. data), and (Dunning, 1993).

2: Authors' pers obs, (Raffaele et al., 1998) and (del Hoyo et al., 1997; del Hoyo et al., 1999).

Migrant landbirds

In terms of numbers of species, the majority of Montserrat's landbirds are in fact passage migrants and winter visitors that breed in North America (Table 6.2). The migrants are dominated by Parulidae (wood-warblers), with a small number of other families represented. However, although relatively rich in species, the migrant avifauna is very thinly spread on Montserrat. None of these species have been recorded more than 10 times during the Centre Hills Bird Monitoring Programme, during well over 1,000 point counts, indicating that they are all very scarce relative to the resident forest bird species (by comparison, even the rarer of the forest resident species, such as bridled quail-dove *Geotrygon mystacea*, brown trembler *Cinclocerthia gutturalis* and Lesser Antillean bullfinch *Loxigilla noctis* have been recorded over 100 times). The passage migrants are probably under-recorded. They are generally inconspicuous and quiet, their calls are less well known to the observers, and they have not been the focus of a great deal of

attention. They are not present during summer census work. A number of records in the Forest Bird Monitoring Programme are of 'unidentified warblers', and we suspect that not all identifications are positive; for example prothonotary warbler *Dendroica citrea* seems curiously common since Raffaele *et al*. (1998) report it as predominantly a mangrove species that is easily confused with yellow warbler *Dendroica petechia* (common on Montserrat). Similarly, there are no records of northern waterthrush *Seiurus noveboracensis*, but several of Louisiana waterthrush *Seiurus motacilla*. Nevertheless, it is clear that migrant landbirds are not numerically an important part of the Centre Hills' avifauna, and that the Centre Hills, and Montserrat more generally, does not support a significant proportion of the population of any migrant landbird species.

Within the Centre Hills, Cape May warbler *Dendroica tigrina*, prothonotary warbler, American redstart *Setophaga ruticilla* and Louisiana waterthrush are the only Parulidae species that can currently be regarded as regular in occurrence. Merlin, peregrine, Antillean nighthawk *Chordeiles gundlachii* and barn swallow *Hirundo rustica* are all relatively frequent non-breeding visitors to Montserrat, but none are numerous in the Centre Hills.

6.1.2. Centre Hills birds in the Montserratian context

The Centre Hills has the largest continuous forest block on Montserrat, comprising mostly mesic and wet forest at higher altitudes within the forest reserve, with dry forest at lower altitudes and mostly outside the reserve. There is a very limited area of elfin forest at the summits (Chapter 1, Fig. 1.11). Landbirds in Montserrat

Species	Raffaele *et al.* 1998			Draft Montserrat Bird List	Centre Hills Forest Bird Monitoring Programme	Northern Lowland bird monitoring
	Migrant status	Habitats	Status on Montserrat			
Peregrine falcon *Falco peregrinus*	WV	All habitats	Rare	Listed	No records	No records
Merlin Falco columbarius	PM, WV	Coasts, forest	Absent	Listed	No records	1 record, Jan
Yellow-billed cuckoo *Coccyzus americanus*	PM	Scrub, dry forest	Rare	In Siegel (1983). Not in new bird list.	No records	No records
Antillean nighthawk Chordeiles gundlachii	PM	Open areas	Uncommon	Listed	No records	
Black swift Cypseloides niger	SV	Mountains	Rare	Listed	No records	No records
Barn swallow Hirundo rustica	PM	Open areas	Uncommon	Listed	No records	No records
Cedar waxwing Bombycilla cedrorum	WV	Rainforest, gardens, farmland	Absent	Not listed	No records	
Yellow-throated vireo *Vireo flavifrons*	WV	Forest, scrub	Absent	Not listed	1 record, Dec, 253 m, mesic forest	No records
Red eyed vireo *Vireo olivaceus*	PM	Forest, scrub, gardens	Absent	Listed	No records	No records
Northern parula *Parula americana*	WV, PM	Scrub, dry forest, rainforest	Rare	Listed	2 records, Mar, Dec, 129 - 253 m, mesic forest	3 records, Nov, Dec, Mar

Species	Raffaele *et al.* 1998			Draft Montserrat Bird List	Centre Hills Forest Bird Monitoring Programme	Northern Lowland bird monitoring
	Migrant status	Habitats	Status on Montserrat			
Chestnut sided warbler *Dendroica*	WV	Forest, gardens	Absent	Listed	No records	No records
Cape May warbler *Dendroica tigrina*	WV	All habitats	Rare	Listed	6 records, Mar, Jul (2), Sep, Dec (2), 59-732 m, dry-elfin forest	4 records, Jan (2), May, Sep
Black throated blue warbler *Dendroica*	WV	Rainforest, forest edge	Absent	Listed	No records	No records
Black throated green warbler *Dendroica*	WV	Rainforest, dry forest	Absent	Listed	No records	No records
Yellow-throated warbler *Dendroica dominica*	WV	Lowland forest, gardens	Vagrant	Not listed.	No records	No records
Prairie warbler Dendroica discolour	WV	Dry forest, mangrove, gardens	Rare	Listed	No records	No records
Blackpoll Warbler *Dendroica striata*	PM	Forest, scrub, open areas	Absent	Not listed	No records	1, Sep
Black-and-white warbler *Mniotilta varia*	WV	Forest	Rare	Listed	No records	2 records, Nov & Jan
American redstart Setophaga ruticilla	WV,	Forest, gardens, scrub	Rare	Listed	3 records, Jan & Mar, 280-320 m, mesic forest	3 records, Jan & Mar, dry forest.
Prothonotary warbler *Protonotaria citrea*	WV	Mangroves	Vagrant	Listed	9 records (10 birds), Oct (5), Nov (3), Jan (1), 161-704 m, mesic & elfin forest	No records
Ovenbird Seiurus aurocapillus	WV	Forest	Rare	Listed	No records	No records
Northern waterthrush Seiurus noveboracensis	WV	Mangrove, coastal scrub, near water	Uncommon	Not listed	No records	No records
Louisiana waterthrush *Seiurus motacilla*	WV	Near water, often at high altitude	Rare	Listed	5 records, Mar, Sep, Nov, Dec (2), 195 - 501 m, mesic & wet forest	No records

Species	Raffaele *et al.* 1998			Draft Montserrat Bird List	Centre Hills Forest Bird Monitoring Programme	Northern Lowland bird monitoring
	Migrant status	Habitats	Status on Montserrat			
Hooded warbler Wilsonia citrina	WV,	Rainforest, mangrove	Vagrant	Listed	2 records, Dec, 189 – 362 m, mesic forest	Not recorded
Scarlet tanager *Piranga olivacea*	PM	Forest, forest edge, gardens	Vagrant	Listed	No records	No records
Indigo bunting Passerina cyanea	WV, PM	Scrub, open areas	Absent	Listed	No records	No records
Bobolink Dolichonyx oryzivorus	PM	Open areas	Absent	Listed	No records	No records

Table 6.2. Status of migrant landbirds on Montserrat

The table lists all passage migrant and winter visiting landbirds which are listed as occurring in Montserrat by (Raffaele et al., 1998), in the Draft Montserrat Bird List (Allcorn, Daley & Fenton), or which have been recorded during the 1997-2006 Bird Monitoring programmes.

Timing, habitat and abundance as listed by (Raffaele et al., 1998) are summarised. SV= summer visitor; WV = winter visitor; PM = passage (spring and autumn) migrant.

Records from the Centre Hills Bird Monitoring Programme are reported with details on month, altitude and forest type. Records from the Northern Lowland Bird Monitoring Programme are reported by month. All records from the latter programme are from dry forest habitats at 10-300 m asl.

Additional notes on occurrence of some species are included.

Species	Scientific name	Family	Centre Hills	Lowland forest patches	Farms, gardens, settlements	South Soufrière Hills
Scaly-naped pigeon	Columba squamosa	Columbidae	common	frequent	?	abundant
Zenaida dove	Zenaida aurita	Columbidae	frequent	common	common	absent
Common ground-	Columbina	Columbidae	rare	common	common	absent
Bridled quail-dove	Geotrygon mystacea	Columbidae	infrequent	rare	absent	scarce
Mangrove cuckoo	Coccyzus minor	Cuculidae	frequent	infrequent	infrequent	scarce
Smooth-billed ani	Crotophaga ani	Cuculidae	rare	frequent	frequent	absent
Purple-throated carib	Eulampis jugularis	Trochilidae	frequent	rare	rare	absent
Green-throated carib	Eulampis holosericus	Trochilidae	scarce	infrequent	frequent	scarce
Antillean crested hummingbird	Orthorhyncus cristatus	Trochilidae	common	common	common	common
Caribbean elaenia	Elaenia martinica	Tyrannidae	common	common	?	absent
Grey kingbird	Tyrannus dominicensis	Tyrannidae	rare	scarce	frequent	absent

Species	Scientific name	Family	Centre Hills	Lowland forest patches	Farms, gardens, settlements	South Soufrière Hills
Caribbean martin	*Progne dominicensis*	Hiruninidae	absent	rare	scarce	absent
Scaly-breasted thrasher	*Margarops fusca*	Mimidae	common	common	common	common
Pearly-eyed thrasher	*Margarops fuscata*	Mimidae	abundant	abundant	abundant	abundant
Brown trembler	*Cinclocerthia gutturalis*	Mimidae	infrequent	rare	absent	scarce
Forest thrush	*Cichlherminia lherminieri*	Turdinae	common	frequent	absent	frequent
Black-faced grassquit	*Tiaris bicolor*	Emberizinae	rare	frequent	common	absent
Lesser Antillean bullfinch	*Loxigilla noctis*	Emberizinae	scarce	infrequent	infrequent	common
Antillean euphonia	*Euphonia musica*	Thraupinae	rare	rare	rare	absent
Yellow warbler	*Dendroica petechia*	Parulidae	rare	frequent	common	absent
Bananaquit	*Coeroba flaveola*	Parulidae	abundant	abundant	abundant	abundant
Black-whiskered vireo	*Vireo altiloquus*	Vireonidae	rare	common	?	absent
Carib grackle	*Quiscalus lugubris*	Icteridae	absent	absent	infrequent	absent
Montserrat oriole	*Icterus oberi*	Icteridae	common	absent	absent	abundant

Table 6.3. Breeding landbird species in Montserrat, and their distribution among major habitats Population densities of Montserrat forest birds

Abundance estimates are based on the overall mean number of birds detected per point during census work, 1997-2006. Zero birds detected = "absent"; <0.05 birds per point = "rare"; 0.05-0.1 birds per point = "scarce"; 0.1-0.2 birds per point = "infrequent"; 0.2-0.5 birds per point = "frequent"; 0.5-1.0 birds per point = "common"; >1.0 birds per point = "abundant". Estimates for `farms, gardens, settlements' are subjective assessments, since no census work has been conducted in such habitats.

vary in the degree to which they are forest-dependent, in the degree to which they are able to persist in small forest patches away from the main Centre Hills block, and in their preference for dry lowland forest or rainforest (Table 6.3). Consequently, for some of Montserrat's landbird species, the Centre Hills is the main breeding site on Montserrat, while for others it is of less importance. With the exception of Caribbean martin *Progne dominicensis*, all of the breeding landbirds in Montserrat have been recorded during Centre Hills bird census work.

Species that flourish primarily in open country, and for which the Centre Hills represents a relatively marginal habitat are American kestrel, zenaida dove *Zenaida aurita*, common ground-dove *Columbina passerina*, smooth-billed ani *Crotophaga ani* and green-throated carib *Eulampis holosericus*. Species that are most abundant in the dry lowland forest areas, and are rather rare in the wetter forests of the Centre Hills include Lesser Antillean bullfinch, Antillean euphonia *Euphonia musica* (Fig. 6.1), yellow warbler and black-whiskered vireo *Vireo altiloquus*. Antillean crested hummingbird *Orthorhyncus cristatus*, scaly-breasted *Margarops fusca* and pearly-eyed thrasher (Fig. 6.2) and bananaquit *Coeroba flaveola* are common in all habitats in Montserrat, including inhabited and farmed areas. Caribbean elaenia *Elaenia martinica* is restricted to forest areas, but appears to be equally common in dry- and rainforest.

However, for a number of species, including several of conservation concern, mesic and wet forest is the key habitat on the island. Montserrat oriole is only found in mesic and wet forest. Scaly-naped pigeon *Columba squamosa*, bridled quail-dove, mangrove cuckoo *Coccyzus minor*, purple-throated carib *Eulampis jugularis*,

Species	Model	Distance band treatment	Goodness of Fit (df)	Density (birds ha^{-1})	Number[1] (95% CI)
Bananaquit	Hazard-cosine	Inner two distance	0.72 (1)	8.3	11,900
Caribbean elaenia *Elaenia martinica*	Hazard-cosine	Inner two distance bands pooled	0.70 (1) P =0.40	12.2 (7.8-19.2)	17,600 (11,300-27,500)
Forest thrush *Cichlherminia lherminieri*	Half-normal – Hermite polynomial	Inner two distance bands pooled	0.17 (1) P =0.68	2.17 (1.31-3.59)	3,100 (1,900-5,200)
Montserrat oriole *Icterus oberi*	Hazard-cosine	Inner two distance bands pooled	1.87 (1) P =0.17	3.65 (1.89-7.03)	5,200 (2,700-10,100)
Purple-throated carib *Eulampis jugularis*	Hazard-cosine	No truncation/ pooling	1.82 (1) P =0.18	9.52 (5.40-16.80	13,700 (7,800-24,100)
Pearly-eyed thrasher *Margarops fuscata*	Hazard-cosine	Inner two distance bands pooled	0.0008 (1) P =0.98	22.6 (12.9-39.7)	32,500 (18,500-57,100)
Scaly-breasted thrasher *Margarops fusca*	Half-normal - Hermite polynomial	No truncation/ pooling	1.83 (3) P =0.61	3.43 (2.51-4.69)	4,900 (3,600-6,700)
Scaly-naped pigeon *Columba squamosa*	Hazard-cosine	Truncate at 40m	0.0008 (1) P =0.98	3.55 (1.33-9.52)	5,100 (1,900-13,700)
Brown trembler *Cinclocerthia gutturalis*	Half-normal – Hermite polynomial	Merge into three distance bands (0-20m, 20-40m, 40-80m)	2.58 (1) P =0.11	0.288 (0.137-0.608)	410 (200-870)

Table 6.4. Population densities of Montserrat forest birds

Estimates are made using the December 2004 full census, comprising 146 point-counts, on an even grid throughout the Centre Hills. 'Distance 5.0' software was used to analyse data.

1: Assuming an area of 1,440 ha; this is the size of the polygon onto which the point-count grid was originally set out. It does not equate to the full area of forested land in the Centre Hills.

forest thrush *Cichlherminia lherminieri* and brown trembler all occur on occasion in lowland dry forest, but are much more abundant in the moist forests of the Centre Hills. Data for the other (much smaller) patch of rainforest on the island, in the South Soufrière Hills, are very scant, but seem to indicate that the bird community is similar to the Centre Hills. There is a hint that bridled quail-dove, brown trembler and forest thrush might be at lower densities in the southern forest patch, whereas Montserrat oriole may be more common.

6.1.3. Population densities

We estimated density of the more abundant forest bird species using data from the December 2004 full census of the Centre Hills (Table 6.4). Distance-sampling (Buckland *et al*., 1993) was used to convert point-count data into estimates of absolute abundance.

As always with distance-sampling of mobile species such as birds, careful consideration of the biology of the species is required, to assess whether the assumptions of the technique are likely to be violated, and hence estimates to be incorrect. We suspect that abundance estimates for hummingbird species may be too high, because they are highly mobile; estimates for these species are likely to be rather sensitive to the duration of the count. It is quite possible that birds that were not close to the observer at the outset move past the observer at some point during the course of a 10-min stationary point-count. We have also argued that early censuses of Montserrat oriole tended to over-estimate numbers because birds tended to respond to observers by approaching them and calling (Hilton *et al*. 2003). This phenomenon has tended to decline over the years since the census began, because the birds have become less naïve to human presence. Nevertheless, we suspect that distance-sampling still over-estimates oriole numbers to some degree.

All population sizes reported here are essentially estimates of the number of individuals in the post-

breeding populations, since most Montserratian birds breed during March-July. It thus includes juveniles from the previous breeding season as well as territorial adults. Consequently, it is rather difficult to convert these estimates to densities of breeding pairs.

Along with Antillean crested hummingbird, which may be substantially over-estimated, the pearly-eyed thrasher stands out as being exceptionally abundant: almost twice as common as all other species in the Centre Hills. Numbers of purple-throated carib (but see comments above regarding hummingbirds), Caribbean elaenia and bananaquit are also estimated to exceed 10,000 individuals. The Restricted-range Species – forest thrush, scaly-breasted thrasher, and Montserrat oriole occur in populations of a few thousand.

The estimate of *ca.* 5,000 Montserrat orioles equates to a breeding population of ca. 1,000 pairs (based on known breeding success during 2004, and estimates of the number of immatures and floaters in the population). Other work suggests that this is estimate is too high. A territory-mapping exercise conducted in 2005 suggests a population of several hundred pairs, but certainly well under 1000.

The estimate for brown trembler is open to some doubt, because the detection curve is a relatively poor fit to the data, but the estimates are of a population of only a few hundred birds. Given that tremblers are almost entirely confined to the rainforest areas of Montserrat (being extremely rare in lowland dry forest), and also that there is some (tentative) evidence of decline since 1997 (Dalsgaard *et al*., 2007), there is some concern for this species. Almost nothing is known of its ecology on Montserrat.

Figure 6.3. Montserrat oriole Icterus oberi. (Photo: C. Bowden, RSPB)

Figure 6.4. Forest thrush Cichlherminia lherminieri (Photo: G. Hilton, RSPB)

6.1.4. Conservation importance of the Centre Hills

The Centre Hills is an Important Bird Area (Sanders, 2006) of considerable importance to global conservation. It qualifies as such because it supports a significant assemblage of Restricted-range Species, and important numbers of two Globally Threatened Species.

Apart from being one of only two sites for the endemic, Critically Endangered Montserrat oriole (Fig. 6.3), it is possibly the world headquarters of the globally Vulnerable forest thrush (Fig. 6.4): the species is reported to be uncommon and declining on St Lucia and Guadeloupe, with status on Dominica unclear (BirdLife_International, 2006), D. Wege, *pers comm*.)

In keeping with the high endemicity characteristic of the Caribbean region, Montserrat forms part of an Endemic Bird Area – EBA030, the Lesser Antilles (Stattersfield *et al*., 1998). This 6,300 km^2 EBA stretches from Grenada in the South to Anguilla in the North, and has 33 Restricted-range [bird] Species, of which 24 are found only within this EBA, and the remaining nine are found in parts of some of the neighbouring EBA's (EBA029 Hispaniola, EBA028 Puerto Rico & the Virgin Islands, EBA026 Bahamas).

(Stattersfield *et al*., 1998) report twelve Restricted Range Species occurring on Montserrat (Table 6.5). There are substantial populations of ten of these species in the Centre Hills. Lesser Antillean flycatcher *Myiarchus oberi* is a very rare species on Montserrat, and its status is unclear. It is most likely to be a non-breeding vagrant, occasionally detected in lowland dry forest, and not recorded in the Centre Hills hitherto. Antillean euphonia is also very scarce and is primarily found in the fringes of the hills during the winter months. It has been recorded in the Duberry area of the Centre Hills during Forest Bird Monitoring work. It is not clear whether it is a regular breeding species in Montserrat, although we think this is likely (in very small numbers). For bridled quail-dove, purple-throated carib, forest thrush, brown trembler and Montserrat oriole, the majority of the Montserratian population occurs in the Centre Hills. The remaining five species have substantial populations elsewhere in Montserrat (see above).

The two remaining IBAs on Montserrat are the Northern Forested Ghauts and the South Soufrière Hills. The former comprises discrete, small patches of lowland dry forest, mostly fringing the Centre Hills. The latter is a patch of wet and mesic forest in the exclusion zone of the south of the island, which is surrounded by pyroclastic flows. Both sites support most of the Restricted-range Species that the Centre Hills holds. However, the

Species	Global Status	Global Breeding Distribution
Green-throated carib	Least Concern	Common throughout Lesser Antilles & in Puerto Rico & Virgin Islands.
Purple-throated carib *Eulampis jugularis*	Least Concern	Lesser Antilles except Anguilla & St Martin in north; common in most islands.
Antillean crested hummingbird *Orthorhyncus cristatus*	Least Concern	Throughout Lesser Antilles & in Puerto Rico & Virgin Islands; common in most islands.
Lesser Antillean flycatcher *Myiarchus oberi*	Least concern	Lesser Antilles between St Kitts & St Lucia; common in most islands.
Forest thrush Cichlerminia lherminieri	Vulnerable	Rare St Lucia, uncommon Guadeloupe & Dominica.
Scaly-breasted thrasher *Margarops fusca*	Least Concern	Throughout Lesser Antilles except Anguilla & St Martin in north & St Vincent. Apparently extirpated from St Eustatius, Antigua, Barbados; common in most other islands.
Pearly-eyed thrasher *Margarops fuscata*	Least Concern	All of Lesser Antilles, plus Hispaniola, Dominica, Bahamas, Netherlands Antilles; common in most islands.
Brown trembler Cinclocerthia gutturalis	Least Concern	Common Saba, Guadeloupe, Dominica; uncommon St Christopher, Nevis, St Lucia, St Vincent; rare Martinique, Grenada.
Lesser Antillean bullfinch *Loxigilla noctis*	Least Concern	Throughout Lesser Antilles & in some Virgin Islands; common in most islands.
Antillean euphonia *Euphonia musica*	Least concern	Hispaniola & Puerto Rico (where common); uncommon in Lesser Antilles between Antigua & Grenada (except Barbados where absent)
Montserrat oriole *Icterus oberi*	Critically Endangered	Endemic to Montserrat.

Table 6.5. Restricted-range (bird) Species reported to occur in Montserrat[1]

1: Stattersfield *et al.*, (1998)

Northern Forested Ghauts site does not have Montserrat orioles, and other key species such as bridled quail-dove, forest thrush and brown trembler are extremely scarce. Both sites are much smaller than the Centre Hills (only 100-400 ha, compared to ca. 1,400 ha for the Centre Hills). It is therefore clear that the Centre Hills is by far the most important site for bird conservation in Montserrat, and has great importance in a regional and global context.

6.1.5. Threats and limiting factors

Habitat destruction

The Restricted-range and globally threatened bird species that occur in Montserrat are primarily threatened, not surprisingly, by habitat destruction and invasive alien species. The forest specialist species - bridled quail-dove, forest thrush, brown trembler, Antillean euphonia, and Montserrat oriole - are most at risk from habitat destruction. . These are also the species with the smallest global ranges. However, as previously noted, in Montserrat, rainforest destruction has been slight in recent years. Dry forest is more vulnerable, because lying predominantly outside the Forest Reserve and in areas heavily impacted by human agricultural and urban development. Among the Restricted-range Species in Montserrat, Antillean crested hummingbird, forest thrush, scaly-breasted thrasher, Lesser Antillean bullfinch and possibly Antillean euphonia can be considered dry forest specialists. However, the first three of these are also found relatively frequently in other forest types, and the bullfinch is common in human-dominated areas.

Degraded dry forest areas are relatively widespread in lowland Montserrat, but only a relatively small area of dry forest is contiguous with the main Centre Hills forest block, predominantly in the north-east of the island. Thus isolation and edge-effects are likely to be most severe for dry forest bird populations.

Invasive Alien Animals and opportunistic omnivores

Lesser Antillean endemic birds are perhaps not as sensitive to introduced predatory mammals as species of islands such in the Pacific Ocean, because terrestrial predators were already present, in the form of various

reptile and amphibian species, prior to human introduction of rats, cats and mongooses. Nevertheless, the impacts of introduced species on Lesser Antillean landbirds are not well studied, and anecdotal information suggests that they may have been under-estimated in the past. As noted above, both black (ship) rats *Rattus rattus* and brown (Norway) rats *R norvegicus* are abundant in the Centre Hills, and might be expected to reduce tree regeneration, and macro-invertebrate and small herptile abundance (Allen *et al.*, 1994; Wilson *et al.*, 2003; Towns *et al.*, 2006). If this does occur in Montserrat, the effects on forest bird species might be considerable, for example by reducing food availability and changing habitat structure. An experiment is currently under way to investigate such effects. Research work during 2001-5 has shown that rats (apparently mostly *R rattus*) are major predators of Montserrat oriole nests, and also predate forest thrush nests (G.A.L. Gray pers comm.). Population models show that rat predation is sufficient to drive a decline in the Montserrat oriole population in the Centre Hills in some years. There is no information on whether other bird species are similarly affected.

As noted above, feral cats are also probably present in the Centre Hills, with unknown impacts on forest birds. The high abundance of opportunistic omnivores is a potential concern for the avifauna. Both as competitors and predators, rats and thrashers can have important detrimental effects on the avifauna. They are notable predators of birds nests, and major consumers of large invertebrates (Arendt, 2006; Towns *et al.*, 2006).

Catastrophic disturbance

The impacts of hurricanes on West Indian avifaunas have been well-studied in recent years (Wiley and Wunderle, 1994). In general, effects have been relatively short-term; it is often difficult to tell whether observed declines in some populations reflect mortality or redistribution to less affected areas. Most severe impacts are thought to occur due to food shortage after the storm – affecting nectarivores and frugivores above all – rather than due to direct impacts of the storm itself. There is evidence of inter-site and inter-habitat movements by some populations in response to hurricane damage. Hurricane Hugo, one of the most powerful storms in history, passed directly over Montserrat in October 1989, with massive impacts on human society. There were also enormous ecological effects, with defoliation of forests, and substantial tree-fall. Bird survey work in March 1990, with comparisons to earlier work by the same observer in 1984, suggested that the avifauna had suffered relatively minor and short-lived impacts (Arendt, 1990). There was a suggestion that the steeply incised valleys of the hill ranges had served as refugia where defoliation was less severe. The effects of the volcanic eruption on the avifauna are summarised above.

Catastrophic natural events, while a natural feature of Caribbean islands, are also a major risk to the avifauna. If more than one negative factor (unusual precipitation, hurricanes and eruptions) occurs close together in time, then populations with limited ranges are clearly vulnerable to extinction, whether these events are natural or not. Population modelling indicates that such events in combination are likely to greatly increase extinction risk for Montserrat oriole, and the 1997-2002 decrease in the oriole population seems to have resulted from a combination of ash-falls and dry season drought, plus high numbers of nest predators.

Precipitation

Analysis of forest bird monitoring data indicates that rainfall is an important determinant of bird population trends, though exact patterns are currently hard to determine (Dalsgaard *et al.*, 2007). Detailed studies of Montserrat oriole support this. In general, reproductive output of orioles is low in years when the dry season (which coincides broadly with the breeding season) is relatively dry (unpublished data). This is a consequence of both reduced reproductive investment (laying frequency, clutch size) and increased nest failure rates, particularly due to predation. Such a response may not be common to all species: Montserrat oriole is one of rather few species to strongly avoid dry forest areas, so clearly does not tolerate drought-prone areas well. There is also evidence that adult survival of orioles is lower when the wet season is relatively wet (unpublished data). This may, speculatively, result from reduced arthropod availability in cool, wet and windy periods during winter. Recent research in other West Indian islands supports the idea that weather patterns have important influences on bird population trends (Dugger *et al.*, 2004).

Clearly, variability in weather is a natural phenomenon, and as such would not normally be considered a threat to conservation interests. However, if it is true that it is a major driver of population trends, then it is clearly important to monitor weather and be aware of likely consequences of droughts and wet periods. Furthermore, anthropogenic climate change will cause directional shifts in temperature and precipitation patterns during the present century, outside the range of current variations, and hence might cause major changes in bird abundance.

Threats – Conclusions

This section on threats to the birds of the Centre Hills needs to be set in context: over ten years of bird monitoring, all forest bird species have been stable or increasing, despite some shorter-term declines, that appeared, in the case of the oriole 1997-2002, extremely worrying (see below). The possible exception to this, though data are scant due to its rarity, is the brown trembler. Thus, it seems that, in recent years, the threats described have not been sufficient to drive population declines in Montserrat's forest birds.

Nevertheless, there is much to be concerned about. First, Montserrat's forest birds have lost approximately 60% of their habitat during the volcanic eruptions. There has been further small-scale loss of small

and peripheral forest areas in the north, as the area has been re-developed. Therefore, the Centre Hills are increasingly the sole location for many species. Second, although invasive alien species and the very high pearly-eyed thrasher densities don't appear to be driving ongoing declines in forest birds, we do not know to what extent populations are limited by these factors; that is, forest bird populations may be stable, but at substantially lower levels than would be seen in the absence of aliens. Third, climatic threats will worsen dramatically in future years, due to anthropogenic climate change. Fourth, changing climate might increase the impact of invasive alien species. For instance, increased frequency or force of hurricanes might create more short-term habitat destruction, but also the higher levels of disturbance might favour invasive alien plants over native species. As climate moves out of the range experienced on Montserrat in the past, native species may be increasingly stressed, and therefore be increasingly sensitive to competition and predation by invasive alien species. Finally, some invasive species are still in an increasing phase – most notably pigs, with their enormous destructive potential, and perhaps some plant species.

6.2 Patterns in bird diversity within the Centre Hills: Implications for biodiversity conservation

6.2.1. Altitudinal variation in species abundance

The Centre Hills continuous forest block runs from almost sea level in the north-east of the island to around 740 m asl on the summit of Katy Hill, and comprises a transition from dry forest, through mesic and wet forest to elfin forest: altitude is the key environmental gradient in the site.

The Centre Hills Forest Bird Monitoring Programme provides quantitative data from points distributed between ca.50-740 m asl, and in all major habitat types, and thus gives good information on altitudinal distribution of bird species (Fig 6.5). Among forest bird species, there are several which appear to be most frequent in dry forest: mangrove cuckoo, scaly-naped pigeon, Caribbean elaenia, forest thrush, scaly-breasted thrasher and Lesser Antillean bullfinch all show a general decline in abundance with increasing altitude. The effect is particularly marked for mangrove cuckoo and Lesser Antillean bullfinch. A second group of species reach peak abundance in mesic and wet forest at intermediate altitudes: bridled quail-dove, brown trembler and pearly-eyed thrasher reach peak abundance at around 350 m, in the mesic forest zone, while purple-throated carib and Montserrat oriole peak at 500 m, where mesic forest grades into wet forest. Among these, Montserrat oriole shows a particularly pronounced pattern, being effectively absent from dry forest, while bridled quail-dove is almost absent from high altitude sites. Antillean crested hummingbird shows a curious and not very pronounced pattern, which we do not fully understand, of reaching peak abundance in dry and wet-elfin forest, with lower abundance at intermediate altitudes. Bananaquit, somewhat surprisingly, becomes more abundant with increasing altitude.

Overall species richness tends to decrease with increasing altitude in the Centre Hills (Fig 6.5). However, this trend masks a different pattern among more specialist forest bird species and among Restricted-range Species, which are generally of greatest conservation concern. Among these groups, species richness increases with increasing altitude up to around 350 m asl, and decreases again at greater altitudes.

The conclusion to be drawn from these varied altitudinal distribution patterns among species and species-groups is that the conservation value of the Centre Hills can be maximised by conserving the full range of elevations in a single continuous forest block. This is the only way to capture the different altitudinal preferences of the full range of species. Given the comments made elsewhere about the relatively small area of dry forest, the greater threats it faces and its more fragmented state outside the forest reserve, maintaining an area of dry forest continuous with the higher elevation forest currently contained with the forest reserve is vital.

Curves are based on Generalised Linear Models, using altitude as a covariate, year as a categorical effect, and point x season as a repeated-measures effect. Linear and quadratic altitudinal effects were tested, and the best fit model (using Maximum Likelihood) was used. For more abundant species, the response variable was bird counts, with a Poisson distribution and log-link function; for less abundant species, bird presence-absence was the response variable, with a binomial distribution and logit link function. For species groups, the response variable was number of species, with a negative binomial distribution and log-link function.

6.2.2. Spatial patterns in the Centre Hills avifauna

Figs 6.6 – 6.10 illustrate some spatial patterns in bird richness and abundance, based on an Inverse Distance Weighted interpolation of the 1997 and 2004 census data. The maps need to be interpreted with some caution. Each census comprised a single 10-min point-count in each location, so there is a considerable degree of stochasticity in the counts; apparent hotspots can be driven by random chance to some extent. Furthermore, each census lasted for approximately two weeks, during which weather conditions varied substantially. Certain parts of the hills were done on days when the weather was relatively poor for detecting birds, which can generate spurious spatial patterns. Finally, the interpolations are based purely on the count data; they take no account of topography or other environmental variables, which, in the steep hills of Montserrat can vary over very small areas, and which we have shown are important determinants of bird abundance.

In both 1997 and 2004, Montserrat orioles had a number of localised and widely scattered hotspots, and were scarce across most of the Centre Hills (Fig 6.6a-c).

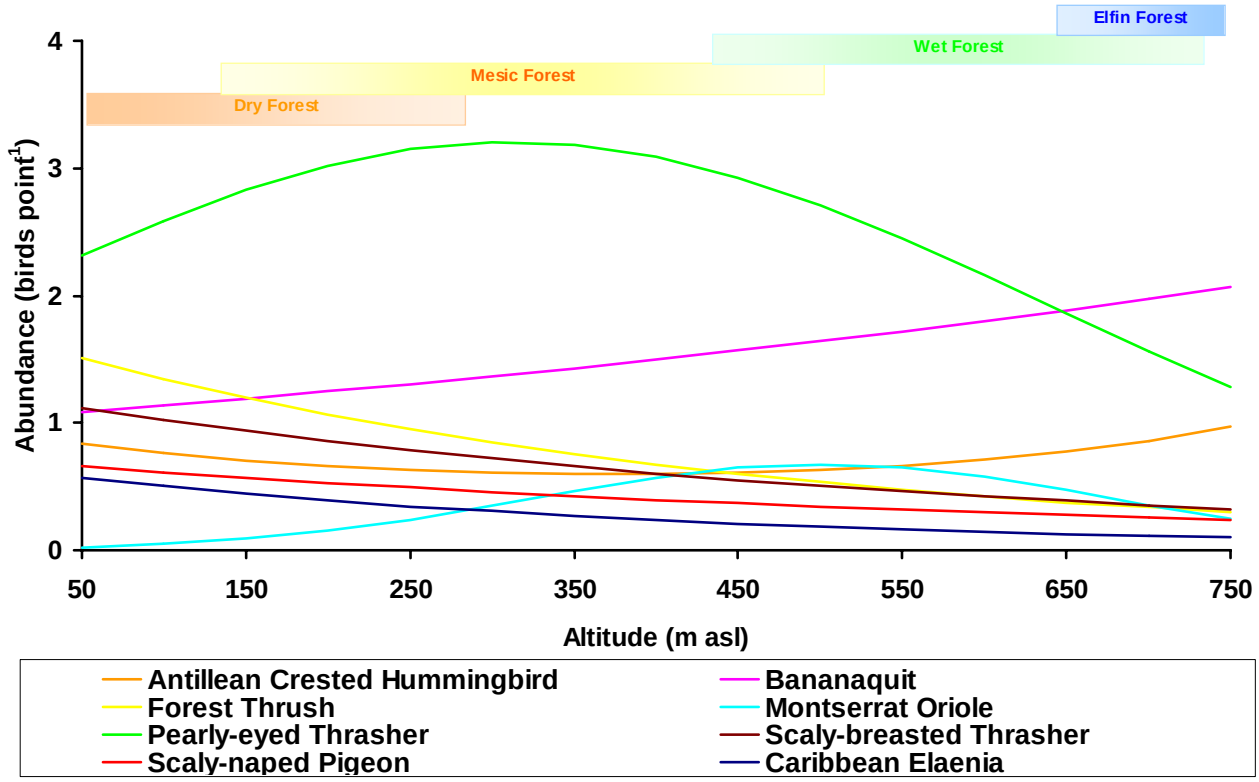


Fig 6.5. Altitudinal abundance patterns among forest birds in the Centre Hills.
(a) Abundant species (models based on abundance)

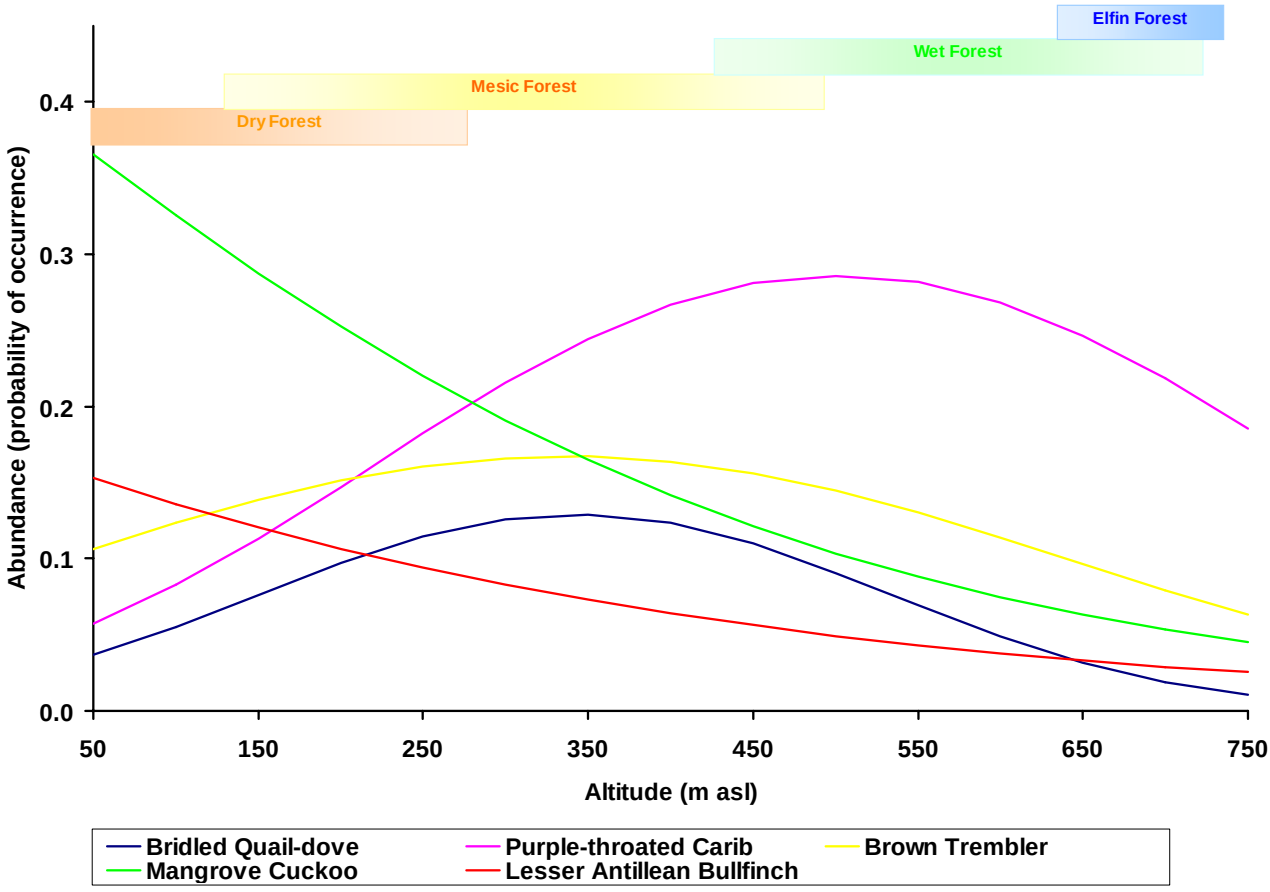


Fig 6.5. Altitudinal abundance patterns among forest birds in the Centre Hills.
(b) Less abundant species (models based on presence-absence)

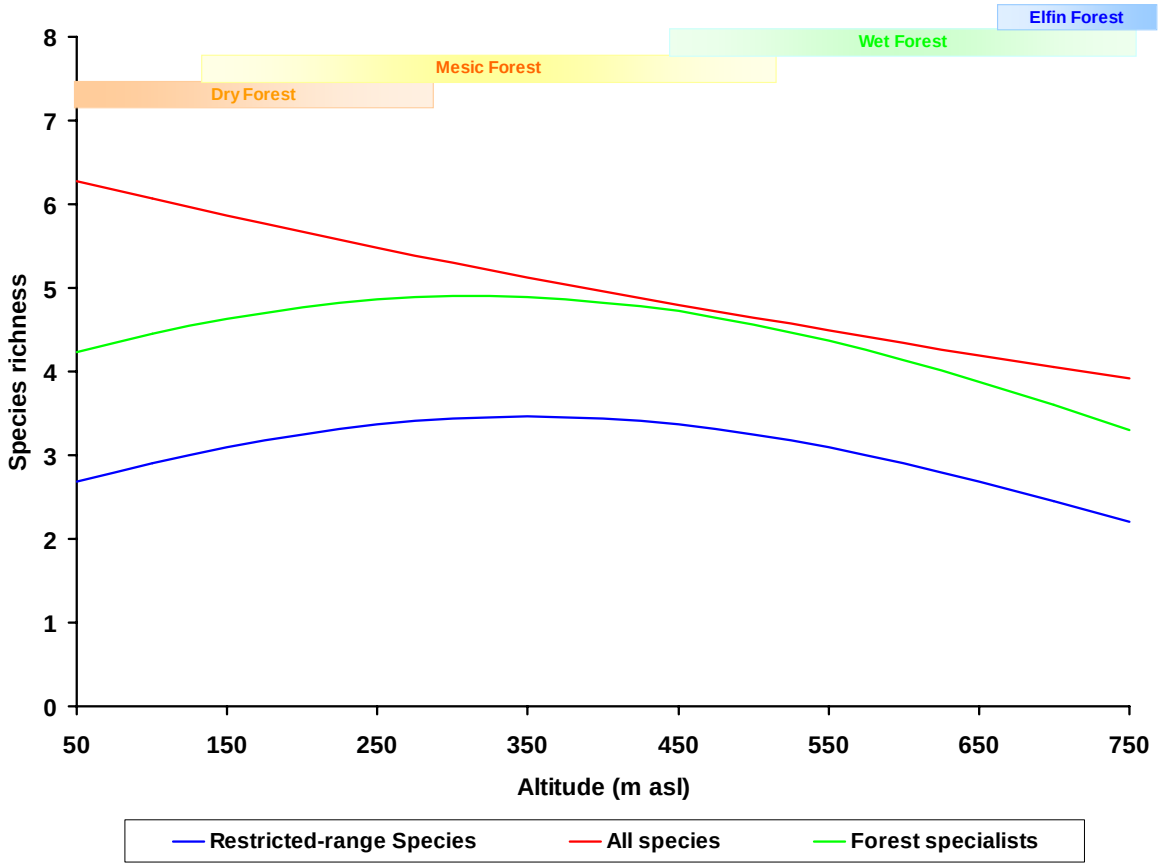


Fig 6.5. Altitudinal abundance patterns among forest birds in the Centre Hills.
(c) Altitudinal variation in abundance of bird species groups in the Centre Hills.

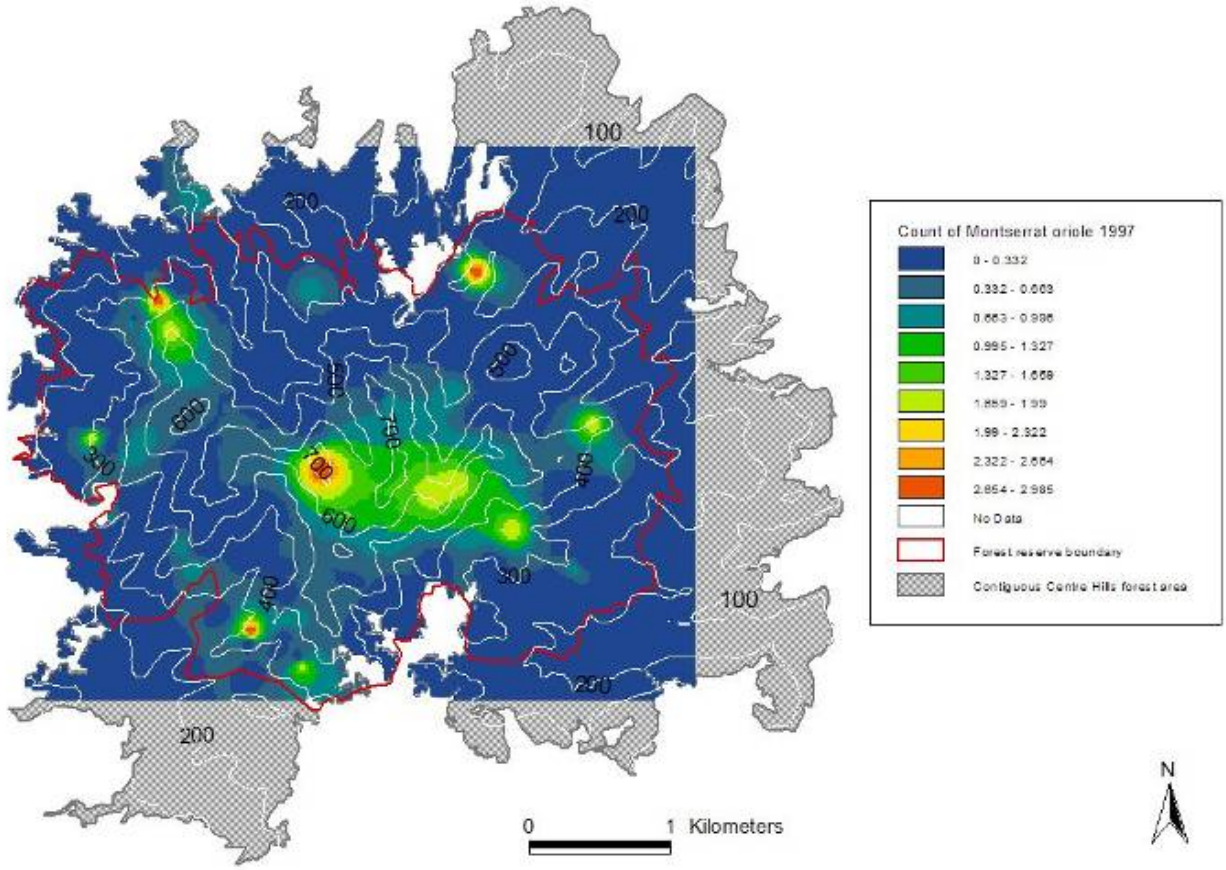


Fig. 6.6a. Interpolated map of Montserrat oriole abundance in 1997

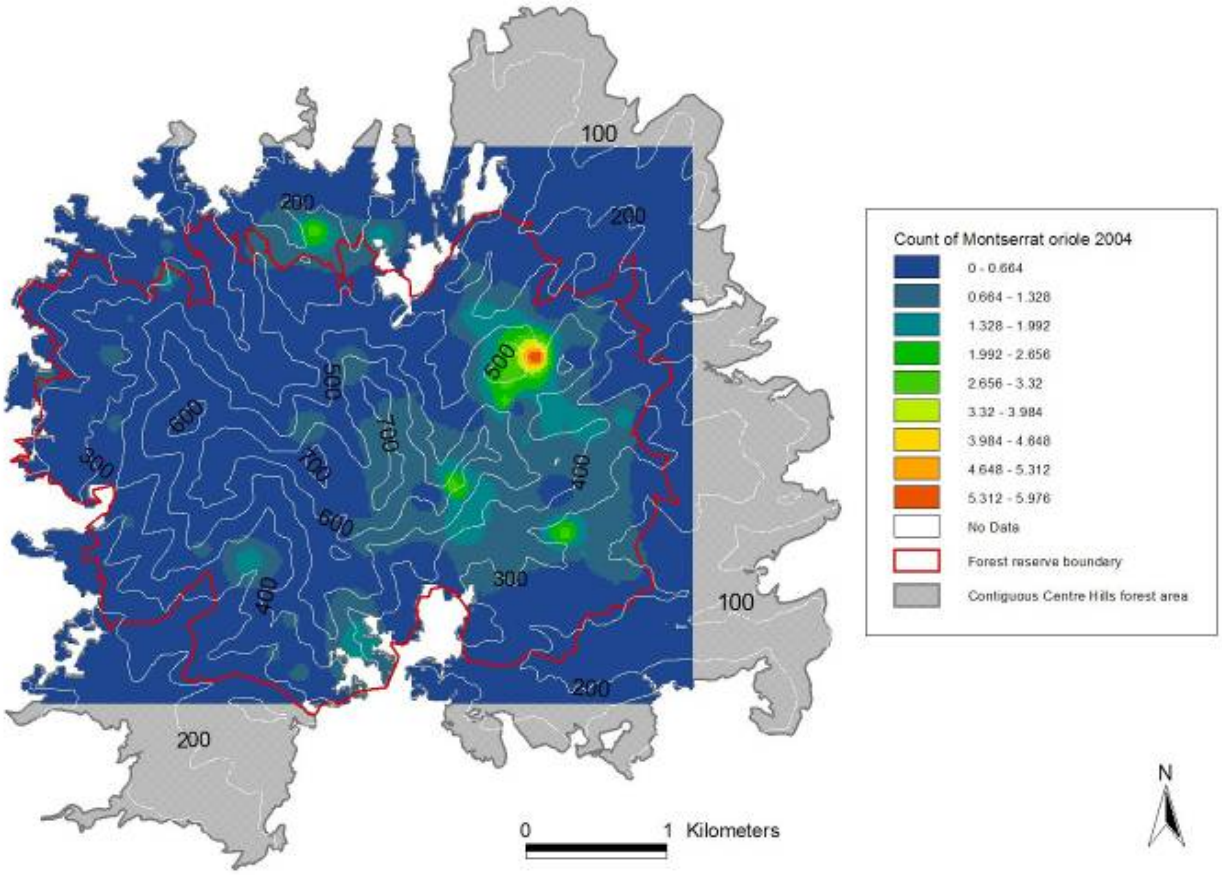


Fig. 6.6b. Interpolated map of Montserrat oriole abundance in 2004

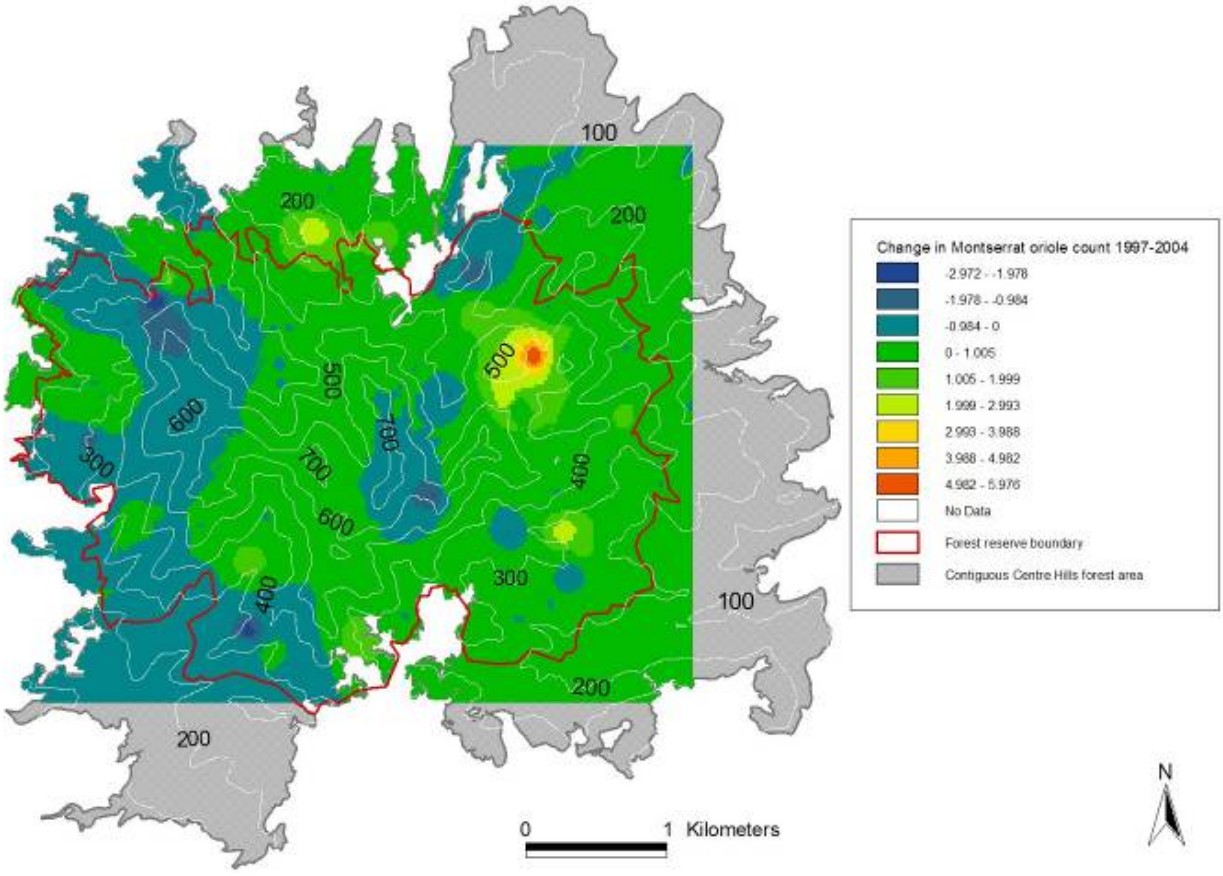


Fig. 6.6c. Interpolated map of change in Montserrat oriole counts between 1997 and 2004

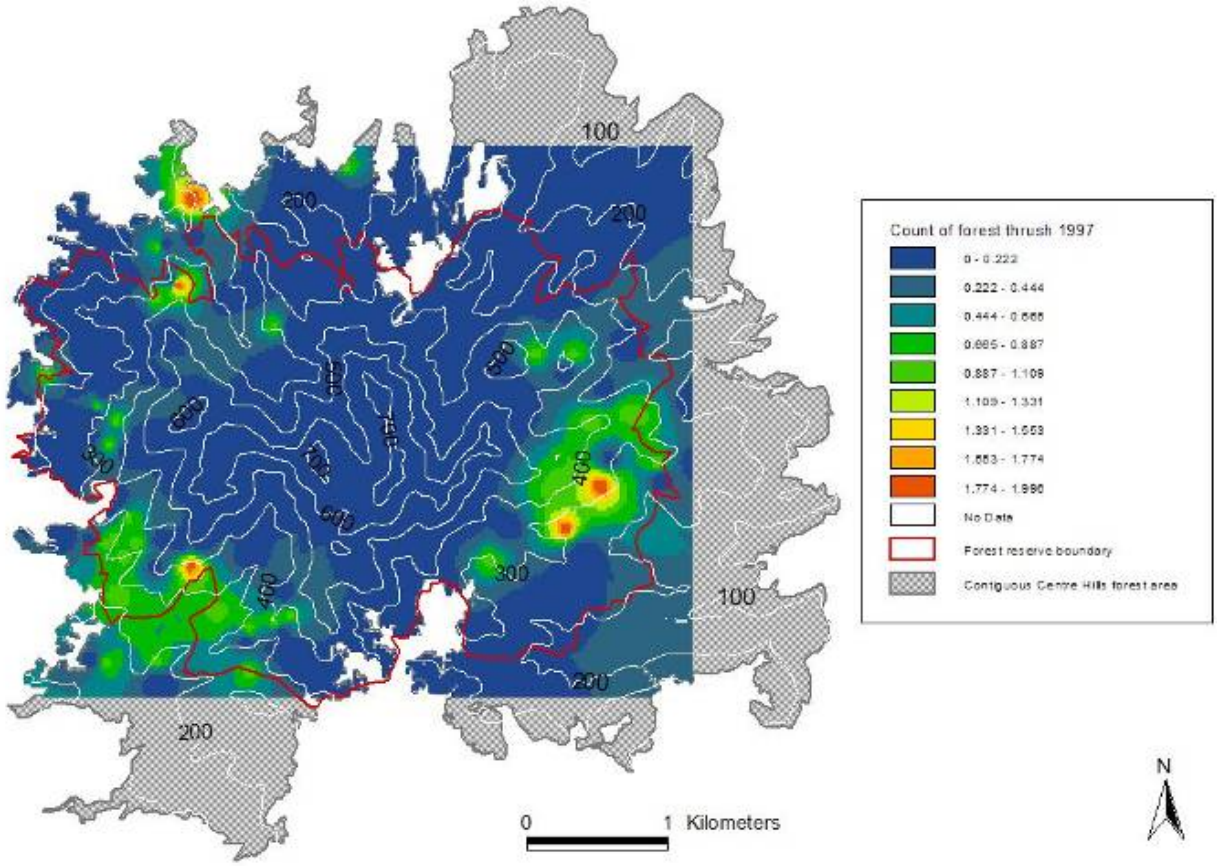


Fig. 6.7a. Interpolated map of forest thrush abundance in 1997

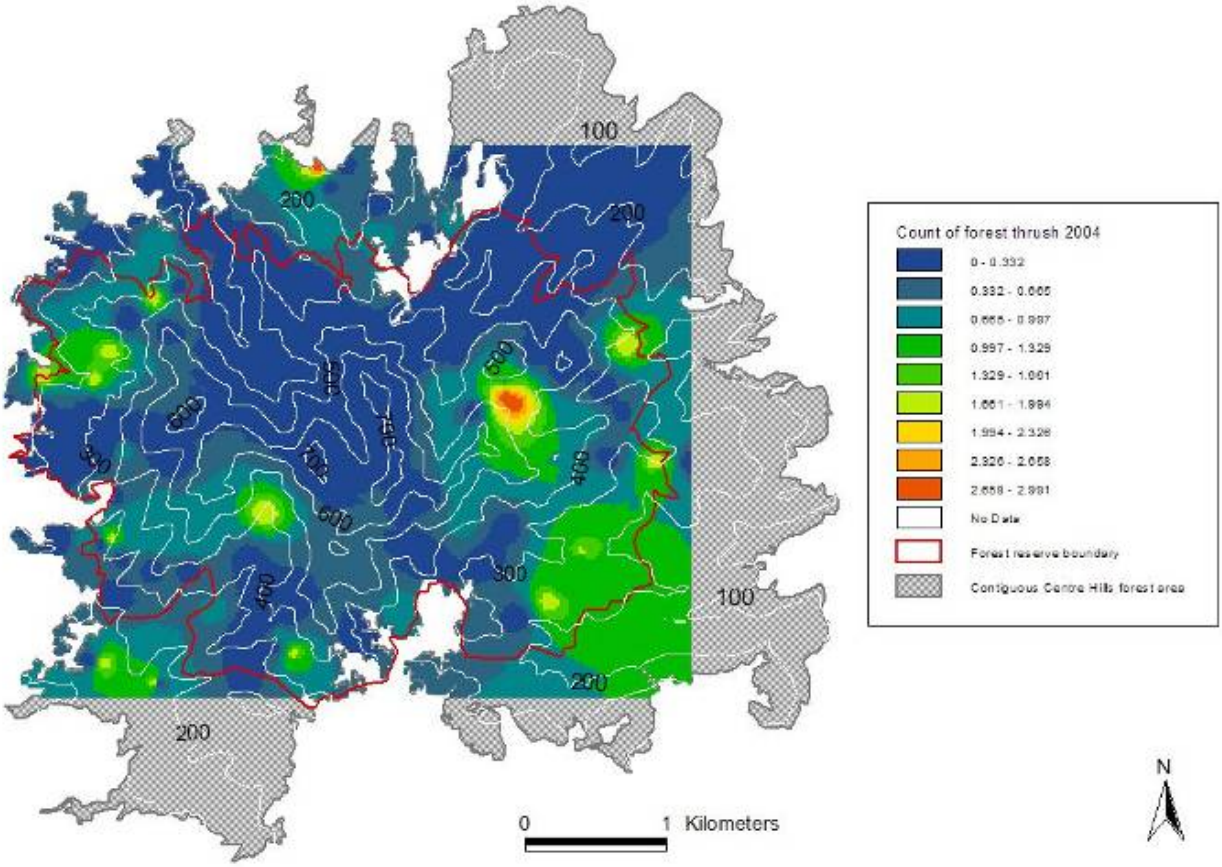


Fig. 6.7b. Interpolated map of forest thrush abundance in 2004

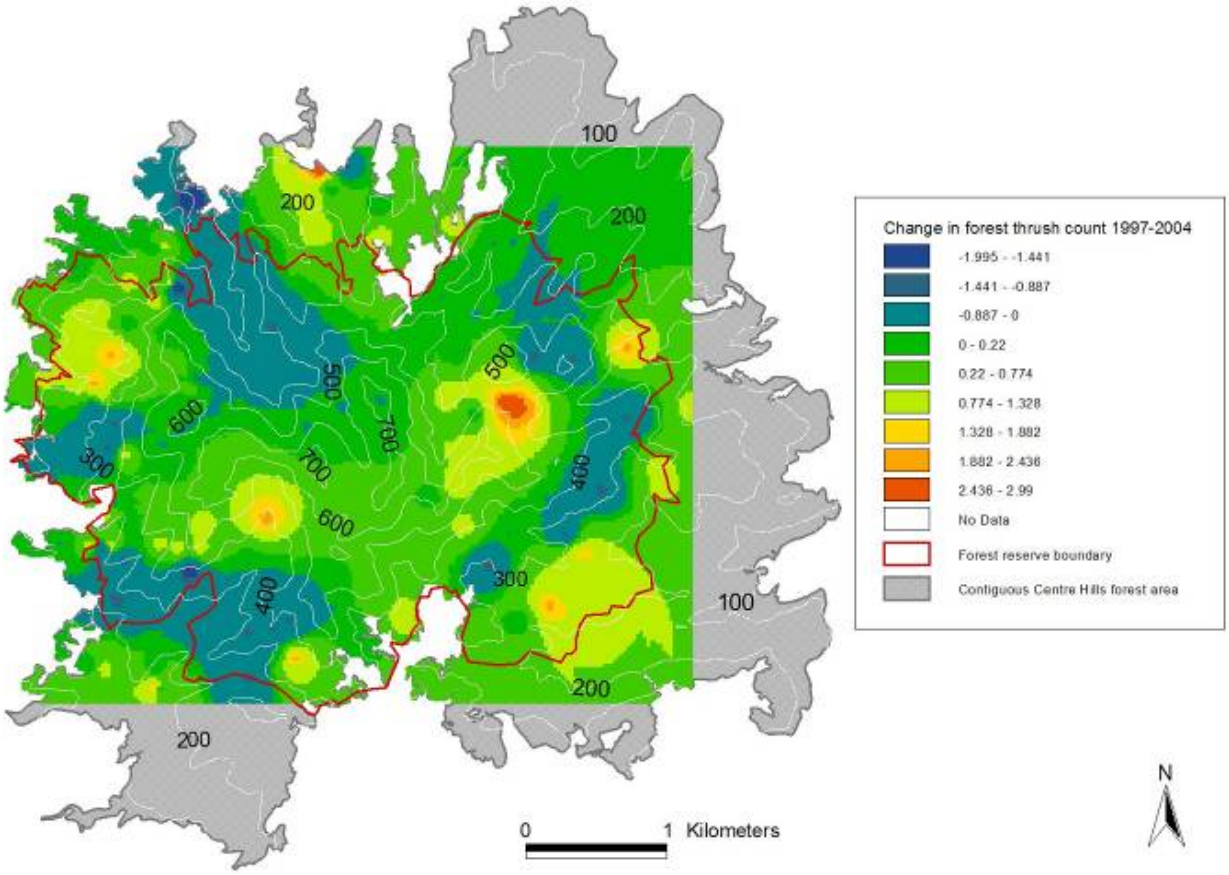


Fig. 6.7c. Interpolated map of change in forest thrush counts between 1997 and 2004

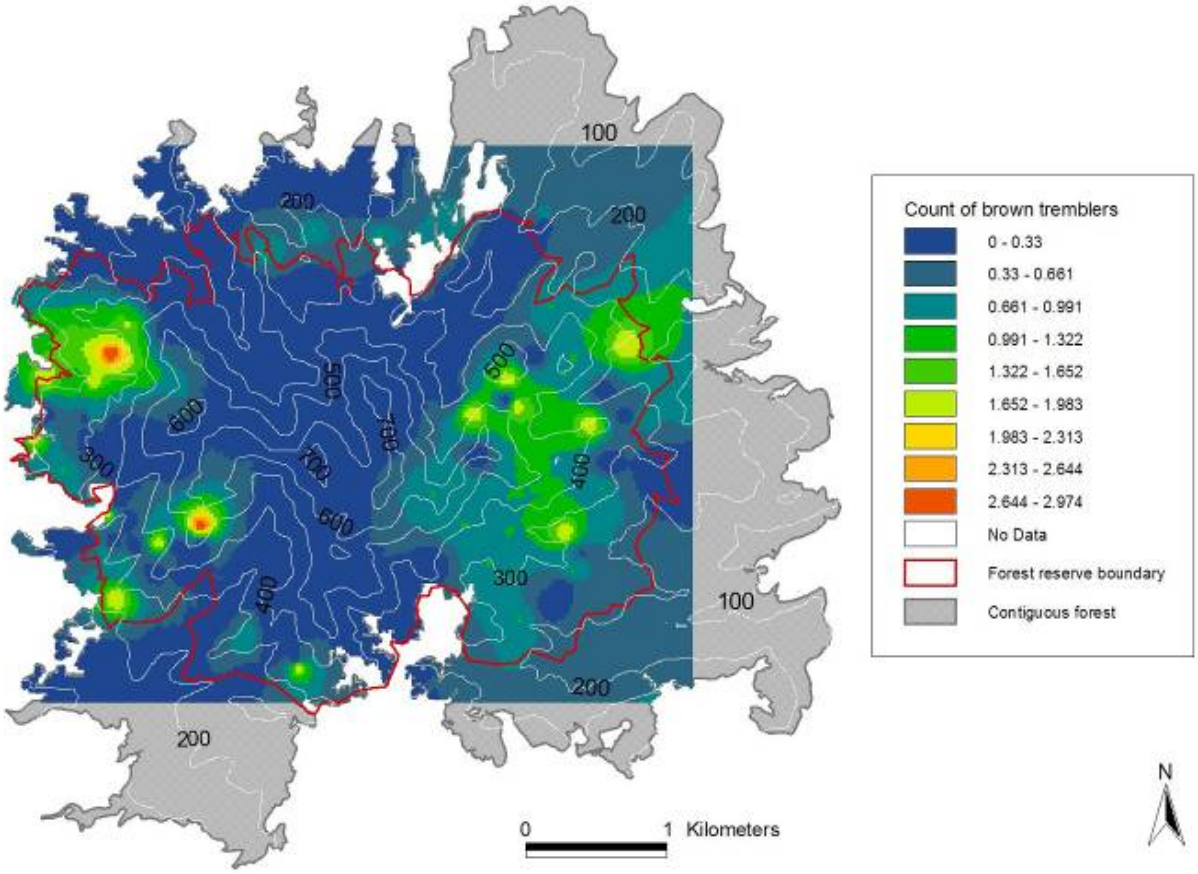


Fig. 6.8. Interpolated map of brown trembler counts (1997, 1999 and 2004 data pooled)

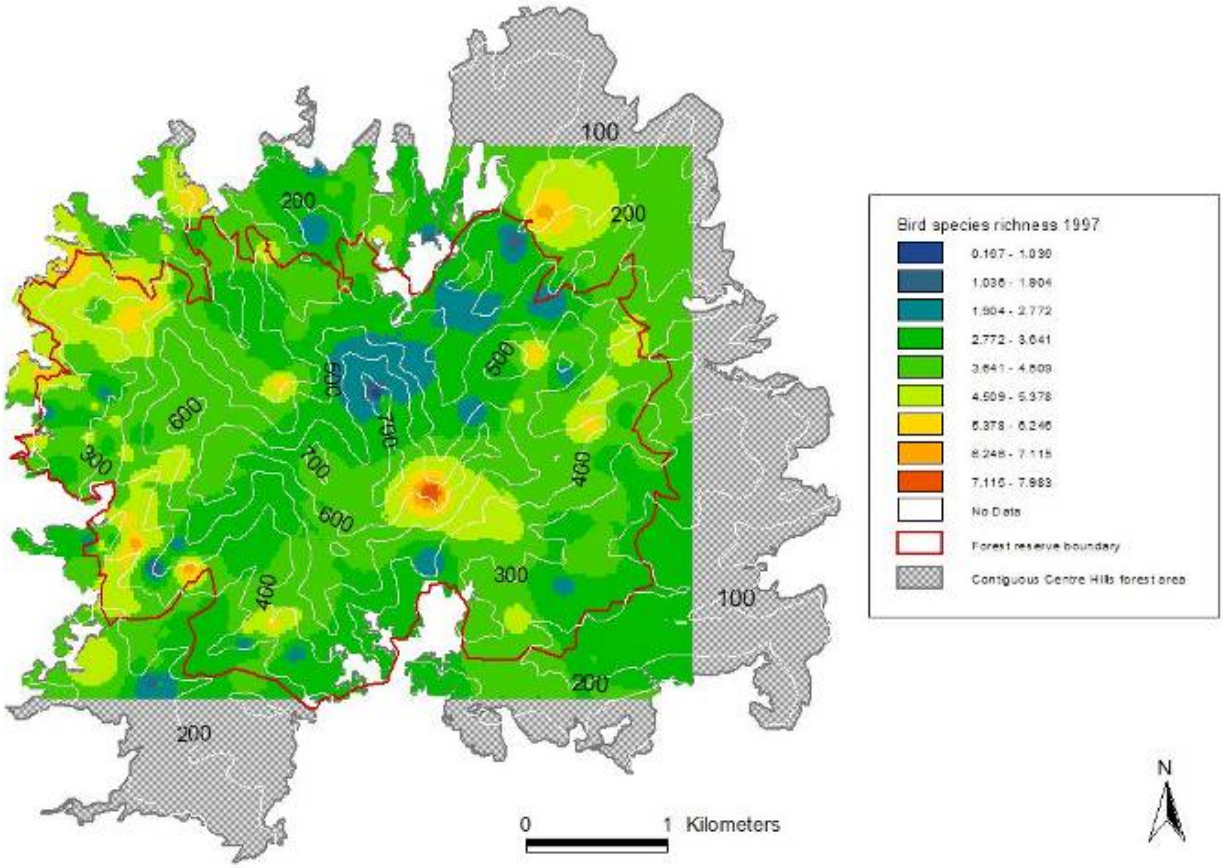


Fig. 6.9a. Interpolated map of bird species richness in 1997

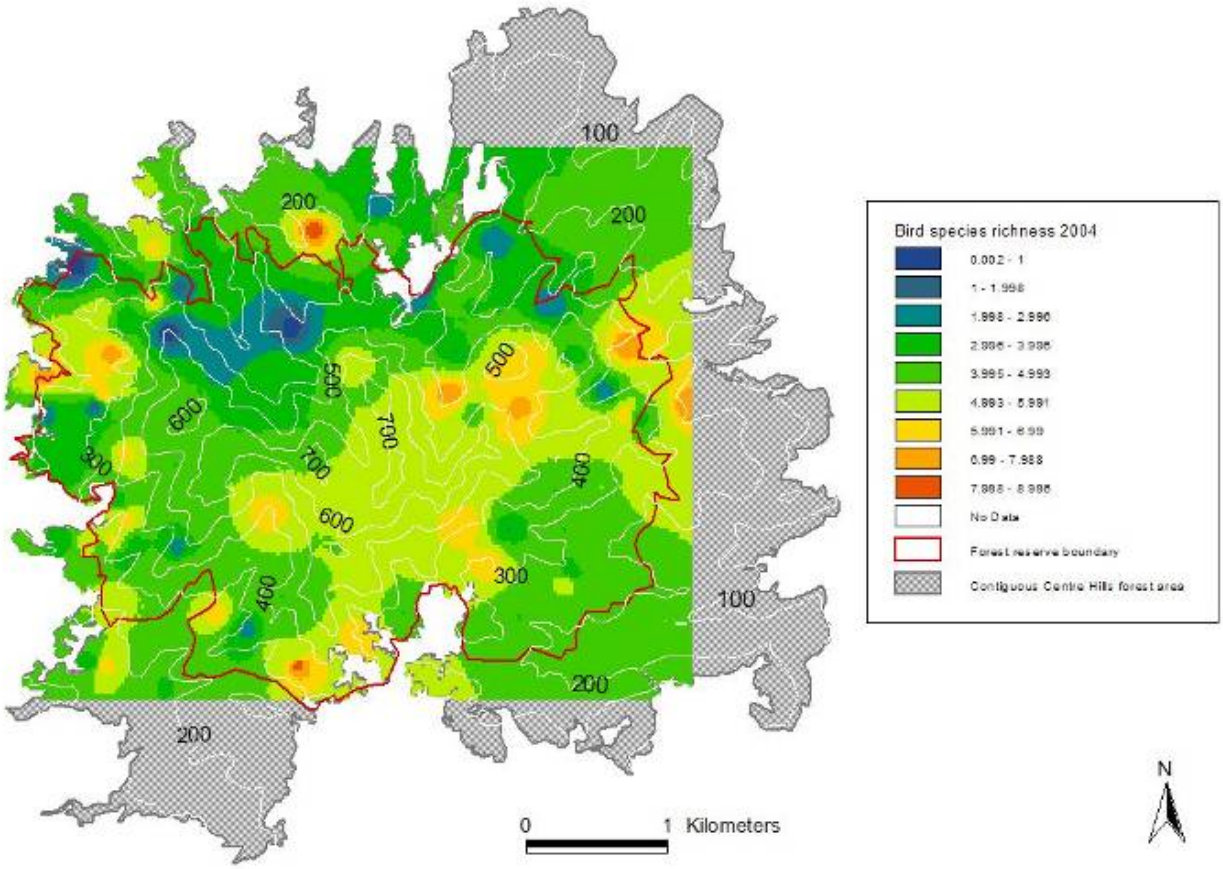


Fig. 6.9b. Interpolated map of bird species richness in 2004

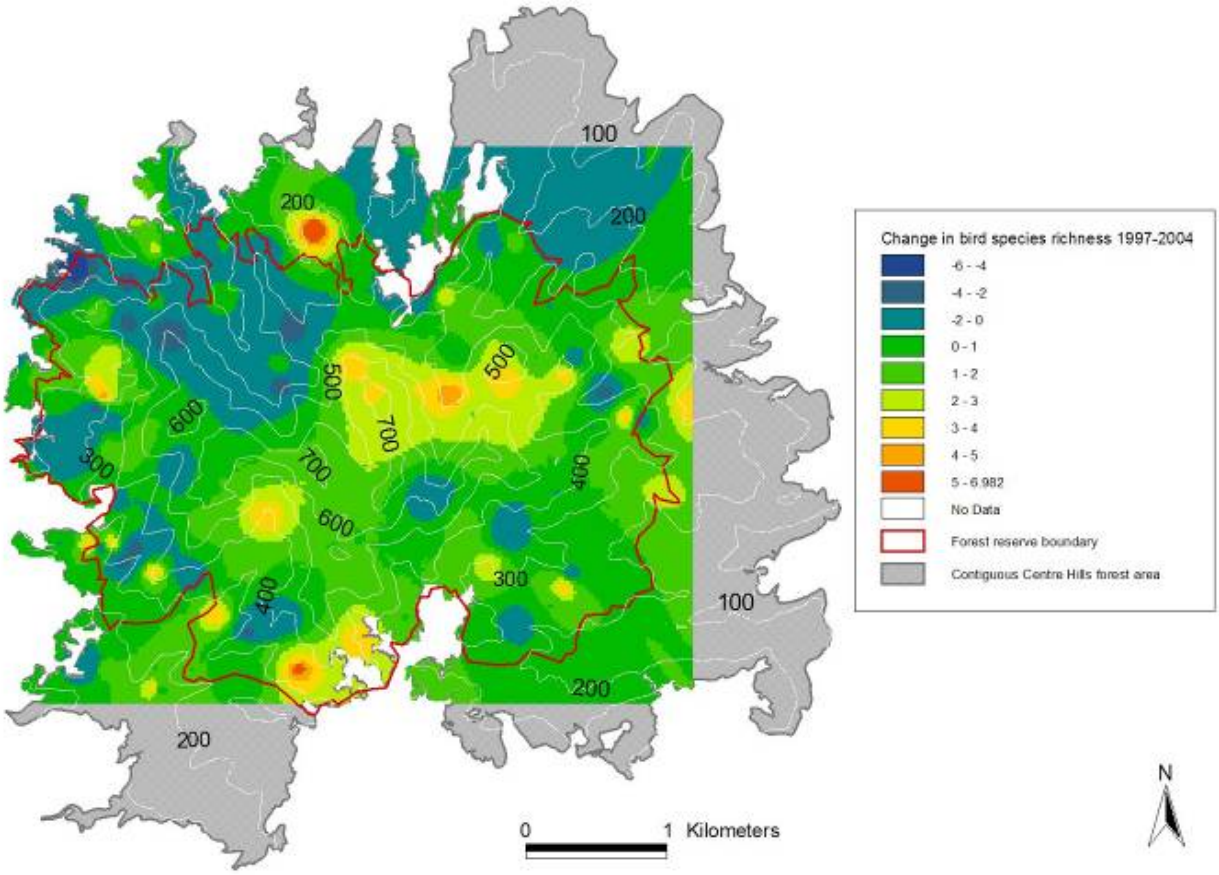


Fig. 6.9c. Interpolated map of change in species richness between 1997 and 2004

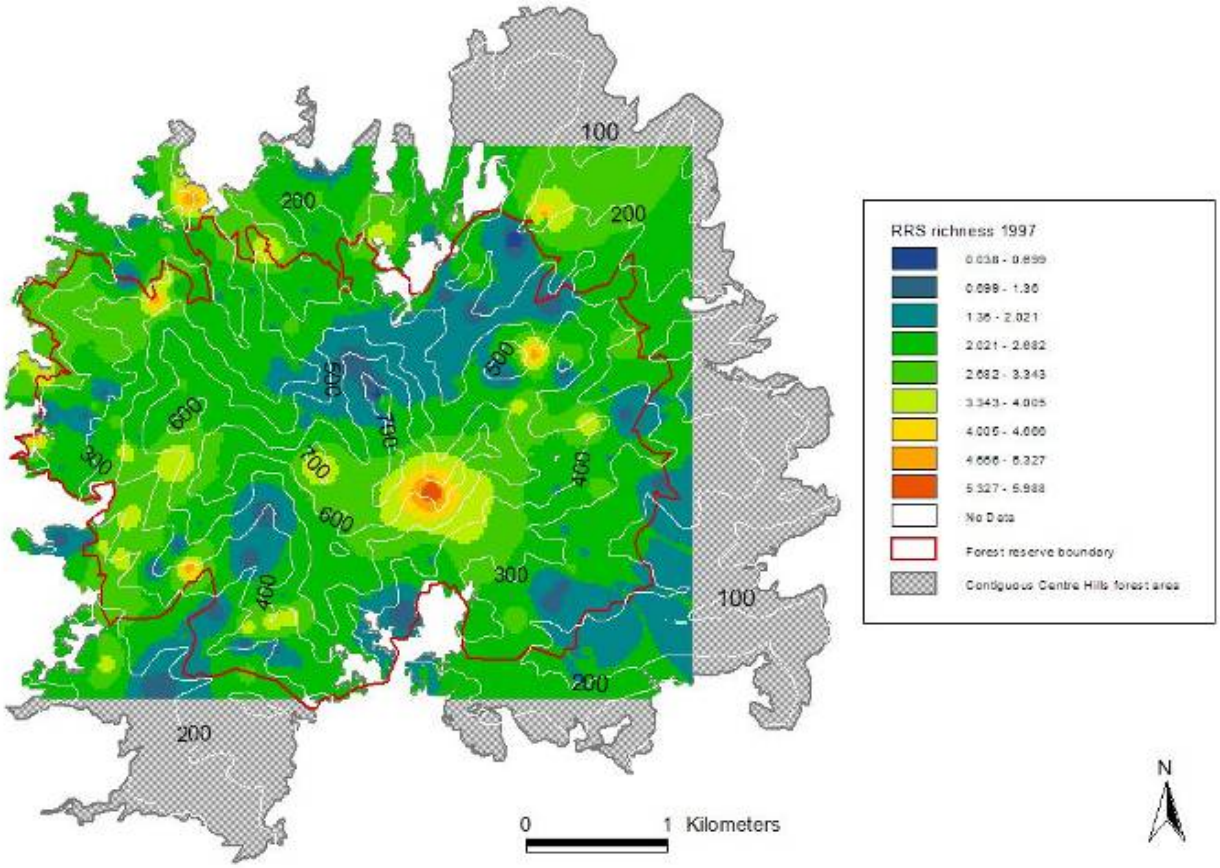


Fig. 6.10a. Interpolated map of restricted range species richness in 1997

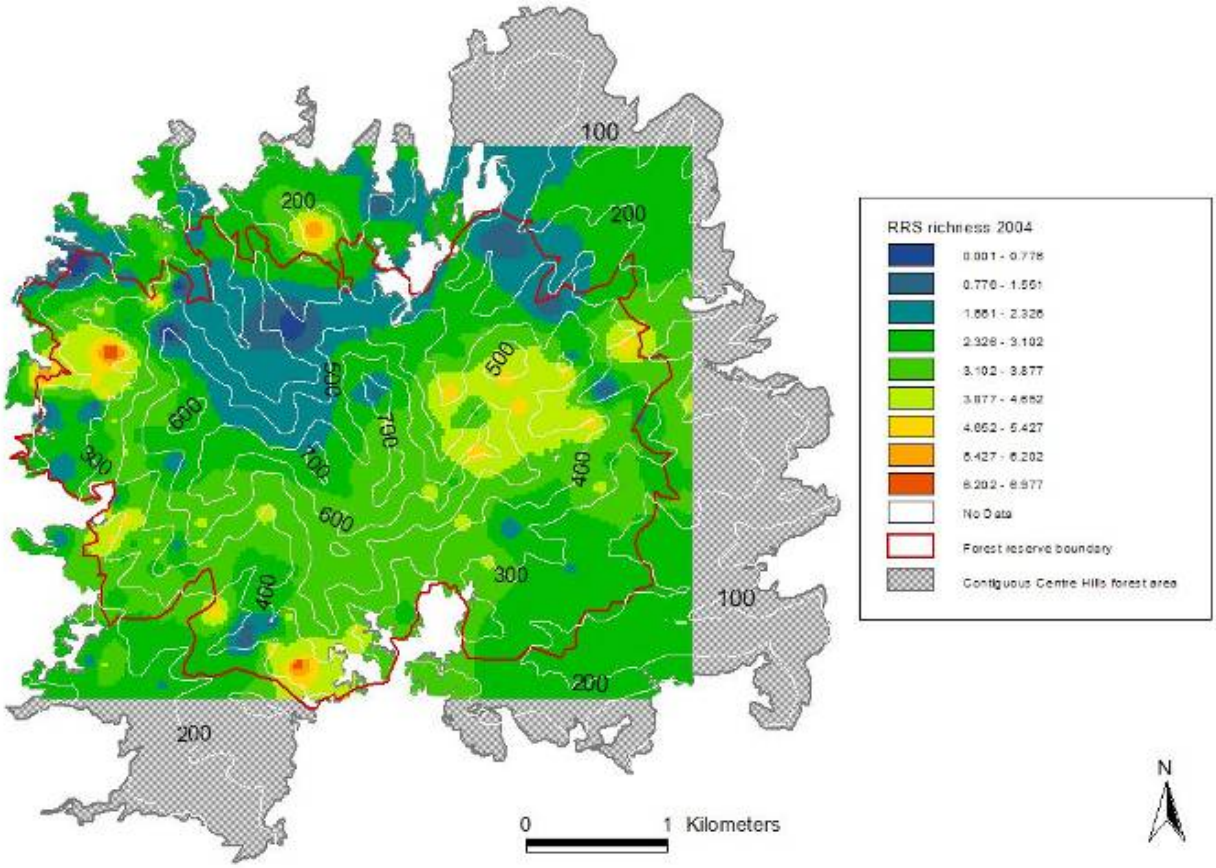


Fig. 6.10b. Interpolated map of restricted range species richness in 2004

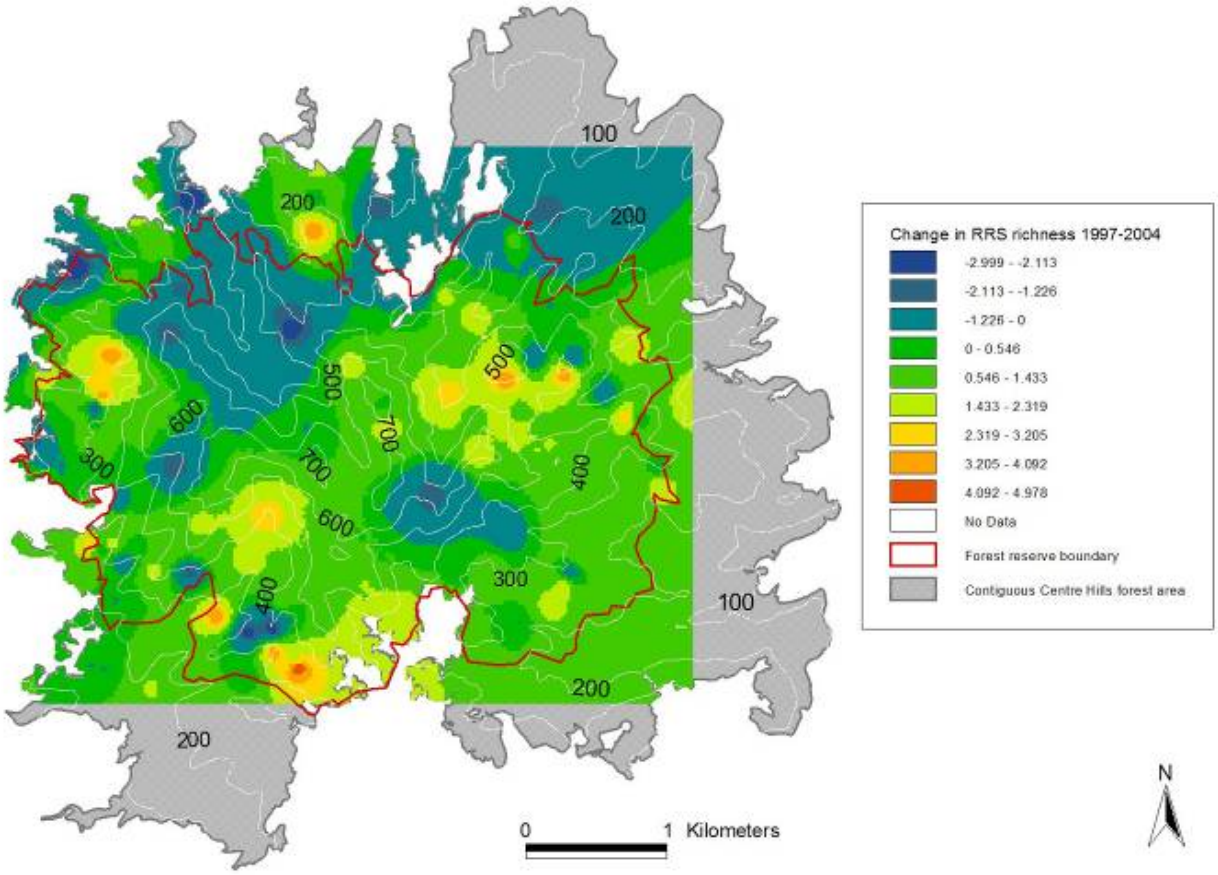


Fig. 6.10c. Interpolated map of change in restricted range species richness between 1997 and 2004

There was almost no concordance between the hotspots in 1997 and 2004. This may reflect rapid turnover of local hotspots, due to stochastic factors or ephemerally suitable habitats; however, it may equally reflect a considerable degree of stochasticity in the point-counts themselves, see above. There was evidence of a systematic shift in the oriole population between the two censuses. In 1997, the species appeared to be patchily distributed throughout the hills with one large area of higher density in the central zone, running west-east from the head of Hope Ghaut to the Bugby Hole/Corbett Spring area. In 2004 there was a strong overall bias towards the eastern flanks. The change map shows a strong pattern of declines in the west, and increases in the east.

Forest thrushes are largely concentrated around the edges of the Centre Hills, with hotspots in particular in the south-west, north-west and east (Fig 6.7a-c). This pattern did not change between censuses in 1997 and 2004, although the location of individual hotspots did, and probably reflects the species' preference for lower altitude forests. The change map for forest thrush shows a general increase in population density across most areas, but little spatial pattern.

The maps for bird species richness and Restricted-range Species richness are very similar in their respective years, which largely reflects the fact that the majority of birds in the forest are of restricted-range (Fig 6.9a-c, Fig 6.10a-c). The patterns for the 1997 and 2004 censuses are broadly similar, with hotspots dotted along the western flanks, and in a broad swathe across the south-eastern half of the hills, and lower richness in the north. The change maps suggest declines across much of the north and parts of the west between 1997 and 2004, but increases over the greater part of the hills.

Taking all the single species maps and the richness maps, there is an intriguing overall pattern of increases in the eastern and south-eastern parts of the hills, and decreases in the west/north-west. The increases generally outweigh the decreases. Forest regeneration has taken place in parts of the eastern Centre Hills in the last two decades, following the abandonment of agricultural land, and this may be a cause of increases in the east. However, this does not easily account for concomitant decreases in the west, and these remain unexplained. One might tentatively suggest that greater human presence around the western and northern forest fringes in recent years could lead to increased densities of opportunistic omnivores, especially rats and thrashers, which could in turn affect other bird species, but there is no direct evidence for this, and the stochastic nature of these data must be emphasised.

The maps illustrate an important point about bird distributions in the Centre Hills: that a number of key areas lie outside or right at the edge of the forest feserve. As a result of their preference for the lower altitude fringes of the hills, important forest thrush hotspots lie outside the boundary in the north, south-west and south-east. The brown trembler, like the forest thrush, appears to be concentrated around the forest edge, but unlike the thrush, their hotspots lie mainly just within the forest reserve. This reflects their preference for mid-altitude forests (Fig 6.8), which tend to lie just within the forest feserve boundary. The oriole, with it's preference for higher altitudes still, is found predominantly within the reserve boundary, but some occupied areas do fall outside. Areas with above average richness of restricted-range species occur outside the reserve boundary in several places in both censuses, including some notable hotspots. This pattern has obvious implications for management. Hotspots outside the boundary are effectively unprotected, while hotspots adjacent to the boundary have minimal buffering against adverse impacts of human activities on the other side.

6.2.3. Temporal trends in bird abundance in the Centre Hills

The Centre Hills Forest Bird Monitoring Programme allows an insight into population trends since 1997 (see Dalsgaard *et al*., 2007). Such a long run of monitoring data is unique among the fauna and flora of Montserrat, and indeed is very rare for birds in the West Indies.

There is a considerable concordance in population trends among bird species in the Centre Hills, suggesting that similar environmental drivers have tended to influence them. The most common pattern was for an increase between 1997 and 2001, and a subsequent decrease between 2001 and 2003 (Fig. 6.11). After 2003, the consistency in pattern breaks down, and population trends were very varied. The main exceptions to this general pattern were Caribbean elaenia and Montserrat oriole, which decreased between 1997 and 2001; bananaquit, which showed very little change until a sharp drop between 2002 and 2004, and purple-throated carib and Caribbean elaenia which doubled in abundance between 2001 and 2003 while nearly all other species were decreasing dramatically.

The overall conclusion is that almost none of the species showed an overall decline between 1997 and 2006. The possible exception to this is brown trembler. The graph for this species suggests an ongoing downward trend, but statistical power to confirm this is weak, because detection rate is low. Nevertheless, forest rangers concur with the idea that this species has become less common, and as a forest specialist Restricted-range Species, it deserves careful attention. Several species are far more abundant in 2005 than at the beginning of the monitoring scheme – most notably scaly-naped pigeon, bridled quail-dove, forest thrush and scaly-breasted thrasher. Unfortunately, it is rather difficult to put these changes into a broader context. Monitoring began at the height of the volcanic activity. We do not know if populations at that point were depleted by the intense ashfalls of the previous year, or indeed by other entirely separate environmental factors such as precipitation (see above).

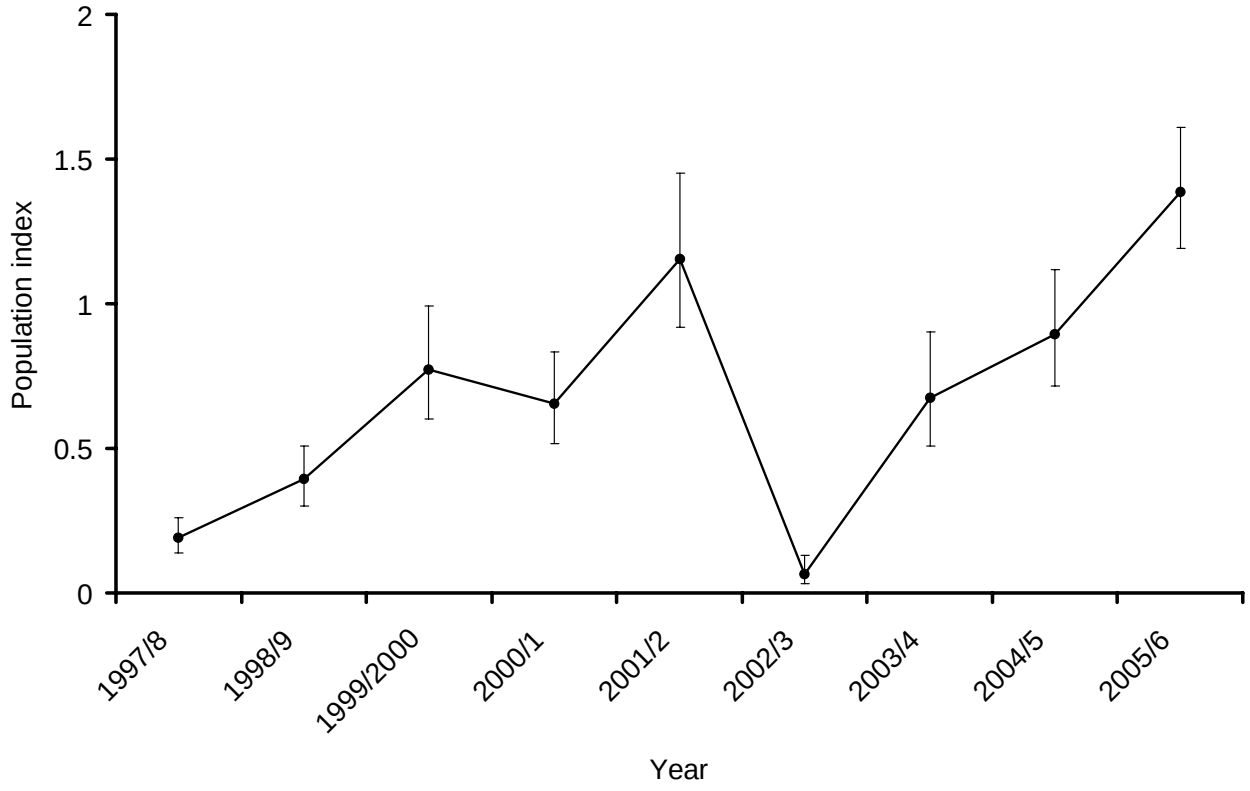
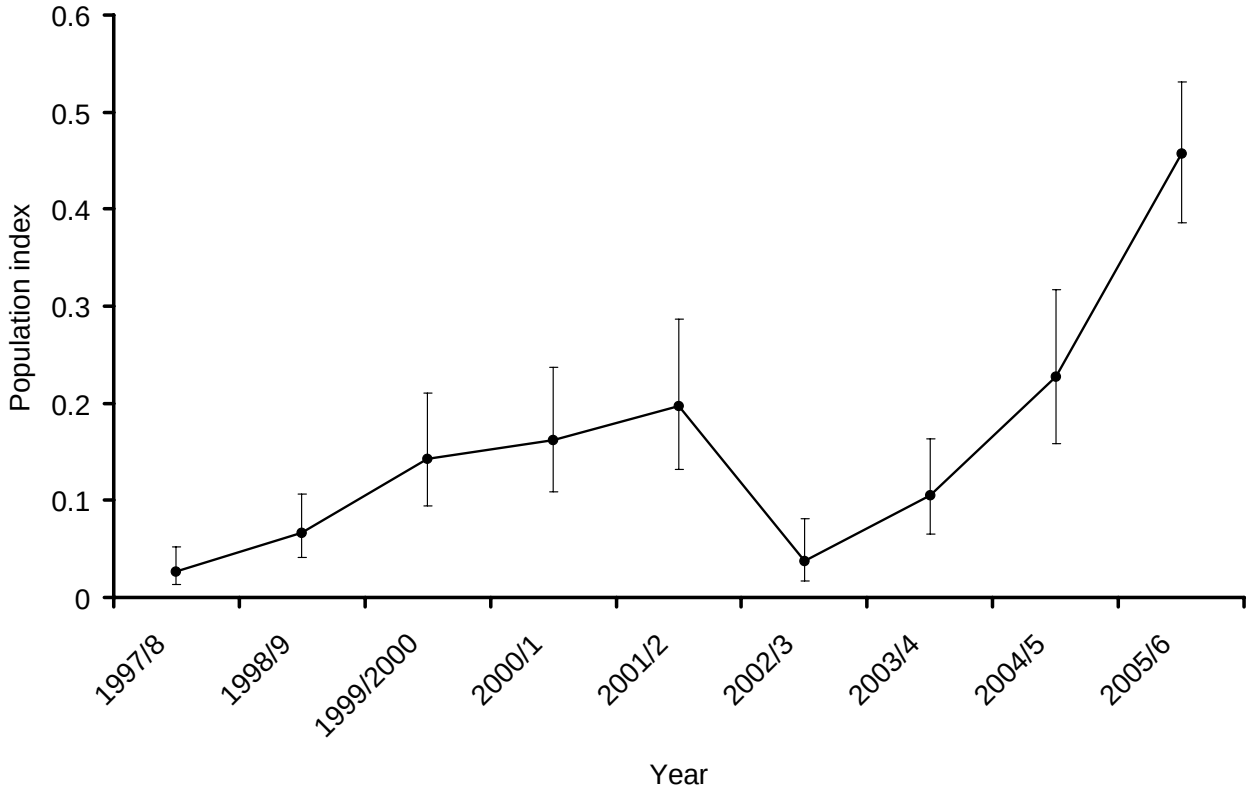
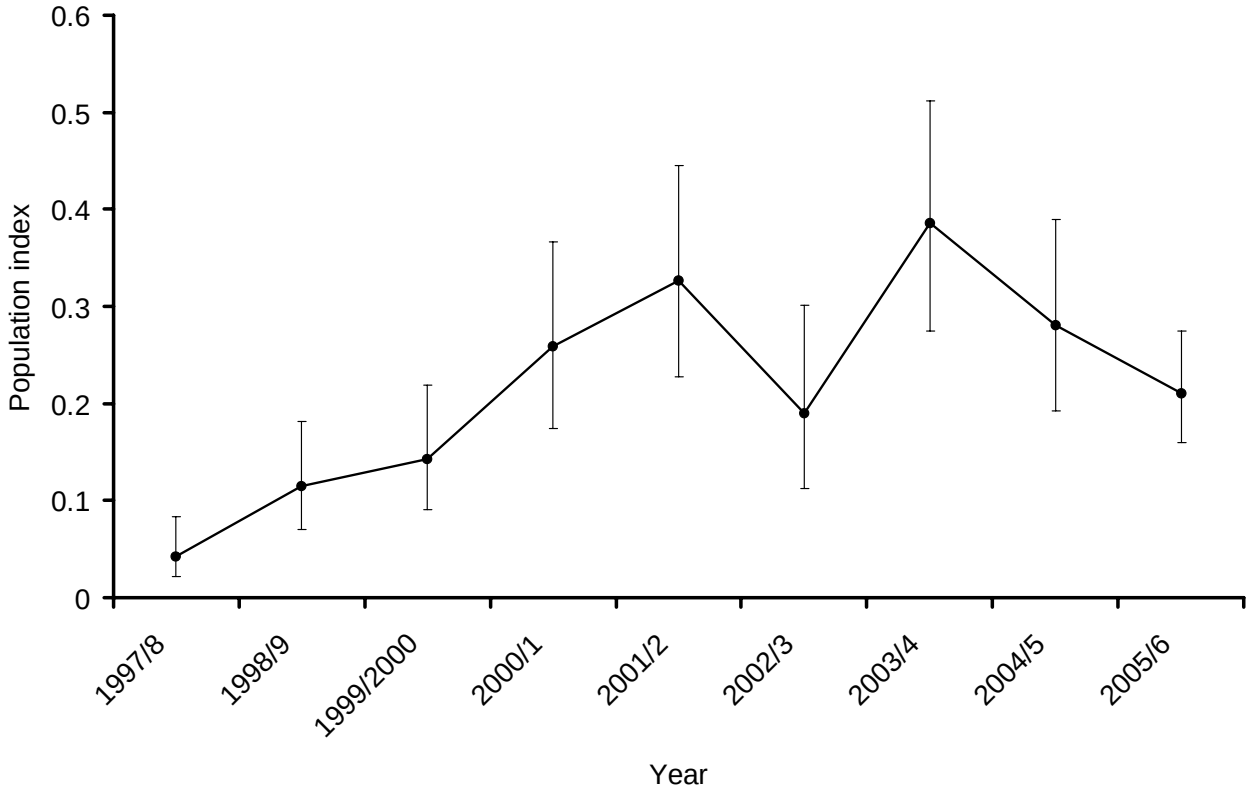


Fig. 6.11. Population trends among Centre Hills' bird species; Reproduced from (Dalsgaard *et al.*, 2007).

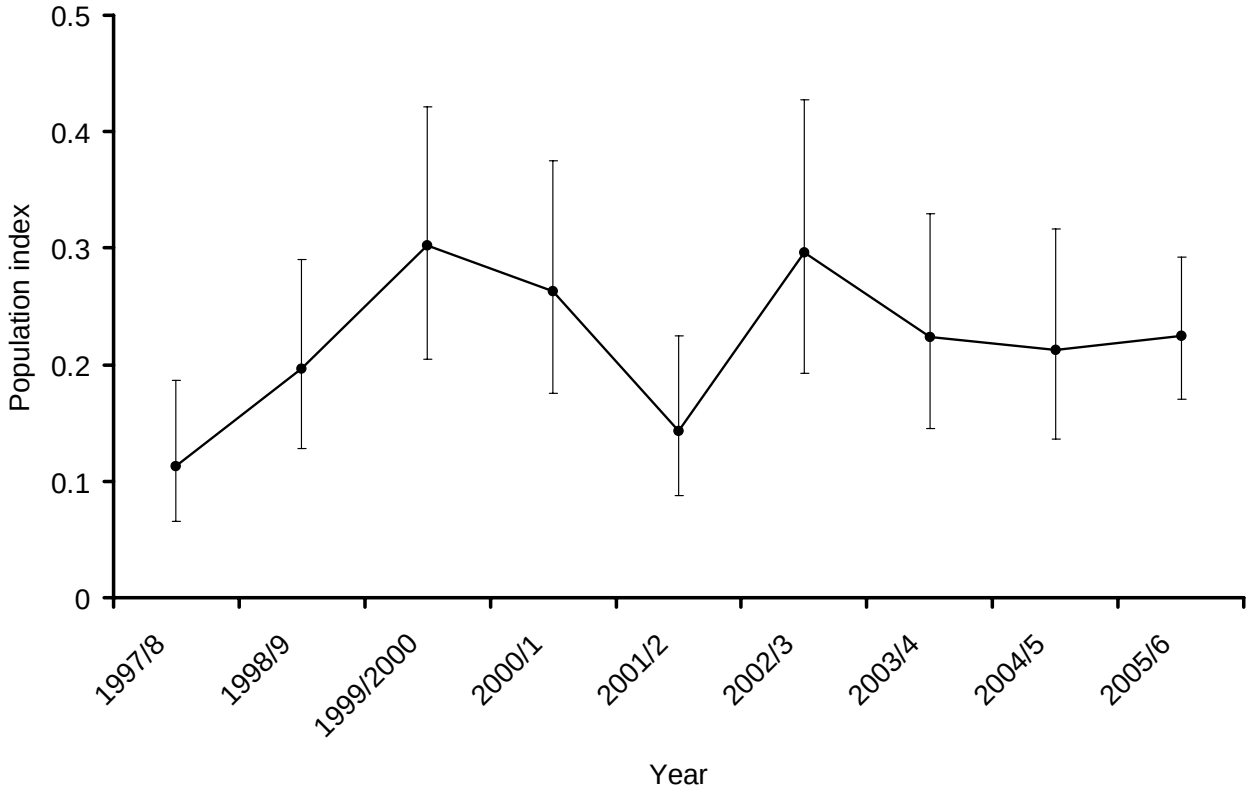
(a) Scaly-naped pigeon



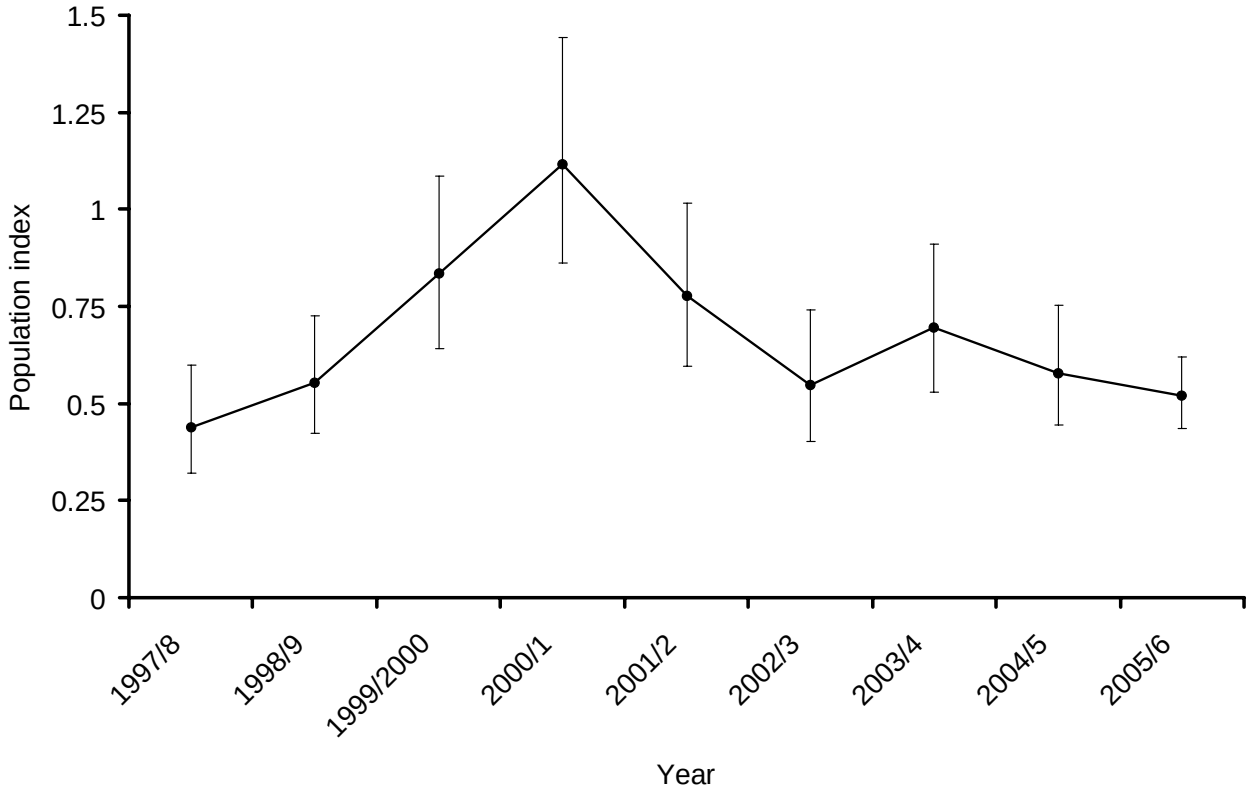
(b) Bridled quail dove



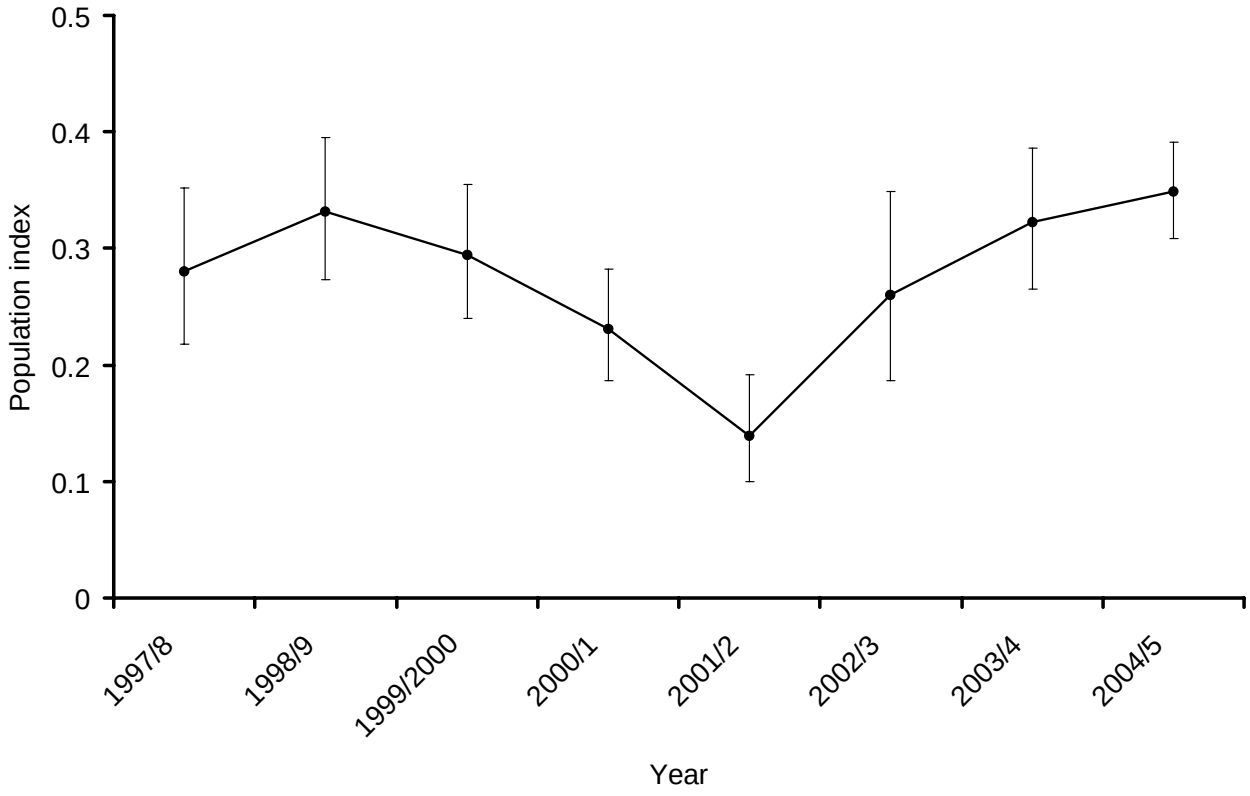
(c) Mangrove cuckoo



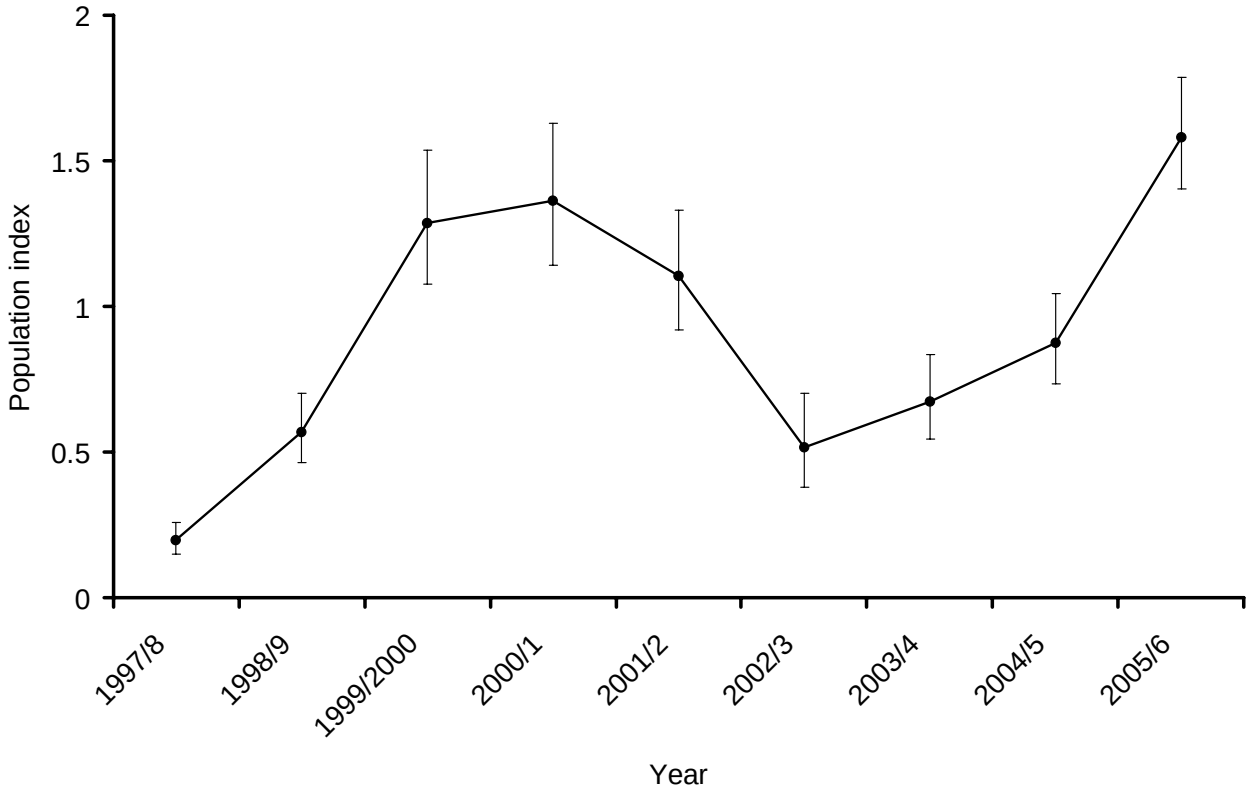
(d) Purple-throated carib



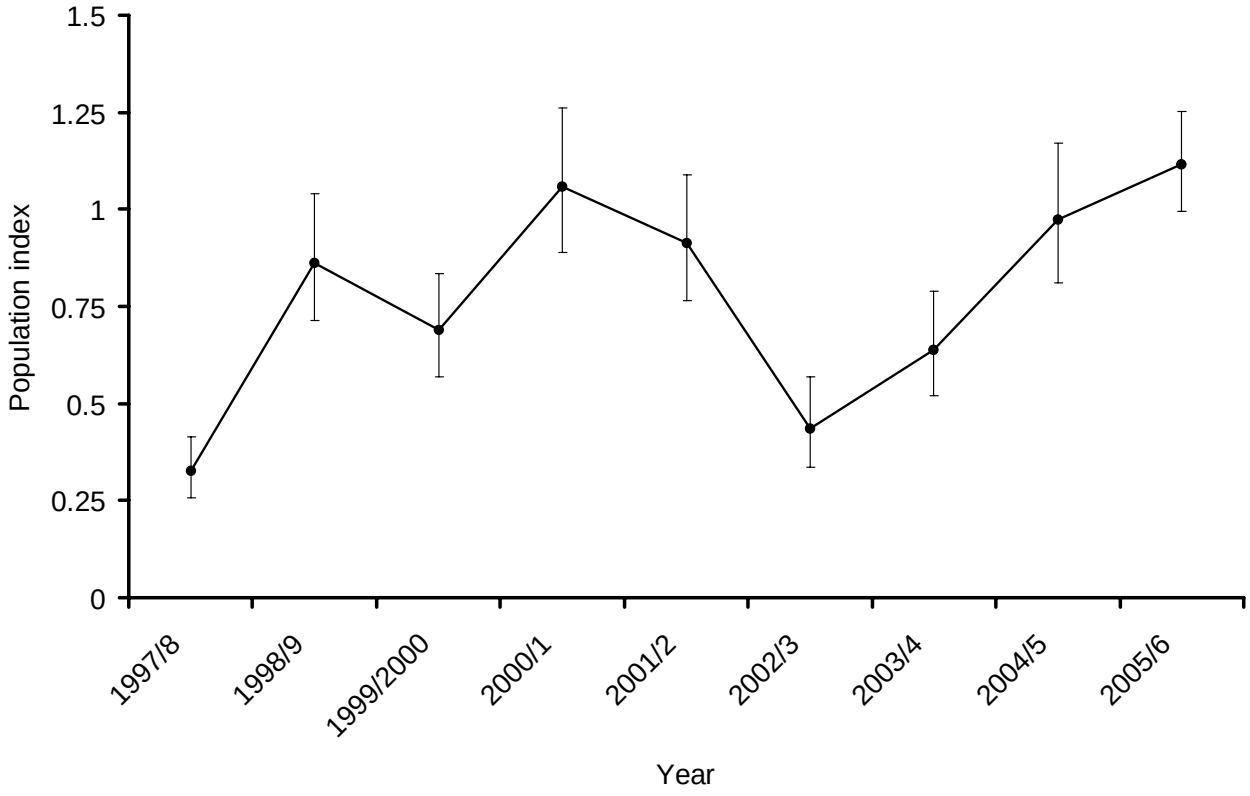
(e) Antillean crested hummingbird



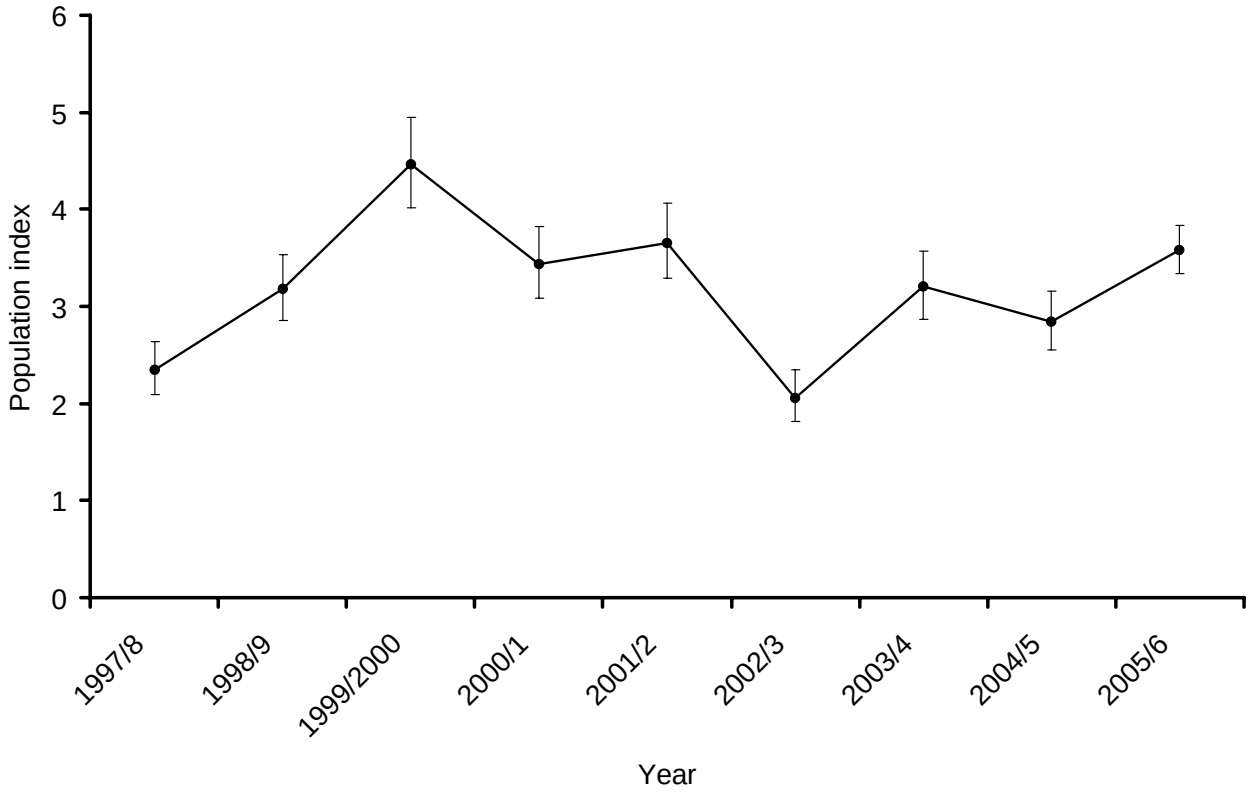
(f) Caribbean elaenia



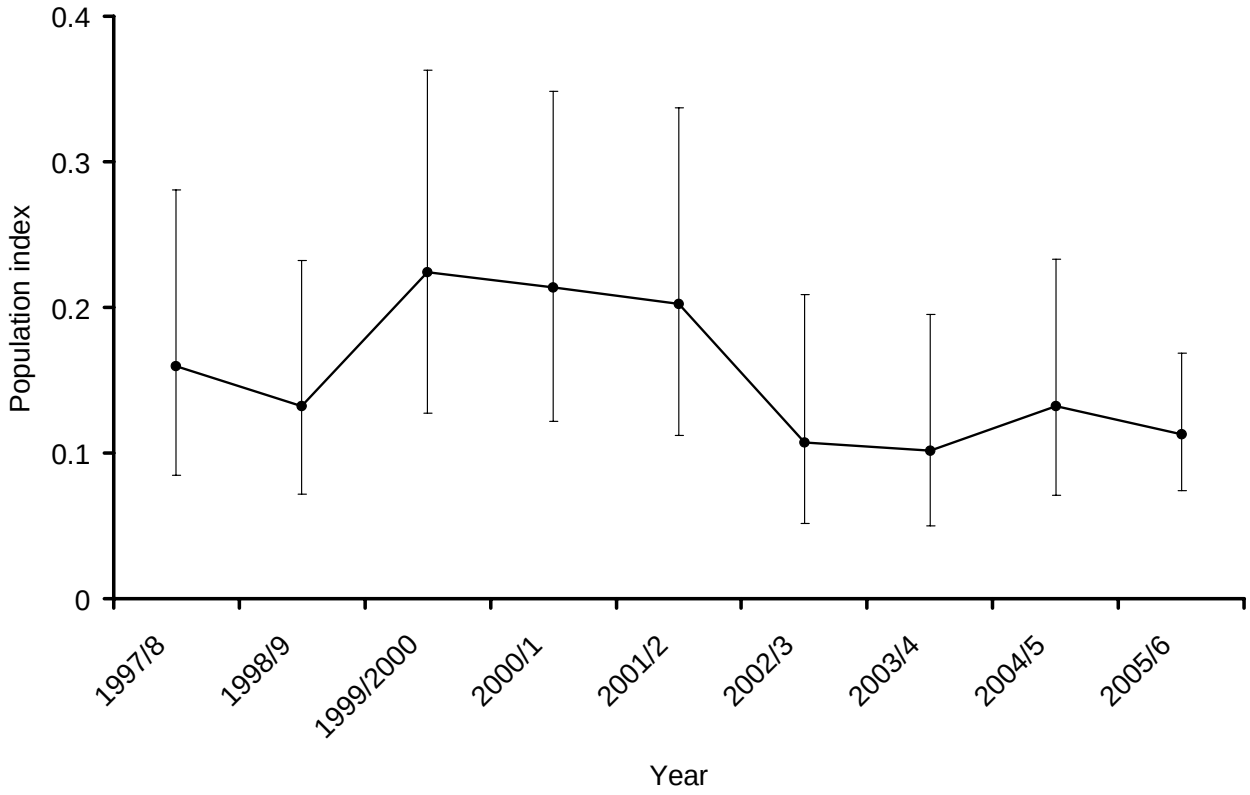
(g) Forest thrush



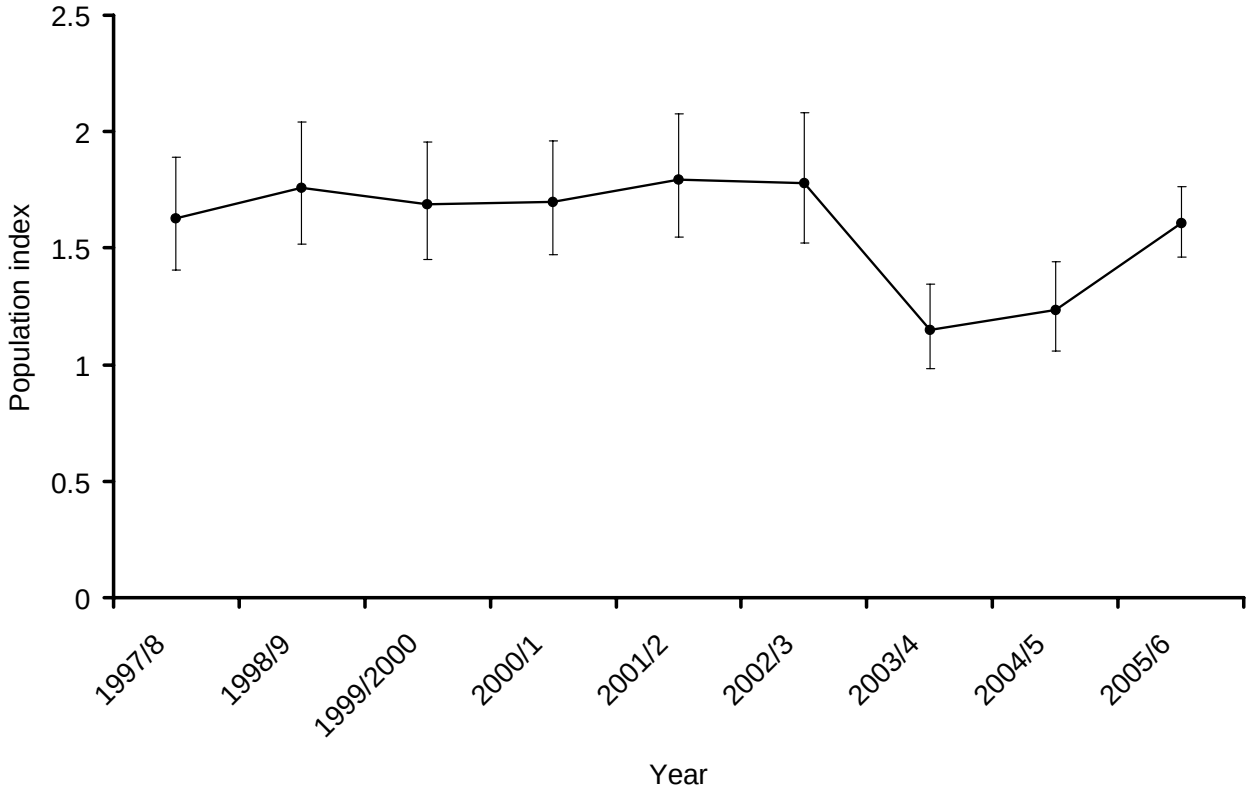
(h) Scaly-breasted thrasher



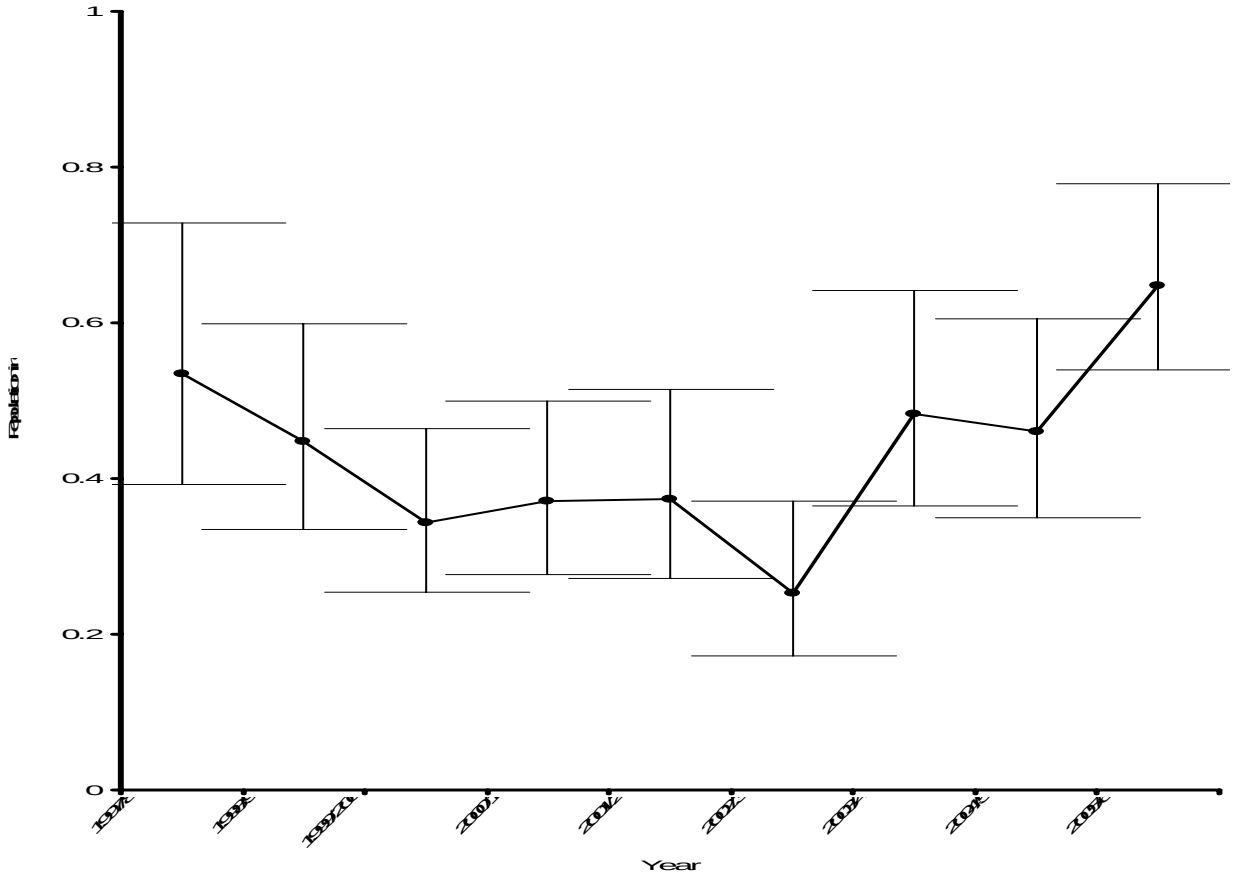
(i) Pearly-eyed thrasher



(j) Brown trembler



(k) Bananaquit



(l) Montserrat oriole

Box 5 The Centre Hills Forest Bird Monitoring Programme

Field Methods

Post-volcano ornithological work on Montserrat commenced with a bird census in the Centre Hills during December 1997 (Arendt *et al*., 1999). This initial count had the aim of establishing whether and where there remained a viable population of Montserrat oriole, and determining the abundance of other forest species following the intense volcanic activity of the preceding year. This census indicated that orioles were still widespread in the Centre Hills, with a population estimate of *ca*. 4,000 birds (post-breeding population), so concern for the species' immediate future was reduced. Following this successful survey, an ongoing monitoring scheme was established, based on counting a sub-set of the census points on a quarterly basis. This programme continues to the present, and has now generated a decade of monitoring data. From informal beginnings during the peak of the volcanic crisis, it has become one of the strongest bird monitoring schemes in the West Indies, and is used as a template for other programmes.

All the monitoring work is based on stationary point-counts. Line transects are not possible in the Centre Hills, because the lack of paths, steep terrain and dense vegetation prevents easy, quiet movement. At each point, there is a 3-min 'settling down' period, to allow bird activity to return to normal following the arrival of the observers. Subsequently, there is a 10-min counting period, during which all birds detected are recorded. As a means of generating extra detections of Montserrat orioles, we initially deployed tape-playback of oriole song for two-minutes after the end of the count, and separately recorded orioles detected during that period. However, this practice was discarded, as it caused a major analytical problem. Naïve orioles respond strongly to playback, and so many detections were made by this method in the early census visits. However, as individual orioles became accustomed to people and the playback, their response rapidly diminished. Hence, a decline in detections occurred, independent of population trends (Hilton *et al*., 2003). This makes accurate assessment of population trends very difficult.

The 'full census' conducted in 1997 was based on 149 points, set out on a systematic grid across the whole Centre Hills. This has been repeated in December 1999 and December 2004. The ongoing monitoring programme was based on an informally selected subset of 47 of these points. During 2006, the programme was revised, with the frequency of counts being reduced to once per year, in March, and the number of points increased to 90, giving coverage of all areas and altitudes of the Centre Hills. The original census was completed by staff from the Montserrat Department of Environment, with colleagues from RSPB and the International Institute of Tropical Forestry, Puerto Rico. The ongoing monitoring programme has always been executed by Forestry staff, but with data entered, stored and analysed at RSPB. In order to increase the local use of the scheme's results, the programme was re-launched in 2006 as the ''Centre Hills Forest Bird Monitoring Programme'. The data are now entered and held in the Department of Environment, in a custom-built database. The next step, currently under way, is to combine the monitoring data with spatial information, allowing improved management of the Centre Hills.

The aim of the monitoring programme, as with all such, is to complete the essential feedback loop that permits adaptive conservation management. It allows deterioration in the status of any species or area to be detected quantitatively, thus triggering research to diagnose the problem. Once conservation measures have been identified, tested and deployed, the ongoing monitoring permits their success to be assessed. Data from the scheme have been used to assist global prioritisation exercises. For several of the West Indies' Restricted-range Species, Montserrat is the only nation able to supply IUCN/BirdLife with quantitative trends information for Red Listing. The monitoring programme proved its worth when an unexpected decline in the Montserrat oriole was detected in 2000/1. Since the 1997 census had revealed an unexpectedly large population, and volcanic activity had subsequently declined, there was a general expectation that the oriole was safe. However, monitoring data indicated a rapid decline, which was not mirrored by other species in the forest. A major research programme ('Emergency Conservation of the Montserrat oriole'), funded by the UK Foreign & Commonwealth Office, began in 2001, to determine the causes of the decline. These turned out to be a combination of high nest predation by rats and thrashers, dry season drought in 2001, and ashfalls in 1998 and 2001.

Some further quantitative census data are available for Montserrat. Since December 1997, a parallel point-count census programme, covering 43 points, has been undertaken in various forested ghauts in the north of Montserrat. Some of these dry forest patches form a ring around the Centre Hills, with a few being continuous with the main forest block. Others are in and around the Silver Hills in the far north of Montserrat. The census work has generally been undertaken with the same frequency as the Centre Hills monitoring. A very small number of point-counts were undertaken in the surviving forest patch in the South Soufrière Hills during summer 2001 and 2002, giving a small amount of comparable quantitative data from this, the only other surviving patch of mesic and wet forest in Montserrat.

Distance-sampling to estimate absolute abundances

Distance-sampling (Buckland *et al*., 1993) was used to estimate absolute densities of the more frequently detected birds in the Centre Hills. Data used in this report were from a full census of 146 points, conducted between 30

Nov – 14 Dec 2004, according to standard Montserrat bird census methods (see (Arendt *et al*., 1999). Data were analysed for bird species for which we had 20 or more detections (except for brown trembler, for which a model was developed based on 19 detections). All detections of birds or clusters of birds were assigned to one of five distance bands: (0-5 m, 5-10 m, 10-20 m, 20-40 m, >40 m). Distance software (v.5.0) was used to analyse data. *A priori* we chose three data filters: firstly, with all data included, in their original distance bands; secondly, with the data truncated at 40 m (i.e. data from the outermost distance band were omitted); thirdly, with data from the two innermost distance bands pooled into a single band (0-10 m). We selected the best of these data filters based on the Chi-squared Goodness of Fit of the data to the modelled detection curves, and also on whether the modelled detection curve met the assumptions of distance-sampling, specifically, whether the modelled detectability at zero distance approximated 1. Following (Buckland *et al*., 1993), we examined, for each of the three data-filters, the following four combinations of key functions and series expansions: uniform-cosine, uniform-simple polynomial, hazard-cosine, half-normal-hermite polynomial, and chose the model with the lowest AIC value. Distance v5.0 automatically fits the optimum number of adjustment parameters for each detection curve. We did not use model averaging. Empirical variance estimates were used.

Analysing population trends

Information about trends in Centre Hills bird species was generated using Generalised Estimating Equations (GEE's), with count or presence/absence of the species concerned as a response variable (Dalsgaard *et al*., 2007). The data used were just the data from those 47 points included in the frequent censuses; data from those points that were visited only during the three full censuses were not included.

All modelling was conducted using PROC GENMOD in SAS v.9.1. Counts for each species were modelled as Poisson distributed count data (with rescaling using the DSCALE function), with a log link function. Where data were underdispersed in the Poisson model, we reverted to a binomial model (presence/absence), with a logit link function. To accommodate the multiple counts from each point (up to n=24 counts per point), we declared '*point*' x '*season*' as a repeated measures effect with a first-order autoregressive covariance structure, there being four separate '*seasons*' in which censuses took place (Dec/Jan, Mar/Apr, Jun/Jul and Sep/Oct). We used '*year*' (n=8 years) as a categorical explanatory variable, the parameter estimates for each being used as the population index values. '*Year*' was numbered from the Jun/Jul census in calendar $year_t$ to the Mar/Apr census in calendar $year_{t+1}$.

Analysing altitudinal preferences

As for analysis of population trends, tests of altitudinal preference of forest bird species and species groups were conducted using GEE's in SAS v9.1, with count or presence/absence as a Poisson- or binomially-distributed response variable respectively, depending on the abundance of the species.

We used data from all point-counts conducted during 1997-2005. As with population trends models, we declared '*year*' as a categorical explanatory variable, and '*point*' x '*season*' as a repeated-measures effect. We used '*altitude*' as a linear and quadratic covariate, and selected the model with the best fit to the data, using Maximum Likelihood.

Altitudinal data were taken from altimeter readings taken during the December 2004 full census. Because comparison with GIS Digital Elevation Models (DEM) indicated a systematic under-estimate, we added 35 m to all values. Where 2004 altimeter readings were not available, we took the 1999 altimeter reading (to which 35 m was added, there being no consistent difference between 1999 and 2004 altimeter readings, and the same instruments having been used in both censuses). This gave very few (n =7 points) large (>50m) anomalies between DEM and (adjusted) altimeter readings. Among these seven points, the 1999 and 2004 altimeter readings were in good agreement (differing by <40 m) in five cases. At two of these points, there was a large discrepancy between 1999 and 2004 altimeter readings (60 and 163 m respectively), but in neither of these was the difference between the 2004 altimeter vs DEM reading extremely large (54 and 55 m). Hence, we included them as adjusted 2004 altimeter readings.

Acknowledgements

Bird census and study in Montserrat has been an impressive collective effort over a decade, creating one of the Caribbean's leading long-term monitoring schemes. The programme has been led by the Montserrat Forestry Division – now contained within the Department of the Environment (DoE) - with support from the Royal Society for the Protection of Birds (RSPB), and several other individuals. Ken Smith (RSPB), Gerard Gray (DoE) and John Hartley (Durrell Wildlife) planned the original 1997 bird census, and Gerard Gray, David Gibbons (RSPB) and Wayne Arendt (International Institute of Tropical Forestry) instigated and designed the long-term programme. The Montserrat forest rangers have been the core data collectors throughout, and great credit is due to James Daley, James Boatswain, Lloyd Martin, Lloyd Aymer, Calvin Fenton, Jervain Greenaway and John Martin for rigorous data collection in often difficult conditions. Several RSPB staff, volunteers and students have also participated in data collection, discussion and analysis, notably Sarah Sanders, Phil Atkinson, Chris Bowden, Liz Mackley, Joah Madden, Mark Hulme, Richard Allcorn, Bo Dalsgaard, Matthew Brierley, Jo Wright, Glen Tyler and Mark O'Brien. Dyonne Duberry (DoE) and Ian Fisher (RSPB) have led on data management for the project. The Montserrat National Trust has provided strong support to the programme, and staff member Philemon Murrain has been involved in fieldwork since the beginning. The Centre Hills Project staff, Carole McCauley and Stephen Mendes, and Ministry of Agriculture, Lands, Housing and The Environment staff Tony Hill and Claude Gerald provided valuable logistical support. David Buckingham, Richard Bradbury, Paul Donald (RSPB), Richard Young (Durrell) and Preben Blæsild (University of Aarhus) have all provided statistical advice. We are very grateful to John and Bridget Beattie for providing fantastic accommodation for staff visiting Montserrat. The bird monitoring programme has been financially supported at various times by the American Bird Conservancy, UK Environment Fund for Overseas Territories and the UK Darwin Initiative, as well as by the implementing institutions.

References

Allen, R.B., Lee, W.G., & Rance, B.D. (1994). Regeneration in indigenous forest after eradication of Norway rats, Breaksea Island, New Zealand. *New Zealand Journal of Botany*, **32**, 429-439.

Arendt, W.J. (1990). *Impact of Hurricane Hugo on the Montserrat Oriole, other forest birds, and their habitat*. US Department of Agriculture, Forest Department, Institute of Tropical Forestry, Puerto Rico.

Arendt, W.J. (2006). Adaptations of an avian supertramp: distribution, ecology, and life history of the pearly-eyed thrasher (*Margarops fuscatus*). *Gen. Tech. Rep. 27*. U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry, San Juan, Puerto Rico, p. 404.

Arendt, W.J., Gibbons, D.W. & Gray, G.A.L. (1999). Status of the volcanically threatened Montserrat Oriole *Icterus oberi* and other forest birds in Montserrat, West Indies. *Bird Conservation International*, **9**, 351-372.

BirdLife International (2006). Species factsheet: *Cichlherminia lherminieri*. www.birdlife.org/datazone.

Blankenship, J. (1990). *The Wildlife of Montserrat.* Montserrat National Trust, Montserrat, West Indies.

Buckland, S.T., Anderson, D.R., Burnham, K.P. & Laake, J.L. (1993). *Distance Sampling: Estimating Abundance of Biological Populations*. Chapman & Hall, London, UK.

Dalsgaard, B., Hilton, G., Gray, G., Aymer, L., Boatswain, J., Daley, J., Fenton, C., Martin, J., Martin, L., Murrain, P., Arendt, W., Gibbons, D. & Olesen, J. (2007). Impacts of a volcanic eruption on the forest bird community of Montserrat, Lesser Antilles. *Ibis*, **149**, 298-312.

del Hoyo, J., Elliot, A. & Sargatal, J. (Eds.) (1997). *Handbook of the birds of the world. Vol. 4: Sandgrouse to Cuckoos*. Lynx Edicions, Barcelona, Spain.

del Hoyo, J., Elliot, A. & Sargatal, J. (Eds.) (1999). *Handbook of the birds of the world. Vol. 5: Barn-owls to Hummingbirds*. Lynx Edicions, Barcelona, Spain.

Dugger, K.M., Faaborg, J., Arendt, W.J. & Hobson, K.A. (2004). Understanding survival and abundance of overwintering warblers: does rainfall matter? *Condor*, **106**, 744-760.

Dunning, J.C. (1993). *The CRC handbook of avian body masses*. CRC Press, London, UK.

GISD (2006a). Global Inasive Species Database - *Sus scrofa*. IUCN SSC Invasive Species Specialist Group. http://www.issg.org/database/species/ecology.asp?si=73&fr=1&sts=sss; accessed on 09/II/2007.

GISD (2006b). Global Invasive Species Database - *Bos taurus*. IUCN SSC Invasive Species Specialist Group. http://www.issg.org/database/species/ecology.asp?si=172&fr=1&sts=sss, accessed on 09/II/2007.

GISD (2006c). Global Invasive Species Database - *Capra hircus*. IUCN SSC Invasive Species Specialist Group. http://www.issg.org/database/species/ecology.asp?si=40&fr=1&sts=sss; accessed on 09/II/2007.

GISD (2006d). Global Invasive Species Database - *Mus musculus*. IUCN SSC Invasive Species Specialist Group. http://www.issg.org/database/species/ecology.asp&si=97&fr=1&sts=sss; accessed on 09/II/2007.

Hilton, G.M., Atkinson, P.W., Gray, G.A.L., Arendt, W.J. & Gibbons, D.W. (2003). Rapid decline of the volcanically threatened Montserrat Oriole. *Biological Conservation* **111**, 79-89.

Kairo, M., Ali, B., Cheesman, O., Haysom, K. & Murphy, S. (2003). *Invasive Species Threats in the Caribbean Region*. Report to The Nature Conservancy. CAB International, Curepe, Trinidad & Tobago.

Kessler, C.C. (2001). Eradication of feral goats and pigs and consequences for other biota on Sarigan Islands, Commonwealth of the Northern Mariana Islands. In: Veitch, C.R., Clout, M.N. (Eds.), *Turning the tide: the eradication of invasive species*. IUCN, Gland, Switzerland & Cambridge, UK, pp. 132-140.

Laurance, W.F., Lovejoy, T.E., Vasconcelos, H.L., Bruna, E.M., Didham, R.K., Stouffer, P.C., Gascon, C., Bierregaard, R.O., Laurance, S.G. & Sampaio, E. (2002). Ecosystem Decay of Amazonian Forest Fragments: a 22-Year Investigation. *Conservation Biology*, **16**, 605–618.

MacArthur, R.H., Diamond, J.M. & Karr, J.R. (1972). Density compensation in island faunas. *Ecology*, **53**, 330-342.

Marske, K.A. (2004). Effects of volcanic ash on the insect food of the Montserrat Oriole *Icterus oberi* Lawrence 1880. MSc Dissertation, Montana State University, Bozeman, Montana, p. X + 178.

Raffaele, H.A., Wiley, J., Garrido, O., Keith, A. & Raffaele, J. (1998). *A guide to the birds of the West Indies*. Princeton University Press, Princeton, NJ, US.

Reis, K. & Steadman, D.W. (1999). Archaeology of Trants, Montserrat: Part 5. Prehistoric avifauna. *Annals of Carnegie Museum*, **68**, 275-287.

Sanders, S. (Ed) (2006). *Important Bird Areas in the United Kingdom Overseas Territories*. RSPB, Sandy, Bedfordshire, UK.

Schuyler, P.T., Garcelon, D.K. & Escover, S. (2001). Eradication of feral pigs (*Sus scrofa*) on Santa Catalina Island, California, USA. In: Veitch, C.R., Clout, M.N. (Eds.),
Turning the tide: the eradication of invasive species. IUCN SSC Invasive Species Specialist Group, Gland, Switzerland & Cambridge, UK, pp. 274-286.

Siegel, A. (1983). *Birds of Montserrat*. Montserrat National Trust, Montserrat, West Indies.

Stattersfield, A.J., Crosby, M.J., Long, A.J. & Wege, D.C. (1998). *Endemic Bird Areas of the World*. Birdlife International, Cambridge, UK.

Sweitzer, R. & Van Vuren, D. (2004). *Effects of wild pigs in oak woodland ecosystems in California*. Ecological Society of America 2004 Annual Meeting, Portland, Oregon.

Towns, D.R., Atkinson, I.A.E. & Daugherty, C.H. (2006). Have the harmful effects of introduced rats on islands been exaggerated? *Biological Invasions*, **8**, 863-891.

Watson, J.E.M., Whittaker, R.J. & Dawson, T.P. (2004). Habitat structure and proximity to forest edge affect the abundance and distribution of forest-dependent birds in tropical coastal forests of southeastern Madagascar. *Biological Conservation* **120**, 311-327.

Wiley, J.W. & Wunderle, J.M. (1994). The effects of hurricanes on birds, with special reference to Caribbean islands. *Bird Conservation International* **3**, 319-349.

Wilson, D.J., Lee, W.G., Webster, R.A. & Allen, R.B. (2003). Effects of possums and rats on seedling establishment at two forest sites in New Zealand. *New Zealand Journal of Ecology* **27**, 147-155.

7. Bats of the Centre Hills and Montserrat

S. C. Pedersen, R. P. Young, M. N. Morton and W. Masefield

7.1. Diversity and status of bats in Montserrat

Ecologically, Montserrat has a relatively simple chiropteran fauna of ten species including one carnivore (*Noctilio leporinus*), two predominantly nectivorous species (*Brachyphylla cavernarum, Monophyllus plethodon*), four frugivores (*Ardops nichollsi, Artibeus jamaicensis, Chiroderma improvisum, Sturnira thomasi*), and three insectivorous species (*Natalus stramineus, Tadarida brasiliensis, Molossus molossus*), representing four families — Noctilionidae, Phyllostomidae, Natalidae, and Molossidae. Together, these ten species represent the entire extant fauna of native mammals on the island.

Montserrat has historically received a great deal of attention from bat biologists. Twelve surveys, spanning 28 years (survey year 1978 Jones & Baker; 1984 Pierson *et al*.; 1994 Pedersen *et al*.; 1995 Morton & Fawcett; 1997-98, 2000-2002 Pedersen *et al*.; 2003 Kwiecinski; 2004-05 Pedersen *et al*.), have established a database that includes nearly 2500 captures of the ten species of bats from 60 locations on Montserrat. Despite this effort, two of these species, *Sturnira thomasi* (Fig. 7.1) and *Chiroderma improvisum* (Fig. 7.2) remain very poorly known on Montserrat (and elsewhere).

Until recently, only two individuals of *C. improvisum* had ever been caught on Montserrat; in 1978, in the gallery forest that once ran through the golf course, 1km from the mouth of Belham River, and in 1984 in the Paradise Estate. Just three individuals of this species have ever been examined in Guadeloupe (Baker & Genoways, 1978). Previous to the CHBA, only one individual of *S. thomasi* had been caught in Montserrat; in 1994 in the Paradise Estate (Pedersen 1996). It was subsequently described as a subspecies, *S. thomasi vulcanensis* (Genoways, 1998), unique to Montserrat. As a result of damage caused by Hurricane Hugo and the volcanic activity, it was suspected that both these species had become extinct in Montserrat. However, the continuing existence of these species was confirmed during the CHBA when an individual of each species was captured in July 2005 (see below for more information). *C. improvisum* and *S. thomasi* are thought to be extremely rare and are classified by the IUCN as Endangered (Chiroptera Specialist Group, 1996b, d).

Due to their vagility, bats in the Lesser Antilles tend to have relatively low levels of endemicity compared with other taxa such as reptiles and amphibians. However, Montserrat supports three restricted range species. *S. thomasi vulcanensis* is only known from the island (*S. thomasi* at species level occurs on Montserrat and Guadeloupe), *C. improvisum* is only recorded from Guadeloupe and Montserrat, while *Ardops nichollsi* is restricted to the northern Lesser Antilles (*M. plethodon* and *B. cavernarum* only occur on a few islands outside the Eastern Caribbean). The bat fauna on Montserrat can be considered of high conservation importance as it contains two Endangered species, as well as three Near Threatened species (Chiroptera Specialist Group 1996a-e) (see Table 7.2). All of the 10 Montserrat species have been caught within or in the immediate vicinity of the

Figure 7.1. *Sturnira thomasi vulcanensis*. (Photo: W. Masefield, Durrell)

Figure 7.2. *Chiroderma improvisum*. (Photo: W. Masefield, Durrell)

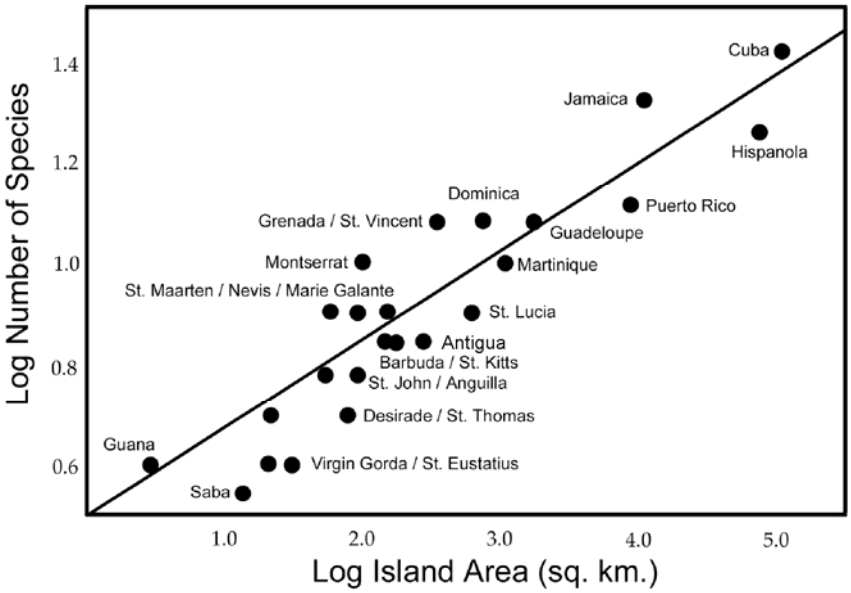


Figure 7.3. Species-area curve of bats in the Caribbean (Pedersen *et al.*, 2005 after Genoways *et al.*, 2001). Linear regression of log-transformed data: y = 0.17x + 0.49 (R-squared = 0.81)

Centre Hills forest and therefore can be considered to use this site to some extent. The recently caught individuals of *S. thomasi vulcanensis* and *C. improvisum* were both captured in the Centre Hills, which therefore currently represents the only recorded home for these species on Montserrat since the volcanic eruption.

Bats are the only extant native mammals in the Lesser Antilles and play a number of key ecological roles in ecosystems, particularly in seed dispersal and pollination, and are likely to be vital to the functioning of the Centre Hills forest. Many fruit bats carry fruit and seeds further away from the parent plants than bird species and so are of particular importance in forest regeneration. The dispersal of seeds plays an important role in the replanting of damaged forests or deforested areas (through volcanoes, hurricanes, clearance for agriculture, etc) and for some trees, bats are the main agents by which new areas can be reforested. Fruit production requires pollination of the flowers on the plant/tree in question and many bats feed on flowers and nectar, and in doing so transfer pollen between plants. Many trees that are of economical importance to man are pollinated by bats, i.e., calabash, mango, banana, and cashew. Many insectivorous bats eat huge numbers of insects nightly. For example, a small colony of free-tailed bats can consume tens of thousands of mosquitoes in an area each evening, which represents free pest-control for humans living nearby. Bats are sometimes considered "*keystone species*" (after the keystone that symbolically holds up an entire building) because the loss of bats from an ecosystem may set-off a devastating cascade of effects throughout an ecosystem. For example, some trees may depend entirely on bats for pollination; if bats

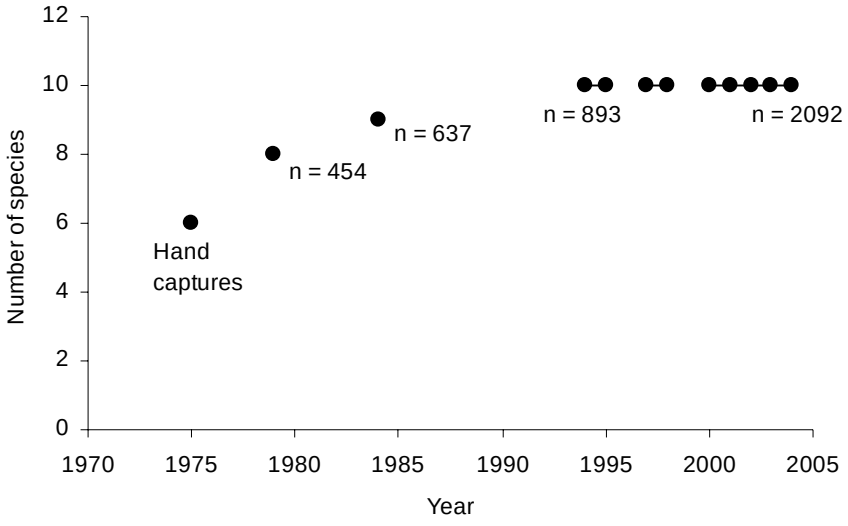


Figure 7.4. Species accumulation curve for Montserrat, 1978-2004 (n = cumulative number of bats caught)

Localities	Fruit bat BNN	Total BNN
Northern Lesser Antillean Faunas		
St. Eustatius (2002, 2003, 2004)[1]	1.55	3.75
Montserrat (1994-95, 97-98, 00-04)[1, 2]	2.10	3.08
Saba (2002, 2003)[2]	0.65	2.47
St. Kitts (1999, 2001)[1]	1.11	2.11
Antigua (1994, 1998, 2000, 2003)[1]	1.45	2.04
St. Maarten (2002. 2003, 2004)[2]	0.92	1.63
Nevis (1999, 2001)[1]	1.34	1.55
MEAN	**1.88**	**2.70**
Mainland Faunas		
San Vito, Costa Rica[3]	5.93	6.65
Osa, Costa Rica[3]	5.68	5.87
La Pacifica, Costa Rica[3]	4.11	4.46
BCI, Panama[3]	2.85	2.98
Canal Zone, Panama[3]	2.20	2.71
MEAN	**4.15**	**4.53**

Table 7.1.Mist-net capture rates (number of bats caught per net-night; BNN) of neotropical bats (from Pedersen *et al.*, 2005)

[1]*Published survey data from Pedersen et al., 1993-2004*

[2]*Un-published survey data from Pedersen et al., 1993-2004*

[3]*Data from Findley, 1993*

are lost from the ecosystem, so are the trees and all their dependent species.

The number of species found on an island tends to be correlated with the size (area) of the island, the distance from a source (typically a continental area) and the diversity of habitats available, which in most cases is directly related to elevation of the island. Increased elevation usually results in increased rainfall and more diverse vegetation (MacArthur *et al.*, 1972). Morgan and Woods (1986) found that 69% of the variance in West Indian mammalian faunal diversity could be explained by island area alone while the "remaining 31% of the variance must be dependent upon other variables such as habitat diversity and distance from source areas." Following models that have been applied to amphibians and reptiles (Preston, 1962), birds (Hamilton *et al.*, 1964), and West Indian bats or mammalian fauna (Morgan and Woods, 1986; Griffiths and Klingener, 1988), a species-area curve for the Antillean bat fauna was constructed (Fig. 7.3).

The relative position of an island '*above the curve*' may be attributed to (1) a long history of survey efforts; (2) a wealth of sufficiently diverse habitat that supports a high level of bat species richness; and (3) close proximity to source islands. Conversely, the relative position of an island '*below the curve*' may be attributed to (1) a simple case of under-sampling; (2) a dearth of sufficient habitat to support bat diversity; and (3) the presence of an insurmountable biological barrier beyond which bats cannot move. The primary forcing agent behind the inter-island movement of bats is probably by way of tropical storms (S. Pedersen, *unpubl. data*). Several islands with low biodiversity (e.g., Antigua, Barbuda, St. Maarten) may simply be so unfortunate as to not lie downwind from a large source island.

Montserrat, with its 10 species of bat, is positioned well above the regression-line in Fig. 7.3 relative to other islands of similar size due mainly due to the presence of two very rare species (*S. thomasi*, *C. improvisum*). We explain this as being due to Montserrat's

down-wind location and close proximity (55 kilometres) to Guadeloupe (12 species; Baker *et al*., 1978; Genoways & Baker, 1975; Genoways & Jones, 1975; Masson & Breuil, 1992), high elevation and topographic diversity, and the fact that the island remains relatively underdeveloped in terms of tourism. If this observation is correct and we can compare Guadeloupe and Montserrat bat faunas, it is interesting to note that two species of insectivorous bat (*Myotis nigricans, Eptesicus guadeloupensis*) remain "missing" from Montserrat despite extensive survey efforts over 28 years. It is unclear whether there is something unique about these two bats that makes them less likely to disperse.

Due to their mobility and nocturnal activity patterns, estimating the size of bat populations is very difficult. Given this difficulty, a simple metric (BNN - bats captured per net-night) has been developed to approximate the abundance of bat populations at our sample sites using mist-netting to catch individual bats (Genoways *et al*., 2006; Pedersen *et al*. 1996, 2003, 2005, 2006). Preliminary data based on night-vision recordings of flyways with and without nets show that only 5% of the bats in an airspace ever come into contact with the mist-net and then only 60% of those become snared by the net (Larsen *et al*., 2005). This suggests mist-netting could vastly underestimate abundance and possibly species richness. However, given the large historical and current sampling effort on Montserrat it is unlikely that species richness has been substantially under-estimated. Figure 7.4 shows a species accumulation curve for Montserrat, which reaches an asymptote in 1994 at 10 species.

We have utilized the BNN metric conservatively by avoiding its use as an estimate of population size *per se*, but rather as an approximation of bat activity at a particular location. However, if we compare trends in BNN over time from any single location, BNN can be viewed as a crude *proxy* for overall bat population trends. If all feeding guilds are considered, bat capture rates on Montserrat are second only to St. Eustatius in the northern Lesser Antilles and are comparable to those reported from mainland populations (Table 7.1; Peder-

Species scientific name	Species common name	Diet*	IUCN Red List category**	Global distribution
Ardops nichollsi montserratensis	Tree bat	Frugivore	Lower Risk/ Near Threatened	Northern Lesser Antilles
Artibeus jamaicensis	Jamaican fruit bat	Frugivore	Lower Risk/ Least Concern	Widespread in C. & S. America, Caribbean
Brachyphylla cavernarum	Lesser Antillean fruit bat	Nectivore	Lower Risk/ Least Concern	Lesser Antilles, Virgin Islands, Puerto Rico
Chiroderma improvisum	White-lined bat	Frugivore	Endangered	Guadeloupe, Montserrat
Molossus molossus	Velvety free-tailed bat	Insectivore	Lower Risk/ Least Concern	Widespread in C. & S. America, Caribbean
Monophyllus plethodon	Long-tongued bat	Nectivore	Lower Risk/ Near Threatened	Puerto Rico, Lesser Antilles
Natalus stramineus	Funnel-eared bat	Insectivore	Lower Risk/ Least Concern	C. & S. America, Eastern Caribbean
Noctilio leporinus	Bulldog bat	Carnivore	Lower Risk/ Least Concern	Widespread in C. & S. America, Caribbean
Sturnira thomasi vulcanensis	Yellow-shouldered bat	Frugivore	Endangered	Sub-specifically island endemic
Tadarida brasiliensis	Brazilian free-tailed bat	Insectivore	Lower Risk/ Near Threatened	Widespread in C., N. & S. America, Caribbean

Table 7.2. Checklist of the bats of Montserrat, including information on diet, conservation status and global distribution

**The dietary categories describe general food preferences only (e.g. the frugivorous and nectivorous species also eat other plant material and insects)*

***All 10 of Montserrat's bat species were last assessed by IUCN's Chiroptera Specialist Group in 1996 and all 10 assessments are listed as "out of date" (i.e. proceeding the current (2001) revision of IUCN's red list criteria). Work on Montserrat and other Eastern Caribbean islands (e.g. Pedersen et al., 1996, 2003, 2005, 2006) suggests that a re-assessment would result in the endangerment status of some of these species being revised downwards, with the probable exception of C. improvisum and S. thomasi.*

sen *et al*., 2005). If only fruit bats are evaluated, average capture rates during our surveys on Montserrat are the highest in the northern Lesser Antilles (Table 7.1; Pedersen *et al*., 2005).

In summary, for its size, Montserrat appears to be richer in species and its bat populations appear to be larger than those on neighbouring islands, taking into account differences in sampling protocols and sampling effort. This is probably due to the lack of habitat modification due to urban and rural development relative to other Lesser Antillean islands. However, the bat fauna of Montserrat has fluctuated dramatically over the last 25 years due to the influence of several natural disasters. The implications of these stochastic events on long-term population dynamics deserve attention, which can only be investigated by long-standing monitoring programmes. As well as the catastrophic threats posed by hurricanes and volcanoes, bats on Montserrat are also vulnerable to a number of other factors. Deforestation leads to the reduction in the availability of food plants and roost sites for a number of species, particularly frugivorous bats. Caves represent important sites for roosting at which large numbers of bats may congregate. Many species have quite specific requirements for roosts, for example, *N. stramineus* seem to require very humid caves which prevent their delicate wing membranes from drying out. Mother bats congregate to give birth to and suckle their babies at so-called nursery roosts. If these critical sites are destroyed or disturbed by humans, then the bat population's reproductive output for that year could be lost or even a large proportion of the whole bat population on an island may be wiped out in a single event. No cave roosts are known in the Centre Hills, but invariably the forest supports a large number of roosting trees. Natural water bodies are important as they support increased densities of both insects and fruiting and flowering trees, as well as being resource for bats drinking, and therefore the modification of the flow of streams and rivers in the Centre Hills is predicted to have negative consequences for insectivorous and piscivorous species of bat.

7.2. Patterns in bat diversity within the Centre Hills: Implications for biodiversity conservation

All 10 species of bat known from Montserrat were recorded during the period of the CHBA, through mist netting both at CHBA sample points and at long-term bat monitoring sites. This was the first time all 10 species of bat have been recorded during a single survey since sampling started in 1978. According to the mist netting data, by far the most dominant species in the Centre Hills was *A. jamaicensis* (Table 7.3). However, acoustic surveys suggested that *Molossus molossus* was present at the majority of sampling points and that this species is ubiquitous in the area, as it appears to be on most Eastern Caribbean islands. Far fewer captures were made of *B. cavernarum* and the restricted range species *A. nichollsi* and *M. plethodon*.

Species	Number of captures
Artibeus jamaicensis	77
Ardops nichollsi	16
Brachyphylla cavernarum	10
Chiroderma improvisum	1
Monophylus plethodon	7
Sturnira thomasi vulcanensis	1
TOTAL	112

Table 7.3. Number of captures of bat species at the 16 CHBA points

The most notable captures were the individuals of *C. improvisum* and *S. thomasi vulcanensis* which were caught at the CHBA points in Corbett Spring and Bottomless Ghaut respectively (Fig. 7.4). Both were lactating females, providing important evidence of the existence of breeding colonies of these species. Another lactating *S. thomasi vulcanensis* individual has subsequently been caught in Bottomless Ghaut in 2006. It is very likely that *C. improvisum* is extremely rare in Montserrat, and possibly in Guadeloupe, and therefore highly threatened. Following the volcanic eruptions in the 1990s, Bottomless Ghaut is now the only location in the world known to support *S. thomasi vulcanensis*, and is clearly a very important site. Mobs of roughly a dozen *S. thomasi vulcanensis* were observed on two occasions in both 2005 and 2006 in Bottomless Ghaut, which may suggest they are not as rare as once thought but were missed in previous monitoring efforts and tend to be hard to catch in mist-nets. Another bat caught in Bottomless Ghaut during the CHBA was initially identified as *A. nichollsi* but (following discussions with G. Kwiecinski) it is possible this was a *Stenoderma rufum*. This species has not previously been described further south than the Virgin Islands but unfortunately no photographs were taken of this individual for retrospective identification; further sampling in Bottomless Ghaut is recommended and may prove productive.

Three species were not recorded at the CHBA points but were caught at the long term monitoring sites. Two fishing bats (*Noctilio leporinus*) were caught at Sappit River in the Centre Hills. This was of interest as this species was unrecorded on Montserrat following the volcanic eruption until the capture of a single specimen in 2004 (by S. Pedersen and team). Though readily netted, these animals have never been captured in large numbers in Montserrat. The highest observed activity and netting success of these bats between 1978 and 2005 was recorded in 1994 and 1995 (post-Hugo, pre-volcano) along the Belham Valley River, but this site has subse-

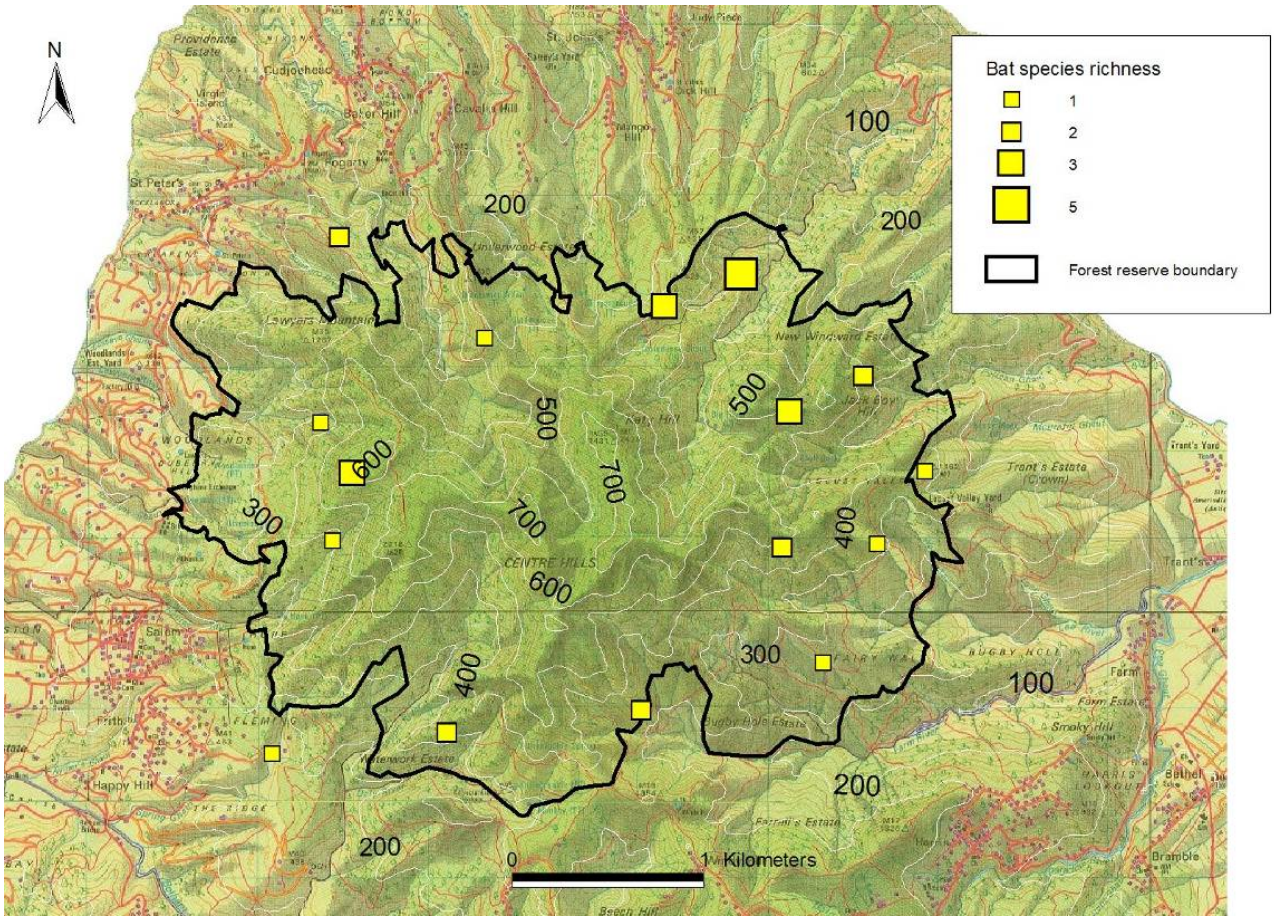


Fig. 7.5. Map of the number of bat species caught in mist-nets at the CHBA points in the Centre Hills.

quently suffered severe damage as a result of pyroclastic flow and ashfall. One individual was netted in a deep ravine at a higher elevation in Hope Springs in 1984. Given that the Hope springs site was 1.5 km distant from the nearest known foraging area, this suggested there was a *N. leporinus* roost site somewhere in this locality but whether it still exists is unknown. Although a globally widespread species, it appears restricted to lower elevations and may have limited habitat available to it on Montserrat, and other small Caribbean Islands, which makes Sappit River probably the most important site for *N. leporinus* on the island. *T. brasiliensis* was also caught at Sappit River and in an abandoned building in the village of Lees in 2005. Finally, *N. stramineus*, believed to be an obligate cave roosting species, was found at a roost in tarrish pits immediately south of the Centre Hills boundary near Happy Hill.

The number of bat species recorded at the CHBA points varied across the Centre Hills (Fig. 7.5). Five species were caught at the Bottomless Ghaut sampling point, including *S. thomasi vulcanensis*, which therefore appears to be a very important ghaut for bats. Three species were recorded at three sampling points, including Gun Hill, Upper Blakes and Jackboy Hill. The latter two sites, Bottomless Ghaut and Corbett Spring, where the endangered *C. improvisum* was caught, all fall in the east and north-east of the Centre Hills. This region therefore appears to be a key zone for bats in the Centre Hills.

However, examination of the long term monitoring data (summarised in Table 7.4) reveals other important sites within the Centre Hills. Due to the large effort required to catch all bat species using a particular site, the monitoring data provide a more accurate estimate of species richness for a given area. The Sappit River, which is still relatively intact following the volcano, can be currently considered a key site for bats, with seven species recorded there between 1978 and 2005. The lower Belham Valley and Paradise Estate have suffered severe damage from the volcano and are currently unlikely to support the high species richness that has been recorded historically. Hope Springs, Soldier and Runaway Ghauts and the Lawyers area are other relatively undisturbed and important sites for bats in the Centre Hills.

Due to their high mobility and capacity of ranging over wide areas, bats present a number of challenges to the identification of key zones and habitats within the Centre Hills. Further, the CHBA data only represent a single 'snapshot' of the distribution of bat species in the Centre Hills. The long term monitoring data tend to be collected between June and August and therefore may not be a representative sample of habitat use and movement of bats across an entire year. Despite these issues, it is clear the Centre Hills forest overall represents a vital resource for bats on Montserrat for foraging, roosts and nursery sites, particularly for the frugivorous species. It is noteworthy that both native and exotic fruiting trees

Location	Species	Nights	Nets	Captures
Belham Valley River, Lower	9	5	41	564
Belham Valley River, Sappit	7	5	51	281
Paradise Estate	7	2	27	177
Collins River	6	6	46	85
Hope Springs	6	5	25	73
Soldier Ghaut	5	4	33	44
Lawyers Tank	5	3	17	48
Runaway Ghaut	5	3	11	9
Lawyers, Lower	5	3	10	31
Dick Hill Farm	3	1	6	15
Cassava Ghaut	2	2	11	8
MEAN	**5.5**	**3.5**	**25.3**	**121.4**

Table 7.4. Number of species caught and sampling effort expended between 1978 and 2004 at 11 sites within or in the vicinity of the Centre Hills

are likely to be important for this guild and therefore removal of exotic trees may reduce food availability for a number of frugivorous species, including the two Endangered species. Offsetting this impact by planting native fruiting trees would need to be considered. Flowing and standing water bodies are a key resource for insectivorous and piscivorous bats and therefore water management practices in the Centre Hills will have implications for these species.

Bats that frequent the Centre Hills also invariably rely on a number of resources located outside and perhaps far from the forest boundary. Therefore, a coherent conservation strategy for bats, and the services they provide to the Centre Hills forest, needs to include relevant mechanisms for protecting these resources. In particular, roost sites are an extremely valuable resource. Bats as a group use a number of different roost types such as caves, trees and buildings but whilst some species utilise a wide variety of roosts (e.g. *A. jamaicensis* and *M. molossus*) others seem to have more specific requirements (e.g. caves for *N. stramineus* and *B. cavernarum*; tree foliage for *A. nichollsi*). Volcanic activity is known to have destroyed a number of roost sites in the south of Montserrat. For example, a large roost used predominantly by *B. cavernarum* was eradicated by pyroclastic flows in 1996. It is absolutely critical therefore that the remaining caves elsewhere on the island are protected. A cave in Little Bay houses a large colony of 5000-6000 individuals of *B. cavernarum* which is probably vital for this species on Montserrat. The potential future development of the nearby port facility is likely to endanger this colony. The tarrish pits south of Belham Valley house the only known roosts for *N. stramineus* on Montserrat and therefore warrant protection. However, they are currently endangered by the mining/gravel facilities therein, although apparently they still use the roost despite the noise and vibration. No caves providing roost sites are known to exist in the Centre Hills and data on other types of roost sites within the forest is lacking, but it seems highly likely that foliage and hollow tree roosts at least will be found inside the boundary. Water bodies outside of the Centre Hills boundary are also an important resource for bats. In particular, the Belham Valley River, the only known site for *N. leporinus* and *N. stramineus*, is a key site and warrants attention.

Although bats on Montserrat have been the subject of intense field research, an investigation of the key feeding and roosting sites and resources is needed to inform the conservation management of bats. Specifically, a better understanding is required of the contemporary distribution of species across Montserrat following the volcanic activity, and resource use by species of conservation concern and biodiversity value throughout the entire year. Given their importance to the functioning of forests, monitoring of bats should be a key component of a management plan for the Centre Hills. We recommend a two-pronged approach; sampling at long term sample sites established by S. Pedersen and team for longitudinal monitoring, combined with a more randomised approach (similar to the one utilised by the CHBA) to produce a spatially more representative sample of the bat fauna.

Acknowledgements

Scott Pedersen wishes to thank the following for financial support of the project: Mary B. Totten Trust, Durrell Wildlife Conservation Trust, South Dakota State University, University of Wisconsin-Whitewater, and the University of Northern Colorado. Thanks go to Gerard Gray, Tony Hill, and Claude Gerald (Chief Forestry and Environment Officers during the duration of this project) of the Ministry of the Environment for granting us collection permits. Steven McNamara, Sarita Francis, Jean White, and the Staff of the Montserrat National Trust are to be thanked for their advice and support. The patience, courtesy and good humor extended to us by the Estate owners on Montserrat is greatly appreciated. In particular, a warm and special thank you goes to the Hollenders of the Waterworks Estate and their dedicated efforts towards maintaining Montserrat's biodiversity. Finally, we wish to acknowledge the fine field assistance of Philemon (*Mapie*) Murrain, James (*Scriber*) Daly, John (*Gambie*) Martin, Calvin (*Blacka*) Fenton, Lloyd (*Lloydie*) Martin, Samson and Andre Lahti-Parcell, Nancy Heisel, Karen Hadley, numerous students who attended the American University of the Caribbean School of Medicine in 1993-94, Jon Appino, Anya Hartpence, Betsy South, Sam Daane, Karen Boegler, Roxy Larsen, Jessica Kiser, and Will Masefield. Materiel and curatorial support was provided by the Division of Zoology of the University of Nebraska State Museum with great thanks for the assistance of Tom Labedz.

References

Baker, R.J., & Genoways, H.H. (1978). Zoogeography of Antillean bats. *Academy Natural Science of Philadelphia Special Publications*, **13**, 563-597.

Baker, R.J., Genoways, H.H. & Patton, J.C. (1978). Bats of Guadeloupe. *Occasional Papers of the Museum, Texas Tech University*, **50**, 1-16.

Chiroptera Specialist Group (1996a). *Ardops nichollsi*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996b). *Chiroderma improvisum*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996c). *Monophyllus plethodon*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996d). *Sturnira thomasi*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 26 November 2007.

Chiroptera Specialist Group (1996e). *Tadarida brasiliensis*. In: IUCN 2007. *2007 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 26 November 2007.

Findley, J.S., & Wilson, D.E.. (1983). Are bats rare in tropical Africa? *Biotropica*, **15**, 299-303.

Genoways, H.H. (1998). Two new species of bats of the Genus *Sturnira* from the Lesser Antilles, West Indies. *Occasional Papers of the Museum, Texas Tech University*, **176**, 1-7.

Genoways, H.H. & Baker, R.J. (1975). A new species of *Eptesicus* from Guadeloupe, Lesser Antilles (Chiroptera: Vespertilionidae). *Occasional Papers of the Museum, Texas Tech University*, **34**, 1-7.

Genoways, H.H., & Jones Jr., J.K. (1975). Additional records of the stenodermine bat, *Sturnira thomasi*, from the Lesser Antillean Island of Guadeloupe. *Journal of Mammalogy*, **56**, 924-925.

Genoways H.H., Pedersen, S.C., Larsen, P.A., Kwiecinski, G.G. & Huebschman, J.J. (2006). Bats of Saint Martin, French West Indies/Sint Maarten, Netherlands Antilles (Submitted: Mastozoologia Neotropical).

Griffiths, T.A. & Klingener, D. (1988). On the distribution of Greater Antillean bats. *Biotropica*, **20**, 240-251.

Hamilton, T. H., Barth, R.H. & Rubinoff, I. (1964). The environmental control of insular variation in bird species abundance. *Proceedings of the National Academy Science*, **52**, 132-140.

MacArthur, R.H., Diamond, J.M. & Karr, J.R. (1972). Density compensation in island faunas. *Ecology*, **53**, 330-342.

Larsen, R., Boegler, K. & Pedersen, S.C. (2005). Mistnetting bias on Montserrat. *Bat Research News*, **46,** 191.

Masson, D. & Breuil, M. (1992). Un *Myotis* (Chiroptera, Vespertilionidae) en Guadeloupe (Petites Antilles). *Mammalia*, **56**, 473-475.

Morgan, G.S. & Woods, C.A. (1986). Extinction and the zoogeography of West Indian land mammals. *Biological Journal of the Linnaean Society*, **28**, 167-203.

Pedersen, S.C. (1998). Blown in, blown off, and blown up; the bats of Montserrat BWI. *American Zoologist*, **37**, 17A.

Pedersen, S.C., Genoways, H.H. & Freeman, P.W. (1996). Notes on the bats from Montserrat (Lesser Antilles), with comments concerning the effects of Hurricane Hugo. *Caribbean Journal of Science*, **32**, 206-213.

Pedersen S.C., Genoways, H.H., Morton, M.N., Johnson, J.W. & Courts, S.E. (2003). Bats of Nevis, northern Lesser Antilles. Acta Chiropterologica, 5, 251-267.

Pedersen, S.C., Genoways, H.H., Morton, M.N., Kwiecinski, G.G. & Courts, S.E. (2005). Bats of St. Kitts (St. Christopher), northern Lesser Antilles, with comments regarding capture rates of Neotropical bats. *Caribbean Journal of Science*, **41**, 744-760.

Pedersen, S.C., Genoways, H.H., Morton, M.N., Swier, V.J., Larsen, P.A., Lindsay, K.C., Adams, R.A. & Appino, J.D. (2006). Bats of Antigua, northern Lesser Antilles. *Occasional Papers of the Museum, Texas Tech University*, **249**, 1-18.

Preston, F.W. (1962). The canonical distribution of commonness and rarity: Part II. *Ecology*, **43**, 410-432.

8. Rats in the Centre Hills

R. P. Young

8.1. Potential impact of introduced rats on the Centre Hills biota

The negative effects of introduced species of rats (*Rattus rattus, R. norvegicus* and *R. exulans*) on indigenous island animal and plants have been long recognised and are well-documented (see Towns, Atkinson and Daugherty, 2006, for a review). These effects can either be direct, e.g. through predation or exploitation competition for food, or indirect, e.g. through changing habitat structure leading to shifts in predator-prey dynamics or access to food resources. There is increasing evidence that the impacts of rats are sufficiently pervasive to affect ecosystem structure and function and have far-reaching consequences for the persistence of island biotas. Effects can be over relatively short time-scales, e.g. effects of high predation rates by rats on small lizards, or over much longer periods, e.g. low recruitment due to seedling predation by rats preventing forest regeneration. Recent studies suggest that the effects of introduced rats on islands have probably been greatly under-estimated (Towns *et al*. 2006).

Fig 8.1. Black rat *Rattus rattus*. (Photo: G. Hilton, RSPB)

Globally, black rats *R. rattus* (Fig. 8.1) have been demonstrably associated with the declines or extinctions of the largest number of indigenous vertebrate species, around 60 species, and are considered the most damaging of the introduced rats. They are arboreal and can predate birds' nests, tree-living reptiles, fruit and seeds and are also capable swimmers so therefore are good colonisers of islands. Brown rats *R. norvegicus* are also known to have major negative impacts on indigenous island species, albeit less wide-ranging, but due to their greater body size may affect larger prey species such as seabirds. Both these species have been introduced onto Montserrat, probably with the arrival of the first Europeans roughly 400-500 years ago, and now occur in many areas of the Centre Hills forest. In order to evaluate which native species in the Centre Hills may be affected by rats it is informative to assess which taxa have been shown to be vulnerable to rats elsewhere. The following taxonomic groups have demonstrated global vulnerability to black and/or brown rats (from Towns *et al*. 2006):

1. Plants with fleshy fruits and/or large edible seeds, or heavily scented inflorescences, or dioecious reproductive systems, or reliant on seabird effects such as enriched soil or open disturbed ground
2. Terrestrial flightless invertebrates, especially large, nocturnal and ground-dwelling species
3. Amphibians and reptiles that are large, nocturnal and ground-dwelling, have low annual reproductive output and are oviparous, laying eggs in rookeries
4. Diurnal ground dwelling reptiles, including some snakes (vulnerable to *R. rattus* only)
5. Small terrestrial birds with weak flight and are surface or crevice nesters near ground level
6. Small arboreal birds, especially hole nesting passerines and parakeets (vulnerable to *R. rattus* only)
7. Small ground nesting birds, including well-flighted species
8. Small burrowing sea-birds (<250g) and surface nesting seabirds, such as tropic birds, terns, petrels and prions
9. Larger bodied seabirds (250-750g) (vulnerable to *R. norvegicus* only)
10. Ground-dwelling or ground-foraging bats (vulnerable to *R. rattus* only)

Clearly, a wide range of plants and invertebrates in the Centre Hills are likely to be affected by rat predation, which may have resulted in population declines and extinctions of these taxa, and others that rely on them, and will do in the future. Amongst the reptiles and amphibians, the galliwasp and mountain chicken would appear to be most vulnerable as they are large-bodied and nocturnal and probably have slow annual reproductive rates. Further, mountain chickens lay eggs in rookeries, which can be easily raided by rats. Mountain chickens in the Centre Hills have been found with wounds that are consistent with rat bites, although no evidence exists that rats are significantly impacting on their population. Other reptile species such as the racer, blind snake, anole and turnip-tailed gecko could also be susceptible to the effects of introduced rats. No small terrestrial or ground nesting birds currently occur on Montserrat but a number of passerine species may be vulnerable to the arboreal black rat, including the Montserrat oriole, as well as forest thrush, and others. Black rats have been observed to predate the eggs and chicks

of the Montserrat oriole (G.M. Hilton, *pers. comm.*) and in some years achieve very high densities in the Centre Hills resulting in high predation rates and a concomitant decrease in oriole annual productivity, which had longer term population effects in this species. None of the bat species on Montserrat are ground-dwelling or ground-foraging and so are unlikely to be directly affected by rats. Rats are also known to have a major impact on plants, through seed, fruit and seedling predation and affect recruitment in plant populations. Plants with fleshy fruits and/or large edible seeds, or heavily scented inflorescences are particularly vulnerable. Terrestrial flightless invertebrates, especially large, nocturnal and ground-dwelling species, are also particularly at risk from rat predation.

Black and brown rats are therefore highly likely to be posing a serious threat to the persistence of a large number of the Centre Hills taxa by exerting a range of direct and indirect effects, which may be sufficiently strong and wide-ranging to influence the overall functioning of the Centre Hills ecosystem. Most worryingly, three Critically Endangered species, the oriole, galliwasp and mountain chicken possess traits that have been shown elsewhere to pre-dispose them to being vulnerable to the effects of introduced rats. These effects may have already had a severe historical impact on the population growth rates of these species. However, no quantitative data exist on the distribution and abundance of rats in the Centre Hills and whether rats have penetrated the interior of the forest at the highest elevations. As part of the CHBA we carried out surveys to understand how rats are distributed across the Centre Hills and how their abundance varies with habitat and landscape features. Nevertheless, methods of reducing the impact of rats on the Centre Hills ecosystem should be a central consideration in the design of the management plan.

8.2. Patterns and correlates of rat abundance within the Centre Hills: implications for biodiversity conservation

In order to detect the presence of rats and to estimate their distribution, short pieces of wood soaked in vegetable oil ('chew-sticks') were placed in the ground at CHBA points which, if rats are present, are chewed. The chew-stick data demonstrate that rats occur throughout the Centre Hills, even in the interior of the forest and at the highest altitudes on top of Katy Hill (see Fig. 8.2).

We estimated the relative abundance of black and brown rats by placing 11 independent lines of snap-traps along trails and ghauts across the Centre Hills (N.B. trapping line is referred to as 'sampling site' in the analysis). Each trapping line consisted of 15 snap-trap stations spaced 25m apart, with two traps situated on the ground (within 1m of each other) and two traps tied to branches at eye level of nearby trees. All snap-traps were baited with peanut butter. Trapping rates were very high in the Gun Hill region (24.4 rats per 100 trap

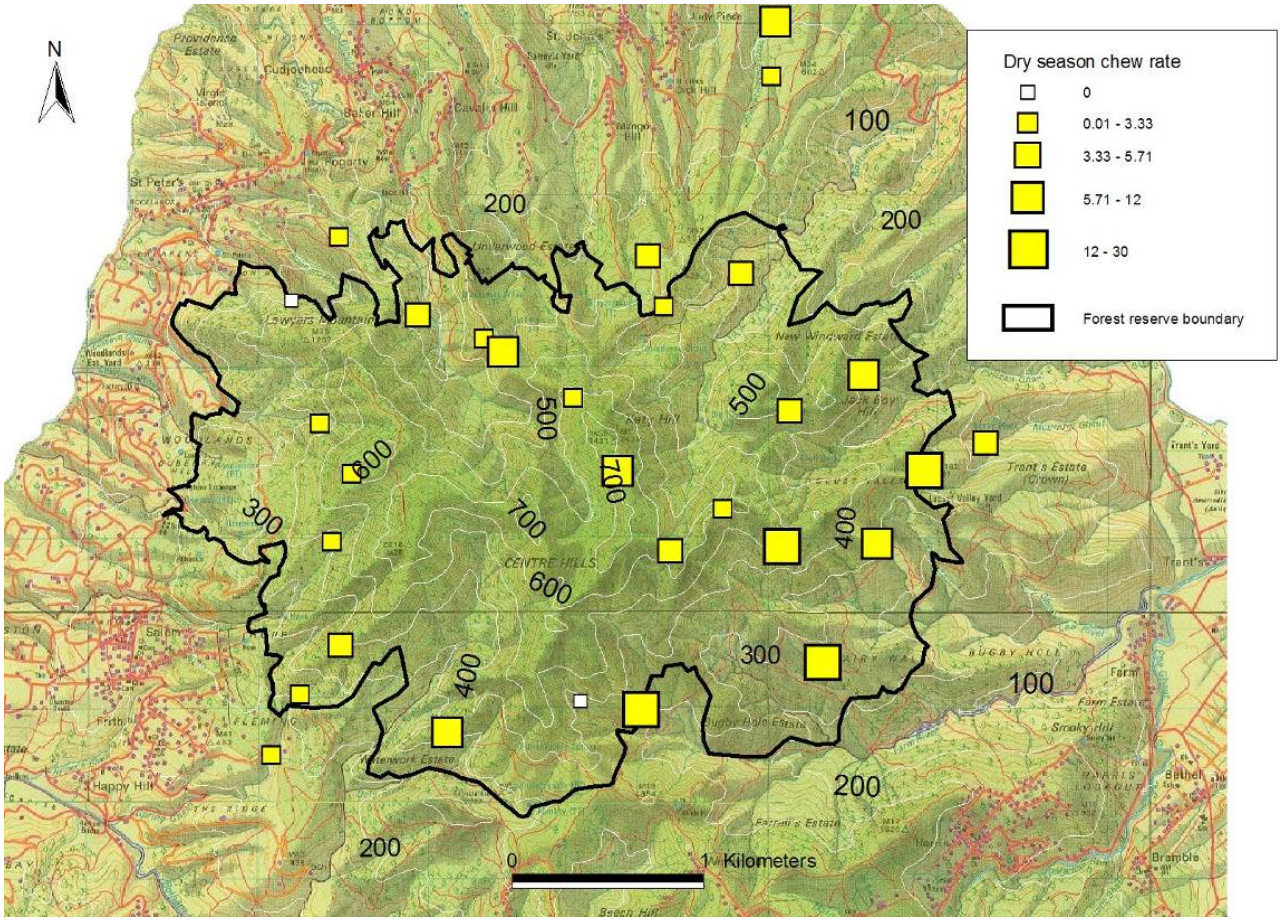


Fig 8.2. Rat chew rate (number of sticks chewed per 100 days) at the CHBA points in the Centre Hills

Line transect	Number of brown rats caught	Number of black rats caught	Brown rat capture rate (rats per 100 trap nights)	Black rat capture rate (rats per 100 trap nights)	Total capture rate (rats per 100 trap nights)
Bottomless Ghaut	0	5	0.00	2.46	2.46
Cassava Ghaut	7	15	4.45	9.55	14.00
Cat Ghaut	2	12	0.94	5.65	6.59
Fairy Walk	6	4	4.26	2.84	7.09
Fogarthy	1	14	0.66	9.24	9.90
Gun Hill	6	27	4.43	19.93	24.35
Hope spring	3	7	1.90	4.43	6.33
Jack Boy Hill	0	10	0.00	6.15	6.15
Jubilee Heights	1	5	0.59	2.94	3.53
Killicrankie	2	5	0.94	2.34	3.28
Underwood	2	2	1.17	1.17	2.34
MEAN	**2.73**	**9.64**	**1.76**	**6.06**	**7.82**

Table 8.1. The number of black rats *Rattus rattus* and brown rats *Rattus norvegicus* caught and capture rates at trapping lines in the Centre Hills

nights), as well as Cassava Ghaut (14.0 rats per 100 trap nights) and Fogarthy (9.9 rats per 100 trap nights) (Table 8.1). The high trap rate observed at Cassava Ghaut is concerning given the proximity of this site to Woodlands where the galliwasps were found and the pre-disposed vulnerability of galliwasps to rat predation. The rat trapping data suggest that overall black rats are much more abundant in the Centre Hills than brown rats, although differences in capture probability have not been taken into account.

To test the hypothesis that rats are more abundant in areas with higher numbers of non-native fruiting trees we investigated the relationship between mean rat capture rate and mean number of fruiting trees at sampling sites (n=11). A linear regression revealed a strong positive relationship between these variables with the mean number of fruiting tress explaining 69.1% of the variance in rat capture rate (Fig. 8.3). However, the effect of one site (Gun Hill with both the highest number of rats and fruiting trees) on this relationship was stronger than expected (i.e. high leverage) and therefore these results should be treated with some caution.

We also used generalised linear mixed modelling to investigate the relationship between the occurrence of rats in individual traps and the number of non-native fruit trees within 10m of the trap. The effect of altitude at which the trap is located (rats are suspected to be scarcer at higher altitudes) was also included in the model, as well as the interaction between number of fruiting trees and altitude. Sampling site was entered into the model as a random term to take account of non-independence of individual traps.

There was a near-significant relationship between the occurrence of rats at trap stations and the number of non-native fruiting trees ($P = 0.061$) (Table 8.2). There was no relationship between rat occurrence and altitude, but there was an association between rats and the interaction of fruiting tree numbers and altitude ($P = 0.024$), suggesting a higher probability of catching rats at increased elevations with more non-native fruiting trees. This is slightly contrary to expectation. However, due to logistical reasons it was not possible to sample at the highest elevations, and therefore most trapping was carried out lower and mid altitudes. Therefore, this interaction effect may not be relevant at the higher elevations of the Centre Hills.

Overall, these analyses provide good evidence that the number of exotic fruiting trees in the Centre Hills forest is positively related to the abundance of rats in an area. Higher numbers of rats supported by plentiful food non-native fruit resources will result in high predation pressure on indigenous plants and animals, which may be sustained even when native prey decline (i.e. inverse density dependent mortality through preda-

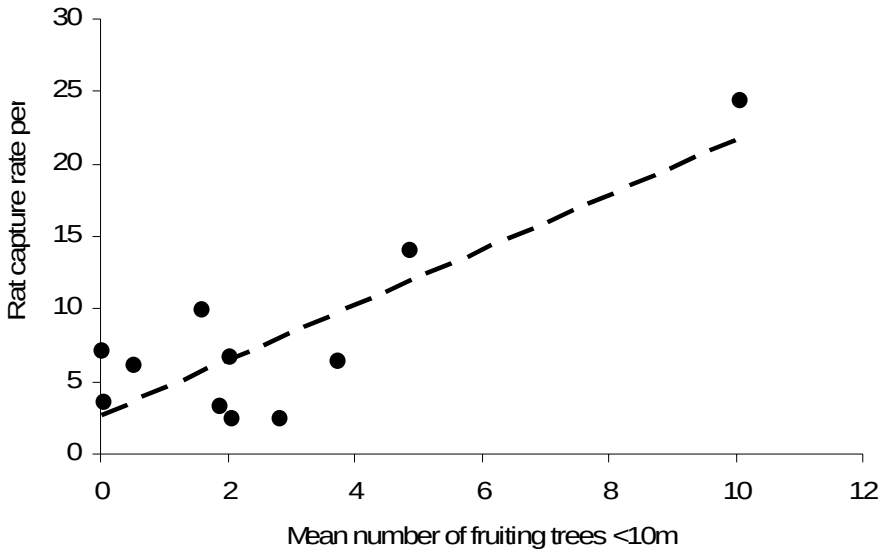


Fig 8.3. Relationship between rat capture rate and mean number of non-native fruiting trees at sampling sites ($F_{1,9}$ = 23.29, R^2 = 0.69, P < 0.001)

tion). Therefore, methods of reducing the impact of rats on the Centre Hills ecosystem should be a central consideration in the management plan to achieve a goal of conserving and restoring biodiversity over the long term. As an eradication of rats from the Centre Hills through trapping or poisoning is impossible in the near future, an experiment to quantify the impact of rats on key indigenous taxa would be informative to estimate the level of control necessary to enable population growth or increased survival or productivity in these taxa. Such an experiment is currently being carried as part of the Centre Hills Management Plan project and should prove informative. Given the correlations between rat density and numbers of fruiting trees, it is highly likely that removing fruit trees would result in an overall decrease in the rat population and ultimately a reduction in their effects on indigenous flora and fauna (but see section on bats). We recommend conducting a 'weeding experiment' to evaluate the time and resources required to conduct this type of management for a given area and to allow the potential reduction in rat abundance to be quantified. Agricultural areas will provide plentiful and accessible food resources supporting high numbers of rats, which will therefore act as source populations for supplementation of populations in the less disturbed forest interior. It would be highly beneficial if such areas within the interior of the forest be managed to restore native vegetation. However, it would be important to combine habitat restoration with simultaneous lethal control of rats, as removal of an important food source may result in rats switching to native prey, resulting in further population declines of indigenous vulnerable species.

As both rat control and habitat management activities are labour intensive, the establishment of carefully placed zones of high intensity management to re-

Fixed term	Wald statistic	Df	Chi-sq prob
Number of fruiting trees	3.51	1	0.061
Altitude	0.34	1	0.561
Number of fruiting trees*Altitude	5.08	1	0.024

Minimal model	Average effect	SE
Constant	-0.177	0.317
Number of fruiting trees	0.132	0.070
Number of fruiting trees*Altitude	0.002	0.001

Table 8.3. Generalised linear mixed modelling shows that the occurrence of rats at trap stations was associated with the interaction of number of fruiting trees and altitude (P=0.024) and possibly with the number of fruiting trees (P=0.061)

duce rat abundance in key areas of biodiversity may be an optimal strategy. If successful, these zones could serve as refuges where native species would be allowed to achieve high productivity and survival which would increase the probability of long term persistence of these taxa. These zones should be placed at medium to high elevations so that brown rat abundance is low and far from the forest edge and agricultural areas where rat populations are likely to be very high. A zone of intensive rat control in the Woodlands area should be considered as part of a Species Action Plan for the Montserrat galliwasp.

We recommend that introduced rats are included in pressure-state-response monitoring programme (i.e. rats as a pressure on the Centre Hills biodiversity) as part of the management plan. Such monitoring would serve both as an early warning device for vulnerable threatened species, such as the Montserrat galliwasp and oriole, and to quantify the impacts of any rat control measures on their population size. Evidence from the Montserrat oriole conservation project indicates that rat populations show large fluctuations in sizes and can achieve very high densities for periods of time. Testing and development of a sensitive but low intensity monitoring technique is vital; the tracking tunnel technique currently being developed by the Centre Hills Management Plan project is promising.

Acknowledgements

Karen Varnham provided valuable expert advice on the design of the snap-trapping lines and protocols for data collection, as well as carrying out training of key individuals. Will Masefield, Richard Allcorn and Lloyd Martin co-ordinated the rat trapping fieldwork and collected much of the data. Agnieszka Ogrodowczyk led the rat distribution survey. Calvin Fenton, James Daley, James Boatswain, John Martin, Lloyd Aymer and Philemon Murrain all made valuable contributions to data collection.

References

Towns, D.R., Atkinson, I.A.E. & Daugherty, C.H. (2006). Have the harmful effects of introduced rats on islands been exaggerated? *Biological Invasions*, 8, 863-

Appendix 1. The Montserrat plant species checklist

S. K. Robbins, M. A. Hamilton, C. Clubbe & S. Bárrios.

Categories

Bio-geographical Categories

Montserrat: Endemic to Montserrat — species range restricted to Montserrat.

Lesser Antilles: Endemic to the Lesser Antilles—species range restricted to the Lesser Antilles.

Restricted range: Species range exceeds Lesser Antilles but is restricted to a small area outside the Lesser Antilles.

Caribbean: Species range does not exceed the Caribbean Islands: i.e. Greater and Lesser Antilles, Bahamas, Trinidad and Tobago etc.

Peri-Caribbean: Species range exceeds Caribbean but is restricted to a small continental area.

Wider distribution: Species range exceeds all of the above geographical categories.

Introduced: Denotes that a species is introduced, i.e. ornamental/ food crop/invasive etc.

Cultivation Categories

Ornamental

Food crop

Culinary herb

Medicinal herb

Environmental use: e.g. wind break, sand stabilization, etc…

Plant Category Key

Di: dicot species

C-Di-Intro: candidate dicot species- introduced

C-Di-Nat: candidate dicot species- native

Mo: monocot species

C-Mo-Intro: candidate monocot species- introduced

C-Mo-Nat: candidate monocot species- native

Gym: Gymnosperm

C-Gym-Intro: candidate gymnosperm species- introduced

C-Gym-Nat: candidate gymnosperm species- native

Pter: Pteridophyte

C-Pter-Intro: candidate pteridophyte species- introduced

C-Pter-Nat: candidate pteridophyte species- native

Invasiveness Key

Naturalized

Naturalized and spreading

Invasive

ACANTHACEAE

Asystasia gangetica (L.) T.Anders
Description: Scrambling or sprawling herb with branches to 1m or more.
Distribution: Native of Asia, now a Pantropical weed
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Lucia, St. Vincent, Barbados
Biogeography: Introduced
Plant Category: Di

Barleria cristata L.
Lesser Antilles Distribution: Montserrat, St. Vincent, Barbados
Biogeography: Introduced
Plant Category: C-Di-Intro

Barleria lupulina Lindl.
Description: Shrub; to 1m tall.
Distribution: Native of Mauritius but cultivated and naturalised elsewhere
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Blechum pyramidatum (Lam.) Urb.
Common Name(s): rock balsam.
Description: Herb; stems ascending to 70cm.
Distribution: Neotropical weed, Greater Antilles, Mexico, Central America, introduced in Paleotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Crossandra infundibuliformis (L.) Nees
Lesser Antilles Distribution: Montserrat, Grenada
Biogeography: Introduced
Plant Category: C-Di-Intro

Eranthemum pulchellum Andr.
Lesser Antilles Distribution: Montserrat, Guadeloupe, St. Lucia, St. Vincent, Barbados
Biogeography: Introduced
Plant Category: C-Di-Intro

Fittonia albivensis (Lindl. Ex Veitch) Brummitt
Lesser Antilles Distribution: Montserrat, Barbados
Biogeography: Introduced
Plant Category: C-Di-Intro

Hemigraphis alternata (Burm.f.) T.Anderson
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Lucia
Biogeography: Introduced
Plant Category: C-Di-Intro

Justicia brandegeana Wassh. & L.B. Sm.
Common Name(s): Shrimp plant.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Barbados
Biogeography: Introduced
Plant Category: C-Di-Intro

Justicia carthaginensis Jacq.
Description: Shrub; to 1.5m.
Distribution: Hispaniola, Virgin Islands, Mexico, Central America, Venezuela, Columbia
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, St. Kitts, Guadeloupe, Dominica, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Justicia eustachiana Jacq.
Description: Shrub; to 1m.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Redonda, Guadeloupe, Marie Galante.
Biogeography: Lesser Antilles
Plant Category: Di

Justicia secunda M. Vahl
Common Name(s): St John, St. John's bush.
Description: Stout herb or subshrub; to 4m tall.
Distribution: St. Croix, Trinidad, Guianas, Venezuela, Colombia
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Justicia sessilis Jacq.
Common Name(s): cossie balsam
Description: Herbaceous or slightly woody plants; to 40cm.
Distribution: Greater Antilles, Central America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Odontonema nitidum (Jacq.) Kuntze
Description: Shrub; to 3m.
Distribution: Cuba, Jamaica, Virgin Islands
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.

Biogeography: Caribbean
Plant Category: Di

Oplonia microphylla (Lam.) Stearn
Description: Erect, branched shrub; to 1.5m tall.
Distribution: Jamaica, Hispaniola, Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, La Desirade, Marie Galante, the Grenadines.
Biogeography: Caribbean
Plant Category: Di

Pseuderanthemum carruthersii (Seem.) Guillaumin
Common Name(s): Jacob's coat, coloured leaf.
Description: Shrub; 1-2m tall.
Distribution: Native to the Polynesian Islands but widely cultivated in tropical coutries
Lesser Antilles Distribution: Montserrat, Antigua, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Ruellia brittoniana Leonard
Cultivated: ornamental
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Ruellia tuberosa L.
Common Name(s): Bluebell, sheep potato, Daniel's great gun, minne root, snapdragon root.
Description: Perennial herb; to 50cm.
Distribution: Florida, Greater Antilles, Mexico, Central America, South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Wider Distribution
Plant Category: Di

Sanchezia speciosa Leonard
Lesser Antilles Distribution: Montserrat, Guadeloupe, Barbados
Biogeography: Introduced
Plant Category: C-Di-Intro

Teliostachya alopecuroides (M. Vahl) Nees
Description: Perennial herb; to 50cm.
Distribution: Greater Antilles, Central America, Trinidad, South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Thunbergia alata Bojer ex Sims
Common Name(s): Golden bells.
Description: Trailing or climbing herbaceous vine; stems to 1m.
Distribution: Native of eastern Africa now widely cultiv\ted and escaped in Tropical; areas
Lesser Antilles Distribution: Montserrat, Antigua, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Thunbergia erecta (Benth.) T. Anderson
Description: Erect shrubs; to 3m tall.
Notes: persists after cultivation and has been found residual at old house foundations
Distribution: A native of Africa now widely cultivated in tropical areas
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica,St. Lucia.
Biogeography: Introduced
Plant Category: Di

Thunbergia fragrans Roxb.
Common Name(s): White lady.
Description: Slender, climbing herbaceous vine; stems to several meters.
Distribution: Native of India, widely cultivated, escaped and persisting in tropics
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

ADIANTACEAE

Adiantopsis radiata (L.) F,e
Description: Terrestrial fern; fronds 20-50cm long.
Distribution: Greater Antilles except Puerto Rico; Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Pter

Adiantum latifolium Lam.
Description: Terrestrial fern; fronds 35-95cm long.
Distribution: Greater Antilles, Virgin Islands, Trinidad, continental tropical America from Mexico to South America
Lesser Antilles Distribution: Montserrat, Nevis, Redonda, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Adiantum pyramidale (L.) Willd.

Description: Terrestrial fern; fronds 30-100cm long.
Distribution: Greater Antilles, St. Thomas
Lesser Antilles Distribution: Montserrat, Guadleoupe, Martinique
Biogeography: Caribbean
Plant Category: Pter

Adiantum tenerum Sw.
Description: Terrestrial fern; fronds 25-110cm long.
Distribution: Southern US, Bahamas, Greater Antilles, Tobago, Trinidad, Central America, northern Central America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barthelemy, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Adiantum tetraphyllum Humb. & Bonpl. ex Willd.
Description: Terrestrial fern; fronds 35-100cm long.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America from Mexico to South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Adiantum villosum L.
Description: Terrestrial fern; fronds 50-100cm long.
Distribution: Greater Antilles, Virgin Islands, continental tropical America from Mexico to northern South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Cheilanthes microphylla (Sw.) Sw.
Description: Small terrestrial fern; fronds 20-60cm.
Distribution: Southeastern US, Greater Antilles, Cayman Islands, Mexico
Lesser Antilles Distribution: Montserrat, St. Barthelemy, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Les Saintes, Dominica, Martinique, St. Vincent, Grenadines.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Pter

Doryopteris pedata (L.) F,e
Description: Small terrestrial fern; fronds 8-50cm long.
Distribution: Greater Antilles, St. Thomas
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique
Biogeography: Caribbean
Plant Category: Pter

Hemionitis palmata L.
Description: Small terrestrial, soft-herbaceous fern; fronds 15-35cm long.
Distribution: Greater Antilles, continental tropical America from Mexico to Bolivia
Lesser Antilles Distribution: Montserrat, St. Martin, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Pityrogramma calomelanos (L.) Link
Description: Terrestrial fern; fronds to 1m long.
Distribution: Tropical and sub-tropical America and Africa; naturalised elsewhere in warm regions
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barthelemy, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Pityrogramma chrysophylla (Sw.) Link
Description: Terrestrial fern; fronds 10-60cm long.
Distribution: Puerto Rico
Lesser Antilles Distribution: Montserrat, St. Barthelemy, Saba, St. Kitts, Nevis, Redonda, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Restricted Range
Plant Category: Pter

AGAVACEAE

Agave dussiana Trel.
Description: Succulent; rosette-forming, non-suckering; leaves 1-1.6m tall; inflorescence 5-9m long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, Martinique
Biogeography: Lesser Antilles
Plant Category: Mo

Agave karatto Mill.
Description: Succulent; non-suckering; leaves 1.3-1.7m long; inflorescence 5-6m tall.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Barbuda, Saba, St. Kitts, La Desirade
Biogeography: Lesser Antilles
Plant Category: Mo

Agave sisalana Perrine
Description: Succulent; short caudex, commonly suckering from base; leaves to 1.5m long; inflorescence to 8m tall.
Distribution: Native to Mexico, cultivated in South America, Central America, Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, St. Kitts, Nevis, Grenada, Barbados
Biogeography: Introduced

Plant Category: Mo

Furcraea tuberosa W.T. Aiton
Description: Rosette plants; leaves 1-2m long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados, St. Th
Biogeography: Lesser Antilles
Plant Category: Mo

AIZOACEAE

Sesuvium portulacastrum (L.) L.
Common Name(s): Sea purslane.
Description: Succulent perennial; trainling stems to 2m long.
Distribution: Southeastern US, Mexico, Central America, Greater Antilles, South America, and the Old World
Lesser Antilles Distribution: Montserrat, Anguilla, St. martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Redonda, Guadeloupe, Les Saintes, Dominica, Martinique, St. lucia, the Grenadines
Biogeography: Wider Distribution
Plant Category: Di

Trianthema portulacastrum L.
Description: Succulent perennial herb; stems prostrate; to 1m long.
Distribution: Southern US, Mexico and Central America, Greater Antilles, and South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Guadeloupe, Martinique, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

AMARANTHACEAE

Alternanthera bettzichiana (Regel) Voss
Description: Erect herb; to 1.5m tall.
Distribution: Southern Florida, Central and South America, cultivated elsewhere in the tropics
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, Barbados
Biogeography: Introduced
Plant Category: Di

Alternanthera brasiliana (L.) Kuntze
Description: Herbacious perennial; erect and spreading; weedy; to 2m tall.
Distribution: Mexico, Central America and Columbia to the Guianas, Brazil, Ecuador, and Peru
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Alternanthera flavescens Kunth
Description: Climbing or scrambling herb; roadsides and waste places.
Cultivated: ornamental
Invasiveness: Naturalised
Distribution: Florida, Mexico, Columbia, Venezuela, Brazil, Peru, Paraguay, West Indies
Lesser Antilles Distribution: Montserrat, Guadleoupe, Dominica, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Introduced
Plant Category: Di

Alternanthera sessilis (L.) R. Br. Ex DC.
Description: Trailing or scandent herb; of open places or shallow water.
Distribution: Scattered in US, Mexico, Central America, Greater Antilles, South America, tropical Afric and Asia
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Montserrat, Guadeloupe, Marie Galante, Domica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Alternanthera tenella Colla
Description: Herb; spreading to ascending; weedy.
Cultivated: ornamental
Distribution: South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Amaranthus spinosus L.
Description: Weed, often large, robust and woody, to 6dm.
Invasiveness: Naturalised and spreading
Distribution: originally of the old world tropical lowlands, now weedy elsewhere in America and in central and southern Europe, tropical Asia and Africa
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, grenada, barbados
Biogeography: Introduced
Plant Category: Di

Amaranthus viridis L.
Description: Succulent weed; to 1 metre tall.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Blutaparon vermiculare Raf.
Description: Trailing succulent perennial; diffuse with creeping branches rooting at nodes; grows along shores.
Distribution: Florida, Texas, mexico, Central America, Northern South America to the Guianas, West Indies, Bahamas, eastern Brazil and Equador.
Lesser Antilles Distribution: Montserrat, St Martin, St Barts, Barbuda, Antigua, St Eustatius, St Kitts, Guadeloupe, Marie Galante, Le Saintes, Dominica, Martinique, St Lucia, St Vincent, The Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Celosia argentea L.
Description: Annual herb; to 12 dm tall; cultivated or weedy.
Distribution: Probably native to Asia, but weedy and cultivated throughout the tropics.
Lesser Antilles Distribution: Montserrat, St Martin, St Barts, Antigua, St Eustatius, St Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Chamissoa altissima (Jacq.) Kunth
Description: Climbing shrub of waste areas and thickets often several metres long.
Distribution: West Indies, Mexico, Central America, and scattered collections from much of tropical America.
Lesser Antilles Distribution: Montserrat, St Martin, Saba, St Kitts, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Gomphrena globosa L.
Description: Annual herb.
Distribution: Widespread in cultivation throughout the tropics.
Lesser Antilles Distribution: Montserrat, St Martin, St Barts, Antigua, St Eustatius, St Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Gomphrena serrata L.
Description: Perennial; erect or partly decumbent.
Distribution: Florida, Mexico, Central America, Greater Antilles, Bolivia, Paraquay.
Lesser Antilles Distribution: Montserrat, St Martin, St Kitts, St Lucia
Biogeography: Wider Distribution
Plant Category: Di

Iresine angustifolia Euphras,n
Description: Weedy scrambling shrub of thickets or open areas; to 3 m tall.
Distribution: West Indies, Panama, Colombia, Equador, Brazil.
Lesser Antilles Distribution: Montserrat, St Martin, St Barts, Antigua, Saba, St. Eustatius, St Kitts, Redonda, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Iresine diffusa Humb. & Bonpl. ex Willd.
Description: Scrambling or erect herb to 2 metres tall; dioecious or rarely monoecious.
Distribution: Southern US, West Indies, Central America and tropical South America, south to Argentina.
Lesser Antilles Distribution: Montserrat, St Martin, St Barts, Antigua, Saba, St Eustatius, St Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Lithophila muscoides Sw.
Description: Prostrate, rosette and mat forming; arising from thick woody tap root .
Distribution: West Indies and northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St Martin, St Barts, Barbuda, Antigua, Saba, St Eustatius, St Kitts, Redonda, Guadeloupe, La Desirade, Marie Galante, Martinique, St Lucia, The Grenadines.
Biogeography: Wider Distribution
Plant Category: Di

AMARYLLIDACEAE

Crinum asiaticum L.
Lesser Antilles Distribution:
Biogeography: Introduced
Plant Category: C-Mo-Intro

Hymenocallis caribaea (L.) Herb.
Common Name(s): Lily, spider lily, white lili.
Description: Perennial herb; bulbous base; leaf blades 23-60x2.8-4.9cm long; Scape 25-60cm long.
Key ID Feature: Grows in sandy coastal areaas
Distribution: Jamaica, St. Croix
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Mo

Zephyranthes puertoricensis Traub
Common Name(s): Barbados snow drop, white snow drop.
Description: Bulbous herb.
Distribution: Greater Antilles, Tobago, Columbia, Venezuela
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Barbuda, Saba, St. Eustatius, Guadelupe, Martin-

ique, St. Lucia, St. Vincent, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

ANACARDIACEAE

Anacardium occidentale L.
Common Name(s): Cashew, cashew nut, wild almond, neva.
Description: Tree to; to 12m tall (5-7m in the Lesser Antilles).
Distribution: Cultivated throughout the tropics; native to tropical America.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Comocladia dodonaea (L.) Urb.
Common Name(s): Hogwood, hollywood.
Description: Slender shrub or small tree; to 1.5m
Notes: all parts poisonous causing contact dermatitis
Distribution: Hispaniola, Puerto Rico and the Virgin Islands
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Caribbean
Plant Category: Di

Mangifera indica L.
Common Name(s): Mango.
Description: Large tree; 7-30m tall (generally to 20m in the Lesser Antilles).
Notes: Large specimens along roadsides form important habitats for abundant epiphytes including Epidendrum montserratense, Polystachia, bromeliads and ferns as sited by the UKOTs team
Invasiveness: Naturalised
Distribution: native to Indo-Malesia, but widely cultivated and naturalised throughout the tropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Spondias mombin L.
Common Name(s): Hog plum.
Description: Tree; to 25m tall.
Distribution: Native to tropical America from Mexico to South America, cultivated throughout the tropics of both hemispheres, becoming naturalised in some cases
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

ANNONACEAE

Annona glabra L.
Common Name(s): Pond apple, dog apple, gut apple, monkey apple.
Description: Tree; 5-10m tall.
Distribution: Greater Antilles, Florida, along coast from Mexicio, to Southern Brazil, western Africa
Lesser Antilles Distribution: Montserrat, Antigua, Barbuda, Guadeloupe, Marie Galante, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Annona muricata L.
Common Name(s): Guanabana, soursop.
Description: Tree; 4-10 tall.
Distribution: Greater Antilles, Trinidad, Mexico, Central America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Barbuda, Saba, St. Eustatius, Guadeloupe, Marie Galante, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Annona squamosa L.
Common Name(s): Sweet sop, sugar apple, custard apple.
Description: Small tree; 2-10m tall.
Distribution: Greater Antilles, Mexico, Central America, tropical South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. barts, Barbuda, Antigua, Saba, St. Eustatius, Nevis, Guadeloupe, Marie Galante, Dominica, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Artabotrys hexapetalus (L. f.) Bhandari
Lesser Antilles Distribution:
Biogeography: Introduced
Plant Category: C-Di-Intro

Cananga odorata (Lam.) Hook. F. & Thomson
Common Name(s): Ylang-ylang.
Lesser Antilles Distribution: Montserrat and probably other islands
Biogeography: Introduced
Plant Category: C-Di-Intro

Guatteria caribaea Urb.
Common Name(s): Blackbark, mountain soursop.
Description: Medium sized to large tree; up to 40m tall; very erect; often with 1 or 2 smaller trees sprouting from

the base.
Key ID Feature: Base of trunk is often deeply lobed or lightly buttresed. The bark is very black, rough, finely fissured and soft. Flowers are solitary, small, greenish and scented, borne in the leaf axils all along the branchl
Distribution: Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, St Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, Grenada
Biogeography: Caribbean
Plant Category: Di

APIACEAE

Anethum graveolens L.
Common Name(s): Dillweed, aniseed, lami dill.
Distribution: Cultivated worldwide
Lesser Antilles Distribution: Montserrat, Anguilla, Guadeloupe, Dominica, Martinique, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Eryngium foetidum L.
Common Name(s): Blessed thistle, celantro.
Description: Biennial herb; to 40cm tall.
Distribution: Circumtropical weed or culinary herb.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

APOCYNACEAE

Allamanda cathartica L.
Description: Shrub.
Distribution: Possibly native to Brazil but cultivated and naturalised throughout the tropics
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Asclepias curassavica L.
Common Name(s): Red head, blood flower, milk weed, johanna.
Description: Erect perennial herb; usually unbranched; to 60cm tall.
Distribution: Bahamas, Greater Antilles, Mexico, Central America, South America, and introduced widely throughout the tropics
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, Guadeloupe, Les Saintes, Dominica, Martinique, St. Vincent, the Grenadines, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Calotropis procera (Aiton) W.T. Aiton
Common Name(s): French cotton, French Jasmine.
Description: Shrub; to 3m tall.
Notes: sited by UKOTs team feb 06 in Mrat growing in xeric sites usually along road sides
Invasiveness: Naturalised and spreading
Distribution: Native to the Old World tropics, widely introduced in the Neotropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Guadeloupe, La Desirade, Martinique, St. Vincent, the Grenadines.
Biogeography: Introduced
Plant Category: Di

Catharanthus roseus (L.) Don
Common Name(s): Periwinkle.
Description: Herb; to 80cm.
Distribution: Native of Madagascar but widely cultivated, escaped and spreading in tropical and subtropical areas.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Cryptostegia madagascariensis Bojer ex Decne.
Cultivated: ornamental
Invasiveness: Invasive
Distribution: Old World
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Marsdenia macroglossa Schltr.
Description: Climber.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, the Grenadines
Biogeography: Lesser Antilles
Plant Category: Di

Matelea maritima (Jacq.) Woodson
Description: Woody climber; stems 6m long.
Distribution: Hispaniola, Puerto Rico, Panama, northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Metastelma parviflorum (Sw.) R. Br. ex Schult.
Description: Slender climber; to 4m tall.
Distribution: Puerto Rico, Virgin Islands, Trinidad, Margarita
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Redonda, Guadeloupe, La Desirade, Dominica, Martinique, St. Vincent, Barbados.
Biogeography: Caribbean

Plant Category: Di

Nerium oleander L.
Common Name(s): Oleander.
Description: Shrub or small tree; to 5m tall.
Distribution: Native to the Mediterranean region but widely cultivated and persisting in the tropics
Lesser Antilles Distribution: Montserrat, St. Barts, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Barbados.
Biogeography: Introduced
Plant Category: Di

Plumeria alba L.
Common Name(s): Wild frangipani, pigeon wood, caterpillar tree, jasmine.
Description: Small to medium-sized tree; to 10m tall.
Notes: plants are commonly infested and defoliated by the large, black and yellow-striped caterpillar of the sphinx moth
Distribution: Puerto Rico to northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Bar
Biogeography: Wider Distribution
Plant Category: Di

Rauvolfia viridis Willd. ex Roem. & Schult.
Common Name(s): Bellyache bush, balsam, sassafras, milk tree.
Description: Shrub; to 2m tall.
Distribution: Puerto Rico, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barba
Biogeography: Wider Distribution
Plant Category: Di

Tabernaemontana citrifolia L.
Common Name(s): Milky bush, milk tree.
Description: Shrub or small tree; to 10m tall.
Distribution: Cuba, Hispaniola, Bahamas
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Caribbean
Plant Category: Di

Tabernaemontana divaricata (L.) R. Br.
Cultivated: ornamental
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Tabernaemontana pandacaqui Poir.
Cultivated: ornamental
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Thevetia peruviana K.Schum.
Common Name(s): Lucky nut.
Description: Tree; to 7m tall.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

AQUIFOLIACEAE

Ilex dioica (M. Vahl) Griseb.
Description: Shrub or small tree; to 8m tall.
Distribution: Apparently endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Martinique, St. Vincent, Grenada
Biogeography: Lesser Antilles
Plant Category: Di

Ilex macfadyenii (Walp.) Rehder
Description: Shrub or small tree; to 5m tall.
Notes: *in original Howard Montserrat species list but not listed in *Flora of Lesser Antilles*.
Distribution: Greater Antilles
Lesser Antilles Distribution: *Montserrat, St Kitts, Nevis, Guadeloupe, Dominica, Martinique.
Biogeography: Caribbean
Plant Category: Di

Ilex nitida (M. Vahl) Maxim.
Description: Tree; to 20m.
Distribution: Mexico, Cuba, Jamaica, Dominican Republic, Puerto Rico.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Martinique.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Ilex sideoxyloides (Sw.) Griseb.
Common Name(s): Caca rat, black teeth, white birch.
Description: Shrub or medium sized tree; to 15 (-40)m.
Distribution: Jamaica, Pueto Rico, Trinidad
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Di

ARACEAE

Anthurium acaule (Jacq.) Schott
Description: Epiphyte; stems short.

Distribution: Lesser Antilles, Trinidad, Guyana
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Peri-Caribbeanaribbe
Plant Category: Mo

Anthurium cordatum (L.) Schott
Common Name(s): Hand leaf.
Description: Climbing, epiphytic plant; with extensive supporting roots.
Distribution: Greater Antilles, Virgin Islands
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Caribbean
Plant Category: Mo

Colocasia esculenta (L.) Schott
Common Name(s): Taro, dashine, malanga.
Description: Perennial herb; starchy tuberous rootstock.
Notes: *sited by UKOTs team feb 06 in Mrat. But not listed as occurring in Flora
Distribution: Native to tropical Asia, widely cultivated in tropics
Lesser Antilles Distribution: *Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Introduced
Plant Category: Mo

Dieffenbachia seguine (Jacq.) Schott
Common Name(s): Dumb cane.
Description: Erect perennial herb; to 2m tall.
Notes: *sited by UKOTs team feb 06 in Mrat. But not listed as occurring in Flora
Distribution: Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: *Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Philodendron giganteum Schott
Common Name(s): China bush.
Description: Terrestrial or occasional epiphytic; leaves 50-100cm x 40-80cm.
Distribution: Puerto Rico, Virgin Islands, Trinidad, Venezuela.
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Mo

Philodendron scandens K.Koch & Sello
Description: Scandent, slender plant.
Distribution: Mexico, Central America, Greater Antilles, South America.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Mo

Pistia stratiotes L.
Common Name(s): Chance, godapail, water lettuce.
Description: Aquatic, floating or rooted herb.
Distribution: Tropical America, Asia, and Africa.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Les Saintes, Martinique, St. Vincent.
Biogeography: Introduced
Plant Category: Mo

ARALIACEAE

Oreopanax capitatus (Jacq.) Decne. & Planch.
Common Name(s): Candlewood, broad leaf balsam.
Description: Shrub or tree; to 15m tall.
Distribution: Cuba, Jamaica, Hispaniola, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Schefflera attenuata (Sw.) Frodin
Common Name(s): White elder.
Description: Small tree; 2-13m tall.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Barts, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

ARECACEAE

Cocos nucifera L.
Description: Medium to large palm; with the trunk characteristically leaning; to 30m tall.
Notes: Common on most islands wherever there is or has been human habitation. Occasionally spontaneous along hedgerows, roadsides and sandy beach areas
Invasiveness: Naturalised
Distribution: Widely cultivated throught the world tropics.
Lesser Antilles Distribution: Montserrat*
Biogeography: Wider Distribution
Plant Category: Mo

Phoenix sp. L.
Description: Small, medium or large, solitary or caespitose, dioecious, armed, pinnate leaved palms.
Cultivated: food plant
Lesser Antilles Distribution:
Biogeography: Introduced
Plant Category: C-Mo-Intro

Prestoea montana (Graham) G. Nicholson
Common Name(s): Mountain cabbage.

Description: Small palm; usually solitary; 3-15 (-20)m tall.
Distribution: Primarily a montane species distributed throught out the Caribbean from eastern Cuba, Hispaniola, Puerto Rico and the Lesser Antilles to Grenada.
Lesser Antilles Distribution: Montserrat, Saba, St. Martin, St, Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vicent, Grenada.
Biogeography: Caribbean
Plant Category: Mo

Roystonea oleraceae (Jacq.) O.F.Cook
Common Name(s): cabbage palm, royal palm
Description: Palm; 18-40m tall.
Notes: *common name given in Mrat: "cabbage palm" but species not in Howard's list
Distribution: Trinidad, Tobago, northern Venezeula, and northeastern Columbia.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica, Martinique, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: C-Mo-Nat

Syagrus amara (Jacq.) Mart.
Description: Solitary palm; with gray caudex; 10-20m tall.
Notes: Syn.: Syagrus amara
Distribution: Endemic to the Lesser Antilles and Trinidad.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Restricted Range
Plant Category: Mo

ARISTOLOCHIACEAE

Aristolochia labiata Willd.
Description: Liana.
Distribution: South America
Lesser Antilles Distribution: Montserrat* (*cultivated according to Howard (1988- dicots vol 1))
Biogeography: Wider Distribution
Plant Category: Di

ASPLENIACEAE

Asplenium abscissum Willd.
Description: Terrestrial fern; fronds 15-40cm long.
Distribution: Florida, Greater Antilles, Trinidad, continental tropical America from Mexico to Brazil
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Asplenium cristatum Lam.
Description: Terrestrial fern; fronds 20-75cm long.
Distribution: Florida, Greater Antilles, Tobago, Trinidad, continental tropical America, from Mexico to Brazil, continental tropical America from Mexico to Bolivia and Brazil
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Asplenium formosum Willd.
Description: Terrestrial fern; fronds 8-30cm long.
Lesser Antilles Distribution: Montserrat, Saba, Guadeloupe, Dominica, Martinique.
Biogeography: Wider Distribution
Plant Category: Pter

Asplenium laetum Sw.
Description: Terrestrial fern; fronds 20-50cm long.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America from Mexico to Argentina
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Asplenium obtusifolium L.
Description: Lithophytic fern; fronds 5-40cm long.
Distribution: Cuba, Puerto Rico, Tobago, Trinidad, and continental tropical America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Asplenium pumilum Sw.
Description: Terrestrial fern; fronds 40-110cm long.
Distribution: Florida, Greater Antilles, Virgin Islands, Tobago, continental tropical America from Mexicoto Brazil.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent,Grenada
Biogeography: Wider Distribution
Plant Category: Pter

Asplenium serratum L.
Description: Terrestrial fern; fronds up to 100cm long.
Distribution: Florida, Greater Antilles, St. Thomas, Tobago, Trinidad, continental tropical America from Mexico to Brazil
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Asplenium serratum Langsd. & Fisch.
Description: Terrestrial fern; fronds 1.5m long.
Distribution: Greater Antilles, Trinidad, continental tropical America, from Mexico to Brazil, tropical Africa

Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Pter

ASTERACEAE

Acanthospermum hispidum DC.
Description: Annual herb; to 60cm.
Distribution: Greater Antilles, Central America, South America, introduced elsewhere and persisitng as a weed
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Wider Distribution
Plant Category: Di

Acmella uliginosa (Sw.) Cass.
Description: Annual herb.
Distribution: A pantropical weed of disturbed areas.
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Ageratum conyzoides L.
Description: Herb; to 1m tall.
Distribution: Native of tropical America, now worldwide as a weed.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Ambrosia hispida Pursh
Common Name(s): Tapis.
Description: Shrubby perennial; stems prostrate to 80cm long.
Distribution: Bahamas, Greater Antilles.
Lesser Antilles Distribution: Montserrat,St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Caribbean
Plant Category: Di

Baccharis dioica Vahl
Description: Shrub; to 2m long.
Distribution: Bahamas, Greater Antilles.
Lesser Antilles Distribution: Montserrat, Barbuda, La Desirade
Biogeography: Caribbean
Plant Category: Di

Bidens pilosa L.
Description: Erect annual; to 1.5m tall.
Distribution: North America, Greater Antilles, Mexico south through South America
Lesser Antilles Distribution: Montserrat, St. Martin, Saba, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Bidens reptans (L.) G. Don
Description: Woody climbing herb; to 6m long.
Distribution: Greater Antilles, Central America, Venezuela, Brazil
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Chaptalia nutans (L.) Pol.
Description: Perennial herb.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat,St. Martin, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Chromolaena dussii (Urb.) R.M. King & H. Rob, Phytologia 20: 200. 1970 (Phytologia; BPH (0)
Description: Shrub; to 4m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, guadeloupe.
Biogeography: Lesser Antilles
Plant Category: Di

Clibadium erosum (Sw.) DC.
Description: Shrub or tree; to 4m tall.
Distribution: Puerto Rico
Lesser Antilles Distribution: Montserrat, St Martin, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent.
Biogeography: Restricted Range
Plant Category: Di

Conyza apurensis Kunth
Description: Erect annual herb; to 1m tall.
Distribution: Greater Antilles, Central America, South America
Lesser Antilles Distribution: Montserrat, St. Martin, Saba, St. Kitts, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Conyza bonariensis (L.) Cronquist
Description: Erect herb; to 1.2m tall.
Distribution: Native of tropical America but now a pantropical weed.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia,

St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Conyza canadensis (L.) Cronquist
Description: Erect annual herb; to 2m tall.
Distribution: Abundant weed in temperate and tropical areas.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Cosmos caudatus Kunth
Description: Annual herb; to 2m tall.
Distribution: Widely dispersed in the Neotropics as a weed.
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Cosmos sulphureus Cav.
Description: Annual herb; to 2m tall.
Notes: cultivated and naturalised
Distribution: Mexico, Central America, but cultivated elsewhere
Lesser Antilles Distribution: Montserrat, Antigua, St. Vincent
Biogeography: Introduced
Plant Category: Di

Eclipta prostrata (L.) L.
Common Name(s): Kongolala.
Description: Annual herb; to 90cm tall.
Distribution: A nearly cosmaopolitan weed in temperate and tropical areas
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Elephantopus mollis Kunth
Description: To 2m tall.
Distribution: Greater Antilles, Mexico south to northern Argentina
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Emilia fosbergii Nicolson
Common Name(s): Rabbit meat.
Description: Herb; to 2m tall.
Distribution: Presumed to be native of the Old World but widely distributed in the Antilles and less so in Central America and northern South Amerca
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Redonda, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Emilia sonchifolia (L.) DC.
Description: Herb; to 30 cm tall.
Distribution: Pantropical weed of Old World origin.
Lesser Antilles Distribution: Montserrat,St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Introduced
Plant Category: Di

Erechtites valerianifolia (Spreng.) DC.
Description: Annual; to 1m tall.
Distribution: Neotropics, introduced in the Old World.
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Wider Distribution
Plant Category: Di

Eupatorium corymbosum Aubl.
Description: Shrub to 1.5m tall.
Distribution: Bahamas, Hispaniola, Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, Saba, St. Kitts, Guadeloupe, La Desirade, Martinique.
Biogeography: Caribbean
Plant Category: Di

Eupatorium integrifolium Bertero
Description: Shrub; to 3m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica.
Biogeography: Lesser Antilles
Plant Category: Di

Eupatorium macrophyllum L.
Description: Herb; to 3 m tall.
Distribution: Greater Antilles, Mexico, south to Argentina.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Eupatorium microstemon Cass.
Description: Herb; to 1m tall.
Distribution: Greater Antilles, Central America, northern

South America, Africa.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Eupatorium odoratum L.
Common Name(s): Chrsitmas bush, baby tea.
Description: Shrub; to 1.5m tall.
Distribution: Florida, Texas, Greater Antilles, Mexico, south to Argentina
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Eupatorium sinuatum Lam.
Description: Shrub; to 2 m tall.
Distribution: Cuba, Hispaniola, Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, Guadeloupe, La Desirade.
Biogeography: Caribbean
Plant Category: Di

Eupatorium trigonocarpum Griseb.
Description: Shrub to 2m tall
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Lesser Antilles
Plant Category: Di

Gundlachia corymbosa (Urb.) Britton ex Bold.
Common Name(s): Yam bush.
Description: Shrub; to 1.2 m.
Distribution: Bahamas, Hispaniola, Puerto Rico, Curacao
Lesser Antilles Distribution: Montserrat, Barbuda, Saba, Guadeloupe, La Desirade.
Biogeography: Caribbean
Plant Category: Di

Launaea intybacea (Jacq.) Beauverd
Description: Herb; to 1.2m tall
Distribution: Nearly cosmopolitan as a weed
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, St. Barts.
Biogeography: Wider Distribution
Plant Category: Di

Mikania latifolia Sm.
Description: Twining liana.
Distribution: Endemic to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, Barbados.
Biogeography: Lesser Antilles
Plant Category: Di

Mikania micrantha Kunth
Common Name(s): Bitter vine, wappe.
Description: Herbaceous to semiwoody twiner.
Distribution: Wet tropical America. Introduced to tropical Asia and the Pacific islands.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Neurolaena lobata (L.) Cass.
Description: Annual or perennial herb; to 3m tall.
Distribution: Greater Antilles, mexico south to northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Parthenium hysterophorus L.
Common Name(s): Whitehead, white top.
Description: Annual; flowering when only 10 cm tall or becoming 70 cm tall.
Notes: Plants toxic to many people as a contact poison causing edema and swelling with strong itching.
Distribution: Greater Antilles, Mexico, Central America, South America, introduced and established as a noxious weed in Asia.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Pectis humifusa Sw.
Description: Diffuse annual or perennial; branched from base; stems 5-40 cm long.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Caribbean
Plant Category: Di

Pluchea carolinensis (Jacq.) G. Don
Common Name(s): Wild tobacco, cure-for-all, sweet scent, cattletongue.
Description: Shrub; to 3m tall
Distribution: Southern Florida, Greater Antilles, Mexico, Central America, northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, St. Kitts, Guadeloupe, Marie Galante, Martinique, Dominica, St. Lucia, St. Vincent.
Biogeography: Wider Distribution

Plant Category: Di

Porophyllum ruderale (Jacq.) Cass.
Description: Erect annual; to 1m tall.
Distribution: Greater Antilles, Central America, South America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Pseudelephantopus spicatus (Aubl.) C. F. Baker
Description: Erect herb; to 1m tall.
Distribution: Greater Antilles, Mexico, Central America south Chile.
Lesser Antilles Distribution: Montserrat, St. Martin, Saba, Antigua, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Rolandra fruticosa (L.) Kuntze
Description: Erect herb; to 1m tall.
Distribution: Hispaniola, Puerto Rico, Costa Rico south to northern South America.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Sonchus oleraceus L.
Common Name(s): Sow thistle.
Description: Herbs; to 1m tall.
Distribution: A cosmopolitan weed.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Synedrella nodiflora (L.) Gaertn.
Description: Erect herb; to 70 cm tall.
Distribution: Neotropics, introduced into the Old World.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Tagetes erecta L.
Common Name(s): Marigold.
Description: Annual herb; to 1m tall.
Distribution: Native of Mexico but widely cultivated and persisting
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Tithonia diversifolia (Hemsl.) A. Gray
Description: Erect perennial; to 3m tall.
Distribution: Native of Mexico and Central America but now widely cultivated in tropical areas
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Vernonia albicaulis Pers.
Description: Shrub; to 2m tall.
Distribution: Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica.
Biogeography: Caribbean
Plant Category: Di

Vernonia cinerea (L.) Less.
Description: Herb; annual to 80 cm tall.
Distribution: Weedy and in disturbed habitat, nearly pantropical.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Wedelia calycina Rich.
Common Name(s): Marigold.
Description: Shrub; to 3m tall.
Distribution: Puerto Rico, northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Redonda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Gren
Biogeography: Wider Distribution
Plant Category: Di

Wedelia trilobata (L.) Hitchc.
Common Name(s): Yellow marigold.
Description: Herb; with prostrate trailing and woody stems, often exceeding 1 m.
Distribution: Florida, Greater Antilles, Mexico, Central America, South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Zinnia elegans Jacq.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica
Biogeography: Introduced
Plant Category: C-Di-Intro

AURACARIACEAE

Araucaria heterophylla (Salisb.) Franco
Lesser Antilles Distribution:
Biogeography: Introduced
Plant Category: C-Gym-Intro

AVICENNIACEAE

Avicennia germinans (L.) L.
Common Name(s): Black mangrove, olive mangrove.
Description: Tree; to 16m tall.
Key ID Feature: bark characteristically dark coloured, fissered with orange-red cortex, erect pneumatophores abundant, single and clustered aerial adventitious roots from older branches of mature trees
Distribution: Florida, Greater Antilles, Mexico, Central America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, Martinique, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

BALSAMINACEAE

Impatiens balsamina L.
Common Name(s): Impatience, gekweekt.
Description: Erect annual herb; to 40cm tall.
Distribution: Native to India, China, and parts of south-east Asia, now generally introduced throughout the world as an ornamental.
Lesser Antilles Distribution: Montserrat, St. Eustatius, Guadeloupe, Dominica, Martinique, Barbados
Biogeography: Introduced
Plant Category: Di

BEGONIACEAE

Begonia obliqua L.
Description: Erect, stout, perennial herb; to 2m tall.
Notes: sited and HS collected along Katy Hill trail by UKOTs team feb 06 in Mrat. But not listed as occurring in Flora
Distribution: Lesser Anitlles
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica, Martinique
Biogeography: Lesser Antilles
Plant Category: C-Di-Nat

Begonia retusa O.E. Schulz
Description: Erect perennial; to 1.5m tall.
Key ID Feature: stems purple-brown
Distribution: Restricted to northern Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Barts, Saba, St. Eustatius, St. Kitts, Nevis.
Biogeography: Lesser Antilles
Plant Category: Di

BIGNONIACEAE

Crescentia cujete L.
Common Name(s): Calabash.
Description: Tree; to 10m tall.
Distribution: native to northern tropical America but widely cultivated in tropical areas
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Macfadyena unguis-cati (L.) A.H. Gentry
Common Name(s): Cat's-claw.
Description: Liana.
Key ID Feature: strongly developed uncinate 3-fid tendrils
Distribution: Greater Antilles, Central America, South America south to Argentina
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Phryganocydia corymbosa (Vent.) Bureau ex K. Schum.
Description: Liana.
Notes: Cultivated
Distribution: Panama to Brazil and Bolivia
Lesser Antilles Distribution: Montserrat, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Phryganocydia corymbosa (Vent.) Bureau ex K. Schum.
Lesser Antilles Distribution: Montserrat, Grenada
Biogeography: Introduced
Plant Category: C-Di-Intro

Tabebuia chrysantha (Jacq.) G.Nicholson
Description: Tree; to 40m tall.
Distribution: Mexico to Panama, Trinidad, Venezuela and Amazonian Peru
Lesser Antilles Distribution: Montserrat, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Tabebuia heterophylla (DC.) Britton
Common Name(s): Cedar.
Description: Shrub or tree; to 20m.

Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

Tabebuia pallida (Lindl.) Miers
Common Name(s): white cedar, cedar
Description: shrub or large tree; to 35m tall.
Notes: *common name given in Mrat: "white cedar" but species not in Howard's list
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Lesser Antilles
Plant Category: C-Di-Nat

Tecoma stans (L.) Juss. Ex Kunth
Description: Shrub or small tree; 5 (-10)m tall.
Distribution: Greater Antilles, Southwestern US and South Florida to Argentina
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Saba, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

BIXACEAE

Bixa orellana L.
Description: Shrub or small tree; to 6m tall.
Distribution: Tropical middle and South America, West Indies; widely cultivated and naturalised in the tropics of the Old World.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

BLECHNACEAE

Blechnum binervatum (Poir.) C.V. Morton & Lellinger
Description: Climbing fern; fronds up to 115cm long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St.. Lucia
Biogeography: Lesser Antilles
Plant Category: Pter

Blechnum divergens (Kunze) Mett.
Description: Terrestrial fern; fronds 30-90cm.
Distribution: Greater Antilles except Jamaica; continental tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Blechnum insularum Morton & Lellinger
Description: Large epiphytic fern; up to 50cm tall.
Distribution: Puerto Rico
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, St. Vincent
Biogeography: Restricted Range
Plant Category: Pter

Blechnum occidentale L.
Description: Terrestrial fern; fronds 30-75cm long.
Distribution: Widespread in tropical and sub-tropical areas from Florida to Argentina
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Pter

Blechnum ryanii (Kaulf.) Hieron.
Description: Large errestrial fern; fronds to 125cm long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Pter

Blechnum serrulatum Rich.
Description: Terrestrial fern; rhizome subterranean; fronds 0.5-1.2m long.
Distribution: Florida, Bahamas, Greater Antilles, Trinidad, continental tropical America from Mexico to southern Brazil; also in the Paleotropics.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Lucia.
Biogeography: Wider Distribution
Plant Category: Pter

BORAGINACEAE

Argusia gnaphaloides (L.) Heine
Common Name(s): Sea lavender, sea rosemary.
Description: Erect shrub; to 2m.
Distribution: Bahamas, Greater Antilles
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Les Saintes, Dominica, Martinique, St. Vincent, the Grenadines, Barbados.
Biogeography: Caribbean
Plant Category: Di

Bourreria succulenta Jacq.
Common Name(s): Cherry, chinkswood, chink, bambora, bodywood, caf? marron.
Description: Shrub or small tree; to 6m tall.

Distribution: Florida, Bahamas, Greater Antilles, Trinidad, Venezuela
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Wider Distribution
Plant Category: Di

Cordia alliodora (Ruiz & Pav.) Oken
Description: Tree; to 18m tall.
Distribution: Cuba, hispaniola, Puerto Rico, Mexico, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Cordia collococca L.
Common Name(s): Sip, slip, clammy cherry.
Description: Tree; to 10m tall.
Distribution: Cuba, Mexico, Central America, northern South America
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Cordia globosa (Jacq.) Kunth
Common Name(s): Wild black sage.
Description: Shrub; to 3m.
Distribution: Lesser Anitlles
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Lesser Antilles
Plant Category: Di

Cordia nesophila I.M. Johnst.
Common Name(s): Black sage.
Description: Shrub; 1-3m tall.
Distribution: Lesser Anitlles
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia.
Biogeography: Lesser Antilles
Plant Category: Di

Cordia obliqua Willd.
Common Name(s): Gum, clammy cherry, sticky cherry, white manjack.
Description: Tree; to 8m
Distribution: Native of India, widely introduced in tropical areas.
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Cordia reticulata M. Vahl
Description: Shrub or small tree; to 10m.
Distribution: Restricted to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Lesser Antilles
Plant Category: Di

Cordia sebestena L.
Common Name(s): Geiger tree, scarlet cordia.
Description: Tree; to 10m.
Distribution: Probably native to the Bahamas and Greater Antilles and introduced elsewhere as an ornamental
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Martinique, St. Lucia, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Cordia sulcata DC.
Common Name(s): Manjack.
Description: Tree; to 15m.
Distribution: Cuba, Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Caribbean
Plant Category: Di

Heliotropium angiospermum Murray
Common Name(s): Eye bright.
Description: Erect loosely branched herb; to 1m.
Distribution: Southeastern US, Greater Antilles, Mexico, Central America, Trinidad, South America to Bolivia and Chile
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Heliotropium indicum L.
Common Name(s): Abooba, wild clavey.
Description: Erect herb; to 60 cm tall.
Distribution: Greater Antilles, Trinidad
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

Heliotropium ternatum Vahl
Description: Branched shrub; to 50cm.
Distribution: Greater Antilles, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, Saba, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines.
Biogeography: Wider Distribution
Plant Category: Di

Mallotonia gnaphalodes (L.) Britton
Description: Erect, much branched shrub; to 2m.
Notes: Syn. Of Argusia gnaphalodes
Distribution: Neotropics
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

Rochefortia spinosa (Jacq.) Urb.
Description: Thorny shrub; to 2m m tall.
Distribution: Bahamas, Greater Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, La Desirade, Marie Galante, Martinique.
Biogeography: Caribbean
Plant Category: Di

Tournefortia bicolor Sw.
Common Name(s): May wet.
Description: Climbing shrub.
Distribution: Cuba, Hispaniola, Jamaica, Trinidad, Tropical America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Tournefortia filiflora Griseb.
Description: Shrub or tree; to 8m.
Distribution: Puerto Rico and the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Restricted Range
Plant Category: Di

Tournefortia volubilis L.
Description: Climbing shrub.
Distribution: Neotropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenad
Biogeography: Wider Distribution
Plant Category: Di

BRASSICACEAE

Cakile lanceolata (Willd.) O.E. Schulz
Common Name(s): Sea rocket.
Description: Annual or rarely perennial; erect or often prostrate; branches sometimes over 1 m.
Distribution: Greater Antilles, Carribean coasts of Central America and northwestern South America, US and Mexican coasts of the Gulf of Mexico
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Martinique, St. Vincent, the Grenadines, Grenada, Barbad
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Lepidium virginicum L.
Common Name(s): Pepper grass, Virginia pepper grass, poor man's pepper.
Description: Annual or biennial; 20-90 cm.
Distribution: Native of North America, introduced to all other continents except Antarctica, v common in W Indies.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Introduced
Plant Category: Di

BROMELIACEAE

Aechmea smithiorum Mez
Description: Epiphyte/terrestrial; leaves to 70cm long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Lesser Antilles
Plant Category: Mo

Catopsis floribunda L.B. Sm.
Description: Epiphyte; leaves of rosette 20-40 cm long.
Distribution: Florida, Greater Antilles, Trinidad, Venezuela
Lesser Antilles Distribution: Montserrat,St. Martin, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines
Biogeography: Wider Distribution
Plant Category: Mo

Glomeropitcairnia penduliflora (Griseb.) Mez
Description: Epiphyte; leaves of rosette to 1m.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique.
Biogeography: Lesser Antilles
Plant Category: Mo

Guzmania megastachya (Baker) Mez
Description: Epiphyte; leaves of rosette to 1m.
Distribution: Lesser Antilles and Tobago.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St Vincent, Grenada.
Biogeography: Restricted Range
Plant Category: Mo

Guzmania plumieri (Griseb.) Mez
Description: Epiphyte; leaves to 40cm.
Notes: Growing in mossy forest areas.
Distribution: The Lesser Antilles and Venezuela.
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Vincent, Grenada.
Biogeography: Restricted Range
Plant Category: Mo

Pitcairnia angustifolia Aiton.
Description: Epiphyte; leaves 50-120cm.
Distribution: Endemic to the Greater and Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Mo

Tillandsia antillana L.B.Sm.
Description: Epiphyte; leaves in a dense rosette each up to 30 cm long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Saba, St Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Lesser Antilles
Plant Category: Mo

Tillandsia recurvata (L.) L.
Common Name(s): Old man's beard.
Description: Epiphyte.
Distribution: United States, Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Mo

Tillandsia usneoides (L.) L.
Common Name(s): Old man's beard.
Description: Epiphyte; stems flexuous, hanging in festoons; 1m> long.
Distribution: Southeastern U.S states, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines
Biogeography: Wider Distribution
Plant Category: Mo

Tillandsia utriculata L.
Common Name(s): Wild pine.
Description: Epiphyte; to 2m tall; leaves to 70cm long.
Distribution: Mexico, Central America, Trinidad, Venezuela
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Mo
Werauhia guadelupensis (Baker) J.R. Grant, Originall listed as Vriesia guadelupensis; changed after consulting monocot checklist
Nomenclature Notes: Originall listed as Vriesia guadelupensis; changed after consulting monocot checklist
Description: Epiphyte; leaves 50cm x 5cm.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica.
Biogeography: Lesser Antilles
Plant Category: Mo

Werauhia ringens (Griseb.) J.R. Grant, Originall listed as Vriesia ringens; changed after consulting monocot checklist.
Nomenclature Notes: Originall listed as Vriesia ringens; changed after consulting monocot checklist.
Description: Epiphyte; leaves to 60 cm.
Distribution: Costa Rica, Panama, Greater Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Peri-Caribbeanaribbe
Plant Category: Mo

BURMANNIACEAE

Apteria aphylla (Nutt.) Barnhart ex Small
Description: herb; 5-25cm.
Distribution: throughout the Neotrpics
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Mo

BURSERACEAE

Bursera simaruba (L.) Sarg.
Common Name(s): West Indian birch, turpentine tree, birch, naked Indian, gommier, gommier maduit, gommi
Description: Tree; to 15m.
Key ID Feature: bark peels inthin red-brown papery layers
Distribution: Florida, Mexico, Central America, Greater Antilles, South America

Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Dacryodes excelsa Vahl
Description: Very large dominant tree; to 35 m.
Key ID Feature: Bark is grey-green, scaley in round flakes, cuts exude a watery gum, very strongly scented of turpentine, which solidifies. Leaves are imparipinnate with 3 to 5 leaflets 6-16x3-8cm, often cupped or rolled inward
Distribution: Puerto Rico and the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, St Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St Vincent, the Grenadines.
Biogeography: Restricted Range
Plant Category: Di

CACTACEAE

Cereus hexagonus (L.) Mill.
Description: Xerophyte; to 15m tall; usually branched from base.
Key ID Feature: stems six-ribbed
Distribution: Northern South America and cultivated elsewhere
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Eustatius, St. Kitts, Guadeloupe.
Biogeography: Wider Distribution
Plant Category: Di

Hylocereus trigonus (Haw.) Saff.
Common Name(s): Night blooming cactus.
Description: Xerophyte.
Key ID Feature: stems elongate, 2-4cm broad, thickly 3-angled
Distribution: Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, Nevis, Guadeloupe, Marie Galante, Martinique, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Di

Melocactus intortus (Mill.) Urb.
Common Name(s): Turk's cap, Pope's head, barrel cactus.
Description: Xerophyte; plants globose to cylindrical; to 1m tall.
Distribution: Bahamas, Puerto Rico, Virgin Islands.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Les Saintes, Dominica.
Biogeography: Caribbean
Plant Category: Di

Opuntia cochenillifera (L.) Mill.
Common Name(s): Cochineal cactus.
Description: Xerophyte; much-branched; to 6m.
Notes: introduced into tropical areas as a potential host plant for the cochineal insect
Distribution: Possibly native to Jamaica but intriduced and cultivated in many tropical areas
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Opuntia dillenii (Ker Gawl.) Haw.
Common Name(s): Prickly pear, dildo, tuna, broad-leafed cassie.
Description: Xerophyte; low spreading plants often forming massive extensive clumps; to 2 m tall.
Distribution: South US, Greater Antilles, introduced elsewhere in the Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadi
Biogeography: Wider Distribution
Plant Category: Di

Opuntia elatior Mill.
Common Name(s): French Prickle.
Description: Xerophyte; densely branched sturdy plants with short thick cylindrical trunk; to 5m tall.
Distribution: Curacao, Venezuela, Columbia, Panama
Lesser Antilles Distribution: Montserrat, Saba, Redonda
Biogeography: Wider Distribution
Plant Category: Di

Opuntia rubescens Salm-Dyck ex DC.
Common Name(s): Signpost cactus.
Description: Xerophyte; erect with single stemmed cylindrical trunks; to 3-6m tall.
Distribution: Puerto Rico, St Croix, Virgin Islands.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, La Desirade.
Biogeography: Caribbean
Plant Category: Di

Opuntia triacantha (Willd.) Sweet
Common Name(s): Suckers, sucking cassie, jumping cassie.
Description: Xerophyte; stems erect and branched; to 1.5 m tall.
Distribution: Puerto Rico, Virgin Islands.
Lesser Antilles Distribution: Montserrat,St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Les Saintes, St. Lucia.
Biogeography: Caribbean

Plant Category: Di

Pereskia aculeata Mill.
Description: Xerophyte; shrub-like in form with long branches clambering or high-climbing.
Distribution: Neotropics and cultivated or escaped elsewhere in the tropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Vincent, the Grenadines, Barbados.
Biogeography: Introduced
Plant Category: Di

Pereskia grandiflora Haw.
Description: Xerophyte; tree/shrub-like in form; long arching branches.
Key ID Feature: .
Distribution: widely planted in tropical areas
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe
Biogeography: Introduced
Plant Category: Di

Pilosocereus royenii (L.) Byles & G.D. Rowley
Local Name(s): Dildo
Common Name(s): Dildo, organ cactus.
Description: Xerophyte; stout plants or erect single stems or much branched near base with short trunk to 30cm in diameter.
Uses: Dye made from sap of fruit.
Distribution: Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, t
Biogeography: Caribbean
Plant Category: Di

CAMPANULACEAE

Hippobroma longiflora (L.) G. Don
Common Name(s): Star of Bethlehem, pipe-shank.
Description: Herb; 15-50cm tall.
Notes: The white latex of this plant is caustic and will burn the skin. It is reported to be very toxic to humans and animals
Distribution: Neotropics, introduced into the Palaeotropics.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Lobelia digitalifolia (Griseb.) Urb.
Description: Erect herb; to 2m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica
Biogeography: Lesser Antilles
Plant Category: Di

CANELLACEAE

Canella winteriana Gaertn.
Common Name(s): Pepper cinnamon, wild cinnamon, bastard cinnamon.
Description: Small tree or less often a shrub; to 10m tall.
Notes: Habitat; dry woodland
Distribution: Southern Florida, Bahamas south through the Lesser Antilles, and northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Barbuda, Antigua, Guadeloupe, La Desirade, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

CAPPARACEAE

Capparis baducca L.
Common Name(s): Church blossom, mabouya, rat-bean, rope, sapo.
Description: Shrub or small tree; 1-8m tall.
Notes: plants of woodlands and thickets in moist districts
Distribution: Southern Mexico, to northern South America, West Indies
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Capparis coccolobifolia Mart. ex Eichler
Description: Shrub or small tree; 3-10 m.
Notes: syn. Of C. hastata
Distribution: Neotropics.
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

Capparis cynophallophora L.
Common Name(s): Black willow, linguan tree, man of war bush, mustard tree.
Description: Shrubs or trees; 2-15m tall.
Notes: common on limestone hillsides in coastal woodlands and thickets
Distribution: southern Florida, Central America, West Indies
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Gaudeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Barbados
Biogeography: Wider Distribution

Plant Category: Di

Capparis flexuosa (L.) L.
Common Name(s): Bat-leaved caper, caper tree, mostazo, palinguan, rat bean.
Description: Shrub or small tree; sometimes vinelike; 2-9 m tall.
Distribution: southern Florida, the West Indies, Central America to central South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Capparis hastata Jacq.
Common Name(s): Broad-leaved caper tree, burro.
Description: Shrubs or small tree; 3-10m tall.
Notes: plants of dry limestone forest along coast and inland
Distribution: Hispaniola, Puerto Rico, Virgin Islands, Trinidad, Curucao, Columbia, Venezuela
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Capparis indica (L.) Druce
Common Name(s): White willow.
Description: Shrub or small tree; 2-10 m
Distribution: Southern Mexico, to northern South America, West Indies
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Cleome aculeata L.
Common Name(s): Acaya.
Description: Erect annual herb; 2.5-9dm tall.
Notes: plants of disturbed grounds along seashores and among woods
Distribution: Mexico, Central America, Geater Antilles, Trinidad, South America, to Argentina
Lesser Antilles Distribution: Montserrat, St. Martin, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Cleome gynandra L.
Common Name(s): Sambo, small spider flower, white masambee, spider wasp.
Description: erect annual herb; 2-15dm tall.
Notes: weed of waste grounds, fields, roadsides, wet or dry woodlands or wood clearings, and rocky and sandy shores
Distribution: Native of the Old World tropics and subtropics, introduced from Africa into the Caribbean region; widely distributed from southeastern US to Mexico, West Indies, and South
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Introduced
Plant Category: Di

Cleome rutidosperma DC.
Common Name(s): Consumption weed.
Description: Erect to procumbent annual herb; 1-9 dm tall.
Notes: weed of waste places, disturbed grounds, roadsides, fields, and sandy areas inland and along seashores
Distribution: Native of western tropical Africa, introduced to Florida, Honduras, Panama, Jamaica, Hispaniola, Virgin Islands, Tobago, Trinidad, Brazil.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Introduced
Plant Category: Di

Cleome spinosa Jacq.
Common Name(s): Sambo, spider flower, wild massambee.
Description: Erect herbs; 0.6-2m tall.
Notes: found growing in sand and gravel along riverbeds, thickets, and open slopes; weedy along roadsides and in waste grounds
Distribution: widely distributed from the US southward through Mexico, Central America, the West Indies, and South America
Lesser Antilles Distribution: Montserrat, St. Martin, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Cleome viscosa L.
Description: Erect annuals, 2-10 dm tall.
Notes: weed of roadsides, waste grounds, cultivated fields, snady and rocky seashores
Distribution: Native of Old World Tropics, naturalized in neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada,
Biogeography: Introduced
Plant Category: Di

Morisonia americana L.
Common Name(s): Dog sapodilla, jubie sapodilla, wild mespili, wild mesple.
Description: Shrub or small tree; 2-10 m.
Distribution: western Mexico, Guatemala, Nicaragua, the West Indies, northern Southe America
Lesser Antilles Distribution: Montserrat, St. Martin, St. barts, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, the Grenadines
Biogeography: Wider Distribution
Plant Category: Di

CARICACEAE

Carica papaya L.
Description: Unbranched trees or tree-like herbs to 6m tall; usually dioecious.
Notes: The fruits are a source of proteolytic enzymes ; these are used as meat tenderizers, to clarify bear, or in the treatment of dyspepsia
Distribution: Native to tropical America but Pantropical having been spead through cultivation
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

CARYOPHYLLACEAE

Drymaria cordata Gaertn.
Description: Branched herb; often rooting at nodes.
Distribution: Florida, Mexico, Central and South America, Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Martin Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

CASUARINACEAE

Casuarina equisetifolia L.
Common Name(s): She-oak, Australian pine.
Description: Tree; to 15m tall with ascending branches and open crown.
Cultivated: environmental use
Notes: Common along coastal areas and in sandy, nutrient poor soil generally.
Invasiveness: Invasive
Distribution: Originally from Australia and the Islands of the Indo Pacific, now wide spread in the tropics generally
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

CECROPIACEAE

Cecropia schreberiana Miq.
Description: Tree; to 20m tall.
Notes: Sometimes referred to as C. peltata L. which is common in Central America and northern South America and occurs in Jamaica. C. schreberiana differs in the presence of brown, instead of white, pith, in types of ha
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

CELASTRACEAE

Cassine xylocarpa Vent.
Description: Shrub or small tree; to 4 (-8)m tall.
Distribution: Greater Antilles, Mexico, Panama, and Venezuela
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, St. Kitts, Nevis, Guadeloupe, Martinique, St. Vincent, the Grenadines.
Biogeography: Wider Distribution
Plant Category: Di

Crossopetalum rhacoma Crantz
Common Name(s): Maidenberry.
Description: Shrub or occassionally becoming tree-like; to 4m.
Distribution: Florida, West Indies, southern Mexico, northern Central America, and northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Martinique, St. Lucia.
Biogeography: Wider Distribution
Plant Category: Di

Gyminda latifolia (Sw.) Urb.
Description: Shrub or small tree; to 6m tall.
Distribution: Southern Florida, West Indies, and Mexico
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Barbuda, Antigua, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Martinique, St. Lucia, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Di

Maytenus laevigata (M. Vahl) Griseb.
Description: Shrub or small tree; to 10m tall.
Key ID Feature: young branchlets distinctly quadrangular
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, Anguilla, St.

Barts, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines.
Biogeography: Caribbean
Plant Category: Di

Schaefferia frutescens Jacq.
Description: Shrub or small tree; to 6 m tall.
Distribution: Southern Florida, West Indies, southern Mexico to northern Central America, and South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

CHENOPODIACEAE

Chenopodium ambrosioides L.
Common Name(s): Wormwood, worm bush, bolbo.
Description: Annual or perennial herb; to 1 m.
Notes: Cultivated or weedy
Distribution: Possibly native to Mexico and C America, pantropical; widespread and weedy worldwide in warm regions
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Chenopodium murale L.
Common Name(s): Sprainbush.
Description: Erect perennial or long-lived annual weed; to 8 dm tall.
Distribution: Worldwide, tropical and temperate.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, St. Eustatius, St. Kitts, Montserrat, Guadeloupe, Dominica, Martinique
Biogeography: Wider Distribution
Plant Category: Di

CHLORANTHACEAE

Hedyosmum arborescens Sw.
Description: Dioecious shrub or small tree; to 10 m and 35cm d.b.h; sometimes forming stilt roots to 1m high on trunk.
Key ID Feature: Totally glabrous, bark brown, smooth, thin, inner bark pink brown, pungent. Twigs ringed at nodes by annular stipular scars. Leaf blades narrowly elliptic, oblong to oblanceolate, the base attenuate, the margin
Distribution: Greater and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Caribbean
Plant Category: Di

CHRYSOBALANACEAE

Chrysobalanus icaco L.
Common Name(s): Coco plum, fat pork.
Description: Shrub with erect stems or small tree; to 5m tall.
Distribution: Florida, Mexico, Central America, Greater Antilles, northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Hirtella triandra Sw.
Common Name(s): Pigeon berry.
Description: Tree; to 15 m tall.
Distribution: Mexico, Central and South Americ, Greater Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

CLUSIACEAE

Calophyllum calaba L.
Common Name(s): Galba.
Description: Tree; to 25m tall.
Notes: commonly used as a windbreak and/or plated as a living fence and roadside tree
Distribution: Greater Antilles, St. Croix, Trinidad, Tobago
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

Clusia major L.
Description: Epiphytic or freestanding trees; to 20m tall.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Lesser Antilles
Plant Category: Di

Garcinia humilis (Vahl) C.D. Adams
Description: Tree; to 10m tall.
Distribution: Jamaica, Hispaniola, Trinidad.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante, Dominica, Martinique, Grenada..

Biogeography: Caribbean
Plant Category: Di

Garcinia livingstonei T. Anderson
Cultivated: ornamental
Notes: Represented by ageing plants in Montserrat BG
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro
Mammea americana L.
Common Name(s): Mammee apple, zab-wiko, zapricot.
Description: Tree; to 20m tall.
Distribution: Greater Antilles, St. Thomas, St. Croix, Trinidad, Mexico, Central America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Marila racemosa Sw.
Common Name(s): Bwa pwa, bull tongue.
Description: Tree or commonly a shrub; to 10m tall.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent.
Biogeography: Lesser Antilles
Plant Category: Di

COCHLOSPERMACEAE

Cochlospermum vitifolium (Willd.) Spreng.
Common Name(s): Rose of Peru.
Description: Tree or shrub; 5-15m tall.
Notes: Flowers of most are the double form and are consequently sterile
Distribution: Northwestern Mexico through Central America to Bolivia. Cultivated elsewhere in the West Indies.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Introduced
Plant Category: Di

COMBRETACEAE

Buchenavia tetraphylla (Aubl.) R.A. Howard
Description: Large tree with sympodial growth; to 30m tall and 3m in diameter.
Distribution: Panama to Bolivia and the West Indies
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Bucida buceras L.
Common Name(s): Whitewood tree.
Description: Tree with sympodial branching often spreading or drooping; 20-25m tall, 1.5m in diameter.
Distribution: Neotropical.
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Conocarpus erectus L.
Common Name(s): Buttonwood, button bush, button mangrove, West Indian alder.
Description: Shrub or tree; to 1.5-10 m.
Notes: Commonly associated with Laguncularia, Avicennia, and Rhizophora at the inner edge of mangrove habitat, generally occuring above the level of tidal inundation
Distribution: Neotropics and West Africa.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Laguncularia racemosa (L.) C.F. Gaertn.
Common Name(s): White mangrove, Tom House mangrove.
Description: Shrub or tree; 1.5-15m tall.
Notes: One of the common mangrove species along with Rhizophora, Avicennia, and Conocarpus
Distribution: Tropical America and West Africa
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Terminalia catappa L.
Common Name(s): Almond, Indian Almond, Barbados Almond, sea almond, wild almond.
Description: Tree to 15m tall; with spreading branches obviously tiered.
Distribution: Native to Malaysia, introduced and more or less naturalised in southern Florida, the West Indies, Mexico, Central America and northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

COMMELINACEAE

Callisia repens (Jacq.) L.
Description: Slender, prostrate, often mat forming stems.
Distribution: Cuba, Jamaica, Puerto Rico, Mexico, South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Mo

Commelina benghalensis L.
Description: Rhizomatous herb.
Distribution: Asia, Cuba, Jamaica
Lesser Antilles Distribution: Montserrat, Martinique, St. Vincent, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Commelina diffusa Burm.
Common Name(s): Water grass, french weed, curage.
Description: Perennial herb.
Distribution: S and C America, Neotropics.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Mo

Commelina elegans Kunth
Common Name(s): Pond grass, water grass, curage.
Description: Perennial herb.
Distribution: Mexico, Central America, Greater Antilles, Trinidad, South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Barbuda, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Mo

Cyanotis cristata (L.) D. Don
Description: Stems creeping, branches erect or ascending, to 50cm.
Distribution: Native of Asia Reported as introduced and naturalized in 1900 to Martinique, found growing as a weed in Montserrat (in cotton fields)near silver hill
Lesser Antilles Distribution: Montserrat, Martinique
Biogeography: Introduced
Plant Category: Mo

Tradescantia zebrina Heynh. var. *zebrina*
Common Name(s): Wandering Jew.
Description: Prostrate, trailing or pendent plants.
Distribution: Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, Antigua, Saba, Guadeloupe, Martinique, St. Lucia, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

CONVOLVULACEAE

Cuscuta americana L.
Common Name(s): Yellow dod (or dodder), love vine.
Description: Parasitic, herbaceous, twining perennial; attached by host haustoria.
Distribution: Widespread in the Western Hemisphere, parasitizing a variety of woody host species.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Cuscuta globulosa Benth.
Description: Parasitic, herbaceous, twining perennial, attached by host haustoria.
Distribution: Mexico, the West Indies.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Martinique, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Ipomoea hederifolia L.
Description: Herbaceous vine.
Distribution: Tropical America; introduced into Old World Tropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, t
Biogeography: Wider Distribution
Plant Category: Di

Ipomoea indica (Vahl) Fosberg var. *acuminata* (M. Vahl) Fosb.
Description: Herbaceous vine.
Distribution: Tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Ipomoea nil (L.) Roth
Description: Herbaceous twiner.
Distribution: Throughout the tropics, often cultivated.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Ipomoea pes-caprae (L.) R. Br. Ex DC. subsp. *brasiliensis* (L.) Ooststr.
Common Name(s): Ivy, sea vine, sea wisse, seaside yam,

goat's foot, ipomoea.
Description: Prostrate seashore plant.
Distribution: Tropical seashores
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Eustatius, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Ipomoea repanda Jacq.
Description: Climber.
Distribution: Puerto Rico.
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, The Grenadines, Grenada.
Biogeography: Restricted Range
Plant Category: Di

Ipomoea tiliacea (Willd.) Choisy
Common Name(s): Wild potato vine, wild potato, wild slip, hog meat, caapi.
Description: Climber.
Distribution: Tropical America, Polynesia, introduced into Old World tropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Jacquemontia cumanensis (Kunth) Kuntze
Description: Woody vine.
Notes: *cultivated
Distribution: Puerto Rico, Virgin Islands, Netherlands West Indies, and Venezuela
Lesser Antilles Distribution: Montserrat*, St. Martin
Biogeography: Introduced
Plant Category: Di

Jacquemontia pentantha (Jacq.) Don
Description: Slender vine.
Distribution: Tropical America, Malaysia and Ceylon.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Bar
Biogeography: Wider Distribution
Plant Category: Di

Merremia aegyptia (L.) Urb.
Description: Twiner.
Distribution: Tropical America, Africa, Asia, Pacific Islands
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Merremia dissecta (Jacq.) Hallier f.
Description: Twiner.
Distribution: Tropical America; introduced into other tropical regions and becoming naturalized.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Wider Distribution
Plant Category: Di

Merremia umbellata (L.) Hallier f. subsp. *umbellata*
Description: Twiner; occasionally prostrate and rooting at nodes.
Distribution: Tropical America, West Africa, occasionally in the Far East where it has been introduced.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Stictocardia tiliifolia (Desr.) Hallier f.
Description: Stout climber.
Distribution: Native to Asian tropics, established throughout Old world and introduced into New World.
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Turbina corymbosa (L.) Raf.
Description: Perennial climber; mainly growing on low bushes.
Distribution: Tropical America, Introduced and established in parts of the Old World tropics.
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Nevis, Guadeloupe, Martinique, St. Lucia, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

CRASSULACEAE

Bryophyllum pinnatum (L. f.) Oken
Common Name(s): Leaf-of-life, love bush, travel life, kalabana, sweetheart bush, temetic
Description: Fleshy, perennial herb; often woody at the base; to 1.5m tall.
Notes: Syn: Kalanchoe pinnatum (original list)
Distribution: Native to Madagascar but widely introduced, cultivated or escaped and persisting in all tropical areas.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Barbuda, Antigua, Saba, St. Eustatius, Dominica,

Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Kalanchoe delagoensis Eckl. & Zeyh.
Cultivated: ornamental
Invasiveness: Naturalised and spreading
Distribution: Old World
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

CUCURBITACEAE

Cucumis anguria L.
Common Name(s): Bur gherkin, West Indian gherkin, warty cucumber, wild cucumber.
Description: Annual herb; trailing or climbing; 1-2m long.
Distribution: Originaly from tropical Africa, now widely established in tropical South and Central America and the West Indies
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Melothria pendula L.
Description: Herb; climbing or trailing.
Distribution: Widespread through the Americas
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Momordica charantia L.
Common Name(s): Maiden apple, maiden's bush, wild balsam apple.
Description: Twiner; stems to 8m long.
Distribution: Originally native to the Old World tropics, now pantropical.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

CUNONIACEAE

Weinmannia pinnata L.
Description: Shrub or tree; to 15m tall.
Notes: a characteristic and almost dominant plant of higher elevations
Distribution: Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

CYATHEACEAE

Cyathea arborea (L.) Sm.
Description: Tree fern; to 15m tall.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Pter

Cyathea grandifolia Willd., Cnemidaria grandifolia (Willd.) Proctor var. grandifolia
Nomenclature Notes: Cnemidaria grandifolia (Willd.) Proctor var. grandifolia
Description: Tree fern; to 2m.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia.
Biogeography: Lesser Antilles
Plant Category: Pter

Cyathea muricata Willd.
Description: Tree fern; 4-6m tall.
Key ID Feature: stipes 50-100cm long, usually dark brown, persistently attached to the caudex, minutely scurfey when young, armed with short, straight spines.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis,Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Pter

Cyathea tenera (Hook.) T. Moore
Description: Tree fern; to 8m tall.
Distribution: Cuba, Hispaniola, Trinidad, Margarita Island, Costa Rico.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Pter

CYCLANTHACEAE

Asplundia insignis (Duchass. ex Griseb.) Harling
Description: Terrestrial plant; with erect stems but not climbing.
Distribution: endemic to lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada
Biogeography: Lesser Antilles
Plant Category: Mo

Asplundia rigida (Aubl.) Harling

Description: Climbing liana; adhering by adventitious roots.
Distribution: Lesser Antilles, Trinidad and Tobago
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Restricted Range
Plant Category: Mo

CYPERACEAE

Cyperus alopecuroides Rottb.
Description: Perennial; culms 90-120 cm tall.
Distribution: Pantropical.
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Marie Galante, St. Lucia, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Cyperus flexuosus Vahl, Enum. Pl. 2: 359 (1805). (0), (Vahl.) T. Koyama
Nomenclature Notes: (Vahl.) T. Koyama
Description: 20-75 cm tall.
Distribution: Tropical America.
Lesser Antilles Distribution: Montserrat, Antugua, Guadeloupe
Biogeography: Wider Distribution
Plant Category: Mo

Cyperus ligularis L., (L.) Urban
Nomenclature Notes: (L.) Urban
Description: Robust perennial; 30-80 cm tall.
Distribution: Tropical America, tropical West Africa and the Mascarene Islands.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, St. Lucia, St. Vincent, Grenada, Barbados, St. Thomas, Mustique
Biogeography: Wider Distribution
Plant Category: Mo

Cyperus odoratus L., (L.) Hooper.
Nomenclature Notes: (L.) Hooper.
Description: 30-100 cm tall.
Distribution: Pantropical.
Lesser Antilles Distribution: Montserrat, Nevis,Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Cyperus sphacelatus Rottb.
Description: Annual herb; 20-60 cm tall.
Distribution: Tropical Africa and Tropical America, recently introduced to Ceylon and Malesia
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Eleocharis flavescens (Poir.) Urb.
Description: Culms 10-40 cm tall.
Key ID Feature: Floral glumes 2-2.5mm long pale green to light yellowish
Distribution: S, C and N America.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Mo

Fimbristylis complanata (Retz.) Link
Description: Perennial; culms 30-70 cm tall.
Distribution: Pantropical.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Machaerina restioides (Sw.) Vahl
Description: Perennial; culms 35-140 cm tall.
Distribution: Endemic to the West Indies.
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Martinique, St Vincent.
Biogeography: Caribbean
Plant Category: Mo

Rhynchospora nervosa (Vahl) Boeck. subsp. *ciliata* T. Koyama
Description: Up to 60 cm tall.
Distribution: Tropical America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Rhynchospora nervosa (Vahl) Boeck. subsp. *nervosa*
Description: 8-30 cm tall.
Distribution: Tropical America.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Rhynchospora polyphylla (Vahl) Vahl
Description: 50-100 cm tall.
Distribution: Tropical America.
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Rhynchospora tenerrima Nees
Description: 5-40 cm tall.
Distribution: West Indies, Tropical South America
Lesser Antilles Distribution: Montserrat,Antigua, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution

Plant Category: Mo

Scleria latifolia Sw.
Description: 30-200cm tall.
Distribution: Tropical America from Guatemala and the Lesser Antilles south to northern Guatemala
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Scleria pterota Presley
Description: Rhizomatous, creeping, perennial; culms 50-100 cm tall.
Key ID Feature: Culms solitary or 2 or 3 together
Distribution: Tropical America from the West Indies south to southern Argentina
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Antigua, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Scleria secans (L.) Urb.
Description: Rhizomatous perennial; culms attaining 10m in length.
Notes: Syn: Scleria reflexa
Distribution: Tropical America, from Mexico and the West Indies southward to southern Brazil
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Matinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

DENNSTAEDTIACEAE

Anisosorus hirsutus Underw. & Maxon
Description: Large terrestrial fern; fronds 1-2.5m long.
Distribution: Greater Antilles, continental tropical America from Mexico to Bolivia
Lesser Antilles Distribution: Montserrat, Saba, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

DIOSCOREACEAE

Dioscorea alata L.
Common Name(s): Yami marron.
Description: Glabrous herbaceous vine; stems 4-angled.
Distribution: Native of Southeast Asia and cultivated throughout the tropics.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Barbuda, Saba, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, Grenada
Biogeography: Introduced
Plant Category: Mo

Dioscorea polygonoides Humb. & Bonpl. ex Willd.
Description: Herbaceous vine.
Distribution: Mexico, Central America, Jamaica, Hispaniola, Puerto Rico, South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo
Rajania cordata L.
Common Name(s): Wa-wa.
Description: Herbaceous vine; often exceeding 10 m in length
Distribution: Jamaica, Hispaniola, Puerto Rico, Trinidad
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent
Biogeography: Caribbean
Plant Category: Mo

DRACAENACEAE

Sansevieria cylindrica Bojer ex Hook.
Description: Stemless plants with stout rhizomes.
Distribution: Native of Mauritius, widely cultivated and persisting
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Guadleoupe, Martinique
Biogeography: Introduced
Plant Category: Mo

Sansevieria trifasciata Prain
Common Name(s): Snake plant.
Description: Stemless plants with stout rhizomes.
Notes: sited by UKOTs team feb 06 in Mrat. But not in Flora as occurring in Montserrat
Invasiveness: Naturalised and spreading
Distribution: Native of Africa, cultivated and persisting/
Lesser Antilles Distribution: Montserrat*, St. Martin, Saba, St. Eustatius, Guadeloupe, Martinique, St. Lucia, St. Vincent
Biogeography: Introduced
Plant Category: C-Mo-Intro

DRYOPTERIDACEAE

Ctenitis meridionalis (Poir.) Ching
Description: Terrestrial fern; fronds 1-1.3m long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe, Martinique, Grenada.
Biogeography: Lesser Antilles
Plant Category: Pter

Polystichopsis muscosa (Vahl) Proctor
Description: Small terrestrial fern: fronds 30-65cm long.
Distribution: Trinidad, Margarita Island
Lesser Antilles Distribution: Montserrat, Guadeloupe,

Martinique, St Lucia.
Biogeography: Restricted Range
Plant Category: Pter

Stigmatopteris rotundata (Willd.) C. Chr.
Description: Terrestrial fern; fronds up to 2m long.
Distribution: Trinidad, Brazil
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Tectaria heracleifolia (Willd.) Underw.
Description: Terrestrial fern; fronds 30-85cm long.
Distribution: Florida, Bahamas, Greater Antilles, continental tropical America from Mexico to Peru and Venezuela
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St Lucia, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Tectaria incisa Cav.
Description: Terrestrial fern; fronds up to 1.5m long.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America from Mexico to Bolivia and Brazil
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Tectaria plantaginea (Jacq.) Maxon
Description: Terrestrial fern; fronds 20-60cm long.
Distribution: Puerto Rico, Tobago, Trinidad, continental tropical America from Belize to Peru and Brazil
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Tectaria trifoliata (L.) Cav.
Description: Terrestrial fern; fronds up to 1.5m long.
Distribution: Greater Antilles except Jamaica; Tobago, Trinidad, northern South America.
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

EBENACEAE

Diospyros blancoi A. DC.
Common Name(s): Mabolo, velvet persimmon.
Cultivated: food plant
Lesser Antilles Distribution: Montserrat, Guadeloupe
Biogeography: Introduced
Plant Category: C-Di-Intro

Diospyros malabarica (Desr.) Kostel.
Lesser Antilles Distribution: Montserrat, Dominica, St. Lucia
Biogeography: Introduced
Plant Category: C-Di-Intro

Diospyros revoluta Poir.
Common Name(s): Barbara, black apple.
Description: Tree; to 20m.
Distribution: Hispaniola, Puerto Rico.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante, Dominica, St Lucia.
Biogeography: Caribbean
Plant Category: Di

ELAEOCARPACEAE

Sloanea berteriana Choisy ex DC.
Common Name(s): Bullwood.
Description: Tree; to 25(-30)m tall.
Distribution: Hispaniola, Puerto Rico.
Lesser Antilles Distribution: Montserrat, St Kitts, Nevis, Guadeloupe, Dominica, Martinique.
Biogeography: Caribbean
Plant Category: Di

Sloanea dentata L.
Common Name(s): Burrwood.
Description: Tree; to 40m.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Lesser Antilles
Plant Category: Di

Sloanea massoni Sw.
Common Name(s): Burrwood, bullet tree, red santinee, ironwood.
Description: Tree; to 30m tall.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Saba, St Kitts, Guadeloupe, Dominica, Martinique, St Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

ERYTHROXYLACEAE

Erythroxylum havanense Jacq.
Common Name(s): Barberry, lionwood.
Description: Shrub or tree; to 6m tall.
Distribution: Cuba, Lesser Antilles, Mexico to Panama, Columbia, Equador, Venezuela, Trinidad, Guyana
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Kitts, Guadeloupe, Marie Galante, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the

Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

EUPHORBIACEAE

Acalypha poiretii Spreng.
Description: Annual herb; < 50 cm.
Distribution: Old World native, introduced occasionally and persisting as a weed in the New World.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Kitts, Marie Galante, the Grenadines, Barbados
Biogeography: Introduced
Plant Category: Di

Bernardia corensis (Jacq.) M◉ll. Arg.
Description: Monoecious shrub or small tree; to 4m tall.
Distribution: Lesser Antilles, Northern South America.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Cnidoscolus aconitifolius (Mill.) I.M. Johnst.
Description: Small tree or shrub; to 6m.
Distribution: Nexico, Central America, Cultivated elsewhere
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Di

Codiaeum variegatum (L.) A. Juss.
Description: Shrub; to 4m.
Distribution: Native of Polynesia but widely cultivated-all propagated asexually
Lesser Antilles Distribution: Montserrat, Dominica, St. Lucia
Biogeography: Introduced
Plant Category: Di

Croton astroites Dryand.
Common Name(s): Balsam, black balsam.
Description: Shrub or small tree; to 6m tall.
Distribution: Puerto Rico, Virgin Islands, Leeser Antilles.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Les Saintes, Dominica, Martinique.
Biogeography: Caribbean
Plant Category: Di

Croton corylifolius Lam.
Description: Shrub or slender tree to 10m tall.
Distribution: Cuba, Jamaica, Hispaniola.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, St Lucia, St Vincent.
Biogeography: Caribbean
Plant Category: Di

Croton flavans L.
Common Name(s): Rock sage, sage, balsam, copaiba.
Description: Shrub; to 3m tall.
Notes: common in drier areas. Sap applied directly to ring-worm infections.
Distribution: Greater Antilles, Venezuela
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Barbuda Antigua, Saba, St. Eustatius, St. Kitts, Redonda, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Croton hirtus L'H,r.
Description: Herb; to 60cm tall.
Distribution: Jamaica, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Croton lobatus L.
Description: Annual herb; to 60 cm tall.
Distribution: Neotropics, widespread in other tropical areas.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Redonda, Guadeloupe, La Desirade, Marie Galante, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Dalechampia scandens L.
Description: Slender vine; stems to 5m long.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Drypetes glauca M. Vahl
Common Name(s): Green heart.
Description: Tree; to 20m tall.
Distribution: Hispaniola, Puerto Rico.
Lesser Antilles Distribution: Montserrat, St Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Vincent.
Biogeography: Caribbean
Plant Category: Di

Euphorbia articulata Aubl., (Aublet) Britton
Nomenclature Notes: (Aublet) Britton
Description: Erect Shrub; 1-3m tall.
Key ID Feature: conspicuous swollen nodes
Distribution: Bahamas, Puerto Rico

Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines.
Biogeography: Caribbean
Plant Category: Di

Euphorbia cotinifolia L.
Description: Shrub or small tree; to 4m tall.
Distribution: Mexico, Central and northern South America
Lesser Antilles Distribution: Montserrat, Martinique, St. Vincent, the Grenadines
Biogeography: Wider Distribution
Plant Category: Di

Euphorbia heterophylla L.
Common Name(s): Male ipecac, galloping warner.
Description: Annual or perennial herb; to 1m tall.
Distribution: Worldwide in tropical and subtropical areas as a weed.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, St. Eustatius, Dominica, Martinique, St. Lucia, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Euphorbia hirta (L.) Millsp.
Description: Annual; to 30cm.
Distribution: Possibly worldwide in the tropics.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Euphorbia hypericifolia (L.) Millsp.
Description: Erect annual; to 40cm.
Distribution: Florida, Greater Antilles, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Euphorbia hyssopifolia (L.) Small
Description: Erect annual; to 60cm.
Distribution: Florida, Greater Antilles, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, Dominica, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Euphorbia mesembrianthemifolia (Jacq.) Dugand
Description: Erect shrub; to 2m tall.
Distribution: Bahamas, Greater Antilles, Venezuela, Columbia
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, Guadeloupe, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Hippomane mancinella L.
Common Name(s): Manchineel, poison apple, mancenillier, beach apple, med-sinnye.
Description: Tree; to 10m tall (or stunted plants when on limestone).
Notes: the toxicity of this plant should not be underestimated according to Howard.
Distribution: Florida, Mexico, Central and northern South America, Bahamas, Greater Antillles.
Lesser Antilles Distribution: Montserrat, Anguilla, Barbuda, Antigua, St. Kitts, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Jatropha curcas L.
Common Name(s): Physic nut.
Description: Shrub or small tree; to 5m tall.
Distribution: Mexico and Central America,. Introduced and cultivated elsewhere in the tropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Saba, St. Eustatius, Guadeloupe, Dominica, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Jatropha gossypifolia L.
Common Name(s): Physic nut, belly-ache bush, figus nut.
Description: Slightly woody shrub; to 2m tall.
Notes: common in dry areas and wastelands
Distribution: Florida, Mexico, Central and South America, Bahamas, Greater Antilles
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Jatropha integerrima Jacq.
Description: Shrub; to 4m tall.
Distribution: Native to Cuba now commonly cultivated in neotropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Introduced
Plant Category: Di

Jatropha multifida L.
Common Name(s): Coral plant, French physic nut, Spanish physic nut, corail.
Description: Shrub; to 5m tall.
Distribution: Native to tropical America but widely cultivated
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Manihot esculenta Crantz
Common Name(s): Manihot, cassava, yuca.
Description: Monoecious shrub.
Distribution: Native to South America; widely cultivated throughout the tropics.
Lesser Antilles Distribution: Montserrat (sited by UKOTs team feb 06), Barbuda, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Introduced
Plant Category: Di

Pedilanthus tithymaloides (L.) Poit.
Common Name(s): Slipper plant, milk bush, jew bush, bleeding heart, patagon, red bird flower.
Description: Shrubs; often forming dense clumps; stems to 2m tall.
Distribution: Mexico, Central and northern South America, Greater Antilles
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Richeria grandis M. Vahl
Description: Tree; to 20m tall.
Distribution: Panama, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Ricinus communis L.
Common Name(s): Caster oil plant, carapate, ricin.
Description: Shrub or soft wooded small tree; to 5m tall.
Distribution: widely cultivated and naturalized in tropical areas.
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent.
Biogeography: Introduced
Plant Category: Di

Sapium caribaeum Urb.
Common Name(s): Bird-lime.
Description: Tree; 20m tall.
Distribution: Endemic to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Tragia volubilis L.
Common Name(s): Stinging nettle, stinging wiss, fireman.
Description: Twining, slightly woody vine; stems to 4m long.
Distribution: Central and South America, Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

GENTIANACEAE

Enicostema verticillatum (L.) Engl.
Description: Herb; to 60cm tall.
Distribution: Greater Anilles, Central America, Trinidad, Tobago, northern Venezuela
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Voyria aphylla (Jacq.) Pers.
Description: Herb; 15-30cm tall.
Distribution: Greater Antilles, Mexico, Central America, tropical South America
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Voyria tenella Hook.
Description: Herb; to 20cm tall.
Distribution: Greater Antilles, Mexico, Central America, tropical South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

GESNERIACEAE

Alloplectus cristatus (L.) Mart.
Common Name(s): Wild fuchsia.
Description: Scandent epiphytic shrub.

Distribution: Guianas
Lesser Antilles Distribution: Montserrat, St. Barts, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Restricted Range
Plant Category: Di

Besleria lutea L.
Description: Shrub or tree; to 7m tall.
Distribution: Cuba, Jamaica, Hispaniola.
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Di

Columnea scandens L.
Description: Epiphytic or terrestrial slightly woody herb; stems to 50cm long.
Distribution: Greater Antilles, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Gesneria ventricosa Sw.
Common Name(s): Wild frangipani.
Description: Shrub; to 3m tall.
Distribution: St Croix.
Lesser Antilles Distribution: Montserrat, St Barts, Saba, St Eustatius, St Kitts, Guadeloupe, Dominica, Martinique, St Lucia.
Biogeography: Restricted Range
Plant Category: Di

GLEICHENIACEAE

Dicranopteris pectinata (Willd.) Underw.
Description: Fern
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America; common and widely distributed
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadleoupe, Dominica, Martinique, St. Liucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

Gleichenia bifida (Willd.) Spreng.
Description: Fern
Distribution: Greater Antilles, continental tropical America from Mexico to Brazil and Bolivia
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadleoupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

GRAMMITIDACEAE

Cochlidium seminudum (Willd.) Maxon
Description: Small epiphytic fern; fronds 8-20cm long.
Distribution: Greater Antilles except Cuba; Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Grammitis asplenifolia (L.) Proctor
Description: Epiphytic fern; fronds 15-45mm long.
Distribution: Tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Grammitis eggersii (Baker ex Hook.) Proctor
Description: Epiphytic fern; fronds 6-25cm long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Pter

Grammitis serrulata (Sw.) Sw.
Description: Terrestrial/epiphytic fern; fronds 2-10cm long
Distribution: Greater Antilles, Trinidad, continental tropical America, tropical Africa
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Grammitis taenifolia (Jenman) Proctor
Description: Epiphytic fern; fronds 5-20mm long.
Distribution: Greater Antilles except Cuba; Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

HAEMODORACEAE

Xiphidium caeruleum Aubl.
Description: Perennail herb, 20-60cm tall
Distribution: Mexico, Central America, Greater Antilles, Trinidad, South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Dominica, St. Vincent
Biogeography: Wider Distribution

Plant Category: Mo

HELICONIACEAE

Heliconia bihai (L.) L.
Common Name(s): Wild plantain.
Description: Plants 1.5-4.0 m tall.
Distribution: Greater and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Caribbean
Plant Category: Mo

Heliconia caribaea Lam.
Description: Herbs 3-6 m tall.
Distribution: Greater and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Mo

HERNANDIACEAE

Hernandia sonora L.
Common Name(s): Jack-in-the-box.
Description: Large evergreen tree to 20 m.
Key ID Feature: The bark is thick, whitish-brown and covered with small warts in vertical rows. The leaves are large and thin, heart-shaped, alternate, smooth, with palmate veination (13.5-38 x 9.5-26cm). Flowers are small and
Distribution: Endemic to the Greater and Lesser Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Vincent, Barbados
Biogeography: Lesser Antilles
Plant Category: Di

HYDROCHARITACEAE

Limnobium laevigatum (Humb. & Bonpl. ex Willd.) Heine, Adansonia, n.s., 8: 315 (1968). (0)
Description: Compact, floating plants, or if rooted in mud, the leaves often much elongated.
Distribution: Mexico, Central America, Cuba, Puerto Rico, South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Mo

HYDROPHYLLACEAE

Nama jamaicensis L.
Description: Annual herb, much branched with prostrate stems, to 20 cm long.
Distribution: Florida to Texas, Greater Antilles, Mexico, Central America, Venezuela
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Martinique, the Grenadines, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

HYMENOPHYLLACEAE

Hymenophyllum hirsutum (L.) Sw. var. *gratum* (Fée) Proctor, Listed as Hymenophyllum hirtellum var. gratum in Flora of Less Ant but name not accepted by
Nomenclature Notes: Listed as Hymenophyllum hirtellum var. gratum in Flora of Less Ant but name not accepted by
Description: Fern.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Lesser Antilles
Plant Category: Pter

Hymenophyllum hirsutum (L.) Sw.
Description: Fern.
Distribution: Greater Antilles, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadleoupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

Hymenophyllum macrothecum F,e
Description: Fern
Distribution: Puerto Rico
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, St. Vincent, Grenada
Biogeography: Restricted Range
Plant Category: Pter

Trichomanes alatum Sw.
Description: Fern.
Distribution: Greater Antilles, Trinidad, Margarita Island
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Trichomanes angustifrons (F,e) Wess. Boer
Description: Ferns; colonial, forming mats.
Distribution: Greater Antilles, continental tropical America
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

Trichomanes crispum L.
Description: Fern.

Distribution: Greater Antilles, Trinidad, continental tropical America.
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Trichomanes holopterum Kunze
Description: Fern.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Pter

Trichomanes hymenophylloides Bosch
Description: Fern (usually epiphytic).
Distribution: Greater Antilles, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Trichomanes membranaceum L.
Description: Ferns; colonial, forming dense mats.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

Trichomanes polypodioides L.
Description: Fern; epiphytic.
Distribution: Greater Antilles, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Trichomanes punctatum Poir.
Description: Ferns; colonial, forming thin mats.
Distribution: Puerto Rico, Tobago, Trinidad, Venezuela
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

LAMIACEAE

Hyptis atrorubens Poit.
Common Name(s): Lanmant, mint.
Description: Slender herbs; rooting at nodes; stems 1m long.
Distribution: Mexico, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Hyptis capitata Jacq.
Description: Perennial herb; to 2m tall.
Distribution: Greater Antilles, Mexico, Central America, through South America, established in Old World tropics
Lesser Antilles Distribution: Montserrat, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Hyptis mutabilis (Rich.) Briq.
Description: Herb; to 1-2 m tall.
Distribution: Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Lucia, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Hyptis pectinata (L.) Poit.
Description: Herb; to 3m tall.
Distribution: Southern US, Greater Antilles, widespread and abundant weed of American Tropics, Africa and Asia
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Hyssopus officinalis L.
Cultivated: culinary herb
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Leonotis nepetifolia (L.) R. Br.
Common Name(s): Johnny Collins, bird honey, Lord Lavington, bald head, grow pompon.
Description: Erect herb; to 2m.
Distribution: Native of tropical Africa. Now a pantropical weed.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Leonurus sibiricus L.

Common Name(s): Motherwort.
Description: Erect herb; to 60 cm tall.
Distribution: Native of Asia established in Greater Antilles, Mexico, and Central and South America.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Barbuda, Antigua, Saba, Guadeloupe, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Marsypianthus chamaedrys Bartl.
Common Name(s): Marguerite.
Description: Herb; to 70cm long.
Distribution: Native of Asia established in Greater Antilles, Mexico, and Central and South America.
Lesser Antilles Distribution: Montserrat, St. Barts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Introduced
Plant Category: Di

Mentha spicata L.
Cultivated: culinary herb
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Ocimum basilicum L.
Common Name(s): Basilic.
Description: Erect annual herb; to 60cm.
Distribution: Native of India or Asia now widely distributed in tropical areas
Lesser Antilles Distribution: Montserrat, St. Martin, Guadeloupe, La Desirade, Dominica, St. Lucia, St. Vincent.
Biogeography: Introduced
Plant Category: Di

Ocimum campechianum Mill.
Common Name(s): Balm, basil.
Description: Erect annual herb; to 0.5m tall.
Distribution: Widely distributed in the neotropis
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Antigua, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Ocimum gratissimum L.
Common Name(s): Mint, basilic.
Description: Perennial shrub; to 2m tall.
Distribution: Native of India, but common in all tropical areas.
Lesser Antilles Distribution: Montserrat,Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Salvia coccinea Buc'hoz ex Etl.
Description: Annual herb; to 1m tall.
Distribution: cultivated or escaped in many tropical countries
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Vincent
Biogeography: Introduced
Plant Category: Di

Vitex divaricata Sw.
Description: Tree; to 20m tall.
Distribution: Cuba, Hispaniola, Puerto Rico, Trinidad and the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Di

LAURACEAE

Aniba bracteata (Nees) Mez
Common Name(s): Red Sweetwood.
Description: Small tree; to 15m tall.
Key ID Feature: Leaves 15-25cm long, 4-7cm wide; very stiff, rough, elliptical, drawn out at the tip and heart-shaped at the base; clustered at the ends of the branchlets. Flowers are small, white and produced in terminal panic
Distribution: Puerto Rico and the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Dominica, Martinique, St Lucia St Vincent.
Biogeography: Restricted Range
Plant Category: Di

Beilschmiedia pendula (Sw.) Hemsl.
Common Name(s): Zaboca, sweetwood, red sweetwood.
Description: Tree; to 20m tall.
Distribution: Greater and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Caribbean
Plant Category: Di

Cinnamomum elongatum (Nees) Kosterm.
Common Name(s): Pitch-pine, sweetwood.
Description: Tree; 10-20m tall.
Distribution: Cuba, Hispaniola, Puerto Rico, Trinidad, Tobago
Lesser Antilles Distribution: Montserrat, St. Eustatius, Guadeloupe, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Di

Licaria salicifolia (Sw.) Kosterm.
Description: Small tree; to 15m tall.
Key ID Feature: Leaves 3.5-15x1-4.5cm; very stiff, lanceolate, drawn out to a point, veins arching alongthe edge. Branches rust-coloured and minutely tomentose. Flowers are greenish in short axillary spikes. Fruit ovoid-

oblang,
Distribution: Puerto Rico and the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Martinique.
Biogeography: Restricted Range
Plant Category: Di

Nectandra coriacea (Sw.) Griseb.
Description: Tree; to 12m tall.
Notes: Nectandra is a syn of Ocotea
Distribution: Neotropics.
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

Nectandra dominicana (Meisn.) Mez
Description: Tree; to 15m tall.
Notes: In original Howard species list but not in his Flora.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Guadeloupe, Dominica, Martinique.
Biogeography: Lesser Antilles
Plant Category: C-Di-Nat

Ocotea cernua (Nees) Mez
Description: Tree; to 17m tall.
Distribution: Southern Mexico and Central America, and Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Ocotea coriacea (Sw.) Britton
Description: Tree; to 12m tall.
Distribution: Florida, Mexico, Central America, Greater Antilles, Lesser Antilles, northern South America, Trinidad
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Ocotea floribunda (Sw.) Mez
Common Name(s): Sweet wood.
Description: Tree; dioecious; to 20m tall.
Distribution: Greater Antilles, Lesser Antilles, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe
Biogeography: Wider Distribution
Plant Category: Di

Ocotea leucoxylon (Sw.) Laness.
Common Name(s): Pumpkin sweetwood.
Description: Tree; to 20m tall.
Distribution: Greater and Lesser Antilles, Trinidad and Tobago.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Greanda
Biogeography: Caribbean
Plant Category: Di

Ocotea martinicensis Mez
Description: Tree; sometimes with aerial roots; to 12 m tall.
Key ID Feature: Leaves obovate, large, with a blunt tip, minutely tomentose and 5 to 10 pairs of veins uniting into an arc near the edge of the leaf. Leaves not aromatic. Flowers white and fragrant in axillary panicle. Fruit ov
Distribution: Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Ocotea membranacea (Sw.) HOWARD
Common Name(s): Sweetwood.
Description: Tree; to 20m tall.
Distribution: Greater and Lesser Antilles, Trinidad and Tobago.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, Grenada
Biogeography: Caribbean
Plant Category: Di

Ocotea patens (Sw.) Nees
Common Name(s): Sweetwood.
Description: Shrub or tree; to 18m tall.
Distribution: Greater and Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Caribbean
Plant Category: Di

Persea americana Mill.
Common Name(s): Pear, avocado, avocado pear, alligator pear.
Description: Tree; to 40m tall.
Distribution: Native to Central America but generally cultivated and persisting in tropical areas.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, St. Vincent, Probably on all islands but not represented by herbarium specimens
Biogeography: Introduced
Plant Category: Di

Persea urbaniana Mez
Common Name(s): Sweetwood.
Description: Tree; to 7m tall.
Distribution: Jamaica, Puerto Rico, Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia.

Biogeography: Caribbean
Plant Category: Di

Phoebe elongata Nees
Description: Tree; 10-20m tall.
Notes: Syn of Cinnamomum elongatum
Distribution: Greater and Lesser Antilles, trinidad and Tobago.
Lesser Antilles Distribution:
Biogeography: Caribbean
Plant Category: Di

LECYTHIDACEAE

Barringtonia asiatica (L.) Kurz
Common Name(s): Pain tree, mitre's cap, bishop's cap.
Description: Tree; 10-20m tall.
Notes: Occurs mainly in littoral habitats but can tolerate drier sites. The fruits and esp. the seeds are used as fish poison, and on Antigua as a remedy for headaches
Distribution: Native from Madagascar and the Seychelle Islands to Southern India, Sri Lanka, southeast Asia, Malaysia, northeastern Austrailia, Micronesia, and the Pacific Islands.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Introduced
Plant Category: Di

Couroupita guianensis Aubl.
Common Name(s): Cannonball tree.
Description: Deciduous or evergreen trees; up to 35m tall.
Notes: Cultivated. Occuring in humid rainforest
Distribution: South America
Lesser Antilles Distribution: Montserrat, St. Martin, Guadeloupe, Dominica, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

LEGUMINOSAE-CAES

Caesalpinia bonduc (L.) Roxb.
Common Name(s): Grey nicker, horse-nicker, Bahama Brazilletto, konik.
Description: Scrambling shrub or vine; to 6 (15)m tall.
Distribution: Florida, Bermuda, Mexico and Central America, West Indies, South America, Old World tropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. martin, St. Barts, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Caesalpinia pulcherrima (L.) Sw.
Common Name(s): Barbados-pride, flower pride, Spanish carnation, flower fence, dwarf poinciana.
Description: Shrub; to 5m tall.
Distribution: Native to S America, widely cultivated.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Barbuda, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St Vincent, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Cassia grandis L.
Common Name(s): Horse cassia.
Description: Tree; to 30m tall.
Distribution: Central and South America
Lesser Antilles Distribution: Montserrat
Biogeography: Wider Distribution
Plant Category: Di

Cassia javanica L.
Common Name(s): Stinking toe, pink cassi.
Description: Tree; to 40m tall.
Distribution: Eastern Asia, but widely planted throughout the tropics
Lesser Antilles Distribution: Montserrat, Dominica, St. lucia, Barbados
Biogeography: Introduced
Plant Category: Di

Chamaecrista glandulosa Greene var. *schwartzii* (Wiks) H.S.Irwin & Barn
Common Name(s): Wild tamarind, broom cassi, dutchman's butter.
Description: Erect shrubs; to 2m tall.
Distribution: Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, Anguilla, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Caribbean
Plant Category: Di

Haematoxylon campechianum L.
Common Name(s): Logwood, campeachy wood, champish.
Description: Shrub or small tree; to 8m tall.
Distribution: Mexico, Central America, West Indies
Lesser Antilles Distribution: Montserrat, St Martin, St. Barts, Antigua, Barbuda, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Hymenaea courbaril L.
Common Name(s): Locust tree, stinking tree, koubawi, koukoubawi.
Description: Tree; to 30m tall.
Distribution: Mexico, Central America, West Indies (except Bahamas), South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Les Saintes, Marie Galante, Dominica, Martinique, St. Lucia,

St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Parkinsonia aculeata L.
Common Name(s): Jerusalem thorn, holy thorn, royal cashiaw.
Description: Shrub or small tree; to 9m tall.
Distribution: Florida to Texas, Mexico, Central America, West Indies, South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Barbuda, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Senna alata (L.) Roxb.
Common Name(s): Taratana, talentro, ringworm shrub, Christmas candle.
Description: Tree or large shrub; 1-4m tall.
Notes: syn of Cassia alata
Distribution: West Indies, Mexico south to northern Columbia, east to Guianas, Brasil, Ecuador, Paraguay, northern Agentina; cultivated in US and Old World Tropics
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Senna bacillaris (L. f.) H.S. Irwin & Barneby var. *bacillaris*
Common Name(s): Christmas blossom, Christmas bush.
Description: Shrub; to 3-8m tall.
Distribution: south from Nicuaragua across northern South America north to the Winward Isles. Cultivated elsewherre
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Senna bicapsularis (L.) Roxb. var. *bicapsularis*
Common Name(s): Black dog bush, money bush.
Description: Spreading shrub; up to 3.5m tall.
Distribution: Perhaps native to s and e Caribbean, introduced elsewhere throughout Neotropics and Palaeotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, Barbuda, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Di

Senna obtusifolia (L.) Irwin & Barneby
Common Name(s): Italian senna.
Description: Monocarpic herb; 3-24dm.
Distribution: Weedy throughout the tropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Antigua, Barbuda, Guadeloupe, Dominca, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Senna occidentalis (L.) Link
Common Name(s): Wild coffee, coffee bush, stinking weed, wild French guava, stinking bush, pis-a-bed, d
Description: Coarse maloderous weedy herb; usually 1-2m tall.
Notes: common in waste ground
Distribution: weedy through the Neotropics, north to eastern and central US., south to northern Agentina, not recorded from pacific Peru or Amazonian Hylaea
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Senna siamea (Lam.) Irwin & Barneby
Common Name(s): Kas, casse.
Description: Tree; up to 10-15m tall.
Distribution: Forest margins in Burma and Thailand; cultivated throughout the tropics
Lesser Antilles Distribution: Cultivated; Montserrat, St. Lucia
Biogeography: Introduced
Plant Category: Di

Senna sophora (L.) Roxb.
Description: Large, leafy, futescent herb; up to 1-2m tall.
Notes: found growing in waste places
Distribution: circum-Caribbean; Barhamas to West Indies, Mexico to Columbian Andes, and east to Guyana
Lesser Antilles Distribution: Montserrat, Antigua, Barbuda, Guadeloupe, La Desirade, Dominica, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Tamarindus indica L.
Description: Tree; to 20 m.
Distribution: Origin unknown; possibly tropical Africa; cultivated throughout the tropics
Lesser Antilles Distribution: Montserrat, St. Martin , St. Barts, Antigua, Barbuda, Saba, St. Eustatius, St. Kitts, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

LEGUMINOSAE-MIM

Acacia farnesiana (L.) Willd.
Common Name(s): Sweet cassis.
Description: Shrub or small tree; to 6m tall.
Distribution: Florida, and the Gulf Coast, Central Amer-

ica, Greater Antilles, northern South America
Lesser Antilles Distribution: Montserrat, Barbuda, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Les Saintes, Dominica, , Martinique, St. lucia, St. Vincnet, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Acacia glauca (L.) Moench
Common Name(s): Redwood.
Description: Shrub; to 2m tall.
Key ID Feature: unarmed, branches sparsely pubescent.
Distribution: Curucao
Lesser Antilles Distribution: Montserrat, Guadeloupe, St. Vincent
Biogeography: Restricted Range
Plant Category: Di

Acacia nilotica (L.) Delile
Common Name(s): Cassie, casha.
Description: Shrub or tree; to 8m tall.
Distribution: An African species introduced to the Greater and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, Guadeloupe, Martinique, St. Lucia, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Acacia retusa (Jacq.) Howard
Description: Woody vine or slender tree; to 7m tall.
Distribution: Hispaniola, Puerto Rico, Virgin Islands, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. barts, St. Eustatius, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Acacia tortuosa (L.) Willd.
Common Name(s): Alabama cossy.
Description: Shrub or small tree; to 8m tall.
Distribution: Florida, Greater Antilles, northern South America
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, St. Eustatius, Guadeloupe, Martinique, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Adenanthera pavonina L.
Common Name(s): Red sandalwood, dimawi, jumbi bead.
Description: Tree; to 15m tall.
Notes: the flowers often have a strong and foul odour. The seeds are commonly used in necklaces and local handicraft.
Distribution: Widespread in tropical Asia and cultivated and persisting throughout the tropics.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Albizia caribaea (Urb.) Britton & Rose
Common Name(s): Tantacayo.
Description: Tree; to 20m tall.
Distribution: Central America, Trinidad, Tobago, Venezuala
Lesser Antilles Distribution: Montserrat, Guadeloupe, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Bauhinia tomentosa L.
Description: Tree; 5-8m tall.
Distribution: Native to Asia; widely cultivated
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, Barbados
Biogeography: Introduced
Plant Category: Di

Calliandra haematocephala Hassk.
Description: Shrub; 1-3m tall.
Distribution: Native to Bolivia but widely cultivated ub the American tropics
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, St. Lucia
Biogeography: Introduced
Plant Category: Di

Calliandra purpurea (L.) Benth.
Description: Shrub or small tree; 4 or 5 m tall.
Distribution: Trinidad, Venezuela
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Les Saintes, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Calliandra surinamensis Benth.
Common Name(s): Bwa pata.
Description: Shrub or small tree; 3-6m tall.
Distribution: Native to northern South America but cultivated elsewhere in American tropics
Lesser Antilles Distribution: Cultivated, persisting or escaped. Montserrat, Guadeloupe, St. Lucia, Barbados
Biogeography: Introduced
Plant Category: Di

Desmanthus virgatus (L.) Willd.
Description: Erect or ascending herb or subshrub; 0.5-2 m.
Distribution: Greater Antilles, Trinidad and Tobago.
Lesser Antilles Distribution: Montserrat, Anguilla, St. martin, St. Barts, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. vincent, the Grenadines, Grenada, Barbados
Biogeography: Caribbean

Plant Category: Di

Enterolobium cyclocarpum (Jacq.) Griseb.
Common Name(s): Monkey ear.
Description: Large-trunked tree; to 25m.
Distribution: Mexico to Venezuela, although introduced elsewhere
Lesser Antilles Distribution: Cultivated or persisting. Montserrat, Martinique, St. Lucia, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Inga laurina (Sw.) Willd.
Common Name(s): Spanish oak, cacoley.
Description: Tree; to 15m tall.
Distribution: Greater Antilles, Trinidad
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Di

Leucaena leucocephala (Lam.) de Wit
Common Name(s): Wild tamarind, wild mimosa, monval.
Description: Shrub or small tree; to 10m tall.
Distribution: Widespread in Tropical America and introduced to Africa and Asia.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Mimosa pudica L.
Common Name(s): Sensitive plant.
Description: Herbaceous or woody plants.
Key ID Feature: leaflets, pinnae and leaves are all sensitive to touch
Distribution: Pantropical.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadiines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Pithecellobium unguis-cati Benth.
Local Name(s): Bread and Cheese
Common Name(s): Bread and cheese, doctor long, groven eye.
Description: Shrub to small tree; to 6m tall.
Uses: Dye made from bark.
Distribution: Florida, Venezuela, Greater Antilles.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Prosopis juliflora (Sw.) DC.
Description: Small tree; to 13m tall.
Distribution: Greater Antilles, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Barbuda, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Samanea saman (Jacq.) Merr.
Common Name(s): Saman, rain tree, coco tamarind.
Description: Tree; to 20m tall.
Distribution: Greater Antilles, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Barbuda, Guadeloupe, Dominica, martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, barbados
Biogeography: Wider Distribution
Plant Category: Di

LEGUMINOSAE-PAP

Abrus precatorius L.
Description: Climbing or twining woody slender vine; to 3 m long.
Distribution: Probably pantropical.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Les Saintes, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Aeschynomene villosa Poir.
Description: Stems to 1m long; prostrate to weakly ascending.
Distribution: US, Mexico, Central and South America, Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadleoupe, Martinique
Biogeography: Wider Distribution
Plant Category: Di

Andira sapinoides (DC.) Benth.
Common Name(s): Angelin.
Description: Tree; to 20m tall.
Key ID Feature: Leaves pinnately compound, 15-30cm long, leaflets 7.5-12cm long, 3-3.5cm wide, and 9-11 in number. Inflorescenes axillary. corolla pink-purple. Fruit globose to obovoid, fleshy, indehiscent; one seed.
Distribution: Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, Grenada
Biogeography: Lesser Antilles
Plant Category: Di

Arachis hypogaea L.
Common Name(s): Peanut, ground nut.

Description: Annual herb.
Notes: plants persist in abandoned gardens
Distribution: Cultivated in tropical countries
Lesser Antilles Distribution: Montserrat, St. martin, Antigua, Saba, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Cajanus cajan (L.) Huth
Common Name(s): Pigeon pea, pigeon pea bush.
Description: Erect perennial shrub; to 4m.
Distribution: Assumed to have originated in Africa, widely distributed.
Lesser Antilles Distribution: Montserrat, Anguilla, St. martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Calopogonium mucunoides Desv.
Common Name(s): Wild ground nut.
Description: Twining, trailing herb; with stems several metres long.
Distribution: Mexico, Central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Centrosema virginianum (L.) Benth.
Common Name(s): Wild pea, butterfly pea, blue bell.
Description: Twining herbs.
Distribution: southern US, Mexico, Central America, Greater Antilles, South America, and introduced elsewhere
Lesser Antilles Distribution: Montserrat, Anguilla, St. martin, St. barts, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent. Grenada
Biogeography: Wider Distribution
Plant Category: Di

Clitoria ternatea L.
Common Name(s): Blue pea, butterfly pea.
Description: Herbaceous vine, rampant and profuse.
Distribution: native of the paleotropics, widely established in the Neotropics
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Martinique, St. Vincent, the Grenadines, Barbados
Biogeography: Introduced
Plant Category: Di

Cracca caribaea (Jacq.) Benth.
Description: Shrub or woody herb; to 1.5 m.
Distribution: Greater and lesser Antilles, northern S America.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Eustatius, Guadeloupe, Martinique, St. Vincent, the Grendines
Biogeography: Wider Distribution
Plant Category: Di

Crotalaria micans Link
Description: Shrub; to 3m.
Distribution: Mexico, Central America, Trinidad, South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Crotalaria pallida Aiton
Description: Erect annual or shrub; to 2m.
Distribution: throughout the tropics as a weed
Lesser Antilles Distribution: Montserrat, St. Kitts, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Crotalaria retusa L.
Common Name(s): Shack-shack, popbush, shak shak.
Description: Branched annual; to 1m tall.
Distribution: Probably of Asian origin but now pantropical
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, barbados
Biogeography: Introduced
Plant Category: Di

Crotalaria verrucosa L.
Common Name(s): Shack-shack, purple pop bush.
Description: Annual herb; to 80 cm.
Distribution: Native to Asia, now widely naturalised in tropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. martin, St. Barts, Saba, St. Eustatius, St. kitts, Guadeloupe, Dominica, Martinique, St. lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Dalbergia ecastaphyllum (L.) Taub.
Description: Small tree or shrublike vine; 2-20m long.
Distribution: Florida, Greater Antilles, Trinidad, South America, tropical Africa
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Desmodium adscendens (Sw.) DC.
Description: Herb; repent and rooting along the stem; 6-24 inches tall.

Distribution: Widespread in tropical Africa, Asia and America.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Desmodium incanum DC.
Common Name(s): Sweethearts.
Description: Shrubby herb; to3m tall.
Distribution: throughout tropical America and Old World Tropics
Lesser Antilles Distribution: Montserrat, St. Martin, St. barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Desmodium scopiurus (Sw.) Desv.
Description: Herb.
Distribution: Throughout tropical America and a weed elsewhere.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Introduced
Plant Category: Di

Desmodium tortuosum (Sw.) DC.
Common Name(s): Beggar Weed, sweetheart.
Description: Woody herb or shrub; to 1m.
Distribution: Native to subtropical and tropical America but widely cultivated as green manure.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Erythrina corallodendrum L. var. *bicolor* Krukoff
Common Name(s): Jumbie cutlass, Coral Tree.
Description: Tree or shrub; to 8m tall.
Key ID Feature: Differs from the straight species in having seeds part red and part black.
Distribution: Jamaica, Haiti and the Lesser Antilles and Cultivated elsewhere.
Lesser Antilles Distribution: Montserrat,St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Caribbean
Plant Category: Di

Erythrina poeppigiana (Walp.) Cook
Common Name(s): Immortelle.
Description: Large tree; armed with spines.
Distribution: Native of South America, established in Greater Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Lucia, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Erythrina variegata L.
Common Name(s): Easter flower, Holocauste, Motel.
Description: Tree; to 25m tall.
Distribution: Asia, Oceania, Africa and introduced elsewhere in the Tropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, Guadeloupe, Les Saintes, Martinique, St. Lucia, the Grenadines, Grenada
Biogeography: Introduced
Plant Category: Di

Flemingia strobilifera (L.) R. Br.
Common Name(s): Wild hops, Luck plant.
Description: Shrub; to 2 m tall.
Distribution: Native to Asia, including China and Malesia, but introduced and established in many tropical countries. Central America, South America, Greater Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Galactia dubia DC.
Description: Woody climber.
Key ID Feature: Three leaflets, drying brown above and shining pilose below. Corolla rose to purple drying to yellow. Legume is 4-5 cm long, 5mm wide, curved above, seeds are dark brown.
Distribution: endemic to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Anguilla, St Martin, St Barts, Barbuda, Antiqua, St Eustatius, St Kitts, Guadeloupe, La Desirade, Marie Galante.
Biogeography: Lesser Antilles
Plant Category: Di

Galactia rubra (Jacq.) Urb.
Description: Vine; woody at base; to 4m tall.
Key ID Feature: 3 leaflets, pilose below, corolla red, legume 10-12 seeded, 5-7 cm long, 6-9mm wide, almost straight, curved above. Seeds brown to black and shining.
Distribution: Lesser Antilles
Lesser Antilles Distribution: Montserrat, St Martin, Antigua, Saba, St Eustatius, St Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Lesser Antilles
Plant Category: Di

Galactia striata (Jacq.) Urb.
Description: Perennial climber.
Distribution: The American tropics
Lesser Antilles Distribution: Montserrat, St. Barts, Bar-

buda, Guadeloupe, Les Saintes
Biogeography: Wider Distribution
Plant Category: Di

Gliricidia sepium (Jacq.) Kunth ex Walp.
Common Name(s): Quickstick, Nicaragua shade tree, glory cida.
Description: Tree; to 10m tall.
Distribution: Native of South America but widely cultivated in American tropics and elsewhere.
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados
Biogeography: Introduced
Plant Category: Di

Indigofera suffruticosa Mill.
Common Name(s): Indigo, Guatemala Indigo.
Description: Shrub; to 2m tall.
Distribution: Native of tropical America, southern United States, Mexico, Central America, Greater Antilles, South America and introduced into the Old World.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Indigofera tinctoria L.
Common Name(s): Indigo, French Indigo.
Description: Erect or sprawling shrub; to 1.5m tall.
Distribution: Native of Old World, introduced and naturalized in New World.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Kitts, Martinique, St. Lucia, St. Vincent, the Grenadines, Barbados
Biogeography: Introduced
Plant Category: Di

Lablab purpureus (L.) Sweet
Common Name(s): Black Bean.
Description: Vigorous climbing or twining herb; stems to 5m long.
Distribution: Probably native of Africa but introduced and established as a food and forage plant in most tropical countries.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Lonchocarpus violaceus (Jacq.) DC.
Common Name(s): Greenheart.
Description: Tree; to 15m tall.
Distribution: Colombia and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, Nevis, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, Barbados
Biogeography: Restricted Range
Plant Category: Di

Mucuna pruriens (L.) DC.
Description: Climbing herb; stems 2-3m.
Key ID Feature: Corolla mostly blackish purple or lilac, fruits with or without irritant hairs.
Distribution: widespread in tropical areas, wild or cultivated.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Martinique, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Mucuna sloanei Fawc. & Rendle
Description: Robust vine; high climbing, stems tomentose hairs whitish.
Distribution: Greater Antilles and Central America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Ormosia monosperma (Sw.) Urb.
Common Name(s): Snakewood, bastard nickers, jumbi beads, jumbie.
Description: Tree; to 18 m.
Distribution: Lesser Antilles, Trinidad, Tobago, Venezuela.
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Di

Piscidia carthagenensis Jacq.
Common Name(s): Dogwood.
Description: Tree; to 15m.
Distribution: Mexico, Central America, Puerto Rico, Venezuela
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Kitts, Guadeloupe, Les Saintes, Martinique, St Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Pueraria phaseoloides (Roxb.) Benth., J. Linn. Soc., Bot. 9: 125. 1865 (0)
Local Name(s): Kudzu
Life Form: Scrambling vine
Description: Vigorous perennial forming dense tangles masses.
Uses: Introduced as a forage plant.
Cultivated: forage crop
Notes: Not listed as occurring in Montserrat according to Howard's Flora. However, occurrence in Montserrat likely. Herbarium specimen collected from Paradise region in 1960s; this area is now under pyroclastic flow.

Species probably exists elsewhere on the island due to invasiveness.
Invasiveness: 3
Distribution: Southest Asia, introduced elsewhere.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Martinique, St. Lucia, St. Vincent.
Biogeography: Introducedntroduced
Plant Category: Di

Rhynchosia minima (L.) DC.
Common Name(s): Jumby bean, horse rub-down.
Description: Perennial climbing herb; stems to several metres in length.
Distribution: Worldwide in the tropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbado
Biogeography: Wider Distribution
Plant Category: Di

Rhynchosia reticulata (Sw.) DC.
Description: Herbaceous to woody vine; stems to 6m long.
Distribution: Mexico, Central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, Anguilla. St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Sesbania emerus (Aubl.) Urb.
Description: Shrub; stems woody at base; to 5m tall.
Distribution: Florida, Mexico, Central America, Greater Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Guadloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Di

Sesbania grandiflora (L.) Poir.
Description: Small tree; to 10m tall.
Distribution: Hispaniola, Puerto Rico but cultivated and naturalized elsewhere in the tropics.
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, St. Lucia
Biogeography: Caribbean
Plant Category: Di

Strongylodon macrobotrys A.Gray
Cultivated: ornamental
Notes: Currently cultivated in one private garden on Montserrat.
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Tephrosia cinerea (L.) Pers.
Description: Prostrate to erect herb; to 1m or more tall.
Key ID Feature: most parts have silvery pubescence
Distribution: Throughout the neotropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Antigua, St. Kitts, Redonda, Guadeloupe, La Desirade, Marie Galante, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Tephrosia noctiflora Bojer ex Baker
Description: Herb or subshrub; to 1.5m tall.
Distribution: Widespread in Africa, introduced elsewhere
Lesser Antilles Distribution: Montserrat, Antigua, Dominica, Martinique, St. Vincent
Biogeography: Introduced
Plant Category: Di

Teramnus labialis (L. f.) Spreng.
Description: Climbing to prostrate herb; stems to 3m long.
Distribution: Greater and Lesser Antilles and occasionally in Central America.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Di

Zornia reticulata Sm.
Description: Perennial herb; stems prostrate to erect, 60cm in length.
Distribution: US, Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, St. Kitts
Biogeography: Wider Distribution
Plant Category: Di

LEMNACEAE

Lemna valdiviana Phil.
Description: Floating plants; solitary.
Notes: sited by UKOTs team feb 06 in Mrat. But not listed as occurring in Flora
Distribution: Temperate and Tropical America
Lesser Antilles Distribution: *Montserrat, Antigua, Guadeloupe, Les Saintes, Marie Galante, Martinique
Biogeography: Wider Distribution
Plant Category: Mo

LENTIBULARIACEAE

Utricularia alpina Jacq.
Description: Perennial, epiphytic herbs.
Distribution: Nicaragua, Panama, Columbia, Venuzuela, Guyana
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.

Biogeography: Wider Distribution
Plant Category: Di

LOGANIACEAE

Spigelia anthelmia L.
Description: Annual herb; to 50cm tall.
Notes: Considered to be the most effective treatment for worms, but it is dangerous to use. It is still regarded as a very toxic plant throughout the Lesser Antilles.
Distribution: Bahamas, Greater Antilles, Mexico, Central and northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

LOMARIOPSIDACEAE

Bolbitis portoricensis (Spreng.) Hennipman
Description: Terrestrial fern; fronds 40-140cm.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America from Mexico to Columbia
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Elaphoglossum apodum (Kaulf.) Schott
Description: Epiphytic fern; fronds 20-55cm long.
Distribution: Greater Antilles, continental tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Elaphoglossum hirtum (Sw.) C. Chr.
Description: Epiphytic/terrestrial fern; fronds 15-45cm long.
Distribution: Trinidad
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Restricted Range
Plant Category: Pter

Elaphoglossum impressum (F,e) T. Moore
Description: Epiphytic fern; fronds 15-48cm long.
Notes: the relationship between the Lesser Antilles population and related continental forms need clarification
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, La Desirade, Dominica, Martinique, Grenada.
Biogeography: Lesser Antilles
Plant Category: Pter

Elaphoglossum martinicense (Desv.) T. Moore
Description: Epiphytic fern; fronds 20-55cm long
Distribution: Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Pter

Elaphoglossum petiolatum (Sw.) Urb.
Description: Epiphytic fern; fronds 20-65cm long.
Distribution: Hispaniola, Puerto Rico, South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Elaphoglossum schomburgkii (F,e) T. Moore
Description: Epiphytic fern; fronds 45-65cm long.
Distribution: Trinidad, Guiana, Costa Rica
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis
Biogeography: Peri-Caribbeanaribbe
Plant Category: Pter

Hymenodium crinitum (L.) F,e
Description: Epiphytic fern; fronds 40-90cm long.
Distribution: Greater Antilles, Trinidad, Central America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Lomariopsis sorbifolia (L.) F,e
Description: Climbing fern; fronds 50-75cm.
Distribution: Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent.
Biogeography: Caribbean
Plant Category: Pter

LORANTHACEAE

Dendropemon caribaeus Krug & Urb.
Description: Shrub; stems quadrangular.
Distribution: Puerto Rico, Virgin Islands
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Marie Galante, Guadeloupe, Dominca, Martinique, St. Lucia, St. Vincent, Barbados
Biogeography: Caribbean
Plant Category: Di

LYCOPODIACEAE

Lycopodium cernuum L.
Description: Lycopod; terrestrial; 30-100cm tall.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadleoupe, Dominica, Martinique, St. Liucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Pter

Lycopodium taxifolium Sw.
Description: Lycopod; epiphytic, pendent, flaccid; 20-60cm tall.
Distribution: Greater Antilles, Trinidad, continental tropical America, from Mexico to northern South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, St. Lucia, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

LYTHRACEAE

Cuphea hyssopifolia Kunth
Description: Shrubby perennial; 20-70cm tall.
Distribution: Mexico to Panama
Lesser Antilles Distribution: Montserrat, St. Lucia
Biogeography: Wider Distribution
Plant Category: Di

Lagerstroemia indica L.
Common Name(s): Crepe myrtle.
Description: Shrub or small tree.
Key ID Feature: grey bark flaking in plates
Distribution: Native to east Asia. Introduced and extensively cultivated throughout warm regionsof the world as a street or garden tree
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Martinique, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Lawsonia inermis L.
Common Name(s): Henna, reseda.
Description: Shrub; to 3m tall.
Distribution: Native to East Africa or Asia. Now grown widely throughout the tropics; frequently escaped and naturalised.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, Barbados.
Biogeography: Introduced
Plant Category: Di

Punica granatum L.
Common Name(s): Pomegranate.
Description: Shrub or small tree; to 6 or 7m tall.
Distribution: native from south eastern Europe to the Himalayas and Islands of Socotra; cultivated and occasionally naturalised elsewhere
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts,Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

MALPIGHIACEAE

Bunchosia glandulosa (Cav.) DC.
Common Name(s): Stinkwood.
Description: Shrub or small tree; 2-4(-8)m tall.
Distribution: Bahamas, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Guadeloupe, Martinique
Biogeography: Caribbean
Plant Category: Di

Bunchosia polystachia (Andrews) DC.
Common Name(s): Wild coffee.
Description: Shrub or small tree; 2-7m tall.
Distribution: Cuba, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Di

Byrsonima spicata (Cav.) DC.
Common Name(s): Shoemakers' bark
Description: Tree; 3-25m tall.
Distribution: Greater Antilles except Jamaica; northern south America, south to Bolivia
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. lucia, St. Vincent, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Heteropterys purpurea (L.) Kunth
Common Name(s): Black twist.
Description: Woody vine; climbing to 10m tall.
Distribution: Greater and Lesser Antilles, Trinidad, Venezuela.
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Martiique, St. Luci, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Malpighia linearis Jacq.
Common Name(s): Cow-itch bush
Description: Shrub or small tree; 1-5m tall.
Distribution: Puerto Rico, virgin Islands and the Lesser

Antilles.
Lesser Antilles Distribution: Montserrat, St. matin, St. Barts, Barbuda, Antigua, St. Kitts, Nevis, Guadeloupe, La Desirade, Les Saintes, Martinique, St. Lucia
Biogeography: Caribbean
Plant Category: Di

Stigmaphyllon cordifolium Nied.
Description: Woody vine.
Notes: Syn of S. diversifolium.
Distribution: Cuba.
Lesser Antilles Distribution: Anguilla, St Barts, Barbuda, Antigua, St Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique.
Biogeography: Restricted Range
Plant Category: Di

Stigmaphyllon diversifolium (Kunth) A. Juss.
Description: Woody vine.
Key ID Feature: plants of open places at low elevations.
Flowering time Feb to June
Distribution: Cuba
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique
Biogeography: Restricted Range
Plant Category: Di

MALVACEAE

Abelmoschus esculentus (L.) Moench
Common Name(s): Okra, gumbo, chimbombo, gonbo, guingambo, kinkambo, orchra.
Description: Erect; herb to 1-2m.
Notes: *cultivated specimens sited by UKOTs team feb 06 in Mrat. But not listed as occurring in Flora.
Distribution: Southeast Asia and Malesia. Cultivated elsewhere in the tropics and sometimes escaped/
Lesser Antilles Distribution: Montserrat*, St. Barts, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Abutilon guineense (Schumach.) Baker f. & Exell
Common Name(s): Monkey bush.
Description: Shrub; to 1m tall.
Distribution: Northern Australia, New Guinea, Java, Celebes, India, Ceylon; in Africa from Guinea to Angola, Ruanda-Burundi and Somalia to Transvaal, Swaziland, Natal, and Madagascar; We
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua
Biogeography: Wider Distribution
Plant Category: Di

Abutilon hirtum (Lam.) Sweet
Common Name(s): Sweet.
Description: Robust herb; to 1m tall.
Distribution: Pantropical.
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Les Saintes, Martinique, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Abutilon hulseanum (Torr. & A. Gray) Torr. ex A. Gr
Description: Subshrub; 1-1.5m tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique.
Biogeography: Wider Distribution
Plant Category: Di

Abutilon indicum (L.) Sweet
Common Name(s): Monkey bush.
Description: Herb or sub-shrub; to 0.5-2m
Distribution: Widely distributed throughout the tropics
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Abutilon umbellatum (L.) Sweet
Description: Shrub; 1-2 m tall.
Distribution: West Indies and southern Texas to Central and South America (Venezuala to Peru)
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Guadeloupe, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Ceiba pentrandra (L.) Gaertn.
Common Name(s): Silk cotton tree, pin tree.
Description: Large tree; to 25m tall or more.
Distribution: Mexico south to northern South America and West Indies. Introduced and more or less naturalised in the Old World
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Gossypium barbadense L.
Common Name(s): Coton, kidney coton, sea island coton.
Description: Shrubs; 1-3m tall.
Distribution: Originally from South America, now cultivated in many parts of the world.
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, Barbados.
Biogeography: Introduced
Plant Category: Di

Herissantia crispa (L.) Brizicky
Description: Perennial subshrub.
Notes: *listed in Howard Mrat Species list but not listed as occurring in Mrat according to Flora
Distribution: Neotropics, adventive in the Palaeotropics.
Lesser Antilles Distribution: Montserrat* Anguilla, St. Martin, St. Barts, Guadeloupe, Martinique, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Hibiscus rosa-sinensis L. var. *rosa-sinensis*
Common Name(s): Chinese hibiscus, Chinese rose, pavona, shoe black, red hibiscus, garden hibiscus, hibi
Description: Shrub; to 4m tall.
Notes: one of the showiest and best known ornamental shrubs
Distribution: Unknown in the wild, pantropical, cultivated
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Malachra capitata (L.) L.
Description: Herb or subshrub; 1.5m tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat,St. Martin, St. Barts, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Malachra fasciata Jacq.
Description: Herb or subshrub; 0.5-2m tall.
Distribution: Mexico, West Indies, Central and South America, and adventively in parts of the Old World
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, Martinique, St. Lucia, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Malvastrum americanum (L.) Torr.
Description: Herb, subshrub or shrub; 0.5-1.5m tall.
Distribution: Southern US, West Indies, Mexico, Central and South America, Australia, India, and elsewhere in the Old World.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Ba
Biogeography: Wider Distribution
Plant Category: Di

Malvastrum coromandelianum (L.) Garcke
Common Name(s): Soap bush, broomweed.
Description: Subshrub or sometimes annual herb.
Distribution: Pantropical weed.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Eustatius, Guadeloupe, La Desirade, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Ochroma pyramidale (Cav. ex Lam.) Urb.
Common Name(s): Pripri, balsa.
Description: Tree; to 15m tall or more.
Distribution: Southern Mexico to Bolivia, Greater Antilles.
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Pavonia spinifex (L.) Cav.
Description: Subshrub; to 1 m tall.
Distribution: Southeastern United States and the West Indies.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Quararibea turbinata (Sw.) Poir.
Common Name(s): Swizzlestick tree, swizzlestick wood, millerwood.
Description: Tree; 10-15m tall.
Key ID Feature: the dry foliage has a strong "curry" odour
Distribution: Hispaniola
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Restricted Range
Plant Category: Di

Sida acuta Burm. f.
Common Name(s): Wire weed, sweet broom, broomweed.
Description: Erect shrub or sub-shrub; 1 m tall.
Distribution: Pantropical, often weedy.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Sida ciliaris L.
Description: Decumbent perennial herb.

Key ID Feature: freely branching; stems with appressed stellate hairs, hairs usually 4-armed.
Distribution: From the southern US to Argentina
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Martinique, St. Lucia, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Sida cordifolia L.
Description: Erect shrub or subshrub; to 1.5m tall.
Key ID Feature: stellate, tomentose throughout.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Kitts, Redonda, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Sida glabra Mill.
Description: Weak-stemmed herb or subshrub; to 2m tall.
Key ID Feature: erect or often reclining or scandent; stem viscid.
Distribution: Mexico, West Indies, Central America, and northern South America; locally introduced in parts of southeast Asia.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Redonda, Guadeloupe, Dominica, Martinique, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Sida glomerata Cav.
Description: Sub-shrub; 0.5-1m tall.
Distribution: West Indies and Central America, South America
Lesser Antilles Distribution: Montserrat, St. Barts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines.
Biogeography: Wider Distribution
Plant Category: Di

Sida rhombifolia L.
Description: Erect sub-shrub; to 1m tall with ascending branches.
Notes: *listed in Howard Mrat Species list but not listed as occurring in Mrat according to Howard's Flora
Distribution: Pantropical, extending into temperate zones, a common weed.
Lesser Antilles Distribution: Montserrat*Malvaceae Sida glabra, St. Martin, Barbuda, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Sida salviifolia C. Presl
Description: Sub-shrub; to 0.5-1m tall.
Distribution: Mexico, West Indies, Venezuela, Columbia.
Lesser Antilles Distribution: Montserrat, St. Barts.
Biogeography: Wider Distribution
Plant Category: Di

Sidastrum multiflorum (Jacq.) Fryxell
Description: Sub-shrub or shrub; to 1.5m tall.
Distribution: West Indies and Venezuela to northern Agentina.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Kitts, Guadeloupe.
Biogeography: Wider Distribution
Plant Category: Di

Thespesia populnea (L.) Sol. ex Corrˆa
Common Name(s): Cork tree, Spanish cork, bendy tree, seaside mahoe, John bull tree, head-ache tree.
Description: Large shrub or small tree; 3-7 m tall.
Distribution: Pantropical in littoral habitats, often planted elsewhere as an ornamental shade tree.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Urena lobata L.
Description: Shrub; to 2m tall.
Distribution: Nearly pantropical and often weedy, occasionally as an adventive in temperate regions.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Wercklea tulipiflora (Hook.) Fryxell
Description: Tree; 3-10m tall.
Notes: Possibly the large pale-yellow flowered Malvaceae shrub sited but not collected by the UKOts team near summit of Katy Hill in Feb 06
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Lesser Antilles
Plant Category: Di

MARANTACEAE

Maranta arundinacea L.
Description: Perennial herb; 0.5-1.5m tall.
Distribution: Probably native to South America and cultivated or escaped in the Neotropics.
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

Maranta arundinaceae L.

Common Name(s): Arrowroot.
Description: Perennial herb.
Cultivated: food plant
Distribution: Probably native to South America, and cultivated or escaped in Central America, the Greater Antilles and South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada
Biogeography: Introduced
Plant Category: Mo

MARCGRAVIACEAE

Marcgravia umbellata L.
Description: Sprawling hemiepiphytic liana.
Distribution: Restricted to moist, montane regions in the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

MELASTOMATACEAE

Blakea pulverulenta Vahl
Description: Shrub or small tree or massive epiphyte.
Distribution: Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Charianthus nodosus (Desr.) Triana
Description: Shrub; to 2m tall.
Notes: *listed in Howard Mrat Species list but not listed as occurring in Mrat according to Howard's Flora
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat*, Martinique.
Biogeography: Lesser Antilles
Plant Category: C-Di-Nat

Charianthus purpureus D. Don
Common Name(s): Wassard.
Description: Shrub; 1-10 m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St Kitts, Nevis, Guadeloupe, Dominica, Martinique, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Clidemia hirta (L.) D. Don
Description: Shrub 1-1.5m tall.
Distribution: Greater Antilles, Central and South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Clidemia umbrosa (Sw.) Cogn.
Common Name(s): Wild hogwood.
Description: Shrub; to 5m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent.
Biogeography: Lesser Antilles
Plant Category: Di

Conostegia icosandra (Sw. ex Wikstr.) Urb.
Description: Shrub or small tree; to 10m tall.
Distribution: Cuba, Haiti, Jamaica, Trinidad, Central America, Columbia, Brazil
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Conostegia montana (Sw.) D. Don ex DC.
Description: Shrub or tree; 3-8m tall.
Distribution: Cuba, Hispaniola, Jamaica, Costa Rica.
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Henriettea lateriflora (Vahl) R.A. Howard & E.A. Kellog
Description: Shrub or small tree; 8m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. lucia.
Biogeography: Lesser Antilles
Plant Category: Di

Miconia coriacea (Sw.) DC.
Description: Shrub or small tree; to 4m tall.
Notes: *listed in Howard Mrat Species list but not listed as occurring in Mrat according to Howard's Flora
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica.
Biogeography: Lesser Antilles
Plant Category: C-Di-Nat

Miconia cornifolia (Desr.) Naudin
Description: Shrub or small tree; to 8m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St Vincent, Grenada, Barbados.
Biogeography: Lesser Antilles
Plant Category: Di

Miconia globuliflora (Rich.) Cogn. var. *dominicae* R.A.Howard & E.A.Kellogg
Description: Shrub or small tree; to 6m tall.

Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St Kitts, Nevis, Dominica.
Biogeography: Lesser Antilles
Plant Category: Di

Miconia globuliflora (Rich.) Cogn. var. *globuliflora*
Description: Shrub; to 5m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Martinique, St. Lucia.
Biogeography: Lesser Antilles
Plant Category: Di

Miconia impetiolaris (Sw.) D. Don ex DC.
Description: Shrubs to small trees; to 8(-10)m tall.
Distribution: Central and South America, West Indies
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe, Dominica.
Biogeography: Wider Distribution
Plant Category: Di

Miconia mirabilis (Aubl.) L.O. Williams
Description: Small weedy tree; to 14m.
Distribution: West Indies and northern S America.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Miconia prasina (Sw.) DC.
Description: Shrub or small tree; to 10m.
Notes: *listed in Howard Mrat Species list but not listed as occurring in Mrat according to Howard's Flora
Distribution: Mexico and Central America, Greater Antilles, Trinidad, South America
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Martinique, St. Vincent, Genada
Biogeography: Wider Distribution
Plant Category: Di

Miconia striata (M. Vahl) Cogn.
Description: Shrub or small tree; to 5m.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Lesser Antilles
Plant Category: Di

Nepsera aquatica Naudin
Description: Weak herb; to 1m tall.
Distribution: Central America, Greater Antilles, Trinadad, northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Tetrazygia angustifolia (Sw.) DC.
Common Name(s): Broom wood.
Description: Shrub or small tree; to 6m tall.
Distribution: Jamaica, Puerto Rico, Virgin Islands.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Caribbean
Plant Category: Di

Tetrazygia discolor (L.) DC.
Common Name(s): ashes wood, hogwood
Description: Shrub or tree; to 10m tall.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Tibouchina ornata (Sw.) Baill.
Description: Low woody herb; to 30cm tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St Kitts, Guadeloupe.
Biogeography: Lesser Antilles
Plant Category: Di

MELIACEAE

Azadirachta indica A. Juss.
Common Name(s): Nim, nime, neem.
Description: Tree; to 20m tall.
Cultivated: shade tree, ornamental, ornamental,
Notes: considered invasive in some regions according to Barwick, M, (2004); introduced to Antigua in 1955 and spreading rapidly according to C. Pratt
Invasiveness: Naturalised and spreading
Distribution: Native of indo-Malaya but widely introduced and cultivated
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, St. Kitts, Guadeloupe
Biogeography: Introduced
Plant Category: Di

Cedrela odorata L.
Local Name(s): Stinking cedar (Mr
Common Name(s): Red ceder, West Indian cedar, cigar-box wood, Spanish cedar.
Life Form: Tree; to 40m ta
Description: Leaves pinnate, deep green; flowers greenish-white, held in erect panicles; fruit a capsule, to 4cm, woody, dehiscent, held in branched panicles; seeds winged.
Key ID Feature: Capsules become woody before they open to form a star-shape through which they expell their seeds. All parts of plant smell strongly of garlic when freshly cut (repellent to insects).
Uses: Large shade tree; timber tree; wood used for lining cigar boxes and the interiors of closets as it impar
Notes: Collected under local name "stinking cedar" in

Montserrat by UKOTs team; local name matched to species in UK.
Distribution: Mexico, Central America, Greater Antilles, Trinidad, South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, Guadeloupe, Dominica, St. Lucia, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Guarea glabra Vahl
Description: Tree; to 10m tall.
Distribution: Mexico, Central America, Jamaica, Puerto Rico
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Domimica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Guarea macrophylla Vahl
Description: Tree; to 20m tall.
Distribution: South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Melia azedarach L.
Local Name(s): Lilac
Common Name(s): Soap berry, China berry, Barbados lilac, West Indian lilac, syringa.
Description: Tree; to 15m tall.
Distribution: Native of Palaeotropics but widely cultivated, persisting or escaped in Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados
Biogeography: Introduced
Plant Category: Di

Swietenia macrophylla King & Urb.
Common Name(s): Central American mahogany, Honduras mahogany.
Description: Tree; to 20m tall.
Invasiveness: Naturalized
Distribution: Mexico, Central America, South America
Lesser Antilles Distribution: Montserrat (planted for timber), Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Swietenia mahogoni (L.) Jacq.
Common Name(s): Mahogany, West Indian mahogany.
Description: Deciduous tree; to 10m tall.
Distribution: southern Florida, Bahamas, Greater Antilles, Trinidad
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

MELIOSMACEAE

Meliosma herbertii Rolfe
Description: Evergreen tree; to 25m tall.
Distribution: Puerto Rico, Hispaniola, Lesser Antiles, northern Venezuela.
Lesser Antilles Distribution:
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

MENISPERMACEAE

Cissampelos pareira L.
Common Name(s): Velvet leaf.
Description: Slender vines; to 5m long.
Distribution: Worldwide in tropical areas.
Lesser Antilles Distribution: Montserrat, Antigua, St. Martin, Saba, St. Eustatius, Guadeloupe, Marie Galante, Martinique, Dominica, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Hyperbaena domingensis (DC.) Benth.
Description: Stout climbing shrub or vine; to 10m tall.
Distribution: Greater Antilles, Trinidad, Tobago, northern South America, Guianas to Bolivia
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Euststius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Tinospora crispa (L.) Hook. F. & Thomson
Description: Woody climber; to 15m tall.
Distribution: China, Thailand, the Philippines to Java
Lesser Antilles Distribution: Montserrat, at ruins of Sturges Cottage in Olveston area of Central Hills
Biogeography: Introduced
Plant Category: Di

MORACEAE

Artocarpus altilis (Parkinson) Fosberg
Description: Large tree; to 25m tall.
Distribution: Native of the Pacific tropics and now widely cultivated in tropical areas
Lesser Antilles Distribution: Probably found throughout the Lesser Antilles but poorly represented in herbaria. Montserrat, Marie Galante, St. Lucia
Biogeography: Introduced
Plant Category: Di

Castilla elastica Sess, ex Cerv.
Description: Often a large tree.
Notes: Introduced as a source of rubber but no longer tapped for latex
Distribution: Mexico, Central and South America
Lesser Antilles Distribution: Persisting after cultivation or escaped. Montserrat, Guadeloupe, St. Lucia
Biogeography: Introduced
Plant Category: Di

Ficus americana Aubl.
Description: Tree; to 12m tall.
Key ID Feature: stems often lacking milky latex
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Austatius, St. Kitts, Nevis, Guadeloupe, Dominica, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Ficus bengalensis L.
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Ficus carica L.
Description: Much branched shrub or small tree; to 3m tall.
Distribution: Native to tropical Asia but cultivated in tropical and subtropical areas
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, Barbados
Biogeography: Introduced
Plant Category: Di

Ficus citrifolia Mill.
Description: Tree; to 16m tall.
Key ID Feature: Fruit borne among leaves, generally paired, globose or depressed globose, red to yellow or yellow with red spots.
Distribution: Florida, Greater and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Ficus elastica Roxb. Ex Hornem.
Description: Tree to 12m or more tall.
Distribution: Native of tropical Asia; introduced and cultivated elsewhere
Lesser Antilles Distribution: Montserrat, Anguilla, St. Kitts, Guadeloupe, St. Lucia, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Ficus insipida Willd.
Description: Large buttressed tree; to 30m tall.
Distribution: Central and South America
Lesser Antilles Distribution: Montserrat, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Ficus microcarpa L.
Description: Large tree; to 30m tall.
Distribution: Native of tropical Asia, now grown in many tropical areas.
Lesser Antilles Distribution: Montserrat, St. Kitts, St. Lucia, Barbados
Biogeography: Introduced
Plant Category: Di

Ficus nymphaeifolia Mill.
Description: Tree; to 12m tall.
Distribution: Central and South America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Ficus pumila L.
Description: Climbing plant; juvenile branches adpressed to walls and climbing by clusters of adventitious roots.
Distribution: Native of China or Japan and cultivated in many tropical areas
Lesser Antilles Distribution: Montserrat, St. Martin, St. Kitts, Guadeloupe, Barbados
Biogeography: Introduced
Plant Category: Di

Ficus trigonata L.
Description: Tree; to 12m tall.
Distribution: Central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Estatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

MORINGACEAE

Moringa oleifera Lam.
Common Name(s): Horseradish tree, maloko.
Description: Tree; to 9m tall.
Distribution: Probably native to northern India and Pakistan but introduced into Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincentm the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

MUSACEAE

Musa acuminata Colla
Cultivated: food plant
Distribution: ?
Lesser Antilles Distribution: Montserrat including Lesser Antiles
Biogeography: Introduced
Plant Category: C-Mo-Intro

MYOPORACEAE

Bontia daphnoides L.
Common Name(s): Wild olive.
Description: Shrub or tree; to 4m tall.
Distribution: Bahamas, Greater Antilles, Coastal Venezuela and adjacent islands
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Barbuda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

MYRISTICACEAE

Myristica fragrans Houtt.
Common Name(s): Nutmeg (The aril is called mace).
Description: Tree; to 18m tall.
Distribution: Native of the Moluccas and cultivated or naturalised in many areas in tropical America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Introduced
Plant Category: Di

MYRSINACEAE

Ardisia obovata Ham.
Description: Tree; to 6m tall.
Distribution: Bahamas, Puerto Rico, Virgin Islands.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, Barbados.
Biogeography: Caribbean
Plant Category: Di

Myrsine coriacea (Sw.) R. Br. ex Roem. & Schult.
Description: Tree; to 12m tall.
Distribution: Greater Antilles, Mexico, Central America, Trinidad, east coast of South America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

MYRTACEAE

Eugenia ligustrina (Sw.) Willd.
Common Name(s): Black cherry, blackberry.
Description: Shrub or small tree; 2-7m tall.
Distribution: Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Trinidad, Tobago, noertheastern Venezuela, Surinam, reported from southeastern Brazil
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Barbados.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Eugenia monticola (Sw.) DC.
Description: Shrub or small tree; to 8-10m tall.
Distribution: Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Trinidad and Tobago, northern Venezuela and Columbia, and the Guianas
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Eugenia pseudopsidium Jacq.
Description: Shrub or tree; to 15-20m tall.
Notes: *listed in Howard Mrat Species list but not listed as occurring in Mrat according to Howard's Flora
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Di

Eugenia uniflora L.
Common Name(s): Surinam cherry.
Description: Shrub or small tree; to 9m tall.
Distribution: Native to eastern Brazil, now cultivated and escaped in most tropical and subtropical regions.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Gomidesia lindeniana O. Berg
Description: Tall shrub or tree; to 10m tall.
Distribution: Cuba, Hispaniola, Jamaica, Puerto Rico, southeastern Brazil (Minas Geraes).
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Myrcia citrifolia (Aubl.) Urb. var. *imrayana* (Griseb.) Stehl, & Quen
Common Name(s): Birch, red birch, guava berry.
Description: Shrub or small tree 6-8 m tall.
Distribution: Puerto Rico, virgin Islands and the Lesser

Antilles.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Di

Myrcia fallax (Rich.) DC.
Description: Tree; 10-12m tall.
Distribution: Puerto Rico, Trinidad and Tobago, Panama, South America as far south as Peru and eastern Brazil
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Myrcia splendens (Sw.) DC.
Common Name(s): Birch.
Description: Shrub or tree; 10-12m tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Myrcianthes fragrans (Sw.) McVaugh
Description: Shrub or small tree; to 15m tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Kitts, Guadeloupe, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Pimenta racemosa (Mill.) J.W. Moore
Common Name(s): Cinnamon, bay leaf, bay rum tree, bay tree, Christmas tree, bayberry tree.
Description: Tree; 12-13m tall.
Distribution: Cuba, Pueto Rico, Virgin Islands, Trinidad, Surinam.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Psidium cattleianum Sabine
Local Name(s): strawberry guava
Description: Shrub or small tree.
Invasiveness: Naturalised
Distribution: Probably native to southeastern Brazil, cultivated theoughout the tropics and often established
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Martinique.
Biogeography: Introduced
Plant Category: Di

Psidium guajava L.
Local Name(s): guava
Common Name(s): Guava, white guava.
Description: Shrub or tree; to 10m tall.
Invasiveness: Naturalised and spreading
Distribution: Native of Neotropics, cultivated and naturalized in both Neo- and Palaeotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Introduced
Plant Category: Di

NYCTAGINACEAE

Boerhavia coccinea Mill.
Common Name(s): Hogweed.
Description: Perennial herb; to 2m tall.
Distribution: Pantropical.
Lesser Antilles Distribution: Montserrat, St Martin, Barbuda, Antigua, Saba, St Eustatius, St. Kitts, Guadaloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Boerhavia diffusa L.
Description: Perennial herb; to 2m tall.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, Anguilla, Saba, Dominica, St. Lucia, St. Vincent, The Grenadines, Grenada,
Biogeography: Wider Distribution
Plant Category: Di

Boerhavia erecta L.
Common Name(s): Hogweed, Patagon.
Description: Annual weed; to 8dm tall.
Distribution: Neotropics, Southern US, Mexico, Central America, South America, West Indies, West Africa, Malaya.
Lesser Antilles Distribution: Montserrat, St Martin, St Barts, Antigua, Saba, St Eustatius, St Kitts, Guadaloupe, Dominica, Martinique, St. Lucia, The Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Boerhavia scandens L.
Description: Sprawling weed; often scrambling over shrubs; to 2m tall.
Notes: Syn of Commicarpus scandens
Distribution: Texas to Arizona, Mexico, Central and South America, West Indies.
Lesser Antilles Distribution: Montserrat, Anguilla, St Martin, St Barts, Antigua, St Eustatius, St. Kitts
Biogeography: Wider Distribution
Plant Category: Di

Bougainvillea glabra Choisy
Description: High climbing vine.
Distribution: Native to South America; widely cultivated throughout the tropics.
Lesser Antilles Distribution: Montserrat, St Martin, Antigua, Martinique, St. Lucia, St Vincent, Barbados
Biogeography: Introduced
Plant Category: Di

Mirabilis jalapa L.
Common Name(s): Four o' clock.
Description: Weedy herb; to 1m tall.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, Antigua,Saba, St Eustatius, Guadaloupe, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Pisonia aculeata L.
Common Name(s): Blackthorn.
Description: Scrambling shrub or vine.
Distribution: New world tropics and subtropics, southern Asia, Pacific islands.
Lesser Antilles Distribution: Montserrat, St. Martins, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent, the Grenadines, grenada, barbados
Biogeography: Wider Distribution
Plant Category: Di

Pisonia fragrans Dum. Cours.
Common Name(s): Black loblolly, beef wood
Description: Tree or shrub; to 8 (15)m tall.
Notes: *common name given in Mrat: "black loblolly"
Distribution: Greater Antilles, Curacao, Bonaire, Trinidad, Tobago, northern South America.
Lesser Antilles Distribution: Montserrat*, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: C-Di-Nat

Pisonia subcordata Sw.
Common Name(s): Loblolly.
Description: Tree; to 10m tall.
Distribution: Puerto Rico, Virgin Islands, Lesser Antilles
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Marie Galante, Martinique
Biogeography: Caribbean
Plant Category: Di

NYMPHAEACEAE

Nymphaea ampla (Salisb.) DC.
Common Name(s): White water lily.
Description: Aquatic perennial; leaves floating or emergent.
Distribution: Ranging from southern Texas through Central and South America to southern Brazil, including peru and Equador, and widespread in the West Indies
Lesser Antilles Distribution: Montserrat, Antigua, Barbuda, St. Eustatius, Nevis, Guadeloupe, Marie Galante, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

OCHNACEAE

Ouratea guildingii (Planch.) Urb.
Description: Shrub or small tree; to 4(-10?)m tall.
Distribution: Panama(?), Trinidad, Tobago and Venezuela(?).
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Martinique, St. Lucia, St. Vincent.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Sauvagesia erecta L.
Description: Herb to 7dm tall.
Distribution: Neotropics, Central Africa, Madagascar
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

OLACACEAE

Schoepfia schreberi J.F. Gmel.
Description: Shrub or tree; to 8m tall.
Distribution: Florida, Bahamas, Greater Antilles,
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominca, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

OLEACEAE

Chionanthus compacta Sw.
Common Name(s): Wild olive, white ironwood, buckbill, mountin parry.
Description: Tree or occasionally shrub; 5-12m tall.
Distribution: Hispaniola, Puerto Rico, Virgin Islands, Trinidad, Venezuela, Columbia
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Jasminum grandiflorum L.
Description: Climbing or speading shrub; to 5m tall.

Distribution: Native to Arabia but widely cultivated in the tropics
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, Martinique, St. Lucia
Biogeography: Introduced
Plant Category: Di

Jasminum laurifolium Roxb. Ex Hornem. f. *nitidum* (Skan) P.S.Green
Description: Freely branching shrub; to 1m tall.
Distribution: Native to Asia but widely cultivated in the tropics
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Vincent
Biogeography: Introduced
Plant Category: Di

Jasminum multiflorum (Burm. f.) Andrews
Description: Shrub; to 2m tall.
Distribution: Native to Asia but widely cultivated in the tropics
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

OLEANDRACEAE

Nephrolepis multiflora (Roxb.) F.M. Jarrett ex C.V. Mor
Description: Terrestrial fern; fronds 15-120cm.
Invasiveness: Naturalised and spreading
Distribution: India; naturalised in widely scattered troopical areas, including southern Florida, the Bahamas, and the Greater Antilles
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Introduced
Plant Category: Pter

Oleandra nodosa (Willd.) C. Presl
Description: Epiphytic fern; fronds 20-80cm long.
Distribution: Greater Antilles, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

ONAGRACEAE

Ludwigia erecta (L.) H. Hara
Description: Herb; to 3m tall.
Distribution: Neotropics, introduced into the Old World in tropical africa, Madagascar, and the Seychelle and Mascarene Islands.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Ludwigia octavalvis (Jacq.) Raven
Description: Herb, often shrub-like; to 1.5m tall.
Distribution: Pantropical.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

OPHIOGLOSSACEAE

Ophioglossum palmatum L.
Description: Fern; fronds to 50cm long.
Distribution: Widespread in the Neotropics from Florida and Mexico to Peru and Brazil; also found on islands of the Indian Ocean and in southeast Asia
Lesser Antilles Distribution: Montserrat, Guadleoupe
Biogeography: Wider Distribution
Plant Category: Pter

Ophioglossum reticulatum L.
Description: Fern; 15-25cm.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, Saba, Guadeloupe, Dominca, Martinique, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

ORCHIDACEAE

Bletia sp. Ruiz & Pav.
Description: Terrestrial orchid; to 70cm tall.
Notes: Of the genus, B. patula most likely to occur in Mrat according Nir, M (2000)
Distribution: Greater Antilles
Lesser Antilles Distribution:
Biogeography: Caribbean
Plant Category: Mo

Brachionidium sheringii Rolfe
Description: Small orchid; to 4cm tall
Distribution: Puerto Rico, Hispaniola, Cuba, Jamaica
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia and Grenada.
Biogeography: Caribbean
Plant Category: Mo

Brassavola cucullata (L.) R. Br.
Description: Epiphytic orchid; to 50cm tall.
Distribution: Central America, Venezuela, Trinidad, Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Martin, Saba, St. Eustatius, Antigua, Guadeloupe, Maria-Galante, Dominica, St. Vicent, Bequia, Mustique, Ronde,

La Desirade, Canuoan, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Cranichis muscosa Sw.
Description: Terrestrial orchid; variable in size and appearance; to 50cm tall.
Distribution: Florida, Central America, South America, Trinidad, Tobago, Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vicent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Cyclopogon bicolor (Ker Gawl.) Schltr.
Description: Terrestrial orchid; to 80cm tall.
Distribution: Hispaniola, Puerto Rico, Jamaica, South America* (*Occurance non-verified according to Nir (2000)
Lesser Antilles Distribution: Montserrat* (*Occurance non-verified according to Nir (2000))
Biogeography: Wider Distribution
Plant Category: Mo

Cyclopogon elatus (Sw.) Schltr.
Description: Terrestrial orchid; to 60 cm tall.
Notes: Syn. Spiranthes elatus (Sw.) L.C. Rich
Distribution: St. Croix, St. Thomas, Tortola, The Bahamas, Cayman Islands, Jamaica, Hispaniola, Puerto Rico, Cuba, Florida, Mexico, Central America and Venezuela.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Bart, St. Eustatius, Antigua, Guadeloupe, Dominca, Martinique, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Epidendrum ciliare L.
Description: Epiphytic or lithophytic orchid.
Distribution: Tropical America.
Lesser Antilles Distribution: St. Martin, St. Barts, Saba, St. Eustatius, Nevis, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vicent, Bequia, Barbados, Canuoan, Grenada, Union
Biogeography: Wider Distribution
Plant Category: Mo

Epidendrum difforme Jacq.
Description: Epiphytic orchid; very variable in size; to 40 cm tall, commonly much smaller.
Lesser Antilles Distribution: Montserrat, St. Kitts, Dominica, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Mo

Epidendrum montserratense Nir
Description: Epiphytic or lithophytic orchid.
Conservation Measures: Ex-Situ: -MNTBG: plant rescues ongoing from mango trees killed by volcanic activity. -Seed collection made May 2006 stored at MSB.
Distribution: Endemic to Montserrat.
Lesser Antilles Distribution: Montserrat
Biogeography: Montserrat
Plant Category: Mo

Epidendrum pallidiflorum Hook.
Description: Epiphytic orchid; to 40cm tall.
Distribution: No occurance outside lesser Antilles according to Nir (2000), misidentifications of the "Pallidiflorum alliance" has generated incorrect distribution data in older publicat
Lesser Antilles Distribution: Montserrat, Dominica, St. Vincent, Grenada, Nevis, Martinique, Guadeloupe
Biogeography: Lesser Antilles
Plant Category: Mo

Epidendrum strobiliferum Rchb. F.
Description: Epiphytic orchid; to 30cm tall.
Distribution: Hispaniola, Cuba, Jamaica, Florida, Mexico, Central America, South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Vicent, Grenada, Saba
Biogeography: Wider Distribution
Plant Category: Mo

Epidendrum umbellatum Sw.
Description: Epiphytic orchid; to 40cm tall.
Notes: Syn. Neolehmannia difformis, Epidendrum panegyricum
Distribution: Puerto Rico, Hispaniola, Cuba, Jamaica, Mexico, Central America, South America
Lesser Antilles Distribution: Montserrat, St, Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Erythrodes hirtella (Sw.) Fawc. & Rendle
Description: Terrestrial orchid; to 45cm tall.
Distribution: Trinidad, Puerto Rico, Virgin Islands, Hispaniola, Cuba, Jamaica
Lesser Antilles Distribution: Montserrat, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Mo

Erythrodes plantaginea (L.) Fawc. & Rendle
Description: Terrestrial orchid; to 65cm tall.
Distribution: Puerto Rico, Hispaniola, Cuba, Jamaica, Trinidad
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vicent, Grenada
Biogeography: Caribbean
Plant Category: Mo

Eulophia alta (L.) Fawc. & Rendle
Description: Terrestrial orchid; to 1.5m tall.
Distribution: Bahamas, Puerto Rico, Virgin Islands, Hispaniola, Cuba, Jamaica, Florida, Mexico, Central Amer-

ica, South America
Lesser Antilles Distribution: Montserrat, Antiqua, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Ionopsis utricularioides (Sw.) Lindl.
Description: Epiphytic orchid; to 60 cm tall.
Distribution: Puerto Rico, Hispaniola, Cuba, Jamaica, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Mo

Isochilus linearis (Jacq.) R. Br.
Description: Epiphytic or lithophytic orchid; to 75cm tall.
Distribution: Puerto Rico, Hispaniola, Cuba, Jamaica, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Mo

Jacquiniella globosa (Jacq.) Schltr.
Description: Small epiphyte orchid; to 15cm tall.
Distribution: Puerto Rico, Hispaniola, Cuba, Jamaica, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vicent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Malaxis massonii (Ridl.) Kuntze
Description: Terrestrial orchid; to 40cm tall.
Distribution: Puerto Rico, Hispaniola, South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique
Biogeography: Wider Distribution
Plant Category: Mo

Malaxis umbelliflora Sw.
Life Form: Terrestrial orchid
Description: Herb to 45cm tall.
Notes: Accurring in Montserrat according to Literature (via Philippe Feldman- Guadeloupe checklist)
Distribution: Cuba and Jamaica.
Lesser Antilles Distribution: St. Kits, Guadeloupe, Dominica, St. Vincent.
Biogeography: Caribbeanaribbean
Plant Category: C-Mo-Nat

Maxillaria coccinea (Jacq.) L.O.Wms. ex Hodge
Life Form: Epiphytic orchid
Description: Robust epiphyte to 50cm tall.
Notes: Occurence in Montserrat likely but distribution to be confirmed according to Philippe Feldman- Guadeloupe checklist.
Distribution: Puerto Rico, Hispaniola.
Lesser Antilles Distribution: Montserrat*, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Caribbeanaribbean
Plant Category: C-Mo-Nat

Octomeria graminifolia (L.) R. Br.
Description: Small epiphytic orchid; to 17cm tall.
Distribution: Trinidad, Central and South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Mo

Oeceoclades maculata (Lindl.) Lindl.
Description: Terrestrial orchid; to 60cm tall.
Distribution: Very common and widespread. Native to tropical Africa but naturalized in Florida, Bahamas, Puerto Rico, Virgin Islands, Hispaniola, Cuba, Navassa, Cayman Islands, Jamaica P
Lesser Antilles Distribution: Guadeloupe, Martinique
Biogeography: Introduced
Plant Category: Mo

Oncidium altissimum (Jacq.) Sw.
Description: Robust Epiphytic orchid; to 2m tall.
Distribution: Puerto Rico, Virgin Islands according to Nir (2000). Central America, northern South America, Florida, Greater Antilles according to Garray & Herman (1974).
Lesser Antilles Distribution: Montserrat, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Guadeloupe
Biogeography: Wider Distribution
Plant Category: Mo

Oncidium urophyllum Lodd. ex Lindl.
Description: Epiphytic orchid; to 70cm tall.
Lesser Antilles Distribution: Montserrat, St Martin, Saba, St. Barthelemy, St. Eustatius, St. Kitts,Barbuda, Nevis, Antigua, Gaudeloup, La Desiderade, Les Saintes, Marie Galante, Dominica.
Biogeography: Wider Distribution
Plant Category: Mo

Pleurothallis aristata Hook.
Life Form: Epiphytic orchid
Description: Small epiphyte to 8cm tall.
Notes: Occurence in Montserrat likely but distribution to be confirmed according to Philippe Feldman- Guadeloupe checklist.
Distribution: Central America, South America, Puerto Rico, Hispaniola.
Lesser Antilles Distribution: Montserrat*, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Wider Dist
Plant Category: C-Mo-Nat

Pleurothallis ruscifolia (Jacq.) R. Br., Aiton, Hort. Kew.

ed.2, 5:211,1813. (0)
Life Form: Epiphytic/lithophytic orchid
Description: To 30 cm tall.
Notes: Occurence in Montserrat likely but distribution to be confirmed according to Philippe Feldman- Guadeloupe checklist.
Distribution: Central and South America, Puerto Rico, Hispaniola, Cuba, Jamaica.
Lesser Antilles Distribution: Montserrat*, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Dist
Plant Category: C-Mo-Nat

Polystachya concreta (Jacq.) Garay & Sweet
Description: Erect epiphytic or lithophytic orchid; very variable in size; to 45cm tall.
Key ID Feature: Leaves to approx. 35cm long. Column foot prominent. Lateral lobes of lip broadly curved
Distribution: Bahamas, Puerto Rico, Virgin Islands, Hispaniola, Cuba, Florida, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat* (*Occurance unknown according to Nir (2000)), St. Eustatius, Cayman Islands, St. Kitts, Jamaica, Guadeloupe, Les Saintes, Desidirade, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Polystachya foliosa (Hook.) Rchb.
Description: Erect epiphyte or lithophyte orchid; to 18cm tall.
Key ID Feature: Very similar to P. concreta. Leaves to approx. 15cm long. Column foot very short. Lateral lobes of lip triangular-curved
Distribution: American tropics.
Lesser Antilles Distribution: Grenada.
Biogeography: Wider Distribution
Plant Category: Mo

Prescottia stachyodes (Sw.) Lindl.
Description: Terrestrial herb; very variable in size; up to 1m tall.
Distribution: Puerto Rico, Virgin Islands, Hispaniola, Cuba, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, St. Eustatius.Barbuda, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Psilochilus macrophyllus (Lindl.) Ames, Orch. 7:45,1922. (0)
Life Form: Terrestrial orchid
Description: Robust plants to 40cm tall.
Notes: Occurence in Montserrat likely but distribution to be confirmed according to Philippe Feldman-Guadeloupe checklist.
Distribution: Central and South America, Puerto Rico, Hispaniola, Cuba, Jamaica.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Dist
Plant Category: C-Mo-Nat

Psychilis kraenzlinii (Bello) Sauleda, Phytologia 65:15,1988. (0)
Life Form: Epiphytic/lithophytic orchid
Description: To 1.4m tall.
Notes: Accurring in Montserrat according to Literature (via Philippe Feldman- Guadeloupe checklist)
Distribution: Puerto Rico
Lesser Antilles Distribution: Montserrat*
Biogeography: Restricted
Plant Category: C-Mo-Nat

Spathoglottis plicata Blume
Description: Terrestrial orchid; to 1.2m tall.
Invasiveness: Invasive.
Distribution: An Asian species naturalised on several islands including Peurto Rico and the Virgin Islands and spreading to others
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent.
Biogeography: Introduced
Plant Category: Mo

Stenorrhynchos lanceolatum (Aubl.) L.C. Rich. ex Spreng., Syst. Veg. 3:710,1826. (0), Listed as Spiranthes lanceolata in Philippe Feldman's checklist
Nomenclature Notes: Listed as Spiranthes lanceolata in Philippe Feldman's checklist
Life Form: Terrestrial orchid
Description: Erect herb to 45cm tall.
Notes: Occurence in Montserrat likely but distribution to be confirmed according to Philippe Feldman-Guadeloupe checklist.
Distribution: Florida, Mexico, Central and South America, Bahamas, Puerto Rico, Virgin Islands, Hispaniola, Cuba.
Lesser Antilles Distribution: Montserrat*, St. Martin, St. Barts, St. Esutatius, Barbuda, Jamaica, Antigua, Guadeloupe, Dominica, Martinique, Barbados, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Dist
Plant Category: C-Mo-Nat

Tetramicra canaliculata (Aubl.) Urb.
Description: Epiphytic orchid; to 60cm tall.
Distribution: Florida and Greater Antilles (according to Garay & Sweet (1974)), just Hispaniola (according to Nir (2000)
Lesser Antilles Distribution: St. Barts, St. Eustatius, Barbuda, Antigua, Guadeloupe, Martinique, La Desirada, Barbados (according to Garay & Sweet (1974)), No occrance in Lesser Antilles according to Nir (200).
Biogeography: Restricted Range
Plant Category: Mo

Triphora surinamensis (Lindl.) Britton, Sci. Surv. Porto Rico & V.1,5:184,1924. (0)
Life Form: Terrestrial orchid
Description: Delicate herb to 35cm tall.
Notes: Occurence in Montserrat likely but distribution to be confirmed according to Philippe Feldman-Guadeloupe checklist.
Distribution: South America, Puerto Rico, Hispaniola, Jamaica, Trinidad.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica, Martinique, St. Lucia.
Biogeography: Wider Dist
Plant Category: C-Mo-Nat

Vanilla planifolia G. J. Andrews, Bot. Repos. 8:t.538,1808. (0)
Life Form: Epiphytic orchid
Description: Scandent herb, climbing to 6m and longer.
Notes: Occurence in Montserrat likely but distribution to be confirmed according to Philippe Feldman-Guadeloupe checklist.
Distribution: Puerto Rico, Virgin Islands, Hispaniola, Cuba, Jamaica, Mexico, Central and South America.
Lesser Antilles Distribution: Montserrat*, Guadeloupe, Dominica, Martinique, Grenada.
Biogeography: Wider Dist
Plant Category: C-Mo-Nat

OXALIDACEAE

Oxalis barrelieri L.
Description: Annual herb.
Distribution: Central America, Hispaniola, Puerto Rico, Trinidad, South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Oxalis corniculata L.
Common Name(s): Sour grass.
Description: Annual.
Distribution: Established worldwide as a weed.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Oxalis debilis Kunth var. *corymbosa* (DC.) Lourteig
Common Name(s): Shrock.
Description: Herb.
Distribution: Neotropical in origin but widely cultivated, persisting or escaping.
Lesser Antilles Distribution: Montserrat, Saba, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

PAPAVERACEAE

Argemone mexicana L.
Common Name(s): Mexican poppy, thistle, yellow thistle.
Description: Herb to 60 cm.
Distribution: Widespread in Neotropics and elsewhere as a weed.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Bocconia frutescens L.
Description: Shrub; to 5m tall.
Distribution: Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

PASSIFLORACEAE

Passiflora edulis Sims
Common Name(s): Passion fruit.
Cultivated: ornamental/food plant
Distribution: Brazil and extending into neighboring coutnries.
Lesser Antilles Distribution: Montserrat, Dominica, Martinique, St. Lucia
Biogeography: Introduced
Plant Category: C-Di-Intro

Passiflora foetida L. var. *hispida* Killip
Common Name(s): Love-in-a-mist, pop-pop.
Description: Liana.
Key ID Feature: easily distinguished by the type, degree, and location of pubescense
Notes: According to the flora there are 3 vars, but only one, P. foetida var hispida, occurs in Montserrat.
Distribution: West Indies (excluding Hispaniola) and northern South America.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Passiflora laurifolia L.
Common Name(s): Water melon, water lemon, wild

passion flower, bell apple.
Description: Liana.
Key ID Feature: very fragrant flowers, leaves simple "laurel" like
Notes: herb specimen collected along Pelican Ghaut and near garbage tip
Distribution: West Indies and northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Passiflora rotundifolia L.
Description: Liana.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Passiflora rubra L.
Common Name(s): Passion flower, snakeberry vine.
Description: Liana.
Distribution: Bahamas through the West Indies to northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Di

Passiflora suberosa L.
Description: Liana.
Distribution: Neotropics, introduced in the Palaeotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

PHYLLANTHACEAE

Phyllanthus acidus (L.) Skeels
Common Name(s): Gooseberry.
Description: Tree; to 10m tall.
Distribution: Native to South America but cultivated in many tropical areas.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Introduced
Plant Category: Di

Phyllanthus amarus Schum. & Thonn.
Description: Annual herb.
Distribution: Circumtropical weed
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, St. Eustatius, Redonda, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Phyllanthus caroliniensis Walter
Description: Herb; to 30cm tall.
Distribution: Temperate North America, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Antigua, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique.
Biogeography: Wider Distribution
Plant Category: Di

Phyllanthus mimosoides Sw.
Description: Shrub; to 5m tall.
Distribution: Trinidad.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique.
Biogeography: Restricted Range
Plant Category: Di

Phyllanthus niruri L.
Description: Herb; to 50cm tall.
Distribution: Subsp niruri is restricted to West Indies, Subsp lathyroides occurs from Mexico into South America.
Lesser Antilles Distribution: Montserrat* (*In Howards original Checklist as occurring in Mrat. However, listed as not occurring in Mrat according to Flora?), Barbuda, Antigua, Guadleoupe, Martinique, Barbados
Biogeography: Caribbean
Plant Category: Di

Phyllanthus stipulatus (Raf.) Webster
Description: Annual herb; to 50cm tall.
Distribution: Widespread in tropical America.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Phyllanthus urinaria L.
Description: Annual herb; to 10cm tall.
Distribution: Native to tropical Asia but a weed throughou the tropics
Lesser Antilles Distribution: Montserrat, Antigua, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Introduced
Plant Category: Di

PHYTOLACCACEAE

Microtea debilis Sw.
Description: Weedy taprooted herb; to 3 dm tall.
Distribution: West Indies, Guatemala south through Central America to Peru and Brazil

Lesser Antilles Distribution: Montserrat,St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Petiveria alliacea L.
Description: Weed; to 2m tall.
Notes: used for fatigue on Dominica
Distribution: Widespread from Florida to Texas, West Indies, Central America, south to Argentina
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Phytolacca rivinoides Kunth
Description: Sprawling weedy shrub or herb; to 2 m tall.
Distribution: Mexico, south to Bolivia and Brazil, West Indies
Lesser Antilles Distribution: Monteserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Rivina humilis L.
Common Name(s): Blood berry, cat's blood, pepper bush, rouge plant.
Description: Herbaceous weed; to 1m tall.
Distribution: Southern US, Central America, South America to Argentina, West Indies
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadiines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Trichostigma octandrum (L.) H. Walter
Description: Woody vine; to 7.5m tall.
Distribution: Southern Florida, West Indies, Mexico south to Central and South America to Argentina
Lesser Antilles Distribution: Montserrat, St. Martin, St, Barts, Barbuda, Anitigua, Saba, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

PIPERACEAE

Lepianthes peltata (L.) Raf.
Description: Soft wooded shrub or herb; to 2m tall.
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Peperomia emarginella (Sw.) A. Dietr.
Description: Epiphytic, creeping herb; stems succulent.
Distribution: Central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat,Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Peperomia magnoliifolia (Jacq.) A. Dietr.
Description: Terrestrial, rarely epihytic herb; with trailing and rooting stems.
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, St. Martin, Saba, St. Austatius, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Peperomia myrtifolia (M. Vahl) A. Dietr.
Description: Terrestrial plant.
Distribution: St Croix and the Lesser antilles.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St Eustatius, St. Kitts, Redonda, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Restricted Range
Plant Category: Di

Peperomia nigropunctata Miq.
Description: Terrestrial or epiphytic herb.
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Di

Peperomia pellucida (L.) Kunth
Description: Erect herbs; tissue subtranslucent.
Distribution: Neo- and Palaeotropics.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Austatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Peperomia rotundifolia (L.) Kunth
Description: Tenuous vine; appressed to trunks and branches or rarely descending in festoons.
Distribution: Central America, Greater Antilles, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Gua-

deloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Peperomia serpens (Sw.) Loudon
Description: Epiphytic, creeping herb.
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, St, Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Peperomia trifolia (L.) A. Dietr.
Description: Epiphytic, climbing herb.
Distribution: Endemic to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Lesser Antilles
Plant Category: Di

Piper aequale Vahl
Description: Shrub; to 3m tall.
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Piper amalgo L.
Description: Shrub; to 2m tall.
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Piper dilatatum Rich.
Description: Shrub; 2-3m tall.
Distribution: Central America, Greater Antilles, Trinidad
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Austatius, St. Kitts, Nevis Guadeloupe, Marie Galante, Dominica, MArtinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbadoa
Biogeography: Wider Distribution
Plant Category: Di

Piper dussii C. DC.
Description: Shrub; to 3m tall.
Distribution: Restricted to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St Vincent, the Grenadines.
Biogeography: Lesser Antilles
Plant Category: Di

Piper hispidum Sw.
Description: Shrub; to 4m tall.
Distribution: Mexico, central America, Greater Antilles, south America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Piper reticulatum L.
Description: Shrub; to 3m tall.
Distribution: Central America, South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

PLANTAGINACEAE

Plantago lanceolata L.
Description: Perennial herb.
Distribution: Cosmopolitan as a weed
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Di

Plantago major L.
Common Name(s): Plantain, millet.
Description: Perennial herb.
Distribution: Cosmopolitan as a weed
Lesser Antilles Distribution: Montserrat, Antigua, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

PLUMBAGINACEAE

Plumbago auriculata Lam.
Common Name(s): lead vine.
Description: Shrub; to 2m tall.
Distribution: Native to Africa, widely cultivated in the Neotropics
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, Barbados.
Biogeography: Introduced
Plant Category: Di

Plumbago scandens L.
Common Name(s): Doctor john, old woman's bush.
Description: Weak, woody shrub; to 2m tall.
Distribution: Bahamas, Greater Antilles, Trinidad, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts,Redonda, Guadeloupe, Dominica, Martinique,

St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

POACEAE

Andropogon bicornis L.
Description: Coarse perennial; 1-2.5m tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Andropogon glomeratus (Walter) Britton, Sterns & Pogge
Description: Stout perennial; 75-150cm tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Nevis, Guadeloupe, Martinique, St. Lucia, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Anthephora hermaphrodita (L.) Kuntze
Description: Annual; 15-50cm tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Aristida adscensionis L.
Description: Annual.
Key ID Feature: Plants annual, culm spreading-erect
Distribution: Tropical America and Africa.
Lesser Antilles Distribution: Montserrat, Anguilla, Antigua, Nevis, Guadeloupe, Martinique, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Aristida cognata Trin. & Rupr.
Description: Perennial; 20-40cm.
Notes: Wrong det?
Distribution: Cuba and the Virgin Islands.
Lesser Antilles Distribution: Montserrat (uncertain det)
Biogeography: Caribbean
Plant Category: Mo

Arundo donax L.
Description: Culms mostly 2-6 m tall; commonly forming large clumps.
Distribution: Native to Europe and Asia, but now widespread throughout temperate and subtropical region of the world.
Lesser Antilles Distribution: Dominica, Martinique, St. Lucia. Reports from other islands including Montserrat
Biogeography: Introduced
Plant Category: Mo

Bouteloua americana (L. f.) Scribn.
Description: Perennial but often appearing annual.
Key ID Feature: Upper floret typically neuter, reduced to cylindrical awn column and 3 awns of equal or nearly equal length
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Brachiaria adspersa (Trin.) Parodi
Description: Coarse, leafy annual; 30-120 cm or more.
Notes: In loose, open ground, often along ditches and other disturbed areas
Distribution: Florida and the Antilles.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Kitts, Nevis, Guadeloupe, Martinique, St. Lucia, Grenada
Biogeography: Peri-Caribbeanaribbe
Plant Category: Mo

Brachiaria fasciculata (Sw.) S.T. Blake
Description: Annual; with tufted or decumbent-creeping culms; 30-120cm or more.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Brachiaria purpurascens (Raddi) Henr.
Description: Perennial; with thick, decumbent, trailing culms 4-5m long.
Notes: introduced in many areas as a forage grass
Distribution: Tropical America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Brachiaria reptans (L.) C.A. Gardner & C.E. Hubb.
Description: Mat-forming annual; with widely creeping and branching culms 10-35cm long.
Distribution: Tropical and subtropical regions of the world.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Chloris inflata Link
Description: Annual; with culms often decumbent below and rooting at lower nodes.
Key ID Feature: Lemma awns 4-7.7mm long, plants annual
Distribution: Throughout the warmer parts of the world.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, St. Eustatius, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Chloris radiata (L.) Sw.
Description: Annual; with culms 30-60cm tall.
Key ID Feature: reduced florets less than 1mm long excluding the awn
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Coix lacryma-jobi L.
Description: Culms thick and succulent, much branched, mostly 1-1.5 m tall.
Notes: Growing in low, moist areas, often weedy in ditches and other areas of disturbed soil.
Distribution: Native to Asia but widely distributed in Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, Grenada, Barbados
Biogeography: Introduced
Plant Category: Mo

Cynodon dactylon (L.) Pers.
Description: Flowering culms numerous, mostly 10-50 cm tall.
Distribution: Widespread throughout the warmer parts of the world.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Dactyloctenium aegyptium (L.) Willd.
Description: Annual; branching at base, the culms usually decumbent; 10-60cm tall.
Distribution: Worldwide in tropical and subtropical areas, introduced in the Americas.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Mo

Digitaria bicornis (Lam.) Roem. & Schult.
Description: Annual; with weak, decumbent-spreading culms, much branched and stoloniferous below.
Distribution: Worldwide in the tropics and subtropics.
Lesser Antilles Distribution: Montserrat, Anguilla, Nevis, Dominica, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Mo

Digitaria horizontalis Willd.
Description: Annual; with decumbent, spreading, branching, stoloniferous culm bases and erect floriferous shoots; 30-50cm tall.
Distribution: Widespread in tropical regions of both hemispheres.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Redonda, Guadeloupe, Dominica, Martinique, St. Vincent, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Digitaria insularis (L.) Mez ex Ekman
Description: Coarse perennial; with culms mostly 60-150 cm tall.
Distribution: Widely distributed in the American tropics and subtropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Eleusine indica (L.) Gaertn.
Description: Culms erect or spreading and stoloniferous at base; mostly 15-70cm long.
Distribution: Worldwide in tropical and temperate regions.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Eragrostis ciliaris (L.) R. Br.
Description: Annual; with weak, often geniculate-spreading culms; 15-40cm.
Key ID Feature: Panicle contracted, with short, erect and appressed branches. Pedicels mostly shorter than spikelets.
Distribution: Widespread in the warmer regions of the world, apparently introduced in the Americas.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Saba, St. Eustatius, St. Kitts, Redonda, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Mo

Eragrostis tenella (L.) P. Beauv. ex Roem. & Schult
Description: Annual; with slender, weak, often geniculately spreading culms mostly 10-20(-35)cm tall.
Key ID Feature: Panicle open, oblong, pedicles mostly as long as or longer than the spikelet
Distribution: Widely distributed in the warmer parts of both hemispheres; native to the Old World.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, St. Kitts, Guadeloupe, Martinique, St. Lucia, Grenada
Biogeography: Introduced
Plant Category: Mo

Eriochloa punctata (L.) Desv. ex Ham.
Description: Perennial; with erect or spreading-erect culms 60-100cm or more tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult
Description: Perennial; with erect, branching culms 20-80cm tall.
Distribution: Widely distributed in the tropical and subtropical regions of both hemishpheres.
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Mo

Ichnanthus nemorosus (sw.) doell v K.E. Rogers
Description: Weak perennial or long lived annual; erect, floriferous branches mostly 15-40cm tall.
Notes: Moist, shaded forest habitats
Distribution: The Antilles and Trinidad.
Lesser Antilles Distribution: Montserrat, St Kitts, Nevis, Martinique, St Vincent, Grenada
Biogeography: Caribbean
Plant Category: Mo

Ichnanthus pallens (Sw.) Munro
Description: Long trailing and spreading culms; flowering shoots, 25-80cm tall.
Notes: Moist banks and in tropical forest, from low to medium elevations, often forming mats on forest floor
Distribution: The Antilles and Trinidad.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Caribbean
Plant Category: Mo

Isachne disperma (Lam.) D"ll
Description: Culms often climbing and branching over the branches of shrubs, up to 2 m or more long.
Key ID Feature: Spikelets not clustered at the panicle branch tips, panicle forming loosely
Notes: Woody hillsides
Distribution: Endemic to the Lesser Antilles and Tobago.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Restricted Range
Plant Category: Mo

Lasiacis divaricata var. divaric (L.) Hitchc.
Description: Perennial; climbing and trailing over bushes; with slender branches to 5m long.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Lasiacis sorghoidea var. sorghoi (Desv.) Hitchc. & Chase
Description: Robust perennial; with a central culm reaching 5-7m in height.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Leptochloa filiformis (Pers.) P. Beauv.
Description: Weedy annual; with slender, weak culms 10-80cm or more tall.
Key ID Feature: Plants annual, spikelets 2-4 flowered, lemmas 1-1.6mm long, awnless
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo
Leptochloa virgata (L.) P. Beauv.
Description: Perennial; with several, many-noded wiry culms; 30-100cm tall.
Key ID Feature: Plants perennial, spikelets 2-8 flowered, lemmas 1.5-2.8 mm long
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Marie Galante, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Panicum maximum Jacq.
Description: Stout, clump-forming perennial; with thick culms 1-2.5m tall.
Distribution: Pantropical, probably native to Africa.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Redonda, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vin-

cent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Mo

Panicum trichoides Sw.
Description: Tufted annual; with slender, often branching and geniculate-decumbent culms.
Distribution: Neotropics, Asia and Pacific Islands.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Paspalidium geminatum (Forssk.) Stapf
Description: Perennial; with thickish culms in clumps.
Distribution: Neotropics, also in the Old World tropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Paspalum conjugatum P.J. Bergius var. *conjugatum*
Description: Low perennial; with culms 20-50cm tall.
Distribution: Probably native to the Neotropics, also in Old world tropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Paspalum fimbriatum Kunth
Description: Annual; with weak, often decumbent or branching culms mostly 15-100cm tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Paspalum notatum Flugge
Description: Perennial; with culms mostly 20-75 cm tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

Paspalum plicatulum Michx.
Description: Perennial; with erect culms in clumps; mostly 50-75(-100)cm tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Paspalum virgatum L.
Description: Robust perennial; with stiffly erect or basally curved culms; 1-2m tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Pharus glaber Kunth
Description: Culms from an erect base; 50-75cm tall.
Key ID Feature: Fruit 2-3 times longer than glumes, pubescent all over, leaf blades commonly 3-5 cm broad
Distribution: Mexico and Brazil
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Mo

Saccharum officinarum L.
Description: Perennial.
Notes: *UKOTs Site Record by M. Hamilton and C. Clubbe on Molyneux, Mrat.
Distribution: Cultivated in tropics and sub-tropics of the world
Lesser Antilles Distribution: *Montserrat, Antigua, Guadeloupe, Martinique, Barbados
Biogeography: Introduced
Plant Category: Mo

Setaria geniculata (Lam.) P. Beauv.
Description: Perennial; with culms 30-100 cm tall.
Distribution: Apparently native to the western hemisphere, widely distributed throughout the Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Sporobolus jacquemontii Kunth
Description: Perennial;culms 30-100cm tall.
Key ID Feature: Second glume less than half as long as spikelet, panicle branches well developed, slender, loosely erect or speading
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Tragus berteronianus Schult.
Description: Culms geniculate, spreading; 5-30(-40)cm tall.
Notes: T. berteronianum
Distribution: Neotropics and Palaeotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

Vetiveria zizanioides (L.) Nash
Description: Perennial; culms 1-2m or more tall.
Distribution: Throughout the warmer regions of both hemispheres.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Mo

PODOCARPACEAE

Podocarpus coriaceus Rich. & A. Rich.
Distribution: Puerto Rico
Lesser Antilles Distribution: Montserrat, Dominca, Guadeloupe, Martinique, St. Kitts
Biogeography: Restricted Range
Plant Category: Gym

POLYGONACEAE

Antigonon leptopus Hook. & Arn.
Common Name(s): Coralita, coral vine.
Description: Herbaceous or woody vine.
Cultivated: ornamental
Notes: spreading rapidly since 1950 in Antigua; in Nevis the problem seems more severe according to C. Pratt
Invasiveness: Naturalised and spreading
Distribution: Native to Mexico but now widely cultivated throughout the Antilles, South America, and other tropical areas
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Introduced
Plant Category: Di

Coccoloba pubescens L.
Common Name(s): Mountain grape, large leaf, knotty knave.
Description: Tree; to 13m tall.
Distribution: Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Coccoloba swartzii Meisn.
Common Name(s): Redwood, saltwood, wild grape.
Description: Tree; to 20m tall.
Distribution: Greater Antiles, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Coccoloba uvifera (L.) L.
Common Name(s): Sea Grape, seaside grape, grape.
Description: Tree; 2-17m tall.
Notes: should this be uvifera? No record of C. univera.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Saba, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Coccoloba venosa L.
Common Name(s): Wild grape, chiggery grape.
Description: Tree; to 15m.
Distribution: Hispaniola, Puerto Rico, Trinidad, Tobago, Venezuela.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, the Grenadines, Grenada, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

POLYPODIACEAE

Nephrolepis rivularis (Vahl) C. Chr.
Description: Terrestrial or epiphytic fern; fronds 60-200cm.
Notes: commonest of its genus in the Lesser Antilles
Distribution: Greater Antilles, Virgin Islands, Tobago, Trinidad, continental tropical America from mexico to Brazil
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Neurodium lanceolatum (L.) F,e
Description: Small epiphytic fern; fronds 20-40cm long.
Distribution: Florida, Greater Antilles, Virgin Islands, Belize, Guatemala, Honduras, French Guiana.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium aureum L. var. *aureum*
Description: Terrestrial fern; fronds seasonally deciduous, 20-50cm long.
Distribution: Florida, Bahamas, Greater Antilles, Trinidad, continental tropical America.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium crassifolium L.
Description: Epiphytic/lithophytic fern; fronds to 1.3m long.
Distribution: Tropical America
Lesser Antilles Distribution: Montserrat, Saba, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium heterophyllum L.
Description: Climbing fern; fronds up to 15cm long.
Distribution: Florida, Bahamas, Greater Antilles, Virgin Islands
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barthelemy, Antigua, Saba, St. Eustatius
Biogeography: Peri-Caribbeanaribbe
Plant Category: Pter

Polypodium latum (T. Moore) T. Moore ex Sodiro
Description: Epiphytic/lithophytic fern; frondsto 100cm long.
Distribution: tropical America
Lesser Antilles Distribution: Montserrat, Saba, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium loriceum L.
Description: Terrestrial/epiphytic fern; fronds 20-60cm long.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium lycopodiodes L.
Description: Epiphytic/lithophytic fern; fronds 5-20cm long.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium pectinatum L.
Description: Terrestrial fern; fronds 20-90cm long.
Distribution: Florida, Greater Antilles, continental tropical America.
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium phyllitidis L.
Description: Epiphytic/lithophytic fern; fronds1-5cm long.
Distribution: tropical America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium piloselloides L.
Description: Epiphytic/lithophytic fern; fronds 2-5cm long..
Distribution: tropical America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium polypodioides (L.) Watt
Description: Epiphytic/lithophytic fern; fronds 4-15cm long.
Distribution: Tropical America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Polypodium triserale Sw.
Description: Terrestrial/epiphytic fern; fronds 20-50cm long.
Distribution: Cuba, Jamaica, Trinidad, sporadically in continental tropical America
Lesser Antilles Distribution: Montserrat, St. Eustatius, Nevis, Guadeloupe, Dominica, Martinique, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

PORTULACACEAE

Portulaca guadrifida L.

Description: Annual herb; prostrate; stems creeping and rooting at nodes forming mats.
Distribution: Greater Antilles, Trinidad, South America
Lesser Antilles Distribution: Montserrat, St. Barts Antigua, St. Eustatius, St. Kitts, Guadeloupe, the Grenadines, Granada
Biogeography: Wider Distribution
Plant Category: Di

Portulaca halimoides L.
Description: Annual herb; erect or diffuse; 5-15cm tall.
Distribution: Greater Antilles, Mexico and Central America, South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, Redonda, Guadeloupe, Dominica, Martinique, St. Lucia, Granada
Biogeography: Wider Distribution
Plant Category: Di

Portulaca halimoides L.
Description: Erect or diffuse much branched annual, 5-15 cm tall.
Distribution: South America, but cultivated widely and naturalized in temperate and tropical areas.
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

Portulaca oleracea L.
Common Name(s): Purslane, pusley.
Description: Annual herb; fleshy, usually prostrate and spreading; stems to 30cm long.
Distribution: Nearly cosmopolitan as a weed
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigue, Dominica,, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Portulaca pilosa L.
Description: Annual; stems ascending or prostrate.
Distribution: Neotropics.
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

Portulaca quadrifida L.
Description: Much branched prostrate annual; stems creeping and rooting at nodes, forming mats.
Distribution: Neotropics.
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

Talinum fruticosum (L.) Juss.
Description: Perennial; stout and fleshy; to 60cm tall.
Distribution: Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade,Martinique, St Lucia, St Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Talinum fruticosum (L.) Juss.
Lesser Antilles Distribution:
Biogeography:
Plant Category:

Talinum paniculatum (Jacq.) Gaertn.
Description: Herb:sometimes woody at base; tuberous roots; 25cm tall or with inflorescence to 75cm tall.
Distribution: US, Mexico, Central America, Greater Antilles, Trinidad, South America.
Lesser Antilles Distribution: Montserrat, Antigua, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Talinum triangulare (Jacq.) Willd.
Description: Stems erect, to 60 cm tall.
Notes: Syn of Talinum fruticosum
Distribution: Neotropics.
Lesser Antilles Distribution:
Biogeography: Wider Distribution
Plant Category: Di

PROTEACEAE

Grevillea banksii R. Br.
Distribution: Native to Australia
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Grevillea robusta A. Cunn.
Common Name(s): Silk oak.
Distribution: Native to Australia
Lesser Antilles Distribution: Montserrat, Guadeloupe
Biogeography: Introduced
Plant Category: C-Di-Intro

PSILOTACEAE

Psilotum nudum (L.) Griseb.
Description: Epiphytic/terrestrial fern; Rhizomatous; height 20-60cm.
Distribution: Pantopical
Lesser Antilles Distribution: Montserrat, St. Barthelemy, Saba, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Luci, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Pter

PTERIDACEAE

Acrostichum daneaefolium Langsd. & Fisch.
Description: Large fern; fronds 1.5-3.5m long.
Distribution: western hemsphere tropics in suitable localities.
Lesser Antilles Distribution: Montserrat, Antigua, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St Lucia, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Pteris altissima Poir.
Description: Terrestrial fern; fronds 1.5-3m long.
Distribution: Greater Antilles, continental tropical America from Mexico to Bolivia
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Pteris biaurita L.
Description: Terrestrial fern; fronds 70-150cm long.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Wider Distribution
Plant Category: Pter

Pteris multifida Poir.
Description: Terrestrial fern; fronds 10-30cm long.
Invasiveness: Naturalised
Distribution: Tropical Asia; introduced to the neotropics
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique
Biogeography: Introduced
Plant Category: Pter

Pteris quadriaurita Retz.
Description: Terrestrial fern; fronds 1.5m long.
Distribution: Pantropical
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Pter

Pteris vittata L.
Description: Terrestrial fern; fronds 20-100cm long.
Invasiveness: Naturalised
Distribution: Old World tropics; introduced to Florida and the Southern US, Virgin Islands, Trinidad, and perhaps in other localities
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Introduced
Plant Category: Pter

RHAMNACEAE

Colubrina arborescens (Mill.) Sarg.
Common Name(s): Mambe, mabie, soap bush, mauble bark, soapberry, blackbeard tree.
Description: Shrub or small tree; to 1-8m.
Distribution: Southern Florida, Bahamas, West Indies, southern Mexico, and Central America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Saba, Guadeloupe, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Gouania lupuloides (L.) Urb.
Common Name(s): Chew-stick, toothbrush tree.
Description: High climbing vine or less often a scandent shrub.
Notes: stems are chewed to heal and harden gums as well as clean the teeth
Distribution: Florida, Mexico, Central and northern South America, West Indies
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Ziziphus mauritiana Lam.
Common Name(s): Stink tree, dunks.
Description: Shrub or small tree; to 2-10m.
Distribution: Native to Asia and Africa, cultivated and frequently naturalised in the neotropics.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

RHIZOPHORACEAE

Cassipourea guianensis Aubl.
Common Name(s): Mountain coffee.
Description: Shrub or more commonly small tree; 3-15m tall.
Distribution: Neotropics.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent,Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Rhizophora mangle L.
Common Name(s): Black manque.
Description: Shrub or small tree; 1-8m tall.
Notes: principal inhabitant of the "mangrove swamps". Generally occurs in the outermost zone of the mangrove
Distribution: Neotropics and West Africa.
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, St. Kitts, Guadeloupe, Martinique, St.

Lucia, St. Vincent, Grenada..
Biogeography: Wider Distribution
Plant Category: Di

ROSACEAE

Eriobotrya japonica (Thunb.) Lindl.
Common Name(s): Loquat.
Description: Small dense tree; to 7m.
Distribution: Native of Japan and China. Now widely cultivated as an ornamental or for fruit
Lesser Antilles Distribution: cultivated. Montserrat, Guadeloupe, Dominica, Martinique
Biogeography: Introduced
Plant Category: Di

Rubus coronarius (Sims) Sweet
Description: Prickly shrub; canes to 1m tall.
Distribution: Greater Antilles, Trinidad, Brazil, Asia
Lesser Antilles Distribution: Monteserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

Rubus rosifolius Sm.
Common Name(s): Raspberry.
Description: Perennial; with erect canes to 1.5m tall.
Distribution: Native of southeast Asia, introduced to many tropical areas
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Introduced
Plant Category: Di

RUBIACEAE

Antirhea coriacea (Vahl) Urb.
Description: Tree; 8-20m tall.
Distribution: Jamaica, Puerto Rico
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Caribbean
Plant Category: Di

Chiococca alba (L.) Hitchc.
Common Name(s): Snowberry, David's root, Davis root.
Description: Shrub; commonly with scrambling branches 1-3 m long.
Notes: aphrodisiac; used in bush rum
Distribution: Florida, Greater Antilles, Mexico and Central America, northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Chione venosa (Sw.) Urb.
Common Name(s): mastic, fat pork.
Description: Tree; to 15m.
Distribution: Hispaniola, Puerto Rico, Trinidad.
Lesser Antilles Distribution: Montserrat, Antigua, St Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, the Grenadines, Grenada.
Biogeography: Caribbean
Plant Category: Di

Diodia ocymifolia (Willd. ex Roem. & Schult.) Brem
Description: Woody herb; to 30cm.
Distribution: Greater Antilles, Mexico and Central America, Tropical South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Diodia sarmentosa Sw.
Description: Perennial herb; with scrambling or climbing branches to 3m long.
Distribution: Greater Antilles, Mexico and Central America, northern South America, introduced into the Old World tropics
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Di

Erithalis fruticosa L.
Common Name(s): Candlewood.
Description: Shrub or small tree; to 5m.
Distribution: Florida, the Bahamas, Greater Antilles, Belize
Lesser Antilles Distribution: Montserrat, Anguilla, Barbuda, Antigua, Guadeloupe
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Ernodea littoralis Sw.
Common Name(s): Cough bush, wild pomegrati, wild pamgramma.
Description: Shrub; with erect or arching branches; to 1m tall.
Distribution: Florida, the Bahamas, Greater Antilles, Mexico, Honduras
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante.
Biogeography: Wider Distribution
Plant Category: Di

Exostema caribaeum (Jacq.) Roem. & Schult.
Common Name(s): Greenheart, caribee bark tree.
Description: Shrub or small tree; to 8 m.
Distribution: Bahamas, Greater Antilles, Mexico, Honduras, Guatemala
Lesser Antilles Distribution: Montserrat, Anguilla, St.

Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Faramea occidentalis (L.) A. Rich.
Common Name(s): Wild coffee.
Description: Tree; to 10m.
Distribution: Greater Antilles, Mexico, Central America, Trinidad, Tobago, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Gonzalagunia hirsuta (Jacq.) Schum.
Description: Shrub or small tree; to 4 m.
Distribution: Hispaniola, Puerto Rico, Trinidad, Venezuela, Guiana, Brazil.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Guettarda crispiflora Vahl
Description: Tree; to 10 m.
Distribution: Trinidad.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, Grenada.
Biogeography: Restricted Range
Plant Category: Di

Guettarda odorata (Jacq.) Lam.
Description: Shrub; to 5m tall.
Distribution: Puerto Rico, Central America, Venezuela
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Guettarda scabra (L.) Vent.
Common Name(s): Pigeon fat, pigeon bay, white allee.
Description: Shrub or small tree; to 9m.
Distribution: Florida, Cuba, Haiti, Puerto Rico, Trinidad, Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Hedyotis corymbosa (L.) Lam.
Description: Annual herb.
Distribution: worldwide as a weed in the tropics
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Hedyotis lancifolia Schumach.
Description: Annual; stems weak, often decumbent, to 60cm long.
Distribution: Africa.
Lesser Antilles Distribution: Montserrat, St. Martin, Guadeloupe, Martinique.
Biogeography: Introduced
Plant Category: Di

Hillia parasitica Jacq.
Description: Climbing epiphytic shrub.
Distribution: Greater Antilles, Mexico, Central America, Trinidad, Venezuela and Brazil
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Hura crepitans L.
Local Name(s): Boxwood tree (Mrat
Common Name(s): Gogo tree.
Life Form: Tree; to 25m ta
Description: Leaves ovate to orbicular, 12-25 x 7-15cm, base cordate, apex acuminate, margin crenate with glandular teeth, prominently pinnate-veined, spasely pubescent on lower surface. Fruit a woody capsule, 8cm in diameter, 3-5
Key ID Feature: Trunk and limbs covered with spines; leaves simple, deep-green, elongated, cordate, long petioled; flowers dark red, monoecious, held in pairs, terminal; dried fruit (schizocarp) is tangerin-like, with about 20
Uses: Large shade tree, xerophytic.
Notes: Collected under local name "boxwood" in Montserrat by UKOTs team; local name matched to species in UK.
Distribution: Mexico, Central America, Greater Antilles, South America.
Lesser Antilles Distribution: Monterrat*, Anguilla, St. Martin, Barbuda, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: C-Di-Nat

Ixora chinensis Lam.
Cultivated: ornamental
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Ixora ferrea (Jacq.) Benth.
Description: Shrub or tree; to 10m tall.
Distribution: Cuba, Puerto Rico.
Lesser Antilles Distribution: Montserrat, Antigua, St Kits, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St Lucia, St Vincent, the grenadines, Grenada, barbados.
Biogeography: Caribbean
Plant Category: Di

Mitracarpus hirtus (L.) DC.
Description: Annual herb; to 50cm tall.
Distribution: Florida, Texas, Haiti, Jamaica, Mexico, Panama, Guyana, Venezuela, Brazil, Africa
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Morinda citrifolia L.
Common Name(s): Jumbie breadfruit, hog apple, pain killer.
Description: Shrub or small tree; to 6m tall.
Distribution: Tropical Asia and Australia, introduced into the New World.
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Mussaenda s L.
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Neolaugeria resinosa (Vahl) Nicolson
Description: Shrub; 2-3m tall.
Distribution: Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Caribbean
Plant Category: Di

Palicourea crocea (Sw.) Roem. & Schult.
Description: Shrub or small tree; to 6m tall.
Distribution: Greater Antilles, southern Mexico, Central America, south to Brazil and Paraguay
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Pentas lanceolata Schum.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique
Biogeography: Introduced
Plant Category: C-Di-Intro

Psychotria aubletiana Steyerm.
Description: Shrub; to 4m tall.
Distribution: Central America, northern South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, MartiniquE.
Biogeography: Wider Distribution
Plant Category: Di

Psychotria berteriana DC.
Common Name(s): Caf? marron.
Description: Shrub or tree; to 10m tall.
Distribution: Greater Antilles, Trinidad, Central America, Columbia
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Psychotria guadalupensis (DC.) Howard
Description: Epiphytic shrub; with pendant or arching ascending branches.
Distribution: Greater Antilles, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Psychotria mapourioides DC.
Description: Shrub or small tree.
Distribution: Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Di

Psychotria microdon (DC.) Urb.
Common Name(s): Cafe? marron.
Description: Arching shrub; 1-2 m tall.
Distribution: Cuba, Hispaniola, Puerto Rico, Virgin Islands, northern South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Les Saintes, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Psychotria nervosa Sw.
Common Name(s): Caf? marron, wood balsam.
Description: Shrub; to 2.5m tall.
Distribution: Greater Antilles, Central America, northern South America
Lesser Antilles Distribution: Montserrat, St. Eustatius, Nevis, Guadeloupe, Marie Galante, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Psychotria urbaniana Steyerm.
Description: Shrub; to 2m tall.
Distribution: Restricted to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Martin, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Lesser Antilles
Plant Category: Di

Randia aculeata L.
Common Name(s): Fve fingers, goat horn, ink berry, fishing rod.
Description: Shrub or small tree; to 4m tall.
Distribution: Greater Antilles, Mexico, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Saba, St. Kitts, Nevis, Guadeloupe, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Rondeletia americana L.
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Rondeletia buxifolia Vahl
Common Name(s): Privet.
Description: Shrub; 1-2 mm tall.
Conservation Measures: Ex-Situ: -Seed collection made May 2006 stored at MSB.
Distribution: Endemic to Montserrat.
Lesser Antilles Distribution: Montserrat.
Biogeography: Montserrat
Plant Category: Di

Spermacoce assurgens Ruiz & Pav.
Description: Perennial herb; to 40cm tall.
Distribution: Native of tropical America naturalised in Africa, Asia
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Spermacoce berteroana Howard
Description: Woody herb.
Distribution: Endemic to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica.
Biogeography: Lesser Antilles
Plant Category: Di

Spermacoce densiflora (DC.) Alain
Description: Stout herb; to 70cm tall.
Distribution: Jamaica, Central America, northern South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Martinique, St. Lucia.
Biogeography: Wider Distribution
Plant Category: Di

Strumpfia maritima Jacq.
Common Name(s): Rosemary.
Description: Shrub; to 2m tall.
Distribution: Florida, Greater Antilles, Yucatan
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, St. Kitts, Guadeloupe, La Desirade, Marie Galante.
Biogeography: Wider Distribution
Plant Category: Di

RUTACEAE

Amyris elemifera L.
Common Name(s): Torchwood.
Description: Shrub or small tree; to 4m tall.
Distribution: Bahamas, Greater and Lesser Antilles, Trinidad.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Nevis, Guadeloupe, Marie Galante, Les Saintes, Dominica, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Lesser Antilles
Plant Category: Di

Citrus aurantifolia (Christm.) Swingle
Description: Tree; branches with single spines in axils of leaves.
Distribution: Cultivated throughout the tropics.
Lesser Antilles Distribution:
Biogeography: Introduced
Plant Category: Di

Citrus maxima (Burm. ex Rumph.) Merr.
Lesser Antilles Distribution:
Biogeography:
Plant Category:

Murraya exotica L.
Description: Shrub or small tree; to 4m tall.
Distribution: native of tropical Asia but widely cultivated in tropical areas
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, the Grenadines
Biogeography: Wider Distribution
Plant Category: Di

Murraya exotica L.
Notes: Although commonly seen as a cultivated plant, this taxon is now well established.
Invasiveness: Naturalised and spreading
Distribution: Native to China, Taiwan
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, St. Eustatius, St. Kitts, Montserrat, Guadeloupe, Dominica, Martinique, the Grenadines

Biogeography: Introduced
Plant Category: C-Di-Intro

Pilocarpus racemosus Vahl
Description: Shrub or small tree; to 5m tall.
Distribution: Cuba, Hispaniola.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique.
Biogeography: Caribbean
Plant Category: Di

Triphasia trifolia (Burm. F.) P. Wilson
Common Name(s): Sweet lime, Chinese lemon, myrtle lime, citronella.
Description: Shrub; to 4m tall.
Distribution: Native of the East Indies but widely cultivated.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: Di

Triphasia trifolia (Burm. F.) P. Wilson
Notes: This plant persists in hedgerows and around old foundations. It has become established in coastal areas and invades the edges of mangroves.
Invasiveness: Naturalised and spreading
Distribution: Native of East Indes
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Bermuda, Antigua, St. Eustatius, Nevis, Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Introduced
Plant Category: C-Di-Intro

Zanthoxylum flavum Vahl
Description: Shrub or tree; to 12m tall.
Distribution: Bermuda, Florida, Greater Antilles.
Lesser Antilles Distribution: Montserrat, Anguilla, St Martin, St Barts, Barbuda, Antigua, Guadeloupe, Marie Galante.
Biogeography: Caribbean
Plant Category: Di

Zanthoxylum monophyllum (Lam.) P. Wilson
Common Name(s): Yellow prickle, greater yellow hercules.
Description: Shrub or small tree; to 8m tall.
Distribution: Central America, Hispaniola, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Les Saintes, Dominica, Martinique, St. Lucia, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Zanthoxylum spinifex (Jacq.) DC.
Common Name(s): Ram goat.
Description: Shrub or small tree; to 5m tall.
Distribution: Greater and Lesser Antilles, Venezuela.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Barbuda, Antigua, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

SALICACEAE

Casearia decandra Jacq.
Common Name(s): Coco-ravet, jumbie apple, wild cherry.
Description: Shrub or small tree; to 12m tall.
Distribution: Honduras south to Brazil, northern Argentina, Paraguay-Bolivia, and in the West Indies south from Hispaniola throught the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galant, Dominca, Martinique, St. Lucia, St. Vincent, the Grenadadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Casearia sylvestris Sw.
Common Name(s): Crack-open.
Description: Shrub or small tree; to 3(-6)m tall.
Notes: *Montserrat herbarium specimens collected by MH 198, 213, 316 are verified as C. sylvestris by Sue Zmartzy
Distribution: Mexico south to northern Argentina and Uraguay, West Indies from Cuba through Lesser Antilles
Lesser Antilles Distribution: Montserrat*, St. Martin, Saba, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Flacourtia jangomas (Lour.) Raeusch.
Common Name(s): Governor's plum.
Description: Large shrub or small tree; 4-15m tall.
Key ID Feature: Young branches whitespeckled by numerous lenticels, older branches commonly with sharp thorns
Invasiveness: Naturalised and spreading
Distribution: Originating in the Old World (India?). Cultivated in many tropical countries.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominca, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Introduced
Plant Category: Di

Samyda dodecandra Jacq.
Common Name(s): Banso, wild guave.
Description: Shrub or small tree; 2-4m tall.
Distribution: West Indies from Cuba south to Bonaire, Curacao, and Trinidad
Lesser Antilles Distribution: Montserrat, St. Martin, St.

Barts, Anigua, St. Austatius, St. Kitts, Nevis, Guadeloupe, Martinique, St. Vincent
Biogeography: Caribbean
Plant Category: Di

Xylosma serratum Urb.
Description: Dioecious or occasionally polygamous small tree; to 6m tall.
Notes: Very similar to X. martinicense- perhaps only a more robust variety with larger flowers and more numerous stamens.
Distribution: Endemic to Montserrat.
Lesser Antilles Distribution: Montserrat*
Biogeography: Montserrat
Plant Category: Di

SAPINDACEAE

Allophylus racemosus Sw.
Description: Shrub or tree; to 10m tall.
Distribution: Central and northern South America, Greater Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Blighia sapida K.D. Koenig
Common Name(s): akee, aki.
Description: Trees; to 7m
Distribution: Native to tropical Africa, introduced and cultivated in the New World.
Lesser Antilles Distribution: Montserrat, Dominica, Martinique, St. Lucia, Barbados
Biogeography: Introduced
Plant Category: Di

Cardiospermum halicacabum L.
Common Name(s): Ballon vine.
Description: Herbaceaous climber; to 5 m tall.
Distribution: Worldwide in tropical areas and commonly cultivated.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Martinique, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Di

Cardiospermum microcarpum Kunth
Common Name(s): Heart seed, ballon vine, wild parsley.
Description: Herbaceaous annual climber; to 2m tall.
Distribution: Widespread in all tropical areas.
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Cupania rubiginosa (Poir.) Radlk.
Description: Shrub or tree; to 15m tall.
Distribution: Guyana, Northern Brazil.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Marie Galante
Biogeography: Wider Distribution
Plant Category: Di

Paullinia pinnata L.
Description: Climbing vine.
Distribution: Neotropics, Africa.
Lesser Antilles Distribution: Montserrat* (*In Howards original Checklist abut not in Flora?), Dominica, Martinique, St. Lucia, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Paullinia vespertilio Sw.
Description: Climbing vine.
Distribution: Restricted to Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent.
Biogeography: Lesser Antilles
Plant Category: Di

Sapindus saponaria L.
Common Name(s): Soapberry tree, black nicker tree.
Description: Tree; to 20m tall.
Distribution: Florida, Bahamas, Greater Antilles, Mexico, and Central America, tropical South America
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

SAPOTACEAE

Chrysophyllum argenteum Jacq.
Common Name(s): Wild star apple, milky iron.
Description: Tree; to 30m tall.
Distribution: Cuba, Hispaniola, Puerto Rico, northern South America.
Lesser Antilles Distribution: Montserrat, Antigua, Saba, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Micropholis guyanensis (A. DC.) Pierre
Common Name(s): Wild balata.
Description: Tree; to 30m tall.
Distribution: Puerto Rico, Costa Rico, Panama, northern and western South America, coastal Brazil
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Mimusops elengi L.
Description: Tree; to 15m tall.
Notes: occasionally cultivated but in some areas producing numerous seedsseedlings with the potential of escaping
Distribution: Tropical Asia.
Lesser Antilles Distribution: Montserrat, Dominica, Martinique
Biogeography: Introduced
Plant Category: Di

Pouteria multiflora (A. DC.) Eyma
Common Name(s): Penny piece, choky apple.
Description: Tree; to 30m tall.
Distribution: Jamaica, Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Di

Pouteria sapota (Jacq.) H.E. Moore & Stearn
Common Name(s): Mamey sapote.
Description: Tree; to 30m tall.
Notes: cultivated or persisting after cultivation
Distribution: Native to Mexico to Nicaragua, but introduced elsewhere
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique.
Biogeography: Introduced
Plant Category: Di

Sideroxylon foetidissimum Jacq.
Common Name(s): Mastic.
Description: Tree; to 25m tall.
Distribution: Florida, Bahamas, Greater Antilles, Mexico, Guatemala, Belize
Lesser Antilles Distribution: Montserrat, Antigua, Saba, Guadeloupe, Marie Galante, Dominica, Martinique, the Grenadines, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Sideroxylon obovatum Lam.
Common Name(s): Boxwood, milky thorn, box tree.
Description: Shrub or small tree; 2-6m tall.
Distribution: Greater Antilles, Venezuelan islands
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Martinique, St. Lucia, the Grenadines.
Biogeography: Caribbean
Plant Category: Di

SCHIZAEACEAE

Anemia adiantifolia (L.) Sw.
Description: Fern.
Distribution: Florida, Greater Antilles, Trinidad, Mexico, Guatemala, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, Barbados
Biogeography: Wider Distribution
Plant Category: Pter

Anetium citrifolium (L.) Splitg.
Description: Fleshy epiphytic/lithophytic fern; fronds10-40cm long.
Distribution: Greater Antilles, except Cuba; Tobago, Trinidad, continental tropical America from Guatemala to Brazil
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

SCROPHULARIACEAE

Alectra fluminensis (Vell.) Stearn
Description: Annual herb; 30-75cm tall.
Distribution: Hispaniola, Jamaica, Puerto Rico, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Capraria biflora L.
Common Name(s): Wild tea, goatweed.
Description: Herb; to 60cm tall.
Distribution: Florida, Greater Antilles, Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Barbuda, Antigua, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Lindernia crustacea (L.) F. Muell.
Description: Herb; to 20cm tall.
Distribution: Jamainca, Hispaniola, Puerto Rico, Central America, Trinidad, South America
Lesser Antilles Distribution: Montserrat, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Mecardonia procumbens (Mill.) Small
Description: Procumbent herb; stems to 40cm long.
Distribution: Southern US, Cuba, Hispaniola, Puerto Rico, Mexico, Central America to Argentina
Lesser Antilles Distribution: Montserrat, Antigua, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Scoparia dulcis L.
Common Name(s): Sweet broom.
Description: Annual herb; to 1m tall.
Distribution: Nearly pantropical and pansubtropical as a weed.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Wider Distribution
Plant Category: Di

SELAGINELLACEAE

Selaginella flabellata (L.) Spring
Description: Fern; stoloniferous; stems 8-45cm long.
Distribution: Probably endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadleoupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Lesser Antilles
Plant Category: Pter

Selaginella substipitata Spring
Description: Fern: main stems 15-30cm long.
Distribution: Hispaniola, Puerto Rico, Trinidad
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadleoupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Pter

Selaginella tenela (P.Beauv.) Spring
Description: Fern: main stems 5-14cm long.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadleoupe, Dominica, St. Lucia, St. Vincent.
Biogeography: Caribbean
Plant Category: Pter

SIMAROUBACEAE

Picramnia pentandra Sw.
Common Name(s): Gohallow.
Description: Shrub or small tree; to 5m tall.
Distribution: Greater and Lesser Antilles, northern south America.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Barts, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Di

Picrasma excelsa (Sw.) Planch.
Common Name(s): Bitter tree, bitter ash, raw dog.
Description: Tree; to 9m long.
Distribution: Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Venezuala
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Simarouba amara Aubl.
Common Name(s): Tom tar, boardwood, maruba.
Description: Tree; to 30m tall.
Distribution: Central and South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

SOLANACEAE

Acnistus arborescens (L.) Schltdl.
Common Name(s): Hollow heart, wild tobaco.
Description: Shrub or small tree; to 12m tall.
Distribution: Greater Antilles, Central America, South America
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Brunfelsia americana L.
Common Name(s): Lady of the night.
Description: Shrub or small tree; to 5m tall.
Distribution: Hispaniola, Puerto Rico, but cultivated elsewhere in the Neotropics
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Caribbean
Plant Category: Di

Cestrum laurifolium L'H,r.
Common Name(s): Candlewood, torch.
Description: Shrub; to 5m tall.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

Datura stramonium L.
Common Name(s): David bush.
Description: Erect annual; to 1m tall.
Distribution: Native to Mexico but growing as a weed in many countries
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Antigua, St. Kitts, Guadeloupe, Martinique, St. Vincent, Barbados.

Biogeography: Introduced
Plant Category: Di

Lycopersicon esculentum Mill.
Common Name(s): Tomato.
Cultivated: food plant
Lesser Antilles Distribution: Montserrat and probably other islands
Biogeography: Introduced
Plant Category: C-Di-Intro

Nicotiana tabacum L.
Description: Annual herb; often persisting; to 2m tall.
Distribution: Native of Tropical the Neotropics, commonly cultivated
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Redonda, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Physalis turbinata Medik.
Description: Annual; to 1m tall.
Distribution: Greater Anilles, Mexico, Central America
Lesser Antilles Distribution: Antigua, Montserrat, Martinique, St. Vincent, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Solandra grandiflora Sw.
Description: Climbing vine or epiphyte.
Distribution: Greater Antilles, Panama, northern South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Wider Distribution
Plant Category: Di

Solanum americanum Mill.
Common Name(s): Ink balls, nightshade.
Description: Herb; to 0.6m tall.
Distribution: Nearly cosmopolitan in tropical areas as a weed.
Lesser Antilles Distribution: Montserrat, Barbuda, Antigua, Saba, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Solanum capsicoides All.
Common Name(s): Cockroach berry.
Description: Perennial herb; to 0.5m tall.
Distribution: Native to South America but wide spread in tropics as a weed
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Solanum racemosum Jacq.
Common Name(s): Canker berry, gut apple, conka berry.
Description: Shrub; to 2m.
Distribution: St Croix, Virgin Islands
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada
Biogeography: Restricted Range
Plant Category: Di

Solanum seaforthianum Andr.
Common Name(s): St. Vincent lilac.
Description: Vine; to 6m long.
Distribution: Native to S America but widely cultivated and naturalized in tropical areas.
Lesser Antilles Distribution: Montserrat, Saba, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados.
Biogeography: Introduced
Plant Category: Di

Solanum torvum Sw.
Common Name(s): Turkey berry, boo, quashy, wild egg plant.
Description: Shrub; to 3m tall.
Distribution: Native of tropical America now widely naturalized in all tropical areas.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Solanum tuberosum L.
Common Name(s): Potato.
Cultivated: food plant
Lesser Antilles Distribution: Montserrat and other islands
Biogeography: Introduced
Plant Category: C-Di-Intro

STERCULIACEAE

Ayenia insulicola Crist¢bal
Description: Decumbent sub-shrub; to 3dm tall.
Distribution: Bahamas, Hispaniola, Puerto Rico, Virgin Islands.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, St. Eustatius, St. Kitts, Guadeloupe.
Biogeography: Caribbean
Plant Category: Di

Brachychiton acerifolium F.Muell.

Notes: Recorded as growing in a BG in Mrat
Distribution: Native to Austraia
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Guazuma ulmifolia Lam.
Common Name(s): Gun-stock.
Description: Tree; occasionally shrub-like; 8-20m tall.
Distribution: Neotropics and introduced in India and neighbouring countries, Hawaii and Java.
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Melochia nodiflora Sw.
Common Name(s): Mauve.
Description: Shrub; occasionally herbaceous; 0.8-3m tall.
Distribution: Mexico, Central and northern South America, West Indies.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Melochia pyramidata L.
Common Name(s): Mauve.
Description: Erect or spreading herb; to 1m tall.
Distribution: Neotropics, introduced in Indomalesia-Australia.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, St. Lucia, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Melochia tomentosa L.
Common Name(s): Black widow, balsam.
Description: Erect or spreading shrub or subshrub; 0.5-3 m tall.
Distribution: Southern Florida, Mexico, West Indies, northern South America, Infrequent in Central America.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Sterculia apetala (Jacq.) H. Karst.
Distribution: Neotropics
Lesser Antilles Distribution: Montserrat, St. Kitts
Biogeography: Introduced
Plant Category: C-Di-Intro

Sterculia caribaea R. Br.
Common Name(s): Mahot, wild mahot.
Description: Tree; to 16.5 (-35)m tall.
Distribution: Endemic to the large volcanic islands of the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent.
Biogeography: Lesser Antilles
Plant Category: Di

Theobroma cacao L.
Common Name(s): Cocoa.
Description: Tree; 4-8m tall.
Invasiveness: Naturalised.
Distribution: Mexico, northern Central America, nothern-central South America; cultivated elsewhere
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent,Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Waltheria indica L.
Common Name(s): Marsh-mallow, velvet leaf, monkey bush, boater bush, leather coat, buff coat.
Description: Shrub or woody herb; 0.7-2 m tall.
Notes: Specimens from Jamaica, Trinidad, Tobago.
Distribution: A pantropical weed native to the New World, introduced and naturalized in the Old World.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

STRELITZIACEAE

Ravenala madagascariensis Sonn.
Common Name(s): Traveler's palm.
Description: Palmlike trunk; leaves distichous forming a conspicuous fan-like mass.
Notes: sited by S. Robbins and M. Hamilton at the National Trust BG
Distribution: Madagascar
Lesser Antilles Distribution: *Montserrat
Biogeography: Introduced
Plant Category: Mo

STYRACACEAE

Styrax glaber Sw.
Common Name(s): Crump wood.
Description: Tree; to 8m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St Kitts, Guadeloupe, Dominica, Martinique, St Lucia.
Biogeography: Lesser Antilles

Plant Category: Di

SURIANACEAE

Suriana maritima L.
Description: Compact shrub; to 1.5m tall.
Distribution: Florida, Central America, Bahamas, Greater Antilles, northern South America, Madagascar, Polynesia, New Guinea, Australia
Lesser Antilles Distribution: Montserrat, Anguilla, Barbuda, Antigua, Guadeloupe, La Desirade, Martinique, the Grenadines, Grenada
Biogeography: Wider Distribution
Plant Category: Di

SYMPLOCACEAE

Symplocos martinicensis Jacq.
Common Name(s): Caca-rat, white beech.
Description: Small tree; to 4m tall.
Distribution: Puerto Rico, Virgin Islands, Trinidad and the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Di

THEACEAE

Freziera undulata (Sw.) Willd.
Common Name(s): Mountain parrot, pigeonberry, wash'way gunstock.
Description: Shrub or small tree; 1-8m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St Vincent Grenada.
Biogeography: Lesser Antilles
Plant Category: Di

Ternstroemia elliptica Sw.
Description: Shrub or small tree; 1.5-5 (-10)m tall.
Distribution: Endemic to the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Antigua, St kitts, Nevis, Guadeloupe, Dominica, Martinique, St Vincent.
Biogeography: Lesser Antilles
Plant Category: Di

Ternstroemia peduncularis DC.
Description: Shrub or tree; 2-10m tall.
Distribution: Greater and Lesser Antilles, excluding Jamaica.
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia.
Biogeography: Caribbean
Plant Category: Di

THELYPTERIDACEAE

Thelypteris angustifolia (Willd.) Proctor
Description: Terrestrial fern; fronds 15-50cm long.
Distribution: Greater Antilles, St. Thomas, continental tropical America from Costa Rica to Bolivia
Lesser Antilles Distribution: Montserrat.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris balbisii (Spreng.) Ching
Description: Terrestrial fern; fronds 40-110cm long.
Distribution: Greater Antilles, Tobago, Trinidad, Central America, northern South America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris clypeolutata (Desv.) Proctor
Description: Terrestrial fern; fronds 25-40cm long.
Distribution: Endemic to the Lesser Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Lesser Antilles
Plant Category: Pter

Thelypteris decussata (L.) Proctor
Description: Terrestrial fern; fronds 1-2.8m long.
Distribution: Gretaer Antilles, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris germaniana (F,e) Proctor
Description: Terrestrial fern; fronds 500-100cm long.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Caribbean
Plant Category: Pter

Thelypteris glandulosa (Desv.) Proctor
Description: Terrestrial fern; fronds to 1m long.
Distribution: Tobago, Trinidad, Guyana
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, St Lucia, St. Vincent, Grenada.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Pter

Thelypteris interrupta (Willd.) K. Iwats.
Description: Terrestrial fern; fronds to 1m long.
Distribution: Pantropical

Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Marie Galante, Martinique.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris nephrodiodes (Klotzsch) Proctor
Description: Terrestrial fern; fronds 30-75cm long.
Distribution: Greater Antilles, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris opposita (Vahl) Ching
Description: Terrestrial fern; fronds 25-100cm long.
Distribution: Puerto Rico, Tobago, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris patens (Sw.) Small var. *patens*
Description: Terrestrial fern; fronds 40-120cm long.
Distribution: Florida, Greater Antilles, continental tropical America from Mexico to Argentina
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris patens (Sw.) Small var. *scabriuscula* (C.Presl) A.R.Sm.
Description: Terrestrial fern; fronds 40-120cm long.
Distribution: Greater Antilles, Trinidad, continental tropical America from El Salvador to northwestern Argentina and Peru
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris pennata (Poir.) C.V. Morton
Description: Terrestrial fern; fronds 35-75cm long.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America from Mexico to Venezuela and Equador
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris poiteana (Bory) Proctor
Description: Terrestrial fern; fronds 20-35cm long.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America from Guatemala to Peru and Brazil
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris quadrangularis (F,e) Schelpe var. *quadrangulari*
Description: Terrestrial fern; fronds 18-55cm long.
Distribution: Greater Antilles except Puerto Rico; Tobago, Trinidad, continental tropical America from Mexico to Bolivia
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris quadrangularis (F,e) Schelpe var. *inconstans* (C.Chr.) A.R.Sm.
Description: Terrestrial fern; fronds 18-55cm long.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Martinique, St. Vincent, Grenada.
Biogeography: Caribbean
Plant Category: Pter

Thelypteris reticulata (L.) Proctor
Description: Terrestrial fern; fronds 50-120cm long.
Distribution: Florida, Greater Antilles, Tobago, Trinidad, continental tropical America, from Mexico to Brazil
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Thelypteris tetragona (Sw.) Small var. *tetragona*
Description: Terrestrial fern; fronds 30-45cm long.
Distribution: Florida, Greater Antilles, Trinidad, continental tropica America from Mexico to Brazil and Equador
Lesser Antilles Distribution: Montserrat, St. Barthelemy, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

THEOPHRASTACEAE

Jacquinia armillaris Jacq.
Common Name(s): Torchwood.
Description: Shrub or small tree; to 5m tall.
Distribution: Hispaniola, Puerto Rico, Virgin Islands, Trinidad, northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Do-

minica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barba
Biogeography: Wider Distribution
Plant Category: Di

THYMELAEACEAE

Daphnopsis americana (Mill.) J.R. Johnst.
Common Name(s): Bitter mahoe.
Description: Shrub or tree; to 15m tall.
Distribution: Central America, Columbia, Venezuela, Puerto Rico
Lesser Antilles Distribution: Montserrat, St. Martin, Antigua, Saba, St. Eustatius, St. Kitts, Nevis,Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

TILIACEAE

Corchorus aestuans L.
Description: Annual herb; erect or decumbent and subwoody.
Distribution: Pantropical but ost abundant in the West Indies
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Eustatius, St. Kitts, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Triumfetta lappula L.
Common Name(s): Mahot.
Description: Shrub; to 2m tall.
Distribution: Mexico, Central and South America, West Indies
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, Guadeloupe, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada.
Biogeography: Wider Distribution
Plant Category: Di

Triumfetta semitriloba Jacq.
Common Name(s): Nedyah, black bush.
Description: Shrub; 0.5-2 m tall.
Distribution: Neotropics, also found in Africa.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, St. Eustatius, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

ULMACEAE

Celtis iguanaea (Jacq.) Sarg.
Description: Woody vine or shrub.
Distribution: United States, Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Vincent, the Grenadines, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Trema lamarckiana (Roem. & Schult.) Blume
Description: Tree; to 10m tall.
Distribution: Florida, Greater and Lesser Antilles.
Lesser Antilles Distribution: Montserrat, Saba, St. Austatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Vincent.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

URTICACEAE

Boehmeria ramiflora Jacq.
Description: Shrub or small tree; to 8m tall.
Key ID Feature: young stems and leaves densely appressed-hirsute.
Distribution: Central America, South America, Jamaica, Hispaniola
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Laportea aestuans (L.) Chew
Description: Annual herb; to 1.2m tall.
Distribution: Mexico, Central America, Greater Antilles, South America
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Kitts, Nevis, Guadelupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Pilea herniariodes Lindl.
Description: Prostrate herb; monoecious.
Distribution: Florida, Central America, South America, West Indies
Lesser Antilles Distribution: Montserrat, Anitgua
Biogeography: Wider Distribution
Plant Category: Di

Pilea hyalina Fenzl
Description: Erect herb; monoecious; to 3m tall.
Distribution: Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Martinique
Biogeography: Wider Distribution
Plant Category: Di

Pilea inaequalis (Jussieu) Wedd.
Description: Erect, scandent or repent herb; to 4 dm tall.

Key ID Feature: monoecious; stems puberulent with clear unicellular trichomes.
Distribution: West Indies
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Di

Pilea microphylla (L.) Liebm.
Description: Erect or sprawling herb; to 4 dm tall.
Key ID Feature: common on rocky outcrops and old foundation walls
Distribution: Neotropics
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St Eustatius, Nevis, Redonda, Guadeloupe, Marie Galante, Dominca, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Pilea nummulariifolia (Sw.) Wedd.
Description: Trailing herb; moneocious or dioecious.
Distribution: West Indies.
Lesser Antilles Distribution: Montserrat, St. Barts, Antigua, Saba, St. Kitts, Nevis, Guadeloupe, Marie Galante, Dominica, St. Lucia, Barbados
Biogeography: Caribbean
Plant Category: Di

Pilea rivoirae Wedd.
Description: Erect herb; to 2m tall; generally dioecious.
Distribution: Cuba, Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada
Biogeography: Caribbean
Plant Category: Di

Pilea semidentata Wedd.
Description: Erect herb; to 8dm tall; generally monoecious.
Distribution: Hispaniola, Puerto Rico
Lesser Antilles Distribution: Montserrat, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia
Biogeography: Caribbean
Plant Category: Di

Pilea serpyllifolia (Poir.) Wedd.
Description: Erect herb; to 4dm tall; dioecious.
Distribution: Central America, West Indies
Lesser Antilles Distribution: Montserrat, St. Martin, Barbuda, Saba, Guadeloupe, La Desirade, St. Lucia, Grenada
Biogeography: Wider Distribution
Plant Category: Di

Urera caracasana (Jacq.) Steud.
Common Name(s): Nettle tree.
Description: Shrub or tree; to 8 m tall.
Distribution: Mexico, Central and South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent
Biogeography: Wider Distribution
Plant Category: Di

VERBENACEAE

Aegiphila martinicensis Jacq.
Description: Shrub or slender tree; to 5m tall.
Distribution: Jamaica, Puerto Rico, Mexico, Central America and South America
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Citharexylum spinosum L.
Common Name(s): Cutlet, fiddle wood, fig bush, fairy tree.
Description: Shrub or tree; to 12m tall.
Distribution: Lesser Antilles, Northern South America.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Peri-Caribbeanaribbe
Plant Category: Di

Clerodendrum aculeatum (L.) Schltdl.
Common Name(s): Privet, prayer berry, privy hedge, pree-bree.
Description: Shrub; with climbing branches; to 3m tall.
Distribution: Greater and Lesser Antilles, Tobago.
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Caribbean
Plant Category: Di

Clerodendrum chinense (Osbeck) Mabb. var. *chinense*
Lesser Antilles Distribution:
Biogeography:
Plant Category:

Clerodendrum philippinum Schauer
Common Name(s): Stick bush.
Description: Shrub; to 2.5m tall.
Distribution: Native to tropical Asia. Widely cultivated, escaped and well established in the tropics
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Clerodendrum philippinum Schauer
Description: Shrub; to 2.5m tall.
Distribution: Native of tropical Asia, widely cultivated, escaped and well established in the tropics.
Lesser Antilles Distribution:
Biogeography: Introduced
Plant Category: Di

Clerodendrum speciosissimum Van Geert ex Morren
Description: Shrub; to 2m tall.
Distribution: Native to Southeastern Asia but widely cultivated, escaping and persisting in tropical areas
Lesser Antilles Distribution: Montserrat, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique.
Biogeography: Introduced
Plant Category: Di

Clerodendrum umbellatum Poir. var. *speciosum* (Dombrain) Moldenh., Reported as occurring in Montserrat as this name in Flora of Lesser Antilles, but var. speciosum is not validly published.
Nomenclature Notes: Reported as occurring in Montserrat as this name in Flora of Lesser Antilles, but var. speciosum is not validly published.
Cultivated: ornamental
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Martinique
Biogeography: Introduced
Plant Category: C-Di-Intro

Congea tomentosa Roxb.
Cultivated: ornamental
Distribution: Asia
Lesser Antilles Distribution: Montserrat
Biogeography: Introduced
Plant Category: C-Di-Intro

Duranta erecta L.
Common Name(s): Pigeon berry.
Description: Shrub or small tree; to 6m tall.
Distribution: Subtropical US, Greater Antilles, Mexico, Central America and South America.
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Gren
Biogeography: Wider Distribution
Plant Category: Di

Gmelina phillippensis Cham.
Cultivated: ornamental
Distribution: Native to Asia
Lesser Antilles Distribution: Montserrat, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Introduced
Plant Category: C-Di-Intro

Holmskioldia sanguina Retz.
Cultivated: ornamental
Lesser Antilles Distribution: Montserrat, Guadeloupe, Martinique, Barbados
Biogeography: Introduced
Plant Category: C-Di-Intro

Lantana camara L.
Common Name(s): Lantana.
Description: Shrub to 3m tall.
Distribution: Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

Lantana involucrata L.
Description: Shrub: 1-2 m tall.
Distribution: Florida, Greatere Antilles, Mexico, south to northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, G
Biogeography: Wider Distribution
Plant Category: Di

Lantana urticifolia Mill.
Description: Shrubs to 3m tall.
Distribution: Cuba, Mexico, Central America and south to Argentina
Lesser Antilles Distribution: Montserrat, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Lippia nodiflora (L.) Michx.
Description: Herbaceous creeping or trailing plants; stems to 1m long.
Distribution: Southeastern US, Greater Antilles, Mexico, Central America through South America, introduced in the Old World
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, Guadeloupe, Martinique, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Petrea kohautiana C. Presl
Common Name(s): Montserrat wreath plant.
Description: Woody vine.
Distribution: Trinidad
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada.
Biogeography: Restricted Range

Plant Category: Di

Priva lappulacea (L.) Pers.
Description: Perennial herb; to 1m.
Distribution: Greater Antilles, Mexico, Central America, South America, introduced to Africa and Asia
Lesser Antilles Distribution: Montserrat, Anguilla, St. Barts, Antigua, Saba, Guadeloupe, La Desirade, Dominica, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Stachytarpheta cayennensis (Rich.) Vahl
Common Name(s): Vervain.
Description: Shrub; 1-2.5m tall.
Distribution: Greater Antilles, Mexico, Central Merica, South America, as a weed in the Old World
Lesser Antilles Distribution: Montserrat, Antigua, St. Kitts, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Stachytarpheta jamaicensis (L.) Vahl
Common Name(s): Vervain.
Description: Herb; 0.6-1.3m tall.
Distribution: Southern US, Greater Antilles, Mexico, Central America, northern South America, and a weed in many tropical areas
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, Antigua, Saba, St. Kitts, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barbados.
Biogeography: Wider Distribution
Plant Category: Di

Stachytarpheta urticifolia Sims
Common Name(s): Rattail.
Description: Herb.
Notes: *sited by UKOTs team feb 06 in Mrat. But not listed as occurring in Flora
Distribution: Trinidad
Lesser Antilles Distribution: *Montserrat, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
Biogeography: Restricted Range
Plant Category: C-Di-Nat

Tectona grandis L.f.
Common Name(s): Teak.
Description: Tree; to 10m tall.
Distribution: Native to S.E. Asia, introduced and persisting in the Lesser Antilles.
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Introduced
Plant Category: Di

Vitex divaricata Sw.
Description: Tree; to 20m tall.
Distribution: Cuba, Hispaniola, Puerto Rico, Trinidad
Lesser Antilles Distribution: Montserrat, Antigua, Guadeloupe, La Desirade, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Barbados.
Biogeography: Caribbean
Plant Category: Di

VISCACEAE

Phoradendron trinervium (Lam.) Griseb.
Description: Woody parasite.
Distribution: Costa Rica, Panama, Venezuela, Jamaica, Cayman Islands, Hispaniola, Purto Rico, Bahamas, Trinidad, Tobago, Curacao, Margarita
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, Guadeloupe, La Desirade, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Barbados
Biogeography: Wider Distribution
Plant Category: Di

VITACEAE

Cissus verticillata (L.) Nicolson & Jarvis
Common Name(s): Pudding bush, godmort, snake vine.
Description: Vine.
Distribution: Southern Florida, Mexico, Central and northern South America, West Indies
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, Marie Galante, Les Saintes, Dominica, Martinique, St. Lucia, St. Vincent, the Grenadines, Grenada, Barba
Biogeography: Wider Distribution
Plant Category: Di

VITTARIACEAE

Polytaenium feei (W.Schaffn. ex F,e) Maxon
Description: Fleshy epiphytic/lithophytic fern; fronds 20-55cm long.
Distribution: Greater Antilles, Trinidad, continental tropical America from Mexico to northern South America
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Vittaria graminifolia Kaulf.
Description: Terrestrial/piphytic fern; fronds 10-40cmcm long.
Distribution: Greater Antilles, continental tropical America from Mexico to Brazil
Lesser Antilles Distribution: Montserrat, Guadeloupe, Dominica, Grenada.

Biogeography: Wider Distribution
Plant Category: Pter

Vittaria lineata (L.) Sm.
Description: Epiphytic fern; fronds 30-130cm long.
Distribution: Southeastern US, Bahamas, Greater Antilles, Tobago, Trinidad, continental tropical America from Mexico to Paraguay
Lesser Antilles Distribution: Montserrat, Antigua, St. Eustatius, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

WOODSIACEAE

Diplazium cristatum (Desr.) Alston
Description: Terrestrial fern; fronds 50-85cm long.
Distribution: Greater Antilles, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Diplazium limbatum (Willd.) Proctor
Description: Very large terrestrial fern; fronds up to 3m long.
Distribution: Greater Antilles, Tobago, Trinidad, continental tropical America
Lesser Antilles Distribution: Montserrat, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

Diplazium striatum (L.) C. Presl
Description: Terrestrial fern; fronds 1-2m long.
Distribution: Greater Antilles, Trinidad, continental tropical America from Mexico to northern South America
Lesser Antilles Distribution: Montserrat, Saba, St. Kitts, Nevis, Guadeloupe, Dominica, Martinique, St Lucia, St. Vincent, Grenada.
Biogeography: Wider Distribution
Plant Category: Pter

ZINGIBERACEAE

Renealmia alpinia (Rottb.) Maas
Description: Herbaceous perennial; 1-6m tall.
Distribution: throughout the Neotropics, except the Greater Antilles
Lesser Antilles Distribution: Montserrat, St. Kitts, Guadeloupe, Dominica, Martinique, St. Vincent, Grenada
Biogeography: Wider Distribution
Plant Category: Mo

ZYGOPHYLLACEAE

Guaiacum officinale L.
Common Name(s): tree of life, Lignum vitae, manlira.
Description: Tree; to 10m tall.
Distribution: Bahamas, Greater Antilles, Venezuela, Columbia
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Barbuda, Antigua, Guadleoupe, La Desirade, Dominica, Martinique, St. Vincent, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Kallstroemia maxima (L.) Hook. & Arn.
Description: Annual herb; stems prostrate; to 60cm tall.
Distribution: Texas, Mexico, Central America, Greater Antilles, northern South America
Lesser Antilles Distribution: Montserrat, Anguilla, St. Martin, St. Barts, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, La Desirade, Dominica, Martinique, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Kallstroemia pubescens (Don) Dandy
Description: Annual herb; to 50cm tall.
Distribution: Florida, Mexico, Central America, Greater Antilles, northern South America
Lesser Antilles Distribution: Montserrat, St. Barts, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Guadeloupe, St. Vincent, the Grenadines, Grenada, Barbados
Biogeography: Wider Distribution
Plant Category: Di

Appendix 2. Species lists of the beetles, non-beetle hexapods and non-hexapod invertebrates of Montserrat

M. A. Ivie, K. A. Marske, I. A. Foley & L. L. Ivie

The beetles of Montserrat: an annotated checklist

Below are listed all of the beetles known to us from Montserrat, organized by family. Each has a name at the level we are able to assign it. Each has a code indicating the species' distributional status (Table A), from single island endemic to invasive exotic. The symbol "?" associated with this ranking, indicates our lack of knowledge of a particular taxon. Following the distributional code is the original citation (if any) of the species from Montserrat, as well as any notes. This format is also followed for the sections on non-beetle hexapods and the non-hexapods invertebrates.

Table A. Key to Distributional Status

Distributional status	Code	Description
Island Endemic	IE	Montserrat only
Local Endemic	LE	Few islands, i.e St. Kitts, Montserrat & Guadeloupe
Leeward Island Endemic	LIE	Sombrero to Dominica
North Eastern Caribbean Endemic	NEC	Puerto Rico to Dominica
Lesser Antilles Endemic	LAE	Sombrero to Grenada
West Indian Endemic	WIE	Not on mainland, or only south Florida
Widespread Native	WN	West Indies and Mainland
S. America and Lesser Antilles Native	SA	Sombrero to Grenada & S. America
Native	N?	Full distribution unknown
Exotic	EIS	Invasive Species (exotic species not introduced on purpose)
Biological Control Agent	EBC	Exotic spp introduced for beneficial purpose
Status Uncertain	?	Identity not yet ascertained, or range in dispute

COLEOPTERA

Rhysodidae

Clinidium (s.str.) n.sp. nr planum	IE

Carabidae (determined by George Ball and Danny Shpeley, with individual species determined by Wendy Moore, James Liebherr and Terry Erwin)

Cicindela trifasciata Fabricius	WN
Eohomopterus n.sp. (being described by W. Moore)	IE
Aspidoglossa schach (Fabricius)	WN

Bembidion darlingtoni Mutchler	WIE
Mioptachys sp.	? [Leng & Mutchler (1917) recorded *Mioptachys autumnalis* Bates from Montserrat. This species was described from Central America, and has been reported from Cuba and Guadeloupe. However, this genus has never been revised, and the limits of *M. autumnalis* never delimited. Therefore, this published record and our specimens are treated here as *M.* sp. until the specimens involved can be brought together and critically examined.]
Elaphropus singularis Andrews	EIS
Tachys ensenada Mutchler	WN
Paratachys (Eotachys) blemoides Jeannel	EIS
Paratachys sp. #1	?
Paratachys sp. #2	?
Paratachys sp. #3	?
Micratopus insularis? Darlington	NEC
Glyptolennus chalybaeus (Dejean)	WN [Liebherr (1997), not recollected]
Selenophorus alternans Dejean	WIE?
Selenophorus chalybaeus Dejean	WIE
Selenophorus sinuatus Gyllenhal	WIE?
Selenophorus n.sp.?	IE?
Selenophorus subquadratus Putzeys	WIE
Selenophorus discopunctatus Dejean	WN
Selenophorus propinquus Putzeys	NEC
Notiobia pallipes Bates	EIS
Athrostrichus paganus Dejean	WN
Pentagonica flavipes (LeConte)	WN
Zuphium sp.	?
Perigona nigriceps Dejean	EIS
Apenes marginalisDejean	WN
Apenes chalumeaui Ball & Shpeley	LIE
Menidius amandus Newman	EIS?/WN?
Lebia pleurodera Chaudior	WN

Rejected Record: Erwin and Sims 1984 recorded the very large, rare South American and Trinidadian species *Enceladus gigas* Bonelli from Montserrat, but it seems certain that this was either a mislabeled or misinterpted specimen. Since Montserrat is a common place name in Latin America, including a place name in Trinidad, the specimen must have been from a Montserrat in Trinidad or northern South America. A search for the specimen in question at the NMNH in 2007 did not turn up the source of the record, but at some point between 1984 and 2007, Erwin dropped the record from his distributional database (T. Erwin, pers. com.).

Fig. A. *Eohomotperus* n.sp. (Photo: Wendy Moore)

Dytiscidae

Bidessonotus sp.	N?
Copelatus sp. nr. *posticalus* (F.)	N?
Hydrovatus sp.	N?
Laccophilus proximus (Say)	WN
Laccophilus sp.	N?
Megadytes gigantea LaPorte	WN
Rhantus calidus (Fabricius)	WN
Thermonectes basilaris (Harris)	WN

Histeridae (some determinations by A. Ramsdale)

Omalodes laevigatus Quensel	WN
Aeletes lissosternus Wenzel	IE
Bacanius sp. #1	N?
Bacanius sp. #2	N?
Hister servus Erichson	WN
Atholus confinus (Erichson)	WIE [Cooter 1983, Stevens & Waldmann as A. confirnis (lapsus)]
Hypocaccus sp.	N?
Carcinops? sp.	N?
Teretriosoma sp.	N?
Paromalus? sp.	N?

Hydrophilidae

Dactylosternum abdominale (F.)	WN [Leng & Mutchler 1917]
Hydrophilus insularis actorum	WN

Cercyon atricapillus (Marshall)	WN
Cercyon variegatus Sharp	WN
Aculomicrus n.sp.	IE
Tropisternus lateralis Laporte	WN
Tropisternus chalybeus Laporte	WN [Leng & Mutchler 1917]
Phaenonotum exstriatum (LeConte0	WN
Pelosoma sp.	N?
Berosus sp.	N?
Omicrus subopacus Smetana	WN
Parachymus confusus Woodridge	WN
Enochrus bartletti Short	WIE [Short 2004]
Scydmaenidae	
Scydmaenus guadeloupensis Franz	NEC
Euconnus sp. 1	N?
Euconnus sp. 2	N?
Hydraenidae	
Hydraena guadeloupensis d'Orchymont	
Ptiliidae	
Bambara sp. #1 (+)	N?
Bambara sp. #2	N?
Oligella? sp.	N?
Ptiliolum? sp.	N?
Ptinella sp.	N?
Actinopteryx sp.	N?
Leiodidae	
Zeadolopus sp. #1	IE
Zeadolopus sp. #2	IE
Zeadolopus sp. #3	IE
Staphylinidae	
PSELAPHINAE	
Burus/Bythinophysis? sp.	N?
Hamotus (*Hamotoides) hirtus* Raffray	LAE
Eupsenius sp.	N?
Decarthron nr. or = *insulare* Raffray	N?
Ramelbida sp.	N?
TACHYPORINAE	
Coproporus sharpi Cameron	LAE [Blackwelder 1943]
Coproporus rutilus Erichson	WN [Blackwelder 1943]
Coproporus n.sp.	IE?
Sepedophilus interruptus (Erichson)	WN [Blackwelder 1943, not recollected]
Sepedophilus sp. ("scriptus group")	?
Bryoporus sp. #1	?
Bryoporus sp. #2	?

SCAPHIDIINAE	
Baeocera sp. #1	?
Baeocera sp. #2	?
Baeocera sp. #3	?
Baeocera sp. #4	?
ALEOCHARINAE	
Adinopsis sp. #1	?
Anacyptus testaceus LeConte	WN [Blackwelder 1943]
Aleochara sp. #1	?
Aleochara sp. #2	
Oligota minuta Cameron	WN [Frank, Bennet, Comroy 1992]
Oligota guadeloupae Frank	LE
Hypocyphtini sp. #1	?
Hypocyphtini sp. #2	?
Hypocyphtini sp. #3	?
Hypocyphtini sp. #4	?
Hypocyphtini sp. #5	?
Athetini sp. #1	?
Aleochorinae #1	?
Aleochorinae sp. #2	?
Aleochorinae sp. #3	?
Aleochorinae sp. #4	?
Aleochorinae sp. #5	?
Aleochorinae sp. 6	?
Aleochorinae sp. #7	?
Aleochorinae sp. #8	?
Aleochorinae sp. #9	?
Aleochorinae sp. #10	?
Aleochorinae sp. #11	?
Aleochorinae sp. #12	?
Aleochorinae sp. #13	?
Aleochorinae sp. #14	?
Aleochorinae sp. #15	?
Aleochorinae sp. #16	?
Aleochorinae sp. #17	?
Aleochorinae sp. #18	?
Aleochorinae sp. #19	?
Aleochorinae sp. #20	?
Aleochorinae sp. #21	?

Fig. B. Aleochorinae #22, a representative Aleocharinae. (Photo: Ian Foley and Michael Ivie)

PIESTINAE	
Piestus pygmaeus (Laporte)	WN
OSORIINAE	
Clavilispinus guadeloupensis Irmler	WN
Clavilispinus megacephalus (Fauvel)	WN
Clavilispinus politus (Sharp)	WN
Clavilispinus exiguus (Erichson)	WN
Espeson moratus Schaufuss	WN [Blackwelder 1943, not recollected]
Lispinus sp.? *attenuatus*	WN
Lispinus insularis Fauvel	WN [Blackwelder 1943]
Nacaeus impar (Cameron)	WN [Blackwelder 1943]
Nacaeus nigrifrons (Fauvel)	WIE [Blackwelder 1943]
Nacaeus foveolus (Blackwelder)	IE [Blackwelder 1943, not recollected or poss. = Nacaeus sp. #1]
Nacaeus sp. #1	?
Thoracophorus simplex Wendeler	WIE [Blackwelder 1943]
Thoracophorus guadelupensis Cameron	WN
Pseudepeson crassulus (Fauvel)	LAE [Blackwelder 1943]
Holotrochus sp. #1	?
Holotrochus sp. #2 ? *minor*	WN
OXYTELINAE	
Anotylus insignitus Gravenhorst	WN [Blackwelder 1943]
Anotylus glareosus (Wollaston)	EIS

Apocellus ustulatus (Erichson)	WIE [Blackwelder 1943, not recollected]
Bledius caribbeanus Blackwelder	WN [Blackwelder 1943]
Carpelimus sp.#1	?
Carpelimus sp. #2 prob. *correctus* Blackwelder	WIE
Carpelimus sp.#3	?
Carpelimus sp.#4	?
Carpelimus sp. #5	?
Carpelimus sp.#6	?
Oxytelus incisus Motschulsky	WN [Blackwelder 1943, not recollected]
Thinobius exasperatus Blackwelder	WIE [Blackwelder 1943, not recollected]
Thinodromus croceips Fauvel	WIE [Blackwelder 1943]
PAEDERINAE	
Biocrypta fulvipes (Erichson)	WN
Echiaster microps Blackwelder	IE [Blackwelder 1943]
Lobrathium nitidum(Erichson)	WIE
Lithocharis dorsalis Erichson	WN [Blackwelder 1943]
Lithocharis limbatus Erichson	WN
Lithocharis secunda Blackwelder	WN [Blackwelder 1943]
Lithocharis sororcula Kraatz	WN [Blackwelder 1943]
Lithocharis sp.#1	N?
"*Medon*" complex sp. #1	?
"*Medon*" complex sp. #2	?
"*Medon*" complex sp. #3	?
"Medon" complex sp. #4	?
Microlinus pasio (LeConte)	WN
Pinophilus sp. poss. *vermiformis* Cameron	LAE
Palaminus sp. #1	?
Palaminus sp. #2	?
Palaminus sp. #3	?
Palaminus sp. #4	?
Palaminus sp. #5	?
Scopaeus sp.	?
Stamnoderus sp.	?
Sunius debilicornis Wollaston	WN
STAPHYLININAE	
Atanygnathus sp. 1	?
Atanygnathus sp. 2	?
Belonuchus gagates Erichson	WIE [Blackwelder 1943[
Belonuchus sp. 1	?
Belonuchus sp. 2	?
Belonuchus sp. 3	?
Cafius (*Euremus*) *bistriatus* (Erichson)	WN [Blackwelder 1943, not recollected]
Cafius subtilis Cameron	WIE [Blackwelder 1943, not recollected]
Diochus nanus Erichson	WN
Holisus sp. #1	?
*Holisus*sp. #2	?

Neohypnus attenuatus (Erichson)	WN [Blackwelder 1943]
Neohypnus humeralis (Erichson) New Comb.	WIE [Blackwelder 1943]
Neohypnus illucens (Erichson)	SA [Blackwelder 1943, not recollected]
Neoxantholinus hubbardi (Blackwelder)	IE [Blackwelder 1943]
Philonthus discoideus (Gravenhorst)	WN [Blackwelder 1943, not recollected]
Philonthus hepaticus Erichson	WN [Blackwelder 1943]
Philonthus havaniensis (Laporte).	WIE
Philonthus longicornis Stephens	WN [Blackwelder 1943, not recollected]
Philonthus ventralis (Gravenhorst)	WN [Blackwelder 1943]
Passalidae	
Spasslus crenatus M'Lea	WN
Trogidae	
Omorgus suberosus (Fabricius)	WN
Scarabaeidae	
Scarabaeinae	
Ateuchus insulare (Fleutiaux & Sallé)	LE [Leng & Mutchler 1917 as *Choerisium insulare* Chevrolat, Matthews 1966 as *A. illaesus* Harold]
Onthophagus gazella (F.)	EIS
Aphodiinae (dets by P. Skelley)	
Aphodius nigritus (F.)	EIS [Chapin (1940) as *Aphodius cuniculus* Chevrolat]
Aphodius pseudolividus Balthasar	EIS [Chapin (1940) as *Aphodius lividus* (Olivier)]
Ataenius vincentiae Arrow	LAE
Ataenius gracilis (Melsheimer)	EIS
Ataenius scutellaris Harold	WN or EIS
(Chapin 1940 as *A. frater* Arrow)	
Ataenius cameneni Chalumeau & Gruner	LE
Ataenius scabrellus Schmidt	WN
Ataenius liogaster Bates	EIS
Ataenius brevicollis (Wollaston)	EIS
Ataenius temperei Chalumeau & Gruner	LIE
Ataenius howdeni Chalumeau	LE [=*Ataenius luteomargo* Chapin of Chapin 1940, MisID]
Iguazua blackwelderi (Chapin)	NEC
Melolonthinae	
Phyllophaga montserratensis Arrow	LE [Arrow 1920]
Phyllophaga cneda Saylor	LE [Saylor 1940]
Rutelinae	
Anomala n.sp *insularis* group	IE
Leucothyreus guadulpiensis Burmeister	LIE
Macraspis tristis Castelnau	LE
Rutela s. striata (Olivier)	LE ssp. [Chalumeau 1985]

Fig. C. *Rutela s. striata* (Olivier) Adult, larva and pupa in rotten wood. (Photo: Michael Ivie)

Dynastinae	
Cyclocephala mafaffa Burmeister	SA
Ligyrus cuniculus (Fabricius)	WN [Cooter 1983]
Phileurus valgus Linneaus	WN
Strategus syphax (Fabricius)	LE
Scirtidae	
Scirtes n.sp. 1	IE
Scirtes n.sp. 2, testaceus group	IE
Buprestidae	
Polycesta n.sp.	IE
Chrysobothris sp. *thoracica* group	LE
Micrasta sp. #1, nr. uniformis	IE
Micrasta sp. #2, yellow tarsi	IE
Micrasta sp. #3, yellow tibia - big parameres	IE
Micrasta sp. #4, olive-elytra-blue-pronotum	IE
Micrasta sp. #5, bright-blue-wide	*IE*
Elateridae	
Conoderus sp.	WN
Physorrhinus insularis Candeze	LE
Chalcolepidius n. sp.	IE [Recorded by Leng & Mutchler (1917) and Casari (2002) (cited by Peck 2006) as *Ch. obscurus*, however we have not yet seen the Casari paper, and all true *Ch. obscurus* are dark green, while all Montserrat *Chalcolepidius* are bright red.]
Drapetes nigricans Bonvouloir	WN
Heteroderes amplicollis Gyllenhal	LAE [Cooter, 1983 as *H.* sp.]
Dicrepidius ramicornis P. de Beauvois	WN
Dicrepidius distinctus Fleutiaux & Sallé	LE
Lacon subcostatus (Candeze)	WIE
Anchastus sp. #1	IE
Anchastus sp. #2	IE
Anchastus sp. #3	IE

Eucnemindae

Adelothyreus curtis Fleutiaux	LE
Adelothyreus dufaui Fleutiaux	LE
Fornax sp.	N?
Serrifornax sp. #1	N?
Serrifornax sp. #2	N?

Ptilodactylidae

Ptilodactyla macrophthalma LeGross	WIE

Cantharidae (determined by A. Ramsdale)

Tytthonyx n. sp.	IE
Tylocerus picipennis Leng & Mutchler	IE [Cooter 1983, as undet.]
Tylocerus n.sp.	IE

Lampyridae

Aspisoma ignitum L. EIS/WN [Cooter 1983, Stevens & Waldmann's record from Blackwelder is an error, Blackwelder (1945) did not include Montserrat for this species]

Lycidae

Thonalmus hubardi Leng & Mutchler IE [Robson's 1906 record of an undetermined lampyrid is really for a *Thonalmus*, but could be either of these species, first certain record the description by Leng & Mutchler 1922] (move this to after next Thonalmus)

Thonalmus sinuaticostis Leng & Mutchler IE [Leng & Mutchler 1922]

Fig. D. Thonalmus sp. (Photo: Michael Ivie)

Dermestidae

Dermestes maculatus DeGeer	EIS
Trogoderma ornatum Say	EIS (Cooter 1983)

Bostrichidae

Melalgus caribeanus (Lesne)	LAE
Amphicerus cornutus (Pallas)	EIS?/WN
Tetrapriocera longicornis (Olivier)	EIS?/WN
Xylomeira tridens (Fabricius)	EIS?/WN [Fisher 1950]
Xylopsocus capucinus (Fabricius)	EIS
Dinoderus minutus (Fabricius)	EIS
Lyctus caribbeanus Lesne	WN

Minthea rugicollis (Walker) EIS

Rejected record. *Apate monarchus* Boh. (sic) unsupported record Stevens and Waldmann 2001

Anobiidae

Xyletinus marmoratus Pic LE
Protheca sp. 1 N?
Protheca sp. 2 N?
Tricorynus ?pierriei (Lepesme) LIE?
Pseudodorcatomus ?mariei Lepesme LE
Calymmaderus sp. nr. *dufaui* Pic IE?
Microzogus sp. 1 N?
Microzogus sp. 2 N?
Microzogus sp. 3 N?
Caenocara maculatum Fisher NEC
Cryptorama carinatum White NEC
Cryptorama megalops White NEC
Cryptorama ?antillensis White WN
Cryptorama sericeum aureum (Lepesme) LE
Cryptorama sp. 1 IE
Cryptorama sp. nr. *impunctaum* White IE?
Cryptorama sp. nr. *tortolensis* White IE?
Cryptorama sp. nr. *minor* Fall IE?
Cryptorama sp. nr. *rufescens* White IE?
Petalium sp. 1 N?
Petalium sp. 2 N?
Petalium ?antillarum Pic WN
Trichodesma sp. 1 IE?
Trichodesma sp. 2 IE?
Trichodesma sp. 3 IE?
Trichodesma sp. 4 IE?
Trichodesma sp. 5 IE?
Stichtoptenus n.sp. nr. *dufaui* Pic IE
Megorama sp. N?
Ptinus strangulates Fall WN
Ptinus dufaui Pic LE
Gibbium aequinoctiale Boieldieu EIS [Leng & Mutch. 1917 as *Gibbium psylloides* Czempinski]

Fig. E. *Trichodesma* sp. (Photo: Ian Foley and Michael Ivie)

Jacobsoniidae

Derolathrus or near sp.	?

Trogossitidae

Tenebroides transversicollis Jacquelin du Val	WN
Temnochila obscura Reitter	WN?
Temnochila sp.	IE?
Colydobius n.sp.	IE
Nemosoma n.sp.	IE

Cleridae (determinations assisted by W. Opitz)

Neorthopleura murina (Klug)	WIE
Madoniella pici Lepesme	LIE
Pelonium n.sp.	LIE

Melyridae

Melyrodes n.sp.	LE?
Albrechrus n.sp.	IE

Lymexylidae

Atractocerus brasiliensis Lepeletier & Audinet-Ser.	WN

Sphindidae

Sphindus sp.	N?

Nitidulidae

Lobiopa insularis (Castelnau)	WN
Epuraea (*Haptoncus*) *luteolus* (F.)	WN

Stelidota strigosa (Gyllenhal)	WIE
Stelidota coenosa Erichson	WIE
Stelidota ruderata Erichson	WIE
Macrostola vertraci Grouvelle	LIE
Carpophilus humeralis (Fabricius)	EIS
Carpophilus dimidiatus (Linneaus)	EIS [Leng & Mutchler 1917]
Carpophilus sp.	N?
Colopterus infimus (Erichson)	N?
Cilleaus n.sp.	IE
Contotelus conicus (Fabricius)	WIE [Leng & Mutchler 1917]

Smicripidae

Smicrips sp.	N?

Monotomidae

Europs sp. #1	N?
Europs sp. #2	N?
Europs sp. #3	N?
Europs sp. #4	N?
Monotoma. sp.	?

Silvanidae

Silvanoprus scuticollis (Walker)	EIS
Monanus concinnus (Walker)	EIS
Telephanus nodicornis Neverman	LE [Described from Montserrat and Guadeloupe by Nevermann 1932, not recollected. Stevens and Waldmann's assertion of single-island endemic status in error.]

Laemophloeidae

Cryptolestes unicornis (Reitter)	WN
Laemeophoelus sp. #1	N?
Laemeophoelus sp. #2	N?
Placonotus ?patruellus Thomas	WN
Placonotus planifrons Thomas	LAE
Placonotus modestus (Say)	WN
Placonotus politissimus (Wollaston)	EIS
Placonotus ?patruellus Thomas	WN
Placonotus sp. nr. *pallentipennis* & *patruellus*	N?
Dysmerus sp.	N?
Lepidophloeus n.sp.?	IE?
Lathropus pictus Schwarz	WN

Fig. F. *Lepidophloeus* sp. (Photo: Ian Foley and Michael Ivie)

Phalacridae

Ochrolitus tristriatus Casey	WN
Olibrus sp.	N?
Litolibrus sp.	N?

Cryptophagidae

Ephistemus sp.	N?

Languriidae

Toramus #1	N?
Toramus #2	N?
Loberus sp.	N?
Hapalips angulosus Grouvelle	LIE
Hapalips nr. *guadeloupensis* Grouvelle	IE?
Cryptophilus integer (Heer)	EIS
Platoberus dufaui Grouvelle	LE
Telmatoscius sp.	N?

Cerylonidae. (some determinations by S. S. Ślipiński)

Philothermus puberulus Schwarz	WN [Leng & Mutchler 1917]
Euxestes erithacus (Chevrolat)	EIS
Mychocerus sharpi (Champion)	WN
Ostomopsis neotropcalis?	N?
Botrodus sp#1 *dufaui*?	N?
Botrodus sp#2 *estriatus*?	N?

Bothrideridae

Sosylus sp.	N?
Bothrideres dufaui Grouvelle	LE

Endomycidae

n. genus #1 sp.	N?
n. genus #2 sp.	N?
Displotera sp.	EIS
Holoparamecus sp.	EIS

Coccinellidae (dets by R. Gordon)

Cycloneda sanguinea limbifer Casey	WIE [Cooter 1983]
Coelophora inaequalis (F.)	EBC
Cryptolaemus monstrouzieri Mulsant	EBC
Chilocerus cactus (L.)	EBC
Psyllobora lineola (F.)	NEC
Diomus ochroderus (Mulsant)	WIE
Diomus #1	N?
Diomus #2	N?
Diomus #3	N?
Diomus #4	N?
Diomus roseicollis (Mulsant)	WN
Neaptera viola Gordon	IE [Gordon 1991]
Nephaspis n. sp	LE
Scymnus phloeus Mulsant	NEC
Scymnus floralis (Fabricius)	NEC [Leng & Mutchler 1917 as *S. loewii*]
Scymnus (*Pullus*) sp.	N?
Zilus sp.	IE
Stethorus albipes (Mulsant)	WIE
Decadiomus hubbardi Chapin	*NEC*
Coccidophilus cariba Gordon	*SA [Gordon 1978]*
Prodilis n.sp.	*LE*
Delphastus nebulosus Chapin	*WIE*
Calloeneis n.sp.	*IE*
Hyperaspis sp.	*N?*

Corylophidae

Arthrolips sp. # 1	N?
Arthrolips sp. # 2	N?
Arthrolips sp. # 3	N?
Arthrolips sp. # 4	N?

Arthrolips sp. # 5	N?
Clypastraea sp.	N?
Holopsis sp. #1	N?
Holopsis sp. #2	N?
Corylophid sp. #1	N?
Latridiidae	
Cortodere constricta (Gyllenhal)	EIS
Cortilena picta (LeConte)	EIS
Mycetophagidae	
Litargus balteatus LeConte	WN [Leng & Mutchler 1917]
Thrimolus minutus Casey	WN
Berginus sp.	N?
Ciidae	
Orthocis sp. #1	N?
Orthocis sp. #2	N?
Cis sp. #1	N?
Cis sp. #2	N?
Cis sp. #3	N?
Cis creberrimus Mellie	WN
Cis melliei Coquerel	WN
Ceracis #1	N?
Ceracis #2	N?
Mordellidae	
Glipostenoda pallida (Champion)	LAE
Tolidomordella sp.	N?
Mordella sp. #1	N?
Mordella sp. #2	N?
Falsomordellistena sp.	N?
Meloidae	
Cissites maculata (Swederus)	WN
Pseudozonitis marginata (Fabricius)	WIE
Tetraonyx quadrimaculatus (Fabricius)	WN [Leng & Mutchler 1917, not recollected]
Melandryidae	
Orchesia sp.	N?
Rhipiphoridae	
Macrosaigon cruenta Germar	WN

Fig. G. *Macrosaigon cruenta* Germar. (Photo: Ian Foley and Michael Ivie)

Zopheridae

Hyporrhagus sp.	?
Pycnomerus biimpressus (Reitter)	WN
Pycnomerus uniformis Ivie & Ślipiński	LIE

Colydiidae

Lemnis lhermimieri Grouvelle.	LE
Bitoma sp.	?
Colydodes mammalaris (Pascoe)	WN
Synchita sp. #1	? [Leng & Mutchler 1917 as *S. laticollis*]
Synchita sp. #2	?
Paha guadeloupensis Dajoz	LIE
Aulonium bidentatus (Fabricius)	WN.
Monoedus lecontei Fleutiaux & Sallé	NEC [Leng & Mutchler 1917. Contrary to statements by Stevens and Waldmann (2001), this species was named from Guadeloupe.]
Monoedus obscurus Grouvelle	LIE
Nematidium filiforme LeConte	WN

Tenebrionidae

Lagriinae	
Lorelus n. sp.	IE
Phrenapatinae	
Diodeus guadeloupensis Fleutiaux & Sallé	LE
Tenebrioninae	
Palorus cerylonoides Pascoe	EIS
Rhipidandrus cornutus (Arrow)	WN [Blackwelder 1945, as *Eutomus cerylonoides*]
Tribolium castaneum (Herbst)	EIS
Uloma retusa (Fabricius)	WN [Blackwelder 1945]
Blapstinus opacus Mulsant & Rey	NEC
Diastolinus puncticollis Mulsant & Rey	WIE
Diastolinus sp. nr. *barbudensis* Marcuzzi	LE
Opatrinus clathratus (Fabricius)	WN
Alleculinae	

Hymenorus antillensis Campbell or nr. LE

Hymenorus n.sp. IE

Lobopoda n.sp. IE

Diaperinae

Platydema excavataum Say WN

Neomida lecontei Bates WN [Triplehorn 2006, from Hubbard 1894 NMNH, not found post volcano]

Neomida suilla Champion WN

Adelina pici (Ardoin) WN

Gnatocerus curvicornis (Champion) EIS

Gnatocerus guatemalensis Champion EIS

Phaleria fulva Fleutiaux & Sallé WN [Cooter (1983)]

Phaleria picipes Say WN

Gondwanocrypticus sp. N? [Cooter (1983) as *Crypticus* sp.]

Corticeus n.sp. IE

Cryptozoon n.sp. IE

Ulomoides ocularis (Casey) EIS [Triplehorn 1965, as *Palembus ocularis* Casey]

Stenochiinae

Nesocyrtosoma n.sp. IE

Cyrtosoma n.sp. IE [Leng & Mutchler (1917) recorded this as the Guadeloupean *Cyrtosoma lherminieri*(Chevrolat), but examination of the specimens in the NMNH show it to be an undescribed species. It was not recollected]

Strongylium delauneyi Fleutiaus & Sallé LE

Talanus sp. IE?

Mycteridae

Physicus faciatus Pic NEC

Salpingidae

Inopeplus praeustus Chevrolat WIE

Inopeplus striatulus Blackwelder LE

Aprostomis cephalotes Grouvelle LE

Serrotibia n. sp. LE? [Recorded by Leng & Mutchler (1917) as *Parlindria partia* Olliff, described from Ecuador. Olliff's species had been recorded from Guadeloupe (Fleutiaux & Sallé 1889), and was later synonymized with the Columbian *Serrotibia bicolor* Reitter. Comparison of a Montserrat specimen in IREC taken in 1984 at Riley's Estate, does not match typical South American *S. bicolor*, but no Guadeloupe specimens are available for comparison. This group is under revision by H. Escalona, and we leave it to him to resolve the issue. This species was not recollected on Montserrat post-volcano]

Prostominiinae sp. N?

Aderidae

Aderus brunipennis (LeConte) WN

Cnopus sp. #1 N?

Ganascus sp #1 N?

Ganascus sp #2 N?

Ganascus sp #3 N?

Ganascus sp #4 N?

Pseudariotes sp #1 N?

Zonates sp. #1 N?

Fig. H. Aderidae. (Photo: Ian Foley and Michael Ivie)

Anthicidae

Anthicus tobias Marseul	EIS

Oedemeridae

Hypasclera simplex (Waterford)	WN
Oxycopis #1	N?
Oxycopis #2	N?
Oxycopis #2	N?

Chrysomelidae

Bruchinae

Acanthoscelides johnique Johnson WIE [Johnson (1990) mentioned an existing Montserrat record for *Acanthoscelides flavescens* (Fåhraeus), but the source of that record is unknown. This record is placed here as *A. johnique*, a member of the Flavescens species group, common on Montserrat, that went unrecognized until 1983, and is easily confused with *A. flavescens*.]

Acanthoscelides sp. #1	N?
Ctenocolum crotonae (Fåhraeus)	WN
Stator monachus (Sharp)	WN
Mimosestes mimosae (Fabricius)	WN
Sennius rufomaculatus (Motschulsky	WN

Criocerinae

Neolema dorsalis (Olivier)	WIE [Cooter 1983 as Lema sp.]

Hispinae

Chalepus sanguinicollis (Linneaus)	WN
Charidotella sexpunctata (Fabricius)	WN [Cooter 1983 as *Metronia trisignata*]
Chelymorpha cribraria (Fabricius)	WN

Hilarocassis exclamationis (Linnaeus) WN

Fig. I. *Hilarocassis exclamationis* (Linnaeus) (Photo: Caroline Caboo)

Galerucinae

Acalymma innubum (Fabricius) WN [Leng & Mutchler 1917 recorded *Diabrotica melanocephala* (Fabricius), a syn. of *Acalyma vittata* (F.) (Smith & Lawrence 1967), a species name widely confused with this and other species in the West Indian literature. Until Hubbard's specimens are examined, this record will be treated here.]

Ceratoma ruficornis (Olivier) WN

Diabrotica ochreata Fabricius LE [Leng & Mutchler 1917]

Neolochmaea obliterata (Olivier) NEC [Cooter 1983, as *Galerucella tropica*]

Exora encaustica (Germar) ? [Leng & Mutchler 1917 as *E. detritum* (Fabricius)]

Altica occidentalis Suffrian WN

Disanycha sp. ?

Megistops n. sp. nr. granulate IE

Parchicola sp. ?

Epitrix cucumeris (Harris) WN

Epitrix fasciata Blatchley WN

Epitrix sp. ?

Homoschema n.sp. IE

Cyrsylus montserrati Blake IE [Blake 1949]

Aedmon ?*stenotrachela* Blake LIE?

Omophoita albicornis Fabricius WN [Cooter 1983 as *Homophoeta albicornis*]

Eumolpinae

Typophorus sp. ?

Megascelis n. sp. IE

Colaspis sp. ?

Metachroma sp. #1 ?

Metachroma sp. #2 ?

Cryptocephalinae	
Cryptocephalus sp. #1	?
Cryptocephalus sp. #2	?
Diachus sp.	?
Pachybrachis sp.	?

Cerambycidae. Most of the cerambycid records from this project were included (with our permission) in Chalumeau & Touroult (2005), who included keys and illustrations to our species. Only where our records differ from theirs are there notations below.

Prioninae	
Stenodontes maxillosus (Drury)	LAE
Cerambycinae	
Methia necydalea (F.)	WN
Achryson surinamum (L.)	EIS
Ochrus ornatus (Fisher)	LE
Chlorida festiva (L.)	EIS [Leng & Mutchler (1917)]
Eburia decemmaculata (F.)	NEC [Cooter (1983)]
Eburia inermis (F. & S.)	LE
Eburia octomaculata Chevrolat	LE
Elaphidion glabratum (F.)	NEC [Danforth (1939) as *Elaphidion* sp., Blackwelder (1945) as *E. tomentosum*]
Nesanoplium n.sp.	IE [Based on a misidentification communicated by Ivie, this species was recorded by Chalumeau & Touroult (2005) as *Nesanoplium puberulum* (Fleutiaux & Sallé), but further examination shows this to be a different species]
Nesanoplium sp.	LE
Curtomerus flavus (F.)	EIS
Neocompsa cylindricollis (F.)	WN
Caribbomerus attenuatus (Chevrolat)	WIE
Plectromerus fasciatus (Gahan)	LAE [Recorded by Chalumeau & Touroult (2005) as *Plectromerus* n.sp., Gino Nearns, who is revising this genus, has since informed us that the Montserrat specimens are in fact very large *P. fasciatus*.]
Gourbeyella n. sp.	IE
Tillomorphini n.g. near *Euderces*	IE
Oxymerus aculeatus lebasi Dupont	WN
Lepturinae	
Strangalia benitiespinali Chalumeau	IE [Chalumeau 1985]

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Rhysodidae	*Clinidium* (*s.str.*) n.sp. nr *planum*	4	25-Jun-2000	5
Carabidae	*Cicindela trifasciata* Fabricius	7	25-May-2002	6.6
Carabidae	*Eohomotperus* n.sp.	1	14-Aug-2005	5
Carabidae	*Aspidoglossa schach* (Fabricius)	5	31-Jul-2005	7
Carabidae	*Bembidion darlingtoni* Mutchler	2	26-Jul-2005	3
Carabidae	*Mioptachy* sp. (= *M. autumnalis* of authors)	4	1-Jan-1900	1.8
Carabidae	*Elaphropus singularis* Andrews	2	11-Jun-2002	1.9
Carabidae	*Tachys ensenada* Mutchler	1	26-Jul-2005	2.5
Carabidae	*Paratachys* (*Eotachys*) *blemoides* Jeannel	1	1-Aug-2005	2.3
Carabidae	*Paratachys* sp. #1	28	21-Jun-2000	2.6
Carabidae	*Paratachys* sp. #2	8	13-Jan-2002	2.1
Carabidae	*Paratachys* sp. #3	1	23-Mar-2002	2.3
Carabidae	*Micratopus insularis*? Darlington	1	8-Aug-2005	1.6
Carabidae	*Selenophorus alternans* Dejean	8	25-Jun-1971	7.2
Carabidae	*Selenophorus chalybaeus* Dejean	7	29-May-1982	10.5
Carabidae	*Selenophorus sinuatus* Gyllenhal	10	25-Jun-1971	5
Carabidae	*Selenophorus* n.sp.?	18	20-Jun-2000	5.2
Carabidae	*Selenophorus subquadratus* Putzeys	1	7-Aug-2005	6
Carabidae	*Selenophorus discopunctatus* Dejean	35	30-Jun-1935	7
Carabidae	*Selenophorus propinquus* Putzeys	65	1-Feb-1959	8.7
Carabidae	*Notiobia pallipes* Bates	3	12-Dec-1983	10
Carabidae	*Athrostichus paganus* Dejean	7	24-Jul-1936	8.5
Carabidae	*Pentagonica flavipes* (LeConte)	76	13-Jan-2002	3.7
Carabidae	*Zuphium* sp.	2	25-Jul-2005	6.2
Carabidae	*Perigona nigriceps* Dejean	25	1-Mar-1982	2.8
Carabidae	*Apenes marginalis*Dejean	4	11-Jan-2002	10.1
Carabidae	*Apenes chalumeaui* Ball & Shpeley	4	11-Jan-2002	6.5
Carabidae	*Menidius amandus* Newman	2	21-Jun-2002	7.1
Carabidae	*Glyptolennus chalybaeus* (Dejean)	1	22-Aug-1981	7.4

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Carabidae	*Lebia pleurodera* Chaudior	2	25-Jul-2005	4.9
Dytiscidae	*Bidessonotus* sp.	1	26-Jul-2005	2
Dytiscidae	*Copelatus* sp. nr. *posticalus* (F.)	42	8-Jan-2002	6
Dytiscidae	*Hydrovatus* sp.	1	26-Jul-2005	2.5
Dytiscidae	*Laccophilus proximus* (Say)	2	1-Jan-2002	4.5
Dytiscidae	*Laccophilus* sp.	16	21-Jun-2000	3.8
Dytiscidae	*Megadytes gigantea* LaPorte	1	1-Jan-2001	40
Dytiscidae	*Rhantus calidus* (Fabricius)	2	23-Mar-2002	11
Dytiscidae	*Thermonectes basilaris* (Harris)	1	7-Aug-2005	10.7
Staphylinidae	*Burus/Bythinophysis*? sp.	2	25-Jun-2000	1.2
Staphylinidae	*Hamotus* (*Hamotoides) hirtus* Raffray	3	21-Jun-2002	1.9
Staphylinidae	*Eupsenius* sp.	3	30-May-2002	1.1
Staphylinidae	*Decarthron* nr. or = *insulare* Raffray	4	26-Jul-2005	1.5
Staphylinidae	*Ramelbida* sp.	16	23-Mar-2002	0.9
Staphylinidae	*Coproporus sharpi* Cameron	8	1-Jan-1900	1.9
Staphylinidae	*Coproporus rutilus* Erichson	4	1-Jan-1900	1.6
Staphylinidae	*Coproporus* n.sp.	5	21-Jun-2000	1.5
Staphylinidae	*Sepedophilus* sp. ("scriptus group")	6	25-Jun-2000	1.5
Staphylinidae	*Bryoporus* sp. #1	7	5-Jan-2002	3.5
Staphylinidae	*Bryoporus* sp. #2	1	7-Aug-2005	5.2
Staphylinidae	*Baeocera* sp. #1	9	17-Jun-2000	1
Staphylinidae	*Baeocera* sp. #2	19	20-Jun-2000	1.4
Staphylinidae	*Baeocera* sp. #3	29	23-Jun-2000	1.9
Staphylinidae	*Baeocera* sp. #4	13	8-Jun-2002	1
Staphylinidae	*Adinopsis* sp. #1	1	7-Aug-2005	2
Staphylinidae	*Anacyptus testaceus* LeConte	1	1-Jan-1900	1
Staphylinidae	*Aleochara* sp. #1	6	24-Apr-2001	4.6
Staphylinidae	*Aleochara* sp. #2	2	23-Jul-2005	4
Staphylinidae	*Oligota minuta* Cameron	19	1-Nov-1973	0.5
Staphylinidae	*Oligota guadeloupae* Frank	6	23-Jun-2000	0.4

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Staphylinidae	Hypocyphtini sp. #1	2	22-May-2002	0.9
Staphylinidae	Hypocyphtini sp. #2	2	16-May-2002	0.7
Staphylinidae	Hypocyphtini sp. #3	2	30-May-2002	0.6
Staphylinidae	Hypocyphtini sp. #4	2	21-Jun-2002	1
Staphylinidae	Hypocyphtini sp. #5	2	16-May-2002	0.7
Staphylinidae	Athetini sp. #1	27	25-Jun-2002	1.2
Staphylinidae	Aleochorinae #1	76	21-Jun-2000	2
Staphylinidae	Aleochorinae sp. #2	29	17-Jun-2000	1.6
Staphylinidae	Aleochorinae sp. #3	2	25-Jun-2002	2.5
Staphylinidae	Aleochorinae sp. #4	2	18-Jun-2000	1.5
Staphylinidae	Aleochorinae sp. #5	35	20-Jun-2000	2.6
Staphylinidae	Aleochorinae sp. 6	1	14-Jun-2002	2.1
Staphylinidae	Aleochorinae sp. #7	42	11-Mar-2002	1.9
Staphylinidae	Aleochorinae sp. #8	8	5-Feb-2002	2
Staphylinidae	Aleochorinae sp. #9	2	21-May-2002	2
Staphylinidae	Aleochorinae sp. #10	1	10-Jan-2002	2.6
Staphylinidae	Aleochorinae sp. #11	4	21-Jun-2002	2.2
Staphylinidae	Aleochorinae sp. #12	44	20-Jun-2000	1.6
Staphylinidae	Aleochorinae sp. #13	17	25-Jun-2000	2.4
Staphylinidae	Aleochorinae sp. #14	7	23-Mar-2002	2.2
Staphylinidae	Aleochorinae sp. #15	38	30-Jun-2002	1.5
Staphylinidae	Aleochorinae sp. #16	1	10-Jan-2002	1.2
Staphylinidae	Aleochorinae sp. #17	42	24-May-2003	1.7
Staphylinidae	Aleochorinae sp. #18	1	14-Aug-2005	2
Staphylinidae	Aleochorinae sp. #19	2	1-Jun-2003	1.5
Staphylinidae	Aleochorinae sp. #20	1	7-Aug-2005	2.2
Staphylinidae	Aleochorinae sp. #21	1	5-Feb-2002	2.4
Staphylinidae	Aleochorinae sp. #22	1	25-Jun-2002	1.9
Staphylinidae	Aleochorinae sp. #23	4	21-May-2002	1.2
Staphylinidae	Aleochorinae sp. #24	1	21-May-2002	1.1

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Staphylinidae	Aleochorinae sp. #25	2	14-Jun-2002	1.2
Staphylinidae	*Piestus pygmaeus* (Laporte)	12	17-Jun-2000	4.3
Staphylinidae	*Clavilispinus guadeloupensis* (Irmler)	17	30-May-2002	1.9
Staphylinidae	*Clavilispinus politus* (Sharp)	2	23-May-2002	1.6
Staphylinidae	*Clavilispinus megacephalus* (Fauvel)	2	6-Jun-2002	3.8
Staphylinidae	*Clavilispinus exiguus* (Erichson)	1	23-Mar-2002	2.3
Staphylinidae	*Lispinus insularis* Fauvel ?	2	1-Jan-1900	3.3
Staphylinidae	*Lispinus* sp.? *attenuatus*	7	18-Jun-2000	4.4
Staphylinidae	*Nacaeus impar* (Cameron)	3	1-Jan-1900	3
Staphylinidae	*Nacaeus nigrifrons* (Fauvel)	4	1-Jan-1900	2.2
Staphylinidae	*Nacaeus* sp. #1	9	5-Jan-2002	2.2
Staphylinidae	*Thoracophorus simplex* Wendeler	6	1-Jan-1900	1.6
Staphylinidae	*Thoracophorus guadelupensis* Cameron	2	1-Aug-2005	1.8
Staphylinidae	*Pseudepeson crassulus* (Fauvel)	2	1-Jan-1900	2.3
Staphylinidae	*Holotrochus* sp. #1	25	8-Jun-2002	3.2
Staphylinidae	*Holotrochus* sp. #2 ? *minor*	2	24-Jun-2000	2.8
Staphylinidae	*Anotylus insignitus* Gravenhorst	3	1-Jul-1936	3
Staphylinidae	*Anotylus glareosus* (Wollaston)	3	23-Mar-2002	1.5
Staphylinidae	*Bledius caribbeanus* Blackwelder	1	1-Jul-1936	2.5
Staphylinidae	*Apocellus ustulatus* (Erichson)	1	1-Jul-1936	2.1
Staphylinidae	*Cafius* (*Euremus*) *bistriatus* (Erichson)	1	1-Jul-1936	6
Staphylinidae	*Cafius subtilis* Cameron	1	1-Jul-1936	4
Staphylinidae	*Neohypnus illucens* (Erichson)	1	1-Jul-1936	8.5
Staphylinidae	*Espeson moratus* Schaufuss	1	1-Jan-1900	1.4
Staphylinidae	*Oxytelus incisus* Motschulsky	1	1-Jan-1900	3
Staphylinidae	*Philonthus discoideus* (Gravenhorst)	1	1-Jul-1936	5.7
Staphylinidae	*Philonthus longicornis* Stephens	1	1-Jan-1900	7.5
Staphylinidae	*Thinobius exasperatus* Blackwelder	1	1-Jan-1900	1
Staphylinidae	*Nacaeus foveolus* (Blackwelder) ?	1	1-Jan-1900	2
Staphylinidae	*Sepedophilus interruptus* (Erichson) ?	1	1-Jan-1900	2.3

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Staphylinidae	*Carpelimus* sp.#1	8	13-Jan-2002	1.8
Staphylinidae	*Carpelimus* sp. #2 prob. *correctus* Blackwelder	3	6-Jun-2002	2.7
Staphylinidae	*Carpelimus* sp. #3	2	21-Jun-2002	2.5
Staphylinidae	*Carpelimus* sp. #4	1	8-Aug-2005	2.7
Staphylinidae	*Carpelimus* sp. #5	26	13-Jan-2002	1.6
Staphylinidae	*Carpelimus* sp. #6	1	21-Jun-2002	1
Staphylinidae	*Thinodromus croceips* Fauvel	7	18-Jun-2000	2.8
Staphylinidae	*Biocrypta fulvipes* (Erichson)	63	23-Jun-2000	7.2
Staphylinidae	*Echiaster microps* Blackwelder	5	20-Jun-2000	2.4
Staphylinidae	*Lobrathium nitidum*(Erichson)	6	26-Jul-2005	3.4
Staphylinidae	*Lithocharis dorsalis* Erichson	1	1-Jan-1900	2.9
Staphylinidae	*Lithocharis limbatus* Erichson	10	5-Feb-2002	4.2
Staphylinidae	*Lithocharis secunda* Blackwelder	1	1-Jul-1936	3
Staphylinidae	*Lithocharis sororcula* Kraatz	2	1-Jul-1936	3.2
Staphylinidae	*Lithocharis* sp.	1	1-Jun-2003	2.2
Staphylinidae	"*Medon*" complex sp. #1	12	23-Mar-2002	3.8
Staphylinidae	"*Medon*" complex sp. #2	8	25-Jun-2000	4.2
Staphylinidae	"*Medon*" complex sp. #3	1	23-Jun-2000	6
Staphylinidae	"Medon" complex sp. #4	1	25-Jul-2005	2.3
Staphylinidae	*Microlinus pasio* (LeConte)	2	6-Jun-2002	2.6
Staphylinidae	*Pinophilus* sp. poss. *vermiformis* Cameron	3	25-Jul-2005	6.5
Staphylinidae	*Palaminus* sp. #1	2	23-Jun-2000	5.3
Staphylinidae	*Palaminus* sp. #2	7	25-Jun-2002	2.5
Staphylinidae	*Palaminus* sp. #3	3	14-Aug-2005	5
Staphylinidae	*Palaminus* sp. #4	3	19-Jun-2002	3.6
Staphylinidae	*Palaminus* sp. #5	14	1-May-2002	3.2
Staphylinidae	*Scopaeus* sp.	6	13-Jan-2002	2.5
Staphylinidae	*Stamnoderus* sp.	7	20-Jun-2000	2.9
Staphylinidae	*Sunius debilicornis* Wollaston	1	2-Aug-2005	2

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Staphylinidae	*Atanygnathus* sp. 1	4	5-Feb-2002	4
Staphylinidae	*Atanygnathus* sp. 2	1	25-Jun-2000	3.5
Staphylinidae	*Belonuchus gagates* Erichson	5	1-Jan-1900	8.5
Staphylinidae	*Belonuchus* sp. 1	46	5-Feb-2002	8
Staphylinidae	*Belonuchus* sp. 2	1	15-Aug-2005	8.3
Staphylinidae	*Belonuchus* sp. 3	3	26-Jun-2003	8.6
Staphylinidae	*Diochus nanus* Erichson	25	18-Jun-2000	2.9
Staphylinidae	*Holisus* sp. #1	31	23-Mar-2002	2.3
Staphylinidae	*Holisus sp.* #2	11	17-Jun-2000	4.3
Staphylinidae	*Neohypnus attenuatus* (Erichson)	11	1-Jul-1936	6
Staphylinidae	*Neohypnus humeralis* (Erichson) New	12	1-Jul-1936	5
Staphylinidae	*Neoxantholinus hubbardi* (Blackwelder)	1	1-Jan-1900	4
Staphylinidae	*Philonthus hepaticus* Erichson	13	1-Jul-1936	5
Staphylinidae	*Philonthus havaniensis* (Laporte).	3	31-Jul-2005	7
Staphylinidae	*Philonthus ventralis* (Gravenhorst)	1	1-Jul-1936	5.7
Histeridae	*Omalodes laevigatus* Quensel	38	18-Jun-2000	7.5
Histeridae	*Aeletes lissosternus* Wenzel	77	21-Jun-2000	1
Histeridae	*Bacanius* sp. 1	1	23-Jul-2005	0.8
Histeridae	*Bacanius* sp. 2	1	21-Jun-2000	0.8
Histeridae	*Hister servus Erichson+B221*	2	27-May-2002	4.5
Histeridae	*Atholus confinus* (Erichson)	3	1-Aug-1975	3.8
Histeridae	*Hypocaccus* sp.	6	12-Jun-2002	3
Histeridae	*Carcinops*? sp.	4	16-Jun-2000	2.7
Histeridae	*Teretriosoma* sp.	5	23-Mar-2002	3.4
Histeridae	*Paromalus*? sp.	8	18-Jun-2000	1.9
Hydrophilidae	*Dactylosternum abdominale* (F.)	6	1-Jan-1900	4.5
Hydrophilidae	*Hydrophilus insularis* actorum	6	4-Jun-2002	36.5
Hydrophilidae	*Cercyon atricapillus* (Marshall)	4	24-Jun-2000	1.5
Hydrophilidae	*Cercyon variegatus* Sharp	40	5-Feb-2002	2.7

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Hydrophilidae	*Aculomicrus* n.sp.	2	5-Jul-2005	0.8
Hydrophilidae	*Tropisternus lateralis* Laporte	1	15-Jun-2002	9.5
Hydrophilidae	*Tropisternus chalybeus* Laporte	1	1-Jan-1900	10.5
Hydrophilidae	*Phaenonotum exstriatum* (LeConte0	7	10-Jan-2002	3.1
Hydrophilidae	*Pelosoma* sp.	23	14-Aug-2005	2.5
Hydrophilidae	*Berosus* sp.	3	15-Jun-2005	5.75
Hydrophilidae	*Omicrus subopacus* Smetana	10	7-Aug-2005	1.5
Hydrophilidae	*Parachymus confusus* Woodridge	2	13-Jan-2002	2
Hydrophilidae	*Enochrus bartletti* Short	63	13-Jan-2002	4
Scydmaenidae	*Scydmaenus guadeloupensis* Franz	1	7-Aug-2005	1.2
Scydmaenidae	*Euconnus* sp. 1	1	25-Jun-2000	1
Scydmaenidae	*Euconnus* sp. 2	7	23-Jun-2000	1
Hydraenidae	*Hydraena guadeloupensis* d'Orchymont	5	23-Jun-2000	1.5
Ptiliidae	*Bambara* sp. #1 (+)	12	17-Jun-2000	0.6
Ptiliidae	*Bambara* sp. #2	1	21-May-2002	0.6
Ptiliidae	*Oligella*? sp.	1	10-Aug-2005	0.4
Ptiliidae	*Ptiliolum*? sp.	1	12-Jun-2003	0.5
Ptiliidae	*Ptinella* sp.	3	22-May-2002	0.5
Ptiliidae	*Actinopteryx* sp.	10	21-May-2002	0.9
Leiodidae	*Zeadolopus* sp. #1	3	1-Jun-2002	1.2
Leiodidae	*Zeadolopus* sp. #2	4	1-Jun-2003	1.5
Leiodidae	*Zeadolopus* sp. #3	2	1-Jun-2003	1.3
Passalidae	*Spasslus crenatus* M'Lea	50	25-Jun-2000	17
Trogidae	*Omorgus suberosus* (Fabricius)	22	20-May-2003	12.5
Scarabaeidae	*Ateuchus insulare* (Fleutiaux & Sallé)	83	1-Jan-1900	5.7
Scarabaeidae	*Onthophagus gazella* (F.)	21	24-Jun-2000	10.5
Scarabaeidae	*Aphodius nigritus* (F.)	9	1-Jul-1936	3.7
Scarabaeidae	*Aphodius pseudolividus* Olivier	6	1-Jul-1936	4.5
Scarabaeidae	*Ataenius vincentiae* Arrow	48	16-Jun-2000	3.2
Scarabaeidae	*Ataenius gracilis* (Melsheimer)	1	21-Jun-2002	2.9
Scarabaeidae	*Ataenius scutellaris* Harold	13	1-Jul-1936	4.5
Scarabaeidae	*Ataenius cameneni* Chalumeau & Gruner	3	20-Jun-2002	3.9
Scarabaeidae	*Ataenius scabrellus* Schmidt	2	1-Jan-2002	3.5

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Scarabaeidae	*Ataenius liogaster* Bates	6	4-May-2002	4.2
Scarabaeidae	*Ataenius brevicollis* (Wollaston)	2	7-Jul-2002	3.8
Scarabaeidae	*Ataenius temperei* Chalumeau & Gruner	2	21-Jun-2000	4
Scarabaeidae	*Ataenius howdeni* Chalumeau	78	1-Jul-1936	4.1
Scarabaeidae	*Iguazua blackwelderi* (Chapin)	8	18-Jun-2000	3
Scarabaeidae	*Phyllophaga montserratensis* Arrow	48	1-Jan-1900	17.5
Scarabaeidae	*Phyllophaga cneda* Saylor	43	1-Jan-1900	10
Scarabaeidae	*Anomala* n.sp *insularis* group	81	1-Mar-1982	12.2
Scarabaeidae	*Leucothyreus guadulpiensis* Burmeister	19	1-Mar-1982	11.1
Scarabaeidae	*Macraspis tristis* Castelnau	24	18-Jun-2000	25.5
Scarabaeidae	*Rutela s. striata* (Olivier)	39	1-Mar-1982	16.5
Scarabaeidae	*Cyclocephala mafaffa* Burmeister	20	1-Mar-1982	22.5
Scarabaeidae	*Ligyrus cuniculus* (Fabricius)	81	1-Aug-1975	16.5
Scarabaeidae	*Phileurus valgus* Linneaus	57	1-Mar-1982	22.2
Scarabaeidae	*Strategus syphax* (Fabricius)	2	11-May-2004	34
Scirtidae	*Scirtes* n.sp. 1	5	8-Apr-2002	2.7
Scirtidae	*Scirtes* n.sp. 2, *testaceus* group	2	31-Jul-2005	4
Buprestidae	*Polycesta* n.sp.	1	28-Jul-2005	19
Buprestidae	*Chrysobothris* sp. *thoracica* group	9	16-Jun-2000	5.1
Buprestidae	*Micrasta* n. sp. #1, nr. uniformis	35	23-Mar-2002	1.9
Buprestidae	*Micrasta* n.sp. #2, yellow tarsi	5	6-Dec-2002	1.4
Buprestidae	*Micrasta* n.sp. #3, yellow tibia - big parameres	3	8-Apr-03	1.7
Buprestidae	*Micrasta* n.sp. #4, olive-elytra-blue-pronotum	5	22-May-03	2.1
Buprestidae	*Micrasta* n.sp. #5, bright-blue-wide	1	16-May-02	2.1
Dermestidae	*Dermestes maculatus* DeGeer	2	12-Jun-2002	8
Dermestidae	*Trogoderma ornatum* (Say)	10	1-Aug-1975	3.2
Jacobsoniidae	*Derolathrus* or near sp.	1	18-Jun-2000	0.6
Trogossitidae	*Tenebroides transversicollis* Jacquelin du Val	25	11-Mar-2002	6.5
Trogossitidae	*Temnochila obscura* Reitter	2	1-Mar-1982	12
Trogossitidae	*Temnochila* sp.	1	20-May-2003	7.5
Trogossitidae	*Colydobius* n.sp.	6	3-Jan-2002	3.9

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Trogossitidae	*Nemosoma* n.sp.	1	30-Jul-2003	3.1
Trogossitidae	*Nemosoma n.sp.*	1	21-Feb-2003	1.3
Cleridae	*Neorthopleura murina* (Klug)	5	16-Jun-2000	4.7
Cleridae	*Madoniella minor* Pic	4	10-Oct-2002	3
Cleridae	*Pelonium* n.sp.	22	16-Jun-2000	10.5
Melyridae	*Melyrodes* n.sp.	1	6-Jun-2000	2
Melyridae	*Albrechrus* n.sp.	2	3-Jan-2002	1.3
Lymexylidae	*Atractocerus brasiliensis* Lepeletier & Audinet-Ser.	15	24-Apr-2001	23.5
Elateridae	*Conoderus* sp.	72	1-Mar-1982	15.5
Elateridae	*Physorrhinus insularis* Candeze	10	17-Jun-2000	11.9
Elateridae	*Chalcolepidius* n. sp.	4	1-Jan-1900	35
Elateridae	*Drapetes nigricans* Bonvouloir	6	21-Jun-2000	4.5
Elateridae	*Heteroderes amplicollis* Gyllenhal	25	1-Aug-1975	9
Elateridae	*Dicrepidius ramicornis* P. de Beauvois	3	1-Mar-1982	16
Elateridae	*Dicrepidius distinctus* Fleutiaux & Sallé	177	21-Jun-2000	9
Elateridae	*Lacon subcostatus* (Candeze)	9	24-Apr-2002	15
Elateridae	*Anchastus* sp. #1	2	30-May-2002	9.7
Elateridae	*Anchastus* sp. #2	2	21-Jun-2002	8.4
Elateridae	*Anchastus* sp. #3	2	29-Mar-2001	7.7
Eucnemidae	*Adelothyreus curtis* Fleutiaux	9	24-Apr-2001	3.1
Eucnemidae	*Adelothyreus dufaui* Fleutiaux	8	23-Apr-2002	3
Eucnemidae	*Fornax* sp.	1	1-Mar-1982	9
Eucnemidae	*Serrifornax* sp. #1	24	18-Jun-2000	8
Eucnemidae	*Serrifornax* sp. #2	2	19-Jun-2002	5.1
Ptilodactylidae	*Ptilodactyla macrophthalma* LeGross	58	23-Jun-2000	3.2
Cantharidae	*Tytthonyx* n. sp.	170	20-Jun-2000	3.7
Cantharidae	*Tylocerus picipennis* Leng & Mutchler	227	1-Mar-1984	7
Cantharidae	*Tylocerus* n.sp.	9	25-Jun-2002	5.2
Lampyridae	*Aspisoma ignitum* L.	183	1-Aug-1975	12.2
Lycidae	*Thonalmus hubardi* Leng & Mutchler	183	1-Jan-1900	11.6

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Lycidae	*Thonalmus sinuaticostis* Leng & Mutchler	164	1-Jan-1900	12
Bostrichidae	*Melalgus caribeanus* (Lesne)	24	11-Mar-2002	12.6
Bostrichidae	*Amphicerus cornutus* (Pallas)	9	5-Jan-2002	12.5
Bostrichidae	*Tetraprioceraa longicornis* (Olivier)	19	10-Jan-2002	4.8
Bostrichidae	*Xylomeira tridens* (Fabricius)	107	1-Jan-1900	4
Bostrichidae	*Xylopsocus capucinus* (Fabricius)	1	20-May-2003	4.2
Bostrichidae	*Dinoderus minutus* (Fabricius)	1	21-Jun-2002	2.7
Bostrichidae	*Lyctus caribbeanus* Lesne	4	10-Jan-2002	2.7
Bostrichidae	*Minthea rugicollis* (Walker)	4	1-Jan-1999	2.7
Anobiidae	*Xyletinus marmoratus* Pic	87	5-Feb-2002	4.2
Anobiidae	*Protheca* sp. 1	3	5-Jan-2002	1.5
Anobiidae	*Protheca* sp. 2	11	13-Jan-2002	1.8
Anobiidae	*Tricorynus ?pierriei* (Lepesme)	51	23-Mar-2002	2.3
Anobiidae	*Pseudodorcatomus ?mariei* Lepesme	4	20-Jun-2000	1.4
Anobiidae	*Calymmaderus* sp. nr. *dufaui* Pic	3	30-May-2002	3.2
Anobiidae	*Microzogus* sp. 1	4	30-May-2002	1.1
Anobiidae	*Microzogus* sp. 2	4	21-Jun-2002	1
Anobiidae	*Microzogus* sp. 3	6	22-May-2002	1.3
Anobiidae	*Caenocara maculatum* Fisher	11	10-Jan-2002	1.2
Anobiidae	*Cryptorama carinatum* White	40	21-Jan-2002	2.3
Anobiidae	*Cryptorama megalops* White	31	21-Jan-2002	2.2
Anobiidae	*Cryptorama ?antillensis* White	3	16-May-2002	1.5
Anobiidae	*Cryptorama sericeum aureum* (Lepesme)	3	23-Mar-2002	2
Anobiidae	*Cryptorama* sp. 1	143	20-Jun-2000	1.5
Anobiidae	*Cryptorama* sp. nr. *impunctaum* White	11	21-Jan-2002	2.5
Anobiidae	*Cryptorama* sp. nr. *tortolensis* White	9	20-Jun-2000	1.6
Anobiidae	*Cryptorama* sp. nr. *minor* Fall	24	16-May-2002	2.1
Anobiidae	*Cryptorama* sp. nr. *rufescens* White	10	5-Feb-2002	2.4
Anobiidae	*Petalium* sp. 1	10	16-May-2002	1.5
Anobiidae	*Petalium* sp. 2	10	16-May-2002	1.3

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Anobiidae	*Petalium ? antillarum* Pic	9	5-Jan-2002	1.5
Anobiidae	*Trichodesma* sp. 1	18	17-Jun-2000	6
Anobiidae	*Trichodesma* sp. 2	15	20-Jun-2000	4.3
Anobiidae	*Trichodesma* sp. 3	2	11-Mar-2002	5.3
Anobiidae	*Trichodesma* sp. 4	1	3-Jun-2003	5.5
Anobiidae	*Trichodesma* sp. 5	1	28-Jul-2005	5
Anobiidae	*Stichtoptenus* n.sp. nr. *dufaui* Pic	14	21-Jan-2002	4.1
Anobiidae	*Megorama* sp.	11	24-May-2002	5
Anobiidae	*Ptinus strangulatus* Fall	12	4-Mar-2002	2.6
Anobiidae	*Ptinus dufaui* Pic	178	1-Mar-2001	2.2
Anobiidae	*Gibbium aequinoctiale* Boieldieu	1	1-Jan-1900	3.2
Sphindidae	*Sphindus* sp.	3	5-Feb-2002	1.5
Nitidulidae	*Lobiopa insularis* (Castelnau)	79	19-Jun-2000	7
Nitidulidae	*Epuraea* (*Haptoncus*) *luteolus* (F.)	46	19-Jun-2000	2.4
Nitidulidae	*Stelidota strigosa* (Gyllenhal)	123	19-Jun-2000	3.5
Nitidulidae	*Stelidota coenosa* Erichson	2	8-Jan-2002	2.2
Nitidulidae	*Stelidota ruderata* Erichson	42	23-Jun-2000	2.6
Nitidulidae	*Macrasta vertraci* Grouvelle	16	1-Jan-1900	5
Nitidulidae	*Carpophilus humeralis* (Fabricius)	3	29-May-2002	4.2
Nitidulidae	*Carpophilus dimidiatus* (Linneaus)	4	1-Jan-1900	2.2
Nitidulidae	*Carpophilus* sp.	1	1-Jun-2003	2.3
Nitidulidae	*Colopterus infimus* (Erichson)	4	23-Mar-2002	2
Nitidulidae	*Cilleaus* n.sp.	4	26-May-2003	7.4
Nitidulidae	*Conotelus conicus*(Fabricius)	1	1-Jan-1900	3.2
Smicripidae	*Smicrips* sp.	24	23-Jun-2000	1.5
Monotomidae	*Europs* sp. #1	10	13-Jan-2002	2.4
Monotomidae	*Europs* sp. #2	50	18-Jun-2000	1.9
Monotomidae	*Europs* sp. #3	24	17-Mar-2002	2.1
Monotomidae	*Europs* sp. #4	3	2-Aug-2005	2.1
Monotomidae	*Monotoma*. sp.	1	23-Mar-2002	2

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Silvanidae	*Silvanoprus scuticollis* (Walker)	4	1-Jan-2002	2.4
Silvanidae	*Monanus concinnus* (Walker)	5	23-Mar-2002	2.1
Silvanidae	*Telephanus nodicornis* Nevermann	6	1-Jan-1900	4
Laemophloeidae	*Cryptolestes unicornis* (Reitter)	14	21-Jun-2000	1.7
Laemophloeidae	*Laemeophoelus* sp. #1	4	30-May-2002	3
Laemophloeidae	*Laemeophoelus* sp. #2	3	23-Mar-2002	2.4
Laemophloeidae	*Placonotus planifrons* Thomas	20	21-Jun-2000	2.1
Laemophloeidae	*Placonotus modestus* (Say)	5	3-Jan-2002	1.9
Laemophloeidae	*Placonotus politissimus* (Wollaston)	4	5-Jan-2002	1.8
Laemophloeidae	*Placonotus ?patruellus Thomas*	1	3-Jan-2002	2
Laemophloeidae	*Placonotus* sp. nr. *patruellus*	1	23-Mar-2002	1.5
Laemophloeidae	*Dysmerus* sp.	2	5-Feb-2002	1.8
Laemophloeidae	*Lepidophoeus* n.sp.?	2	21-May-2002	1.1
Laemophloeidae	*Lathropus pictus* Schwarz	3	10-Aug-2005	1.1
Phalacridae	*Ochrolitus tristriatus* Casey	83	5-Jan-2002	2.7
Phalacridae	*Olibrus* sp.	4	7-Jan-2002	1.9
Phalacridae	*Litolibrus* sp.	21	17-Jul-2005	1.8
Cryptophagidae	*Ephistemus* sp.	2	26-Jul-2005	1
Languriidae	*Toramus* #1	98	17-Jun-2000	1
Languriidae	*Toramus* #2	17	20-Jun-2000	1.3
Languriidae	*Loberus* sp.	47	17-Jun-2000	1.9
Languriidae	*Haplips angulosus* Grouvelle	1	10-Jul-2005	4
Languriidae	*Haplips* nr. *guadeloupensis* Grouvelle	33	20-Jun-2000	4.5
Languriidae	*Cryptophilus integer* (Heer)	23	10-Jan-2002	2
Languriidae	*Platoberus dufaui* Grouvelle	2	24-Jul-2005	3.1
Languriidae	*Telmatoscius* sp.	13	6-Aug-2005	3.3
Cerylonidae	*Philothermus puberulus* Schwarz	4	1-Jan-1900	1.8
Cerylonidae	*Euxestes erithacus* (Chevrolat)	9	16-Jun-2000	2
Cerylonidae	*Mychocerus sharpi* (Champion)	6	26-Jun-2002	1.6
Cerylonidae	*Ostomopsis neotropcalis?*	3	30-Jun-2002	1
Cerylonidae	*Botrodus* sp#1 *dufaui*?	2		1.7

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Cerylonidae	*Botrodus* sp#2 *estriatus*?	1		1.7
Bothrideridae	*Sosylus* sp.	23	1-Jan-2002	4
Bothrideridae	*Bothrideres dufaui* Grouvelle	21	16-May-2002	3.2
Endomycidae	n. genus #1 sp.	4	21-Feb-2003	1
Endomycidae	n. genus #2 sp.	4	21-May-2002	0.9
Endomycidae	*Displotera* sp.	1	21-Jun-2002	1.5
Endomycidae	*Holoparamecus* sp.	2	6-Jun-2002	0.7
Coccinellidae	*Cycloneda sanguinea limbifer* Casey	85	1-Aug-1975	4.2
Coccinellidae	*Coelophora inaequalis* (F.)	79	18-Jun-2000	5
Coccinellidae	*Cryptolaemus monstrouzieri* Mulsant	32	16-Jun-2000	4.5
Coccinellidae	*Chilocerus cactus* (L.)	14	23-Jun-2000	6.4
Coccinellidae	*Psyllobora lineola* (F.)	153	25-Jun-2000	2.3
Coccinellidae	*Diomus ochroderus* (Mulsant)	62	23-Jun-2000	7.5
Coccinellidae	*Diomus* #1	1	1-Jan-2002	1.3
Coccinellidae	*Diomus* #2	1	8-Jan-2002	1.9
Coccinellidae	*Diomus* #3	1	16-Jun-2000	1.1
Coccinellidae	*Diomus* #4	24	17-Jun-2000	1.4
Coccinellidae	*Diomus roseicollis* (Mulsant)	24	10-Jan-2002	1.5
Coccinellidae	*Neaptera viola* Gordon	32	24-Jul-1936	1
Coccinellidae	*Nephaspis* n. sp	7	16-May-2002	1
Coccinellidae	*Scymnus* (*Pullus*) *phloeus* Mulsant	62	11-Jan-2002	2
Coccinellidae	*Scymnus (S.) floralis* (Fabricius)	31	1-Jan-1900	2.1
Coccinellidae	*Scymnus* (*Pullus*) sp.	1	1-Jun-2003	1.2
Coccinellidae	*Zilus* sp.	2	22-May-2002	1.1
Coccinellidae	*Stethorus albipes* (Mulsant)	8	21-May-2002	0.9
Coccinellidae	*Decadiomus hubbardi* Chapin	1	14-Jun-2002	1
Coccinellidae	*Coccidophilus cariba* Gordon	46	1-Jan-1900	0.9
Coccinellidae	*Prodilis* n.sp.	4	16-May-2002	1.5
Coccinellidae	*Delphastus nebulosus* Chapin	19	16-May-2002	1
Coccinellidae	*Calloeneis* n.sp.	8	21-May-2002	1.6
Coccinellidae	*Hyperaspis* sp.	2	4-Aug-2005	2.7

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Corylophidae	*Arthrolips* sp. # 1	11	3-Jan-2002	1.2
Corylophidae	*Arthrolips* sp. # 2	25	22-May-2002	1.1
Corylophidae	*Arthrolips* sp. # 3	5	3-Apr-2002	0.9
Corylophidae	*Arthrolips* sp. # 4	4	23-Mar-2002	1
Corylophidae	*Arthrolips* sp. # 5	2	14-Jun-2002	0.7
Corylophidae	*Clypastraea* sp.	38	21-May-2002	0.9
Corylophidae	*Holopsis* sp. #1	37	27-May-2000	0.9
Corylophidae	*Holopsis* sp. #2	3	21-May-2002	0.5
Corylophidae	Corylophid sp. #1	1	1-May-2002	1
Latridiidae	*Cortodere constricta* (Gyllenhal)	1	23-Mar-2002	1.4
Latridiidae	*Cortilena picta* (LeConte)	1	3-Jan-2002	1.1
Mycetophagidae	*Litargus balteatus* LeConte	8	1-Jul-1936	1.6
Mycetophagidae	*Thrimolus minutus* Casey	4	18-Jun-2000	0.9
Mycetophagidae	*Berginus* sp.	1	15-Aug-2005	1
Ciidae	*Orthocis* sp. #1	1	22-May-2002	1.1
Ciidae	*Orthocis* sp. #2	2	21-May-2002	0.8
Ciidae	*Cis* sp. #1	1	15-Jun-2002	2
Ciidae	*Cis* sp. #2	1	21-Jun-2002	1.2
Ciidae	*Cis* sp. #3	59	22-May-2002	1.1
Ciidae	*Cis creberrimus* Mellie	26	7-Jan-2002	2
Ciidae	*Cis melliei* Coquerel	13	4-Aug-2005	1.5
Ciidae	Ceracis. #1	11	18-Jun-2000	1.5
Ciidae	Ceracis. #2	4	22-Jun-2002	1.2
Mordellidae	*Glipostenoda pallida* (Champion)	262	20-Jun-2000	3.2
Mordellidae	*Tolidomordella* sp.	247	20-Jun-2000	2.7
Mordellidae	*Mordella* sp. #1	3	24-Apr-2001	4.6
Mordellidae	*Mordella* sp. #2	2	30-May-2002	4.3
Mordellidae	*Falsomordellistena* sp.	4	16-May-2002	3.2
Meloidae	*Cissites maculata* (Swederus)	1	14-May-2002	31
Meloidae	*Pseudozonitis marginata* (Fabricius)	17	1-Jan-1900	12.2
Meloidae	*Tetraonyx quadrimaculatus* (Fabricius)	4	1-Jan-1900	10
Melandryidae	*Orchesia* sp.	1	30-May-2002	4.7
Rhipiphoridae	*Macrosaigon cruenta* Germar	1	21-Jun-2002	4.5

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Zopheridae	*Hyporrhagus* sp.	5	22-Jul-1981	4.9
Zopheridae	*Pycnomerus biimpressus* (Reitter)	2	18-Jun-2000	3.3
Zopheridae	*Pycnomerus uniformis* Ivie & Ślipiński	3	21-Jul-2005	3.3
Colydiidae	*Lemnis lhermimieri* Grouvelle.	2	29-May-1982	3.1
Colydiidae	*Bitoma* sp.	61	21-Jun-2000	2.5
Colydiidae	*Colydodes mammalaris* (Pascoe)	2	8-Jun-2002	4.7
Colydiidae	*Synchita* sp. #1	21	1-Jan-1900	1.9
Colydiidae	*Synchita* sp. #2	8	3-Jan-2002	1.6
Colydiidae	*Paha guadeloupensis* Dajoz	8	23-Apr-2002	2
Colydiidae	*Aulonium* bidentatus (Fabricius)	54	1-Jan-2002	5.8
Colydiidae	*Monoedus lecontei* Fleutiaux & Sallé	2	1-Jan-1900	1.9
Colydiidae	*Monoedus obscurus* Grouvelle	33	25-Jun-2002	2.4
Colydiidae	*Nematidium filiforme* LeConte	82	23-Mar-2002	4.8
Tenebrionidae	*Lorelus* n. sp.	38	28-Jun-2002	2
Tenebrionidae	*Diodeus guadeloupensis* Fleutiaux & Sallé	46	9-May-2004	3.2
Tenebrionidae	*Palorus cerylonoides* Pascoe	6	21-Jun-2000	2.3
Tenebrionidae	*Rhipidandrus cornutus* (Arrow)	25	1-Jul-1936	4.1
Tenebrionidae	*Tribolium castaneum* (Herbst)	4	21-Jun-2000	4
Tenebrionidae	*Uloma retusa* (Fabricius)	64	1-Jul-1936	11
Tenebrionidae	*Blapstinus opacus* Mulsant & Rey	19	1-Mar-1982	4.8
Tenebrionidae	*Diastolinus puncticollis* Mulsant & Rey	2	3-Jan-2002	9
Tenebrionidae	*Diastolinus* sp. nr. *barbudensis* Marcuzzi	11	1-Mar-1982	5.4
Tenebrionidae	*Opatrinus clathratus* (Fabricius)	9	5-Jan-2002	10
Tenebrionidae	*Hymenorus antillensis* Campbell or nr.	2	26-Jul-2005	6.5
Tenebrionidae	*Hymenorus* n.sp.	9	6-Jun-2002	5.5
Tenebrionidae	*Lobopoda* n.sp.	16	17-Jun-2000	8
Tenebrionidae	*Platydema excavataum* Say	1	22-Jul-1981	5.1
Tenebrionidae	*Neomida lecontei* (Bates)	18	1-Jan-1900	6
Tenebrionidae	*Neomida suilla* Champion	11	3-Jan-2002	2.1
Tenebrionidae	*Adelina pici* (Ardoin)	20	7-Jan-2002	4.1
Tenebrionidae	*Gnatocerus curvicornis* (Champion)	6	13-Jan-2002	3.5
Tenebrionidae	*Gnatocerus guatemalensis* Champion	8	16-Jun-2000	3.2
Tenebrionidae	*Phaleria fulva* Fleutiaux & Sallé	26	1-Aug-1975	4.9

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Tenebrionidae	*Phaleria picipes* Say	4	1-Mar-1982	5.1
Tenebrionidae	*Gondwanocrypticus* sp.	5	1-Aug-1975	4.2
Tenebrionidae	*Corticeus* n.sp.	2	23-Mar-2002	2.2
Tenebrionidae	*Cryptozoon* n.sp.	1	2-Aug-2005	1.2
Tenebrionidae	*Ulomoides ocularis* (Casey)	2	1-Jan-1900	3.8
Tenebrionidae	*Nesocyrtosoma* n.sp.	13	1-Jan-1900	6
Tenebrionidae	*Cyrtosoma* n.sp.	2	1-Jan-1900	13
Tenebrionidae	*Strongylium delauneyi* Fleutiaus & Sallé	18	21-Jun-2000	8.4
Tenebrionidae	*Talanus* sp.	3	1-Mar-1982	5.6
Mycteridae	*Physicus faciatus* Pic	177	19-Jun-2000	2.4
Salpingidae	*Inopeplus praeustus* Chevrolat	38	3-Jan-2002	2.1
Salpingidae	*Inopeplus striatulus* Blackwelder	5	22-May-2002	4
Salpingidae	*Aprostomis cephalotes* Grouvelle	5	16-May-2002	1.7
Salpingidae	*Serrotibia* n. sp.	2	1-Jan-1900	5
Salpingidae	Prostominiinae sp.	6	21-Jun-2002	3
Aderidae	*Aderus brunipennis* (LeConte)	2	6-Dec-2002	1.6
Aderidae	*Cnopus* sp. #1	3	5-Jan-2002	1.2
Aderidae	*Ganascus* sp #1	43	23-Jun-2000	1.7
Aderidae	*Ganascus* sp #2	8	16-May-2002	1.9
Aderidae	*Ganascus* sp #3	63	21-May-2002	1.8
Aderidae	*Ganascus* sp #4	18	5-Jan-2002	1.7
Aderidae	*Pseudariotes* sp #1	24	16-May-2002	1.8
Aderidae	*Zonates* sp. #1	3	22-May-2002	1.5
Anthicidae	*Anthicus tobias* Marseul	7	21-Jun-2002	3.4
Oedemeridae	*Hypasclera simplex* (Waterford)	65	16-Jun-2000	8.7
Oedemeridae	*Oxycopis* #1	102	1-Mar-1982	9.5
Oedemeridae	*Oxycopis* #2	33	21-Jun-2000	6.6
Oedemeridae	*Oxycopis* #3	6	13-Jan-2002	9
Chrysomelidae	*Acanthoscelides johnique* Johnson	100	10-Jan-2002	3.1
Chrysomelidae	*Acanthoscelides* sp. #1	2	17-Jul-2005	2.8
Chrysomelidae	*Ctenocolum crotonae* (Fåhraeus)	49	6-Jun-2002	3.7
Chrysomelidae	*Stator monachus* (Sharp)	4	10-Jan-2002	3.1
Chrysomelidae	*Mimosestes mimosae* (Fabricius)	2	26-Jul-2005	4.7

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Chrysomelidae	*Sennius rufomaculatus* (Motschulsky	1	1-Aug-2005	3
Chrysomelidae	*Neolema dorsalis* (Olivier)	7	1-Aug-1975	4.7
Chrysomelidae	*Chalepus sanguinicollis* (Linneaus)	16	6-Jul-2002	6.9
Chrysomelidae	*Charidotella sexpunctata* (Fabricius)	38	1-Aug-1975	5.9
Chrysomelidae	*Chelymorpha cribraria* (Fabricius)	3	5-Jun-2002	7.9
Chrysomelidae	*Hilarocassis exclamationis* (Linnaeus)	1	26-May-2002	9.6
Chrysomelidae	*Acalymma innubum* (Fabricius)	73	1-Jan-1900	7.4
Chrysomelidae	*Ceratoma ruficornis* (Olivier)	15	12-Jan-2002	5.2
Chrysomelidae	*Diabrotica ochreata* Fabricius	15	1-Jan-1900	6.6
Chrysomelidae	*Neolochmaea obliterata* (Olivier)	1	1-Aug-1975	7.1
Chrysomelidae	*Exora encaustica* (Germar)	128	1-Jan-1900	9.4
Chrysomelidae	*Altica occidentalis* Suffrian	37	19-Jun-2002	5.1
Chrysomelidae	*Disanycha* sp.	2	10-Jan-2002	6.9
Chrysomelidae	*Megistops* n. sp. nr. *granulate*	6	23-May-2002	4.4
Chrysomelidae	*Parchicola* sp.	18	5-Feb-2002	5
Chrysomelidae	*Epitrix cucumeris* (Harris)	1	22-Jul-1981	1.5
Chrysomelidae	*Epitrix fasciata* Blatchley	14	9-May-2004	1.4
Chrysomelidae	*Epitrix* sp.	12	21-May-2002	1.6
Chrysomelidae	*Homoschema* n.sp.	3	4-Aug-2005	2.5
Chrysomelidae	*Crysylus montserrati* Blake	2	18-Mar-1894	3.2
Chrysomelidae	*Aedmon ? stenotrachela* Blake	2	7-Aug-2005	2.8
Chrysomelidae	*Omophoeta albicornis* Fabricius	8	1-Aug-1975	6.2
Chrysomelidae	*Typophorus* sp.	108	13-Jun-2002	5.8
Chrysomelidae	*Megascelis* n. sp.	115	22-May-2002	5.7
Chrysomelidae	*Colaspis* sp.	16	1-Jan-2002	4.5
Chrysomelidae	*Metachroma* sp. #1	4	23-Apr-2002	4.1
Chrysomelidae	*Metachroma* sp. #2	3	20-Jun-2002	3
Chrysomelidae	*Cryptocephalus* sp. #1	103	13-Jan-2002	4.2
Chrysomelidae	*Cryptocephalus* sp. #2	25	13-Jan-2002	4.4
Chrysomelidae	*Diachus* sp.	1	17-Jun-2000	1.9
Chrysomelidae	*Pachybrachis* sp.	16	21-Jan-2002	3
Cerambycidae	*Stenodontes maxillosus* (Drury)	7	8-Jan-2002	45
Cerambycidae	*Methia necydalea* (F.)	143	5-Jan-2002	9.7

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Cerambycidae	*Achryson surinamum* (L.)	49	7-Jan-2002	15.5
Cerambycidae	*Ochrus ornatus* (Fisher)	11	10-Jan-2002	11.5
Cerambycidae	*Chlorida festiva* (L.)	67	1-Jan-2002	21.5
Cerambycidae	*Eburia decemmaculata* (F.)	20	1-Aug-1975	18
Cerambycidae	*Eburia inermis* (Fleutiaux & Sallé)	6	5-Feb-2002	22
Cerambycidae	*Eburia octomaculata* Chevrolat	41	11-Mar-2002	17.5
Cerambycidae	*Elaphidion glabratum* (F.)	3	1-Feb-1937	15
Cerambycidae	*Nesanoplium* n.sp.	52	19-Feb-2001	7.5
Cerambycidae	*Nesanoplium* sp.	16	25-Jun-1977	6.7
Cerambycidae	*Curtomerus flavus* (F.)	112	27-Feb-2001	10
Cerambycidae	*Neocompsa cylindricollis* (F.)	51	1-Mar-2001	8.2
Cerambycidae	*Caribbomerus attenuatus* (Chevrolat)	11	5-Jan-2002	6.5
Cerambycidae	*Plectromerus fasciatus* (Gahan)	8	21-Jan-2002	9
Cerambycidae	*Gourbeyella* n.sp.	13	24-Apr-2002	5
Cerambycidae	Tillomorphini n.g. near *Euderces*	7	24-Apr-2002	4.3
Cerambycidae	*Oxymerus aculeatus lebasi* Dupont	10	11-Jun-2002	9.6
Cerambycidae	*Strangalia benitiespinali* Chalumeau	2	29-May-1982	10.7
Cerambycidae	*Ecyrus hirtipes* Gahan	6	11-Mar-2002	9.1
Cerambycidae	*Adetus lherminieri* Fleutiaux & Sallé	1	1-Jan-1900	8.2
Cerambycidae	*Mimestoloides benardi* Breuning	3	23-Mar-2002	7.9
Cerambycidae	*Cacostola ornata* (Fleutiaux & Sallé)	3	1-Mar-1982	8.1
Cerambycidae	*Oreodera glauca* (L.)	1	11-Mar-2002	23.5
Cerambycidae	*Lagocheirus araneiformis* (L.)	4	13-Jan-2002	23.7
Cerambycidae	*Amniscus assimilis* (Gahan)	65	1-Mar-2001	10.5
Cerambycidae	*Styloleptus posticalis* (Gahan)	22	18-Feb-2001	7
Cerambycidae	Acanthocinini ?*Styloleptus* n.sp.	1	1-Aug-2005	8
Cerambycidae	*Urgleptes guadeloupensis* (Fleutiaux &	23	19-Feb-2001	4.9
Cerambycidae	*Urgleptes cobbeni* Gilmour	55	27-Feb-2001	3.7
Cerambycidae	*Epectasis similis* Gahan	1	5-Dec-2002	8.9
Cerambycidae	*Decarthria* n.sp.	18	3-Jan-2002	2.1
Cerambycidae	*Cyrtinus hubbardi* Fisher	44	1-Jan-1900	2
Anthribidae	*Ormiscus* sp. #1	22	16-May-2002	2

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Anthribidae	*Ormiscus* sp. #2	65	19-Jun-2000	2
Anthribidae	*Ormiscus* sp. #3	41	5-Jan-2002	2.1
Anthribidae	*Homocloeus*. #1	14	22-May-2002	3.5
Anthribidae	*Homocloeus* sp. #2	9	5-Jan-2002	3.9
Anthribidae	*Homocloeus* sp. #3	2	17-Jun-2000	5.3
Anthribidae	*Holostilpna* sp. #1	1	16-May-2002	1.2
Anthribidae	Anthribidae sp. #1	1	22-May-2002	0.9
Anthribidae	Anthribidae sp. #2	1	26-Jul-2005	1.5
Anthribidae	Anthribidae sp. #3	1	20-May-2003	1.6
Anthribidae	Anthribidae sp. #4	3	16-Jul-2002	1.5
Attelabidae	*Auletobius* sp.	37	20-Jun-2000	1.7
Brentidae	*Apion* sp.	8	16-May-2002	2.2
Brentidae	*Brentus anchorago* Linneaus	148	1-Jan-1900	17
Brentidae	Brentidae sp. #1	9	17-Jun-2000	13.4
Brentidae	*Cylas formicarius* (F.)	1	21-Jun-2002	6.5
Curculionidae	*Sitophilus linearis* (Herbst)	5	1-Aug-1975	4.4
Curculionidae	*Cosmopolites sordidus* (Germar)	1	7-Jun-2002	11
Curculionidae	*Metamasius hemipterus* (L.)	12	1-Jan-1900	11.5
Curculionidae	*Metamasius quadrisignatus* (Gyllenhaul)	2	1-Jan-1900	17
Curculionidae	*Sphenophorus* sp.	2	3-Jan-2002	9
Curculionidae	*Sphenophorus venatus*? (Say)	16	24-Jun-2000	9.5
Curculionidae	*Anthonomus alboannulatus* Boheman	2	25-Jul-2005	3.5
Curculionidae	*Anthonomus flavescens* Boheman	18	21-Jun-2002	3
Curculionidae	*Anthonomus* sp. #1	1	6-Aug-2005	2.4
Curculionidae	*Anthonomus* sp. #2	1	12-Jan-2002	2.7
Curculionidae	*Anthonomus* sp. #3	1	21-Jun-2002	2.6
Curculionidae	*Anthonomus* sp. #4	1	9-Aug-2005	2.4
Curculionidae	*Anthonomus* sp. #5	1	30-May-2002	2.5
Curculionidae	*Anthonomus squamulosus*? Schenkling & Marshall	14	6-Jun-2002	2.1
Curculionidae	*Ceratopus* sp. #1	1	14-Jun-2002	5.9
Curculionidae	*Ceratopus* sp. #2	3	5-Feb-2002	5.2
Curculionidae	*Phyllotrox palidus* Fåhraeus	4	16-May-2002	1.6

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Curculionidae	*Piazorhinus* n.sp. #1	3	21-Jun-2002	2.6
Curculionidae	*Piazorhinus* n.sp. #2	7	22-May-2002	2.6
Curculionidae	*Smicronyx* sp.	1	8-Aug-2005	2
Curculionidae	*Sibinia* sp. #1	1	15-Aug-2005	2.1
Curculionidae	*Chalcobaris guadeloupensis*? Hustache	1	18-Jun-2000	2.4
Curculionidae	*Limnobaris*? sp.	1	16-Jun-2000	2.5
Curculionidae	*Notesia* sp.	1	23-Jul-2005	4
Curculionidae	*Copturus* sp. nr. *dufaui* Hustache	3	11-Mar-2002	3.9
Curculionidae	*Eulechriops* sp. #1	12	11-Mar-2002	1.4
Curculionidae	*Eulechriops* sp. #2	3	22-May-2002	1.2
Curculionidae	*Eulechriops* sp. #3	4	21-May-2002	1.7
Curculionidae	Cossoninae sp. #1	30	10-Jul-2005	1.3
Curculionidae	*Cossonus guadeloupensis*? Hustache	11	25-Jun-2000	4
Curculionidae	*Cossonus impressus* Boheman	2	4-Mar-2002	3.5
Curculionidae	*Cossonus sulcatifrons*? Hustache	4	14-Jun-2002	3.3
Curculionidae	*Cossonus sulcatirostris*? Hustache	1	23-Jul-2005	5.2
Curculionidae	*Cossonus vitraci*? Hustache	7	23-Jul-2005	4.2
Curculionidae	*Prionathrus* n. sp.	1	7-Aug-2005	4.3
Curculionidae	*Acamptus* n.sp.	39	21-Jun-2000	1.6
Curculionidae	*Catolethrus*? sp.	7	28-Jun-2002	4.3
Curculionidae	*Dryotribus mimeticus* Horn	1	19-Jun-2002	2.8
Curculionidae	*Micromimus* sp.#1	16	22-May-2002	2.6
Curculionidae	*Stenomimus*? sp.	2	15-Aug-2005	2
Curculionidae	*Pseudopentarthrum* sp. #1	16	1-Jan-1900	2.4
Curculionidae	*Stenotribus* sp. #1	3	25-Jun-2002	3.1
Curculionidae	*Stenotribus* sp. #2	10	20-Jun-2000	2.3
Curculionidae	*Stenotribus* sp. #3	46	25-Jun-2002	1.8
Curculionidae	*Macroscytalus*? sp.	2	10-Aug-2005	2.7
Curculionidae	*Proeces depressus* (Wollaston)	1	1-Jan-1900	1.8
Curculionidae	Cryptorhynchinae sp. #1	4	17-Jun-2000	5.1

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Curculionidae	Cryptorhynchinae sp. #2	1	18-Jun-2000	2.5
Curculionidae	*Homoeostethus* sp. #1	13	20-Jun-2000	4
Curculionidae	*Homoeostethus*? sp. #2	5	18-Jun-2000	7.4
Curculionidae	*Macromerus lanipes* (Olivier)	1	23-Jun-2000	9.5
Curculionidae	n,g, "Elephantine" sp. #1	2	23-Jun-2000	6
Curculionidae	n,g, "Elephantine" sp. #2	5	28-May-2002	6.2
Curculionidae	n,g, "Elephantine" sp. #3	2	29-Mar-2000	4.6
Curculionidae	*Neotylodes* sp. #1	1	20-May-2003	4
Curculionidae	*Neotylodes* sp. #2	4	28-May-2002	4.4
Curculionidae	*Neotylodes* sp. #3	30	16-Jun-2002	4.3
Curculionidae	*Neotylodes* sp. #4	9	17-Jun-2000	7.2
Curculionidae	*Pappista aurulenta* (Chevrolat)	13	17-Jun-2000	8.5
Curculionidae	*Semnorhynchus clericus* Chevrolat	18	25-Jun-2000	3.5
Curculionidae	*Semnorhynchus vacillatus* (Boheman)	37	25-Jun-2000	2.8
Curculionidae	*Semnorhynchus*? sp. #1	4	20-Jun-2000	3.8
Curculionidae	*Semnorhynchus*? sp. #2	4	18-Mar-2002	3.3
Curculionidae	*Sternochetus mangiferae* (Fabricius)	6	29-May-2002	8.2
Curculionidae	*Styracopus phaseoli* Marshall	1	6-Aug-2005	3.4
Curculionidae	*Troezon* sp. #1	10	19-Jun-2002	5
Curculionidae	*Acalles* sp. #1	46	20-Jun-2000	2.5
Curculionidae	*Acalles* sp. #2	2	24-Jul-2005	2.5
Curculionidae	*Tyrannion* sp. #1	162	23-Mar-2002	6
Curculionidae	*Faustinus* sp.	3	5-Jul-2002	4.2
Curculionidae	*Lembodes* sp. #1	1	9-Aug-2005	3.4
Curculionidae	*Microxypterus*? sp. #1	1	5-Jul-2002	1.8
Curculionidae	*Oxypteropsis*? sp. #1	1	1-Aug-2005	4.9
Curculionidae	*Pseudomopsis* sp. #1	77	4-Mar-2002	3.7
Curculionidae	*Pseudomopsis* sp. #2	10	20-May-2003	4
Curculionidae	*Pseudomus* sp. #1	10	1-Aug-1975	4.2
Curculionidae	*Ulosominus* sp. #1	4	6-Jun-2003	2.1

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Curculionidae	*Ulosominus* sp. #2	20	16-May-2002	2
Curculionidae	*Diaprepes abbreviatus* (Linneaus) *sensu lat.*	13	1-Jul-1936	16
Curculionidae	*Diaprepes famelicus sensu* Pierce	73	1-Aug-1975	15
Curculionidae	*Lachnopus curvipes* (Fabricius)	54	1-Aug-1975	10
Curculionidae	*Lachnopus* sp. #1	13	22-May-2002	8.1
Curculionidae	*Litostylus pudens* (Boheman)	202	1-Aug-1975	7.5
Curculionidae	*Polydacrys* sp.	1	15-Aug-2005	5.5
Curculionidae	Molytinae sp. #1	11	10-Jan-2002	9.5
Curculionidae	*Anchonus* sp. nr. *interuptus* Fårhraeus	78	19-Jun-2000	4.7
Curculionidae	*Anchonus suillus* (Fabricius)	46	19-Jun-2000	4.5
Curculionidae	*Geobyrsa* sp.	5	11-Jan-2002	5
Curculionidae	*Cholus zonatus* (Swederus)	2	24-Jul-2005	13
Curculionidae	*Conotrachelus cinnamonumeus* Hustache	1	4-Jun-2003	5.1
Curculionidae	*Conotrachelus cristatus* Fåhraeus	5	18-Jun-2000	5.2
Curculionidae	*Conotrachelus* sp. #1	11	12-May-2002	4.4
Curculionidae	*Conotrachelus* sp. #2	1	1-Aug-2005	5.3
Curculionidae	*Heilipus*? sp.	1	16-May-2002	4
Curculionidae	*Heilus sinuatus* (Boheman)	2	23-Mar-2002	11
Curculionidae	*Ozoctenus dufaui* Hustache	8	22-May-2002	5.2
Curculionidae	*Decuanellus* n. sp.	1	5-Jan-2002	2
Curculionidae	*Dorytomorpha*? sp.	1	15-Aug-2005	3.1
Curculionidae	*Chalcodermus insularis* Chevrolat	35	16-Jun-2002	4.8
Curculionidae	*Sternechus vicinus* Fleutiaux & Sallé	18	24-Apr-2001	5
Curculionidae	*Pycnarthrum hispidum* (Ferrari)	8		1.8
Curculionidae	*Gymnochilus reitteri* Eichhoff	17		2
Curculionidae	*Cryptocarenus seriatus* Eggers	3		2.2
Curculionidae	*Cryptocarenus heveae* (Hagedorn)	2		1.6
Curculionidae	*Coccotrypes cyperi* (Beeson)	27	1-Jan-1900	1.9
Curculionidae	*Coccotrypes dactyliperda* (Fab.)	11		2.1
Curculionidae	*Coccotrypes advena* Blandford	2		1.7

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Curculionidae	*Ambrosiodmus lecontei* Hopkins	2		2.7
Curculionidae	*Ambrosiodmus devexulus* Wood	1		2
Curculionidae	*Xyleborus affinis* Eichhoff	62	21-Jun-2000	2.1
Curculionidae	*Xyleborus ferrugineus* (Fab.)	122	24-Jun-2000	2.6
Curculionidae	*Xyleborus volvulus* (Fab.)	127		2.5
Curculionidae	*Xyleborus spinulosus* Blandford	6		2.3
Curculionidae	*Chramesus* sp. A	17		2
Curculionidae	*Chramesus* sp. B	2		2
Curculionidae	*Microborus* sp.	1		
Curculionidae	*Scolytodes striatus* Wood	22		1.7
Curculionidae	*Scolytodes schwarzi* (Hopkins)	29		1.5
Curculionidae	*Scolytodes* spp.	2		
Curculionidae	*Pseudothysanoes* n.sp.	12		
Curculionidae	*Pseudothysanoes* sp.	1		
Curculionidae	*Hylocurus* sp. 1	1		
Curculionidae	*Hylocurus* sp. 2	1		
Curculionidae	*Araptus* sp. A	2		
Curculionidae	*Araptus* sp. B	4		
Curculionidae	*Corthylus* sp.	6		
Curculionidae	*Premnobius cavipennis* Eichhoff	12		2.5
Curculionidae	*Xylosandrus compactus* (Eichhoff)	4		1.4
Curculionidae	*Cladoctonus* sp.	1		
Curculionidae	*Cnemonyx ficus* Schwarz	4		2.3
Curculionidae	*Cnemonyx vagabundus* Wood	2		1.5
Curculionidae	*Cnesinus* sp. A	3		
Curculionidae	*Cnesinus* sp. B	1		
Curculionidae	*Hypothenemus dolosus* Wood	1		1.6
Curculionidae	*Hypothenemus eruditus* Westwood	28		1.2
Curculionidae	*Hypothenemus pubescens* Hopkins	13		1.1
Curculionidae	*Hypothenemus brunneus* (Hopk.)	4		1.4

Table B. Total list of Beetle Species with date of first collection, number of specimens observed (N) and size

Family	Species	N	First Date	Length (mm)
Curculionidae	*Hypothenemus obscurus* (Fab.)	14		1.3
Curculionidae	*Hypothenemus gossypii* (Hopk.)	5		1
Curculionidae	*Hypothenemus birmanus* (Eichh.)	5		1.7
Curculionidae	*Hypothenemus comosus* Bright	2		1.7
Curculionidae	*Hypothenemus plumeriae* (Nordlinger)	2		
Curculionidae	*Hypothenemus* spp.	10	1-Jan-1900	1.5
Curculionidae	*Euplatypus parallelus* (Fabricius)	82	11-Mar-2002	4.4
Curculionidae	*Euplatypus hians* (Chapuis)	32	8-Jan-2002	4.1
Curculionidae	*Teloplatypus* sp.	19	11-Mar-2002	3
TOTAL N		13065		
NUMBER OF SPECIES RECORDED		718		

* Species recorded or collected pre-volcano, but not recollected, with either number of specimens number seen, reported in literature, or if not seen or recorded in literature, assumed to be 1

Notes

All IREC material dated 01 March 1982, but may be 1982, 1983, 1981

Chapin records assumed to be from Blackwelder

Leng & Mutclher assumed to be from Hubbard

Arrow 1920 assumed to be from Hubbard

First Records in Blackwelder, assumed to be from Blackwelder

Champion 1909 assumed to be from Hubbard

Triplehorn 1961 assumed to be from Hubbard

Fisher 1950 assumed to be from Hubbard

Measurements were taken from a representative Montserrat specimen. For cases where no Montserrat specimen was available, data were taken from published references to the species or a closely related congener.

Empty cells indicate data not available, and not included in analyses

NOTE: No records for Protura, Diplura, Zoraptera, Mantodea, Embidina, Phthiraptera, Siphonaptera, and Strepsiptera are included, in spite of the fact that most, if not all of these Orders will be found to occur on Montserrat. All Orders listed below, even those without specific records, have vouchers in the WIBF collections, or have been deposited elsewhere as noted.

COLLEMBOLA

Stevens & Waldmann (2001) reported a single published record of an Isotomidae from Montserrat. However, several families of this group are present on Montserrat, and springtails are abundant and speciose in the soil, canopy and litter layers. Study of this group would yield many new species records for Montserrat.

Fig. K. A small sample of the collembolan diversity in the Centre Hills. (Photo: Michael Ivie)

MICROCORYPHIA

Not reported from Montserrat by Stevens & Waldmann (2001), an unidentified species of this family was taken commonly in the Centre Hills.

Meinertellidae

Undetermined species	?

THYSANURA

Not reported from Montserrat by Stevens & Waldmann (2001), an invasive member of this order was reported from Montserrat in 1995, and another undetermined species is very common in the Centre Hills.

Lepismatidae

Ctenolepisma rothschildi Silvestri	EIS [Irish 1995]

Nicoletiidae

Undetermined species	?

EPHEMEROPTERA

Allenhyphes flinti (Allen)	WN [Baumgardner *et al*. 2003]

ODONATA

Determinations by T. W. Donnelly, additional records by F. Sibley from his Montserrat collections of October 2006). The dragonflies and damselflies are widely used as indicators of environmental health. Cooter (1983) provides the only 4 published records of this group for Montserrat, which we expand to 16. Given the sensitivity of this group to water conditions, we were surprised at the number which have survived the volcano's deposits in Montserrat's fresh water habitats. Two species are local endemics, both only recently discovered from Guadeloupe (Donnelly 2007).

Aeshnidae	
Anax junius (Drury)	WN
Triacanthagyna trifida (Rambur)	WN
Libellulidae	
Brachymesia herbida (Gundlach)	WN
Dythemis sp. (♀♀)	?
Erythrodiplax umbrata (Linnaeus)	WN
Erythemis vesiculosa (Fabricius)	WN
Macrothemis n. sp.	LE
Miathyria marcella (Selys)	WN
Orthemis macrostigma (Rambur)	LAE
Pantala flavescens (Fabricius)	WN
Tramea abdominalis (Rambur)	WN
Coenagrionidae	
Enallagma coecum (Hagen)	WN
Ischnura capreola (Hagen)	WN
Ischnura ramburii (Selys)	WN
Lestidae	
Lestes forficula Rambur	WN
Protoneuridae	
Protoneura romanae Meurgey	LE

ORTHOPTERA/BLATTERIA/PHASMIDA

These orders are the subject of reviews in preparation by Marske and Otte, and are not treated here. One Phasmid, 7 roaches, and 21 Orthopterans are listed by Marske (2004), and more were added in 2005.

Fig. L. *Nesonotus* sp., a long-horned grasshopper used as food by the Montserrat oriole. (Photo: Michael Ivie)

Fig. M. *Microcentrum* sp., a long-horned grasshopper used as food by the Montserrat oriole. (Photo: Michael Ivie)

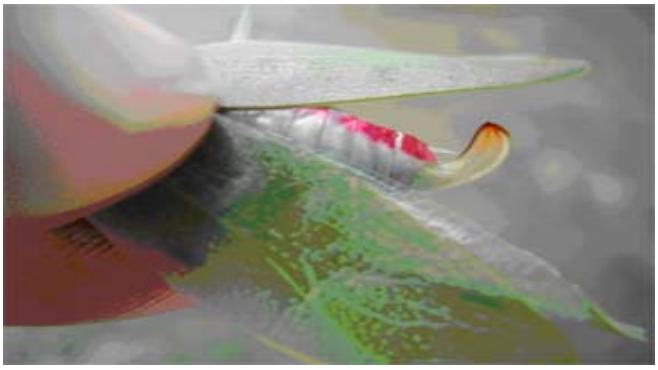


Fig. N. The brightly colored dorsum of the cryptically-patterned *Microcentrum* sp. (Photo: Michael Ivie)

Fig. O. An undescribed forest cricket of the genus *Amphiacusta* (Phalangopsinae: Gryllidae). (Photo: Gerardo Garcia/ Durrell, determination by D. Otte)

DERMAPTERA

Because the earwigs have been revised for the West Indies (Brindle 1971), little attention was paid to this group, and only 14 mounted specimens were preserved. This proved to be a mistake, as 8 species are represented, 4 of which cannot be identified using Brindle! Obviously, here is a place for more collecting.

Carcinophoridae	
Euborellia stali (Dohrn)	EIS [Cooter 1983, not recollected]
Euborellia caraiba Hebard	WN [Brindle 1971]
Forficulidae	
Doru sp. nr. *albipes* (Fabricius)	?
Labiidae	
Labia curvicauda (Motschulsky)	EIS
Labia dorsalis (Burmeister)	EIS [Brindle 1971]

Marava sp.	?
Sp. #1	?
Sp. #2	?

ISOPTERA

Stevens & Waldmann (2001) recorded 15 species of termites from Montserrat. We did not work with this group, and have found no further literature records.

HEMIPTERA: HOMOPTERA

This moderately diverse section of the Hemiptera includes many economic pest species, as well as some endemics of conservations concern. Many more species are yet to be discovered on Montserrat.

Aleyrodidae

Aleurodicus cocois (Curtis)	EIS [Woodruff *et al*. 1998, Stevens & Waldmann (2001) as *Aleurodiscus cocois*]
Bemisia argentifolii (Bellows & Perring)	EIS [Ryckewaert & Alauzet 2001]

Aphidiidae

Aphis gossypii Glover	EIS or WN

Pseudococcidae

Dysmicoccus boninsis (Kuwana)	EIS [Grey sugarcane mealybug, Ben-Dov 1994]
Maconellicoccus hirsutus (Green)	EIS [Williams 1985]
Phenacoccus madeirensis Green	EIS [Cassava or Madeira mealybug Ben-Dov 1994]

Ortheziidae

Orthezia praelonga Douglas	EIS [Miller *et al*. 2001]

Diaspididae

Aonidomytilus albus (Cockerell)	EIS or WN [Woodruff *et al*. 1998]
Aspidiella sacchari Cockerell	EIS [Woodruff *et al*. 1998]
Aspidiotus aurantii Maskell	EIS [Riley 1893]
Aspidiotus destructor Signoret	EIS or WN [Gordon 1978]
Howardia biclavis (Comstock)	EIS [Fennah 1947]
Lepidosaphes beckii (Newman)	EIS or WN [Woodruff *et al*. 1998]
Pseudaulacaspis pentagona (Targioni)	EIS or WN [Fennah 1947]
Selenaspidus articulatus (Morgan)	EIS or WN [Woodruff *et al*. 1998]
Unaspis citri (Comstock)	EIS [Citrus snow scale, Riley and Howard (1890) as *Chionaspis citri* Comstock]
Mytilaspis citricola (Packard)	EIS or WN [Riley and Howard 1890]

Rejected Record: *Chionaspis minor* var *angustior* is cited from Montserrat by Riley 1893, but this is a *nomen nudum*, and should not be used. Further, the species it refers to cannot be identified. If it is attributed to *C. minor*, the current correct name is *Pinnaspis strachani* (Cooley), an invasive species known from Antigua, St. Kitts and the Virgin Islands, but this cannot be considered verified.

Margarodidae

Icerya montserratensis Riley & Howard	WIE? [described from Montserrat by Riley and Howard 1890]

Coccidae

Ceroplastes cirripediformis Comstock	EIS or WN [Woodruff *et al*. 1998, Stevens & Waldmann (2001) as *Cercoplastes cirripediformis*]
Ceroplastes floridensis Comstock	EIS or WN [Woodruff *et al*. 1998, Stevens & Waldmann (2001) as *Cercoplastes floridensis*)
Coccus hesperidum Linneaus	EIS or WN [Woodruff *et al*. 1998]
Parlatoria pergandei Comstock	EIS or WN [Ballou (1912) , Stevens & Waldmann (2001) as *P. perganei* Comstock]
Saissetia oleae (Olivier)	EIS or WN [Woodruff *et al*. (1998) and Stevens & Waldmann (2001) as *Saissettia oleae* Oliver in Coccidae and as *Saissaetia oleae* in Diaspididae]
Saissetia coffeae (Walker)	EIS [Riley 1893 as *Lecanium hemisphericum* [sic, mis-spelling of *L. hemisphaericum*] Targioni-Tozzetti]
Vinsonia stellifera (Westwood)	EIS [Riley 1893]

Asterolecaniidae

Asterolecanium pustulans (Cockerell)	EIS [Cockerell 1893, Riley 1893]
Asterolecanium bambusae Boisduval	EIS [Riley 1893]

Cicadidae

Proarna hilaris (Germar)	WIE

FULGOROIDEA (Extracted from R. G. Fennah's 17 West Indian papers, courtesy of Lois O'Brien, with additions from WIBF collections in O'Brien collection)

Cixiidae

Bothriocera eborea Fennah	WIE
Cyclopoliarus montserratensis Fennah	IE
Cubana sp.	?

Derbidae

Patara mimula Fennah	LIE

Kinnaridae

Paraprosotropis marmorata Fennah	IE [Described from the "Central Hills"]

Flatidae

Flatoidinus caesalpiniai Fennah	IE
Antillormenis albicostalis Fennah	IE
Petrusa epilepsis (Kirkaldy)	LIE
Ilesia septempunctata (Fennah)	IE

Acanaloniidae

Acanalonia bonducellae Fennah	LE
Acanalonia viriditerminata sylvestris Fennah	LE ssp.

Achilidae

Catonia montserratensis Fennah	IE

HEMIPTERA: HETEROPTERA

The true bugs are diverse and ubiquitous on Montserrat, and include pest species, predators, fungivores in the terrestrial and aquatic environment. Presented here is but a tip of the iceberg of this fauna.

Enicocephalidae	
Sp. #1	?
Sp. #2	?
Sp. #3	?
Scizopteridae	
Sp. #1	?
Veliidae	
Sp. #1	?
Sp. #2	?
Gerridae	
Sp. #1	?
Naucoridae (det. by R. Sites)	
Pelocoris sp. #1	WN [A single female was taken, which cannot be named to species.]
Notonectidae	
Sp. #1	?
Sp. #2	?
Reduviidae	
Barce fraterna (Say)	WN [Stevens & Waldmann 2001]
Zelus longipes Linneaus	WN
Emesinae sp.	
Miridae	
Many species present	?
Tingidae	
Present	?
Aradidae	
Sp. #1	?
Sp. #2	?
Sp. #3	?
Cydnidae	
Amnestus sp.	?
Pentatomidae (Determinations by David A. Rider)	
Asopinae	
Podisus sagitta (Fabricius)	WN
Edessinae	
Edessa meditabunda (Fabricius)?	WN [Ingram 1981]
Edessa bifida (Say)?	WN

Pentatominae	
Arvelius albopunctatus (DeGeer)	WN
Chinavia marginata (Palisot de Beauvois)	WN
Cyptocephala antiguensis (Westwood)	WN
Loxa viridis (Palisot de Beauvois)	WN
Mecidea longula Stål	WIE
Mormidea cubrosa (Dallas)	WN
Mormidea ypsilon (Linnaeus)	WN
Nezara viridula (Linnaeus)	WN [Ingram 1981]
Oebalus pugnax (Fabricius)	WN
Proxys victor (Fabricius)	SA
Thyanta perditor (Fabricius)	WN
Thyanta testacea (Dallas)	SA
Vulsirea nigrorubra Spinola	WIE
Scutelleridae (Determinations by David A. Rider)	
Augocoris sp.	?
Diolcus sp.	?
Tetyra antillarum Kirkaldy	WIE
Tessaratomidae (determination by David A. Rider)	
Piezosternum subulatum (Thunberg)	WN
Lygaeidae	
Blissus antillus Leonard	WN [Slater & Baranowski 2005, most West Indian records of *B. insularis* Barber belong here]
Neopamera albocincta (Barber)	WN [Slater & Baranowski 2005]
Neopamera bilobata (Say)	WN [Slater & Baranowski 2005]
Neopamera vicarious (Barber)	WIE [Slater & Baranowski 2005]
Neortholomus jamaicensis (Dallas)	WN [Slater & Baranowski 2005]
Ochrimnus collaris (Fabricius)	WIE [Slater & Baranowski 2005]
Oncopeltus aulicus (Fabricius)	WIE [Slater & Baranowski 2005]
Oncopeltus faciatus (Dallas)	WN [Robson 1906, Slater & Baranowski 2005]
Ozophora quinquemaculata Barber	WIE [Slater & Baranowski 2005]
Pachygrontha minarum saileri Slater	LAE spp. [Slater & Baranowski 2005]
Paragonatas divergens (Distant)	WN [Slater & Baranowski 2005]
Paromius longulus (Dallas)	WN [Slater & Baranowski 2005]
Prytanes formosa (Distant)	WN [Slater & Baranowski 2005]
Pseudopachybrachius vinctus (Say)	WN [Slater & Baranowski 2005]
Xyonysius californicus (Stål)	WN [Slater & Baranowski 2005]
Pyrrhocoridae	
Dysdercus discolor Walker	WN [Fennah 1947, Ingram 1981, Stevens & Waldmann 2001 as *D. discolori*]
Dysdercus andreae (Linneaus)	WIE [Irving 1978]
Coreidae	
Sp. #1	?
Sp. #2	?

THYSANOPTERA (Thrips)

None of the species listed by Stevens & Waldman (2001) have actually been recorded from Montserrat, and no other records have been found, but thrips are speciose and abundant, both as plant pests (probably invasive species), and as native plant feeders, fungivores and predators in forest litter and canopy. Fig. P gives an idea of the diversity from a single canopy fogging sample.

Fig. P. A selection of forest canopy thrips species on a Eastern Caribbean dime. (Photo: Michael Ivie)

PSOCOPTERA

No members of this Order have been reported from Montserrat, but they are both abundant and speciose on the island. Another group that would prove a fertile field of investigation into Montserrat's biodiversity.

NEUROPTERA (determined By J. B. Johnson)

This small holometabolous Order is exclusively predacious, and important in the biological control of several plant pests.

Coniopterygidae

Coniopteryx ?*dominica* Meinander	LIE
Coniopteryx ? *virginum* Meinander	NEC

Hemerobiidae

Micromus subanticus (Walker)	WN
Nusalala sp.	?

Chrysopidae

Ceraeochrysa sp.	?
Chrysoperla ?*externa* (Hagen)	?
Chrysopodes sp. 1	?
Chrysopodes sp. 2	?

Dilaridae

Nallachius americanus (McLachlan)	WN

Ascelaphidae

Ululodes sp. poss. *cajennensis* (Fabricius)	?

Myrmeleontidae

Myrmeleon ?*insertus* Hagen ?

HYMENOPTERA

One of the huge megadiverse Orders, the sawflies, wasps, ants and bees can be expected to approach the Coleoptera in number of species. The number of hymenopterous parasitoids alone to be found on Montserrat will number in the hundreds.

Pergidae (described for this study by David R. Smith)

Acordulecera montserratensis Smith LIE [Smith 2005]

Acordulecera longica Smith LIE [Smith 2005]

Ceraphronidae -- present

Evaniidae

Evania appendigaster (Linnaeus) EBC

Braconindae – many ?

Ichneumonidae -- many

Trichogrammatidae

Trichogramma australicum Girault WN?

Trichogramma japonicum Ashmead WN?

Brachyufens osborni (Dozer) WN? [as *Ufens osborni* in Fennah 1942 (not 1947, and Wolcott 1951, not Walcott 1947, as recorded in Stevens & Waldmann 2001)]

Eulophidae – many ?

Aphelinidae – represented ?

Signiphoridae—represented ?

Encyrtidae – represented ?

Agaonidae – represented ?

Torymidae

Tormyoides cecidomyidae (Ashmead) WN [Woodruff *et al*. 1998]

Pteromalidae -- many

Eucharitidae (determined by J. Heraty)

Pseudochalcura americana WN

Obeza grenadensis LAE

Orasema smithi WN

Kapala sulcifacies complex n. sp. IE?

Fig. Q. Two Montserrat endemics, the microhymenopteran *Kapala sulcifacies* complex n. sp. (Eucharitidae) and the long-horned beetle *Cyrtinus hubbardi* Fisher (Cerambycidae). The longhorns are normally considered a group of large beetles, but *Kapala* is a parasitoid of ants

Perilampidae – represented	?
Eurytomidae – represented	?
Chalcididae – represented	?
Eucoilidae – represented	?
Diapriidae – represented	?

Fig. R. A small sampling of the diversity of the unstudied microhymenoptera of Montserrat

Scelionidae (Norman F. Johnson determiner)

Calotelea sp.	?
Oethecoctonus sp.	?
Baeus sp.	?
Phanuromyia sp. #1	?
Phanuromyia sp. #2	?
Phanuromyia sp. #3	?
Telenomus sp. *podisi*-group	?

Telenomus sp. #2 ?

Platygastridae – represented ?
Figitidae – represented ?
Dryinidae – represented ?

Formicidae

Stevens & Waldmann (2001) recorded 6 species of ants from Montserrat. Several thousand specimens of many species from the WIBF have been deposited with E. O. Wilson at Harvard's Museum for Comparative Zoology.

NOTE: The following 6 families (Tiphiidae, Scolyidae, Pompilidae, Vespidae, Eumenidae and Sphecidae) were the subject of a review by Evans (1972) of material collected by the Bredin-Archbold-Smithsonian Biological Survey of Dominica. It is interesting to compare the relative numbers of species (Table C) produced with targeted collecting by wasp specialists and others on the much-larger-and-higher island of Dominca, to those collected incidentally by coleopterists on Montserrat. From standard island biogeographic theory, we would expect 1.5-2.5 times more species on Dominica than occur on Montserrat, with a correction for the bias of the 2 groups of collectors pushing the difference higher. However, Montserrat's total for the 6 families equal those of Dominica, although the family-by-family totals vary. However, in none of the cases is Dominica's recorded fauna as large as would be expected.

Table C. Relative numbers of Species of Selected Aculeate Wasp Familes from Dominica and Montserrat. Dominica Figures from Evan (1972).

Family	Dominica	Montserrat
Tiphiidae	4	3
Scoliidae	1	3
Pompilidae	7	6
Vespidae	1	2
Eumenidae	1	4
Sphecidae	15	11
TOTAL	**29**	**29**

Tiphiidae

Myzinum haemorrhoidale (Fabricius)
Tiphia paupi Allen & Krombein WIE
Tiphia sp. nr. *dominicae* Allen ?

Scoliidae

Campsomeris dorsata (Fabricius) WN?
Campsomeris trifasciata (Fabricius) WN?
Campsomeris ?*atrata* (Fabricius) ?

Pompilidae. Six species for this group shows unexpected diversity, given that Evans (1972) reported only 7 from much-larger Dominca, after that island was collected by a Smithsonian survey which included a specialist in this group.

Pepsis rubra (Drury) WIE
Pepsis ruficornis (Fabricius) WN
Ageniella sp. ?
Priochilus splendidum opacifrons (Fox) WN

Poecilopompilus mixtus (Fabricius) WIE

Anoplius americanus ambiguous (Dahlbom) WN

Vespidae

Polistes crinitus (Felton) WIE [The "Jack Spaniard." = *Polistes* cf. *annularis* of Stevens and Waldman (2001), not Fabricius. The true *P. annularis* is North American.] recorded from Montserrat by Richards (1978).

Polistes dominicus Vallot [= *P. cinctus* Lepeletier] EBC. [The "Buderman."Recorded from Montserrat by Richards (1978) and Snelling (1983). Ballou (1915) reported that the attempt to establish this species on Montserrat was unsuccessful. Mr William P. Ryan of the Montserrat Department of Agriculture (retired, pers. com.) told me that it was established through the efforts of a Mr. Budderman around the 1940's, and the species' common name on Montserrat therefore became "Budderman." EBC

Eumenidae

Pachodynerus nasidens (Latreille) WN

Pachodynerus atratus (Fabricius) WIN [Menke 1986]

Pachodynerus guadeloupensis (Sassure) LAE [Menke 1986, not seen post-volcano]

Stenodynerus sp. ?

Sphecidae

Sceliphron assimile (Dalbom) WN

Sceliphron caementarium (Drury) WN

Stictia signata (Linneaus) WN

Ectemnius sp. ?

Rhopalum sp. ?

Prionyx thomae (Fabricius WN

Tachyta chrysopyga argentipes Smith WIE

Liris fuliginosa (Dalbom) WIE

Liris labiata (Fabricius) WIE

Liris n.sp. IE?

Sphex sp. ?

Colletidae

Hylaeus sp. ?

Halictidae

Lasioglossum sp. ?

Halictidae sp. # 1 ?

Halictidae sp. # 2 ?

Halictidae sp. # 3 ?

Halictidae sp. # 4 ?

Halictidae sp. # 5 ?

Halictidae sp. # 6 ?

Halictidae sp. # 7 ?

Halictidae sp. # 8 ?

Halictidae sp. # 9 ?

Halictidae sp. # 10 ?

Halictidae sp. # 11 ?

Halictidae sp. # 12 ?

Halictidae sp. # 13 ?

Megachilidae

Chalicodoma lanata (Fabricius)	EIS
Coelioxys sp.	?
Megachile sp.	?
Megachilid sp. #1	?
Megachilid sp #2	?

Apidae

Apis melifera Linnaeus	EIS
Anthophora tricolor (Fabricius)	WIE [Brooks 1999]
Anthophora footei Crawford	LE [Brooks (1999) reports a single female in the USNM determined by Sandhouse as this species, but did not examine it. It may prove to be *A. tricolor*]
Melipona variegatipes Gribodo	LE

Fig. S. *Melipona variegatipes* Gribodo male guarding a nest entrance in a Mahogany tree at Woodlands. The black area above the bee is a tarry wax sheet over an opening, and the dark spots scattered across the surface are ventilation holes. (Photo: Michael Ivie)

Centris sp. #1	?
Centris sp. #2	?
Centris sp. #3	?
Centris sp. #4	?
Exomalopsis sp. #1	?
Exomalopsis sp. #2	?
Melissodes? sp.	?
Mesoplia sp.	?
Xylocopa caribea Lepeltier	LAE [Hurd 1978, followed by Woodruff *et al*. 1998 and Stevens and Waldmann 2001, records this species from Montserrat.]

Xylocopa mordax Smith WIE [Hurd 1978, followed by Woodruff *et al*. 1998 and Stevens and Waldmann 200, records this species from Montserrat.]

Xylocopa sp. ? [Hurd 1978, followed by Woodruff *et al*. 1998 and Stevens and Waldmann 2001, records 2 species of this genus from Montserrat. We have collected one, which species it is, is unknown]

TRICHOPTERA

This group includes many important water-quality indicators. Botosaneanu (1973) reported an early instar *Oxyethira* sp. (as *Oxyethira* by Stevens & Waldmann 2001) from Montserrat, but no adults have been reported (Botosaneanu 2002). He recorded a total of 360 species from the West Indies, although this number is inflated by inclusion of species from islands in the southern Caribbean that lie within the South American biogeographic region (Botosaneanu 2002). Flint and Sykora (1993) list 22 species from the Lesser Antilles, none from north of Guadeloupe. Botosaneanu (1994) added six more new species from Guadeloupe Seven species are now recorded from Montserrat, and given that these are from only a few samples, and that we did not try to collect this group, at least double that number are expected. Oliver Flint did the determinations.

Family Hydropsychidae

Smicridea (*Smicridea*) *karukerae* Botosaneanu LE

Family Hydroptilidae

Alisotrichia lobata Flint LE

Neotrichia iridescens Flint LAE

Ochrotrichia ponta Flint LAE

Oxyethira sp. ? [Botosaneanu 1973]

Family Philopotamidae

Chimarra (*Chimarra*) *haesitationis* Botosaneanu LE

Family Xiphocentronidae

Xiphocentron albolineatum Flint LAE

LEPIDOPTERA

The third of the megadiverse Orders, the vast majority of the biodiversity in this group is not in the well-known and highly visible butterflies, nor even in the so-called macromoths, but in the tiny microlepidoptera that are so understudied throughout the world. Many plant pests and biological control agents are included in this order. We made absolutely no effort to inventory this group, and our additions below are what can happen purely accidentally.

Butterflies. Perhaps, with the mosquitoes, the best studied insect group world-wide. Our material was highly size-biased, missing entirely the smaller-sized species. Smith *et al*. covered the West Indian fauna extensively. Yet, even with all of the work done on this group, we added 2 species of butterflies to those known from the island (Table D). Lack of a collection record in the Ivie *et al*. material should not be construed to indicate the species was absent, as we simply did not even try to collect any of the small species, nor anything that had to be chased down.

Table D. Butterflies of Montserrat, comparing 3 collections. Stevens & Waldmann (2001) summarized the records of Pinchon & Enrico (1969) and Schwartz & Jimenez (1982)

Family	Genus	Species	Pinchon & Enrico 1969	Schwartz & Jimenez 1982	Ivie *et al.* 2000-2006
Danaidae	*Danaus*	*plexippus*	X	x	no
Apaturidae	*Anaea*	*minor*	no	x	no
Nymphalidae	*Junonia*	*evarete*	X	x	x
	Anartia	*jatrophae*	X	x	x
	Biblis	*hyperia*	X	x	x
	Antillea	*pelops*	no	x	x
	Vanessa	*cardui*	X	x	no
	Marpesia	*petreus*	no	no	x
	Eunica	*monima*	no	no	x
Heliconidae	*Heliconius*	*charitonius*	X	x	x
	Dryas	*iulia*	X	x	no
	Agraulis	*vanillae*	X	x	x
Lycaenidae	*Chlorostrymon*	*simaethis*	no	x	no
	Strymon	*acis*	X	x	no
	Strymon	*bubastus*	X	x	no
	Electrostrymon	*angerona*	X	x	x
	Leptotes	*cassius*	X	x	no
	Hemiargus	*hanno*	X	x	no
Pieridae	*Ascia*	*monuste*	X	x	x
	Appias	*drusilla*	X	x	x
	Eurema	*leuce*	no	x	x
	Eurema	*venusta*	X	x	x
	Eurema	*elathea*	no	x	no
	Eurema	*lisa*	X	x	x
	Anteos	*maerula*	no	x	no
	Phoebis	*sennae*	X	x	x
	Phoebis	*trite*	X	no	x
Papilionidae	*Battus*	*polydamas*	X	x	sight

Family	Genus	Species	Pinchon & Enrico 1969	Schwartz & Jimenez 1982	Ivie *et al.* 2000-2006
Hesperiidae	*Epargyreus*	*zestos*	X	x	no
	Polygonus	*leo*	no	x	no
	Polygonus	*manueli*	no	x	no
	Urbanus	*proteus*	X	x	no
	Urbanus	*obscurus*	X	x	x
	Achlyodes	*papinianus*	X	x	no
	Pyrgus	*oileus*	X	x	x
	Wallengrenia	*ophites*	X	x	no
	Hylephila	*phyleus*	X	x	no
	Calpodes	*ethlius*	no	x	no
	Panoquina	*sylvicola*	X	x	no
	Nyctelius	*nyctelius*	X	no	no
N taken			29	36	19
TOTAL			**29**	**38**	**40**

Moths. There are hundreds of moths on Montserrat, but aside from a few pest species, there are virtually no published records. Stevens & Waldmann (2001) could locate only 12 species, all pests (1 Lyonetiidae, 1 Gelichiidae, 2 Pyralidae, 8 Noctuidae) with actual Montserrat records. To hopefully spur someone to the work on the moths of Montserrat, we give 2 new records of very large and beautiful moths that are recorded from the island in the scientific literature for the first time.

Noctuidae. This huge family is well represented on Montserrat. The largest moth on the island, well-known as the "Rat-Bat," belongs here (Fig. T)

Ascalapha odorata (L.) WN

Fig. T. The Black Witch [*Ascalapha odorata* (L.)], one of Montserrat's largest moths. (Photo: Kenneth Puliafico)

Sphingidae. The very large and colorful frangipani worms that appear on ornamental and wild trees from time to time are our representative of this family. The adult is large, but rather dull. Several other, smaller, species are more attractive.

Pseudosphinx tetrio (Linneaus) WN [Fig. U]

Fig. U. The Frangipani Worm, *Pseudosphinx tetrio* on leaves of frangipani, *Plumeria* sp.. (Photo: Michael Ivie)

DIPTERA

(Except as noted, determinations by Richard L. Hurley). The fourth and last of the megadiverse Orders, the number of flies in a Malaise trap sample can easily overwhelm. Montserrat, with over 130 species now recorded, can be expected to yield hundreds more species.

Ceratopogonidae

Culicoides furens (Poey) WN [Woodruff *et al*. 1998]

Chaoboridae

Corethrella spec. 21 ? [Belkin & Heinemann 1976]

Corethrella spec. 22 ? [Belkin & Heinemann 1976]

Culicidae

Stevens & Waldmann (2001) gave an extensive review of the mosquitoes of Montserrat, recording 20 species. We have nothing to add to this beyond a few spelling corrections, and the reader is referred to their treatment.

Aedes (*Howardina*) *busckii* (Coquillett) [in Stevens & Waldmann (2001) as *Aedes* (*Howardia*) *busckii* (Coquillett)]

Aedes (*Ochlerotatus*) *taeniorhynchus* (Wiedemann) [in Stevens & Waldmann (2001) *Aedes* (*Ochlerotarsus*) *taeniorhynchus* (Weidemann)]

Aedes (*Ochlerotatus*) *tortilis* (Theobald) [in Stevens & Waldmann (2001) as *Aedes* (*Ochlerotarsus*) *tortilis* (Theobald)]

Aedes (*Stegomyia*) *aegypti* (Linneaus)

Anopheles (*Nyssorhynchus*) *albimanus* Weidemann

Anopheles (*Nyssorhynchus*) *aquasalis* Curry

Anopheles (*Nyssorhynchus*) *argyritarsis* Robineau-Desvoidy

Culex (*Culex*) *bahamensis* Dynar & Knab

Culex (*Culex*) *declarator* Dynar & Knab

Culex (*Culex*) *habilitator* Dynar & Knab

Culex (*Culex*) *nigripalpus* Theobald

Culex (*Culex*) *quinquefasciatus* Say

Culex (*Melanoconion*) *atratus* Theobald

Culex (*Melanoconion*) *madininensis* Senevet

Culex (*Micraedes*) *bisulcatus* (Coquillett)

Deinocerites magnus (Theobald)

Psorophora (*Grabhamia*) sp nr. *cingulata* (Fabricius)

Toxorhynchites (*Lynchiella*) *guadeloupensis* (Dynar & Knab)

Toxorhynchites (*Lynchiella*) *portoricensis* Roeder

Wyeomyia (Wyeomyia) *grayii* Theobald

Anisopodidae

Olbiogaster sp.	?

Cecidomyiidae

Contarinia gossypii Felt	WIE [Ingram 1981]
Porricondyla gossypii (Coquillett)	SA [Ballou 1912]

Sciaridae – present

Stratiomyidae

Hermetia illucens (Linneaus)	EIS or WN [Danforth 1939)]

Asilidae (Determinations by A. Scarbrough)

Efferia n.sp.	IE
Ommatius prolongatus Scarbrough	IE
Leptogastrinae n. sp. 1	IE?
Leptogastrinae n. sp. 2	IE?

Bombyliidae

Heterostylus sp.	?

Dolichopodidae (Determinations by Richard Hurley and Justin Runyon). This family is one of the most dramatic examples of what remains to be discovered on Montserrat. A relatively large family of small, obscure predaceous flies, the dolies are often overlooked. Not a single previous record of the family for Montserrat exists. Because of the interest of Hurley and Runyon, we made a special effort to obtain samples of this group, and what they discovered is an amazing 46 species from Montserrat. The group was revised for Dominica by Robinson (1975), providing a solid framework for evaluating the Montserrat fauna. The 46 species on Montserrat, obtained without the assistance of a Dipterist, compare with 113 species known from Dominica (Robinson 1975). Running the Chao1 estimator (classic option in EstimateS 7.5.1, Colwell 2007) on the 735 specimens of the 46 species gives a mean estimate of 78 species (95% CI = 53-176 species). Some species of this group are shore and beach specialists, habitats we did not sample, leaving the real expected total of Montserratian dolies unresolved.

Amblypsilopus n.sp. *luteus* (Robinson)	IE
Amblyspilopus n.sp. nr. *bredini* (Robinson)	IE
Asyndetus sp. #1	N?
Asyndetus sp. #2	N?
Chrysotus acutus Aldrich	WN
Chrysotus apicalis Aldrich	WIE
Chrysotus hirsutus Aldrich	WN
Chrysotus lamellicaudus Robinson	LIE
Chrysotus mexicanus Robinson	WN
Chrysotus minimus Robinson	LIE

Chrysotus spectabilis (Loew)	WN
Chrysotus n.sp. nr. *callichromus* Robinson	IE
Chrysotus n.sp. nr. *integer* Robinson	IE
Chrysotus n.sp. nr. *pseudoniger* Robinson	IE
Chrysotus n.sp. nr. *pseudopacus* Robinson	IE
Chrysotus n.sp. nr. *robustus* (Robinson)	IE
Chrysotus n.sp. nr. *subcaudatus* Robinson	IE
Chrysotus orichalceus Gosseries	LAE
Chrysotus proximus Aldrich	LAE
Chrysotus spinipes Van Duzee	WIE
Diaphorinae females	N?
Chrysotus xiphostoma Robinson	LAE
Coeloglutus concavus Aldrich	WIE
Condylostylus longicornis (Fabricius)	EIS
Condylostylus n.sp. nr. *nigripilosus*	IE
Condylostylus peripilosus Robinson	LIE
Condylostylus quadricolor (Walker)	WN
Dactylomyia decora (Aldrich)	LAE
Diaphorus contiguous Aldrich	WN
Diaphorus n.sp. nr. *flavipes*	IE
Diaphorus n.sp. nr. *mundus*	IE
Diaphorus n.sp. nr. *parvulus*	IE
Medetera n. sp. nr. *crassicauda* Robinson	IE
Medetera dominicensis Robinson	LIE
Medetera n.sp. 1	IE
Medertera n.sp. 2	IE
Neurigona fuscicosta Robinson	LIE
Plagioneurus univittatus Loew	WN
Systenus sp.	N?
Systenus n. sp.	IE
Thryptcus n. sp. nr. *delicatus*	IE
Thrypticus sp. 1	N?
Thrypticus sp. 2	N?
Thrypticus violaceus Van Duzee	WIE
Viridigona thoracica (Van Duzee)	WN
Xanthina rubromarginata Robinson	LIE

Empididae -- present

Phoridae [Determinations by Brian Brown, vouchers deposited in Los Angeles County Museum of Natural History] For comparison, 82 species are reported from Dominica (Borgmeier 1969).]

Dohrniphora dispar (Enderlein)	WN [Kung and Brown 2006]
Dohrniphora sp.	?
Coniceromyia latimana (Malloch)	WIE
Megaselia aurea (Aldrich)	WIE
Megaselia femoralis (Endelein)	WN
Megaselia luteicauda (Borgmeier)	WN
Megaselia striativentris Borgmeier	WN

Megaselia spp.	?

Syrphidae. (Determinations by F. C. Thompson and R. L. Hurley)The flower flies are one of the few relatively speciose groups of insects with a comprehensive West Indian revision that records all of the specimens involved (Thompson 1981). As such, it provides an excellent opportunity to study the discovery and accumulation of records. There are 22 species of flower flies now known from Montserrat. Table 10 shows the relationship of Thompson's (1981) original list, Stevens & Waldmann's (2001) list, the WIBF material mounted in the early part of the project and the specimens mounted and labeled in 2005-2006. The Chao 1 estimate of total species for Montserrat is 25, with a 95% confidence interval ranging from 22-37 -- an amazing diversity considering that the entire Lesser Antilles have only 31 recorded species.

Allograpta limbata (Fabricius)	NEC
Copeostylum apicale Loew	WN
Copeostylum discale ?	?
Copeostylum vacuum (Fabricius)	WIE
Copeostylum n.sp.?	IE?
Lepidomyia n.sp.	IE
Meromacrus unicolor (Wulp)	LE
Meromacrus n.sp.	IE
Ocyptamus cylindricus (Fabricius)	WIE
Ocyptamus dimidiatus (Fabricius)	WN
Ocyptamus stenogaster group sp. A	LAE
Ocyptamus sp.	?
Ornidia obesa (Fabricius)	EIS
Palpada vinetorum (Fabricius)	WN
Pseudodorus clavatus (Fabricius)	WN
Toxomerus arcifer (Loew)	WN
Toxomerus dispar (Fabricius)	WN
Toxomerus ferroxida (Hull)	LAE
Toxomerus floralis (Fabricius)	WN
Toxomerus musicus (Fabricius)	WN
Toxomerus pulchellus (Macquart)	WN
Xanthandrus tricinctus Thompson	LIE

Calliphoridae

Chrysomyia sp.	?

Hippoboscidae (incl. Streblidae)

Megistopoda aranea (Coquillett) as *Pterellipsis aranea*]	WN [Coquillett (1899), in Stevens & Waldmann (2001)

Muscidae—represented	?
Sarcophgdidae—represented	?
Tachinidae—represented	?

Micropezidae

Hoplocheiloma sp.	?
Odontomera sp.	?

Neriidae

Odontoloxozus sp.	?

Lonchaeidae – present	?
Tephritidae – present	?
Ulidiidae (Otitidae) – present	?
Lauxaniidae	?
Pachyopella sp.	?
Agromyzidae	
Liriomyza trifolii (Burgess)	EIS [Ingram 1981]
Anthomyzidae	
Anthomyza sp.	?
Clusiidae	
Chaetoclusia sp.	?
Sobarocephala sp.	?
Chloropidae	
Pseudogaurax lancifer (Coquillett)	WIE [Coquillett (1900) and Wolcott (1951) (not Walcott 1947 as in Stevens & Waldmann 2001)]
Drosophilidae	
Drosophila carcinophila Wheeler	WIE [Carson 1967]
Drosophila pulchella Sturtevant	LAE [Grimaldi 1988]
Drosophila richardsoni Vilela	NEA [Grimaldi 1988
Zygothrica insularis Grimaldi *nomen nudem*	LAE [Grimaldi (1988) coined this name without a valid descripton, and it was used by Stevens & Waldmann, but it has never been validated, making it a *nomen nudem* (literally a naked name).]

Table E. Discovery of Syrphidae on Montserrat. Thompson (1981) records 34 species from the Lesser Antilles, 10 of which are endemic. Four of these are NOT Lesser Antillean in the biogeographic sense, occuring only in the Greater Antilles, including the Virgin Islands. One species (Toxomerus watsoni) was recorded from Grenada, but not listed as Lesser Antillean. Thus, the recorded fauna of the biogeographic Lesser Antilles is 31 species (34-4+1). Montserrat now has 19-22 species, with a predicted total of 25.

Species	Number of Specimens Recorded (or citation if no specimens seen)						Distribution
	Thompson 1981	Stevens & Waldman	Ivie *et al.* batch 1	Ivie *et al.* batch 2	Ivie *et al.* total	Total	
Allograpta limbata (Fabricius)	6	Thompson 1981	2	0	2	8	NEC
Copeostylum apicale Loew	0	-	6	11	17	17	WN
Copeostylum discale ?	0	-	0	4	4	4	?
Copeostylum vacuum	2	Thompson 1981	0	1	1	3	WIE
Copeostylum n.sp.?	0	-	0	4	4	4	IE?
Lepidomyia n.sp.	0	-	2	0	2	2	IE
Meromacrus unicolor (Wulp)	0	-	1	0	1	1	LE
Meromacrus n.sp.	0	-	4	2	6	6	IE
Ocyptamus cylindricus (Fabricius)	13	Thompson 1981	14	10	24	37	WIE
Ocyptamus dimidiatus (Fabricius)	7	Thompson 1981	0	10	10	17	WN
Ocyptamus stenogaster group sp. A	0	-	1	0	1	1	LAE
Ocyptamus sp.	0	-	0	1	1	1	?
Ornidia obesa (Fabricius)	0	Danforth 1939	20	7	27	27	EIS
Palpada vinetorum (Fabricius)	Doesburg 1970	Thompson 1981	0	5	5	5	WN
Pseudodorus clavatus (Fabricius)	21	Thompson 1981	5	8	13	34	WN
Toxomerus arcifer (Loew)	1	Thompson 1981	0	2	2	3	WN

Species	Number of Specimens Recorded (or citation if no specimens seen)						Distribution
	Thompson 1981	Stevens & Waldman	Ivie *et al.* batch 1	Ivie *et al.* batch 2	Ivie *et al.* total	Total	
Toxomerus dispar (Fabricius)	1	Thompson 1981	0	0	0	1	WN
Toxomerus ferroxida (Hull)	0	Woodruff *et al.* 1998	4	3	7	7	LAE
Toxomerus floralis (Fabricius)	1*	Thompson 1981	0	0	0	1	WN
Toxomerus musicus (Fabricius)	4	Thompson 1981	0	1	1	5	WN
Toxomerus pulchellus (Macquart)	1	Thompson 1981	0	0	0	1	WN
Xanthandrus tricinctus Thompson	0	-	1	1	2	2	LIE
TOTAL N	**57**		**60**	**70**	**130**	**187**	
Species Recorded	11	13	11	15	19	22	
Number of Singletons	3		3	4	5	5	
Number of doubles	2		2	2	4	3	
Chao 1 Est. of expected species richness						**24.5**	**95% C.L. 22-37**

*excludes Thompson's Busck specimen, which actually refers to Montserrat, Trinidad.

PROTOCTISTA. We have nothing to add to the 3 medically important taxa reported by Stevens and Waldmann (2001).

PLATYHELMINTHES. Stevens & Waldmann (2001) reported one species, the trematode agent of human bilharziasis, to which we add another Class for Montserrat.

Additions to Stevens and Waldman (2001):

TUBULARIA (Flat Worms). A land planarian, possibly of the genus *Rhynchodemus*, occurs in the Centre Hills (Fig. V).

Fig. V. An unidentified land planarian. (Photo: Gerardo Garcia)

NEMATODA (Round Worms). Stevens & Waldmann listed 3 human parasites from this group, all exotic. We discovered only one further record of an economically important plant-pest nematode from Montserrat, from what must be hundreds more plant parasitic, animal (including insect and other invertebrate) parasitic, and free-living species on the island.

Additions to Stevens and Waldman (2001):

Rotylenchulus reniformis Linford & Oliveira, 1940 (reniform nematode) Braithwaite (1973);

ANNELIDA. Earthworms of the Class Oligochaeta occur on Montserrat, but none seem to have been recorded.

ONYCHOPHORA (Onychophorans). A *Peripatus* has been repeatedly recorded from Montserrat (Clark 1929, Peck 1975, Read 1988, Stevens & Waldman 2001) as both *Peripatus* sp and *Peripatus antiguensis* Bouvier, all apparently based on a series collected in 1924 by T. W. Savage-English (not "J. W.", as per Stevens & Waldmann 2001. Clark reported that Savage-English reported the population "now nearly exterminated." Whatever the correct name, after 78 years, it was recollected in the Centre Hills at Hope Ghaut Spring in May 2003. The group is globally sensitive, and of high conservation interest (New, 1995)

MOLLUSCA. The many marine species are beyond the scope of this review. Often, marine shells end up on land because of their use by soldier (or hermit) crabs, but should not be confused with snail species that actually live on land or in fresh water. Data and determinations below were kindly provided by Gary Rosenberg and David Robinson.

GASTROPODA (Snails and Slugs) Stevens & Waldman (2001) listed 5 species of snails from Montserrat -- 4 aquatic and one terrestrial species. One more aquatic species has been recorded since then (Bass 2003). Additions below include the terrestrial snails that made up the first 5 invertebrates reported from Montserrat (Bland 1875). Two terrestrial species were found among the collections of the Academy of Natural Sciences in Philadelphia (ANSP), and three species added from our collections, one a new record of an invasive pest (Fig. X), for a total of 14 snails and one unidentified slug (Fig. W). More terrestrial snail species have been sighted, and given the number of species known from St. Martin and Gua-

deloupe, 30 or more species might be expected, with additions to the one single-island endemic known to date. David Robinson of the USDA, based at the Academy of Natural Sciences in Philadelphia, is planning a much needed survey of the land snails of Montserrat in 2007. Land snails are often among the most sensitive of island species, and are a priority group for conservation monitoring.

Fig. W. An unidentified slug from the Centre Hills. (Photo: Gerardo Garcia)

Terrestrial Snails

Buliminidae

Amphibulimus rawsonis Bland — IE [Described from Montserrat, recollected by Hubbard in 1894 (ANSP)]

Bulimulus guadalupensis (Bruguière) — ? [Recorded by Bland (1875) as "*B. exilis,*" and Breure (1974) as *B. guadeloupensis*.

Bulimulus sp. — ? [A specimen we collected in Hope Ghaut differs from the above species, D. Robinson, in lit.]

Helicinidae

Helicina fasciata (Lamarck) — ? [Recorded from a Trembler stomach by Danforth (1939), and a specimen is in the ANSP, collected by A. P. Brown in 1913. The record of *Helicina picta* (Bland) by Bland (1875) may be a synonym of this species.]

Helicina guadelupensis (Bland) — ? [Recorded by Bland (1875)]

Pleurodontidae

Pleurodonte josephinae (Ferussac) — ? [Recorded by Bland (1875) as "*H. josephinae.*" Recollected by A. P. Brown, 1913 (ANSP).

Subulinidae

Subulina octona (Bruguière, 1792) — WN [from a specimen we collected in Hope Ghaut, det. D. Robinson. This species serves as a second intermediate host for the trematode *Postharmostomum gallinum*, which infects domestic chickens.]

Succineidae

Omalonyx felinus Guppy — ? [in ANSP, collected by Hubbard, 1894]

Strophocheilidae (det. G. Rosenberg)

Megalobulimus oblongus Müller — EIS [Giant South American Land Snail, an invasive pest] (Fig. X)

Aquatic Snails

Hydrobiidae

Potamopyrgus sp.,

Physidae

Physa cubensis Pfeiffer

Planorbidae

Biomphalaria glabrata (Say)

Thiaridae

Melanoides tuberculata (Müller)

Neritidae

An unnamed member of this family was recorded by Bass (2003).

Fig. X. The Giant South American Land Snail, *Megalobulimus oblongus* Müller, an invasive threat to Montserrat's biodiversity. (Photo: Michael Ivie)

ARACHNIDA. This very large group has at least 6 Orders present on Montserrat. For this group, Stevens & Waldmann's (2001) records are all listed, along with new records.

SCORPIONES (Scorpions). Two species of scorpions have been recorded from Montserrat, and both were recovered post-volcano (de Armas 2005).

Centroides pococki Sissom & Francke LE (Sissom & Francke 1983)

Oieclus purvesii (Becker) LIE [Lorenço 1987. As *Oieclus purvesii* (Becker) by de Armas 2005.]

AMBLYPYGI (Tailless Whip Scorpions). A single species of this group has a verified record for Montserrat (Quintero 1981). It was commonly seen post-volcano.

Phrynus goesii Thorell LAE (Quintero 1981, called "Anancy" by Montserratians)

Fig. Y. the Anancy of Montserrat (*Phrynus goesii* Thorell). (Photo: Gerardo Garcia)

SCHIZOMIDA. A species of this group, probably a member of the genus *Schizomus*, was taken repeatedly in the Centre Hills, but remains unidentified.

OPILIONES (Harvestmen). Common and diverse in Centre Hills forests. Specimens have been sent to the American Museum of Natural History.

ARANEAE (Spiders). Stevens & Waldmann (2001) listed 4 species of Montserrat spiders, to which we add 2 additional published records. This number represents but a drop in the bucket for what actually occurs on the island. Several thousand specimens, of what appeared to be a few dozen species, where sent to Norman Platnick at the American Museum of Natural History for eventual determination. The spiders recorded so far are:

Tetragnathidae

Alcimosphenus licinus Simon WIE [*Thonalmus* mimic, recorded from Montserrat by Levi 2005.]

Fig. Z. *Alcimosphenus licinus* Simon. (Photo: Quentin Bloxam)

Salticidae

Lyssomanes michae Brignoli IE [Brignoli 1984]

Theraphosidae

Cyrtopholis femoralis Pocock IE [Pocock 1903]

Fig. A1. The Montserrat tarantula, *Cyropholis femoralis* Pocock. (Photo: Gerardo Garcia)

Theridiidae

Latrodectus geometricus (Koch) WN (Stevens & Waldmann 2001)

Araneidae

Argiope argentata (Fabricius) WN (Stevens & Waldmann 2001)

Gasteracantha cancriformis (Linneaus) [Wolcott (not Walcott) 1951, as *Gasteracanthia* (sic) by Stevens & Waldmann 2001]

Fig. A2. An unidentified Montserratian spider. (Photo: Gerardo Garcia)

ACARI (Mites and Ticks). Berlese samples, canopy fogging, beating vegetation, and infested insects indicated that there are hundreds (at least) of species of mites to be discovered on Montserrat. The variety of forms, sizes, colors (Fig. A3) and lifestyles make this a fascinating, but little known group. The opportunities for endemism are many. Unfortunately, they are beyond our expertise and efforts.

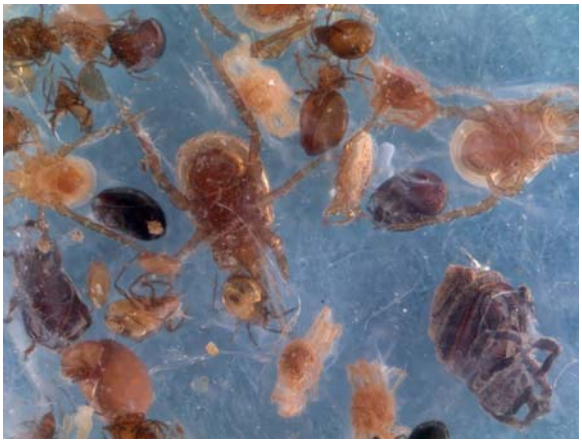


Fig. A3. An indication of the richness of mites present on Montserrat is hinted at by this photo of a sample of mites from leaf litter in the Centre Hills. (Photo: Michael Ivie)

Eriophyidae

Acalitus gossypii (Banks) EIS or WN (Irving 1981)

Phyllocoptruta oleivora (Ashmead) EIS (Ballou 1912) [=*P. oleivorus* of Stevens & Waldmann (2001)]

Tetranychidae

Tetranychus gloveri Banks EIS or WN (Irving 1978)

Ixodidae

Amblyomma variegatum (Fabricius) EIS [The African invasive pest known as the Tropical Bont Tick previously recorded from Montserrat has been provisionally eradicated from the island (Pegram *et al*. 2004).]

More ticks are present, but are as yet unrecorded (Fig. A4).

Fig. A4. An unidentifed soft tick engorged on a *Bufo*. (Photo: Gerardo Garcia)

PSEUDOSCORPIONES (pseudoscorpions). We found no published records for this group, but one or more species were taken and more seen in the field.

CRUSTACEA. To the list of 6 crabs and 6 freshwater shrimps in Stevens & Waldmann (2001) should be added Amphipods and Isopods, unidentified species of both, which occur in abundance on the island.

The only records we found for this group are 2 Isopods.

Philosciidae

Philoscia sp. ? [2 specimens without dates are in the NMNH, taken by Plant Quarantine officials from pineapple roots sent from the Montserrat Botanic Station to Washington, DC.]

Corallanidae

Excirolana braziliensis Richardson Eight specimens in the NMNH from the black sand beach at Fox's Bay on 20 Apr 1959 by Thomas E. Bowman, of the Smithsonian - Bredin Caribbean Expedition.

This is a fertile field of further work, which may identify both invasive and native, if not endemic, species.

CHILOPODA. Stevens & Waldmann (2001) found only 2 records for centipeds, both Scolopendridae, from Montserrat. A good variety of species of several Orders await formal identification, including members of the Scutigeromorpha and Geophilomorpha, both of which are well represented.

DIPLOPODA. That no species of millipeds have been recorded from Montserrat is a surprise to anyone familiar with the island. Many species of several Orders occur on the island, from Polydesmidae, Polyxenidae, Julidae and Spirobolidae.

SYMPHYLA. One or more species of these tiny and cryptic animals were seen in berlese samples from the Centre Hills.

Appendix 3. The Montserrat non-native plant species checklist

S. K. Robbins, M. A. Hamilton, C. Clubbe & S. Bárrios.

Family	Genus	Species 1	Author 1
Acanthaceae	Asystasia	gangetica	(L.) T.Anders
Acanthaceae	Barleria	lupulina	Lindl.
Acanthaceae	Pseuderanthemum	carruthersii	(Seem.) Guillaumin
Acanthaceae	Thunbergia	alata	Bojer ex Sims
Acanthaceae	Thunbergia	erecta	(Benth.) T. Anderson
Acanthaceae	Thunbergia	fragrans	Roxb.
Acanthaceae	Crossandra	infundibuliformis	(L.) Nees
Acanthaceae	Eranthemum	pulchellum	Andr.
Acanthaceae	Fittonia	albivensis	(Lindl. Ex Veitch) Brummitt
Acanthaceae	Hemigraphis	alternata	(Burm.f.) T.Anderson
Acanthaceae	Sanchezia	speciosa	Leonard
Acanthaceae	Barleria	cristata	L.
Acanthaceae	Justicia	brandegeana	Wassh. & L.B. Sm.
Acanthaceae	Ruellia	brittoniana	Leonard
Agavaceae	Agave	sisalana	Perrine
Dracaenaceae	Sansevieria	cylindrica	Bojer ex Hook.
Dracaenaceae	Sansevieria	trifasciata	Prain
Amaranthaceae	Alternanthera	bettzichiana	(Regel) Voss
Amaranthaceae	Alternanthera	flavescens	Kunth
Amaranthaceae	Alternanthera	tenella	Colla
Amaranthaceae	Amaranthus	spinosus	L.
Amaranthaceae	Celosia	argentea	L.
Amaranthaceae	Gomphrena	globosa	L.
Amaryllidaceae	Crinum	asiaticum	L.
Anacardiaceae	Mangifera	indica	L.
Annonaceae	Annona	glabra	L.
Annonaceae	Artabotrys	hexapetalus	(L. f.) Bhandari
Annonaceae	Cananga	odorata	(Lam.) Hook. F. & Thomson
Apocynaceae	Allamanda	cathartica	L.
Apocynaceae	Catharanthus	roseus	(L.) Don

Family	Genus	Species 1	Author 1
Apocynaceae	Nerium	oleander	L.
Apocynaceae	Tabernaemontana	divaricata	(L.) R. Br.
Apocynaceae	Tabernaemontana	pandacaqui	Poir.
Araceae	Colocasia	esculenta	(L.) Schott
Araceae	Pistia	stratiotes	L.
Apocynaceae	Calotropis	procera	(Aiton) W.T. Aiton
Apocynaceae	Cryptostegia	madagascariensis	Bojer ex Decne.
Auracariaceae	Araucaria	heterophylla	(Salisb.) Franco
Balsaminaceae	Impatiens	balsamina	L.
Bignoniaceae	Phryganocydia	corymbosa	(Vent.) Bureau ex K. Schum.
Boraginaceae	Cordia	obliqua	Willd.
Boraginaceae	Cordia	sebestena	L.
Cactaceae	Opuntia	cochenillifera	(L.) Mill.
Cactaceae	Pereskia	aculeata	Mill.
Cactaceae	Pereskia	grandiflora	Haw.
Capparaceae	Cleome	gynandra	L.
Capparaceae	Cleome	rutidosperma	DC.
Capparaceae	Cleome	viscosa	L.
Caricaceae	Carica	papaya	L.
Casuarinaceae	Casuarina	equisetifolia	L.
Chenopodiaceae	Chenopodium	ambrosioides	L.
Clusiaceae	Garcinia	livingstonei	T. Anderson
Cochlospermaceae	Cochlospermum	vitifolium	(Willd.) Spreng.
Combretaceae	Terminalia	catappa	L.
Commelinaceae	Cyanotis	cristata	(L.) D. Don
Asteraceae	Conyza	bonariensis	(L.) Cronquist
Asteraceae	Cosmos	sulphureus	Cav.
Asteraceae	Emilia	fosbergii	Nicolson
Asteraceae	Emilia	sonchifolia	(L.) DC.
Asteraceae	Tagetes	erecta	L.
Asteraceae	Tithonia	diversifolia	(Hemsl.) A. Gray
Asteraceae	Zinnia	elegans	Jacq.

Family	Genus	Species 1	Author 1
Convolvulaceae	Jacquemontia	cumanensis	(Kunth) Kuntze
Convolvulaceae	Stictocardia	tiliifolia	(Desr.) Hallier f.
Crassulaceae	Bryophyllum	pinnatum	(L. f.) Oken
Crassulaceae	Kalanchoe	delagoensis	Eckl. & Zeyh.
Brassicaceae	Lepidium	virginicum	L.
Cucurbitaceae	Cucumis	anguria	L.
Cucurbitaceae	Momordica	charantia	L.
Dioscoreaceae	Dioscorea	alata	L.
Ebenaceae	Diospyros	blancoi	A. DC.
Ebenaceae	Diospyros	malabarica	(Desr.) Kostel.
Euphorbiaceae	Acalypha	poiretii	Spreng.
Euphorbiaceae	Codiaeum	variegatum	(L.) A. Juss.
Euphorbiaceae	Jatropha	curcas	L.
Euphorbiaceae	Jatropha	integerrima	Jacq.
Euphorbiaceae	Manihot	esculenta	Crantz
Phyllanthaceae	Phyllanthus	acidus	(L.) Skeels
Phyllanthaceae	Phyllanthus	urinaria	L.
Euphorbiaceae	Ricinus	communis	L.
Salicaceae	Flacourtia	jangomas	(Lour.) Raeusch.
Lamiaceae	Leonotis	nepetifolia	(L.) R. Br.
Lamiaceae	Leonurus	sibiricus	L.
Lamiaceae	Marsypianthus	chamaedrys	Bartl.
Lamiaceae	Ocimum	basilicum	L.
Lamiaceae	Ocimum	gratissimum	L.
Lamiaceae	Salvia	coccinea	Buc'hoz ex Etl.
Lamiaceae	Hyssopus	officinalis	L.
Lamiaceae	Mentha	spicata	L.
Lauraceae	Persea	americana	Mill.
Lecythidaceae	Barringtonia	asiatica	(L.) Kurz
Leguminosae-pap	Strongylodon	macrobotrys	A.Gray
Leguminosae-caes	Caesalpinia	pulcherrima	(L.) Sw.
Leguminosae-caes	Cassia	javanica	L.

Family	Genus	Species 1	Author 1
Leguminosae-caes	Senna	siamea	(Lam.) Irwin & Barneby
Leguminosae-caes	Tamarindus	indica	L.
Leguminosae-pap	Cajanus	cajan	(L.) Huth
Leguminosae-pap	Clitoria	ternatea	L.
Leguminosae-pap	Crotalaria	retusa	L.
Leguminosae-pap	Crotalaria	verrucosa	L.
Leguminosae-pap	Desmodium	scopiurus	(Sw.) Desv.
Leguminosae-pap	Desmodium	tortuosum	(Sw.) Dc.
Leguminosae-pap	Erythrina	poeppigiana	(Walp.) Cook
Leguminosae-pap	Erythrina	variegata	L.
Leguminosae-pap	Flemingia	strobilifera	(L.) R. Br.
Leguminosae-pap	Gliricidia	sepium	(Jacq.) Kunth ex Walp.
Leguminosae-pap	Indigofera	tinctoria	L.
Leguminosae-pap	Lablab	purpureus	(L.) Sweet
Leguminosae-pap	Tephrosia	noctiflora	Bojer ex Baker
Leguminosae-mim	Acacia	nilotica	(L.) Delile
Leguminosae-mim	Bauhinia	tomentosa	L.
Leguminosae-mim	Calliandra	haematocephala	Hassk.
Leguminosae-mim	Calliandra	surinamensis	Benth.
Lythraceae	Lagerstroemia	indica	L.
Lythraceae	Lawsonia	inermis	L.
Malvaceae	Abelmoschus	esculentus	(L.) Moench
Malvaceae	Gossypium	barbadense	L.
Malvaceae	Hibiscus	rosa-sinensis	L.
Marantaceae	Maranta	arundinaceae	L.
Meliaceae	Azadirachta	indica	A. Juss.
Meliaceae	Melia	azedarach	L.
Meliaceae	Swietenia	macrophylla	King & Urb
Menispermaceae	Tinospora	crispa	(L.) Hook. F. & Thomson
Moraceae	Castilla	elastica	Sess, ex Cerv.
Moraceae	Artocarpus	altilis	(Parkinson) Fosberg
Moraceae	Ficus	carica	L.

Family	Genus	Species 1	Author 1
Moraceae	Ficus	elastica	Roxb. Ex Hornem.
Moraceae	Ficus	microcarpa	L.
Moraceae	Ficus	pumila	L.
Moraceae	Ficus	bengalensis	L.
Moringaceae	Moringa	oleifera	Lam.
Musaceae	Musa	acuminata	Colla
Myristicaceae	Myristica	fragrans	Houtt.
Myrtaceae	Eugenia	uniflora	L.
Myrtaceae	Psidium	cattleianum	Sabine
Myrtaceae	Psidium	guajava	L.
Nyctaginaceae	Bougainvillea	glabra	Choisy
Oleaceae	Jasminum	grandiflorum	L.
Oleaceae	Jasminum	laurifolium	Roxb. Ex Hornem.
Oleaceae	Jasminum	multiflorum	(Burm. f.) Andrews
Orchidaceae	Oeceoclades	maculata	(Lindl.) Lindl.
Orchidaceae	Spathoglottis	plicata	Blume
Arecaceae	Phoenix	sp.	L.
Passifloraceae	Passiflora	edulis	Sims
Plumbaginaceae	Plumbago	auriculata	Lam.
Poaceae	Arundo	donax	L.
Poaceae	Coix	lacryma-jobi	L.
Poaceae	Dactyloctenium	aegyptium	(L.) Willd.
Poaceae	Eragrostis	ciliaris	(L.) R. Br.
Poaceae	Eragrostis	tenella	(L.) P. Beauv. ex Roem. & Schult
Poaceae	Panicum	maximum	Jacq.
Poaceae	Saccharum	officinarum	L.
Polygonaceae	Antigonon	leptopus	Hook. & Arn.
Pteridaceae	Pteris	vittata	L.
Pteridaceae	Pteris	multifida	Poir.
Oleandraceae	Nephrolepis	multiflora	(Roxb.) F.M. Jarrett ex C.V. Mor
Proteaceae	Grevillea	robusta	A. Cunn.
Proteaceae	Grevillea	banksii	R. Br.

Family	Genus	Species 1	Author 1
Lythraceae	Punica	granatum	L.
Rhamnaceae	Ziziphus	mauritiana	Lam.
Rosaceae	Eriobotrya	japonica	(Thunb.) Lindl.
Rosaceae	Rubus	rosifolius	Sm.
Rubiaceae	Hedyotis	lancifolia	Schumach.
Rubiaceae	Morinda	citrifolia	L.
Rubiaceae	Mussaenda	sp.	
Rubiaceae	Pentas	lanceolata	Schum.
Rubiaceae	Ixora	chinensis	Lam.
Rubiaceae	Rondeletia	americana	L.
Rutaceae	Citrus	aurantifolia	(Christm.) Swingle
Rutaceae	Triphasia	trifolia	(Burm. F.) P. Wilson
Rutaceae	Murraya	exotica	L.
Rutaceae	Triphasia	trifolia	(Burm. f.) P. Wilson
Sapindaceae	Blighia	sapida	K.D. Koenig
Sapotaceae	Mimusops	elengi	L.
Sapotaceae	Pouteria	sapota	(Jacq.) H.E. Moore & Stearn
Solanaceae	Datura	stramonium	L.
Solanaceae	Nicotiana	tabacum	L.
Solanaceae	Solanum	capsicoides	All.
Solanaceae	Solanum	seaforthianum	Andr.
Solanaceae	Solanum	torvum	Sw.
Solanaceae	Lycopersicon	esculentum	Mill.
Solanaceae	Solanum	tuberosum	L.
Sterculiaceae	Theobroma	cacao	L.
Sterculiaceae	Brachychiton	acerifolium	F.Muell.
Sterculiaceae	Sterculia	apetala	(Jacq.) H. Karst.
Strelitziaceae	Ravenala	madagascariensis	Sonn.
Apiaceae	Anethum	graveolens	L.
Verbenaceae	Clerodendrum	philippinum	Schauer
Verbenaceae	Clerodendrum	speciosissimum	Van Geert ex Morren
Verbenaceae	Tectona	grandis	L.f.

Family	Genus	Species 1	Author 1
Verbenaceae	Holmskioldia	sanguina	Retz.
Verbenaceae	Congea	tomentosa	Roxb.
Verbenaceae	Clerodendrum	umbellatum	Poir.
Verbenaceae	Gmelina	phillippensis	Cham.

Appendix 4. Information on invertebrate voucher specimens

M. A. Ivie, K. A. Marske, I. A. Foley & L. L. Ivie

Because of the level of taxonomic uncertainty involved in the identification of species from Montserrat, vouchers are critical to being able to track these records in the future. All records in this paper are vouchered with museum specimens, or by a citation from the literature, which themselves usually cite vouchers. The only exceptions are in the case of a few of the photos used to illustrate the non-insect section, which were either taken by people not directly involved with this inventory, and which were not vouchered.

Even well-known species sometimes need to be re-examined, and less-known species are always subject to re-evaluation. Undoubtedly, mistakes in identification have been made. Mistakes in species concepts are also expected. For many groups no literature exists to guide the delimitation of species, and we and our collaborators have been forced to use a best-guess for species limits. It is expected that the number of times we have listed multiple species as one will approximately equal out with the number of single species we have split one as more than one, but only time will tell if this expectation holds. Vouchers are the key to determining this. Vouchers allow these identifications and concepts to be treated as testable hypotheses, subject to review and correction as needed. In any case, our listing represents our best understanding of the situation at the current time, and we hold sole responsibility for the errors that will be discovered.

The vast majority of voucher specimens for this publication are in the West Indian Beetle Fauna Project Collection at Montana State University, Bozeman. However, it has been better to place all or portions of certain groups in other institutions, where they will be more accessible to researchers. These are listed below:

- Mollusca: Department of Malacology, Academy of Natural Sciences, Philadelphia.
- Arachnida -- Araneae and Opiliones – Department of Entomology, American Museum of Natural History, New York. Scorpiones -- Instituto de Ecologia y Sistematica, Havana.
- Hemiptera: Pentatomoidea – Department of Entomology Collection, North Dakota State University, Fargo. Fulgoroidea – Lois O'Brien Collection, Green Valley, Arizona. Naucoridae – Enns Entomology Museum, University of Missouri, Columbia.
- Hymenoptera: Symphyta -- Department of Entomology, National Museum of Natural History, Washington. Scelionidae and other microhymenoptera – Charles A. Triplehorn Collection, Department of Entomology, The Ohio State University. Apoidea – Division of Entomology, University of Kansas Natural History Museum, Lawrence. Formicidae – Museum of Comparative Zoology, Harvard University, Cambridge.
- Diptera: Phoridae – Entomology Section, Natural History Museum of Los Angeles County, Los Angeles. Syrphidae – Department of Entomology, National Museum of Natural History, Washington.
- Trichoptera - Department of Entomology, National Museum of Natural History, Washington.
- Lepidoptera - McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville .
- Neuroptera – James B. Johnson collection, University of Idaho, Moscow.
- Odonata – Thomas W. "Nick" Donnelly collection, Binghamton, New York. Fred Sibley collection, Alpine, New York.
- Orthoptera – Department of Entomology, Academy of Natural Sciences, Philadelphia.

Durrell Wildlife Conservation Trust

The Durrell Wildlife Conservation Trust is a charity that was founded with the singular mission to save species from extinction. Our founder, the naturalist Gerald Durrell, was very clear in what he saw as the role of a zoo and what impact it could have in the future. This role was strongly linked to preservation of wildlife in its natural setting. Over the course of the last 50 years, the Trust has built up a worldwide reputation for its pioneering conservation techniques and the species that it has brought back from the brink of extinction. Currently the organisation runs projects in 18 countries worldwide. In all cases the Trust believes in working with local stakeholders to tackle threats in ways that are effective, sustainable and have the support of those that live in these regions.

About the Conservation Monographs

The Durrell Conservation Monograph series aims to publish applied research concerning either a single taxon or ecosystem that forms part of Durrell's Conservation Programme. Each monograph provides a detailed source of information directly applicable to the conservation of biodiversity in the field.

About the report

The Centre Hills forest is the largest area of natural and semi-natural terrestrial habitat remaining in Montserrat, supporting an internationally important assemblage of plants and animals; many of which are unique to Montserrat and are considered globally threatened. The forest also provides a range of ecosystem services which are vital to Montserrat's future. However the forest continues to be threatened by a number of pressures, including habitat degradation and invasive plants and animals. The monograph reports the findings of a systematic assessment of the plants, invertebrates, amphibians, reptiles, bats and birds of the Centre Hills and proposes a series of conservation priorities and actions. The assessment is being used to support the planning of a protected area, which will be soon implemented to conserve the Centre Hills forest and its natural resources.

durrell

Durrell Wildlife Conservation Trust
Les Augrès Manor, La Profonde Rue,
Trinity, Jersey JE3 5BP
Channel Islands, United Kingdom
Tel: +44 (0)1534 860000
Fax: +44 (0)1534 860001
info@durrell.org
www.durrell.org
Registered charity number: 232004