

Figure 1. Denis Island: Physical map, with locations of vegetation plots.

DENIS

BY

MICHAEL J. HILL¹, TERENCE M. VEL¹, KATHRYN J. HOLM², STEVEN J. PARR³
and NIRMAL J. SHAH¹

GEOLOGY, TOPOGRAPHY AND CLIMATE

Denis is one of the northernmost islands of the Seychelles lying around 80 kilometres North of Mahé, the largest of the granitic Seychelles, at the northern edge of the Seychelles Bank. It is approximately 140 ha in area (Directorate of Overseas Survey (UK)/Seychelles Government, unpublished data), although there is evidence of rapid erosion in the past (Fryer, 1910). The maximum elevation is less than 4 m above sea level and average surface elevation is probably around 2.5 m (Stoddart and Fosberg, 1981).

Unlike the majority of islands on the Seychelles Bank, Denis has no granite and it is formed entirely of reef-derived sands. The deposition of guano on sand deposits has led to the formation of phosphatic sandstone over 80% of the island's surface (Fryer, 1910; Baker, 1963). Much of the guano that originally overlaid this cemented layer has now been removed for export (Stoddart and Fosberg, 1981). Guano removal left parts of the island bare of soil (Baker, 1963). In phosphatic sandstone areas where soil cover has survived, soils of the Jemo Series occur; the rest of the island has Shioya series soils (Piggott, 1968). In some wetland areas, brown loams rich in phosphate (leached from phosphatic rocks) occur (Baker, 1963).

Denis has a number of marsh areas, although the extent of marshland appears to have been greater in the recent past (Stoddart and Fosberg, 1981, show a photograph of *Typha* swamp on Denis). At the time of the surveys, wetlands were limited in extent and most showed some marine influence.

Compared to the granitic islands to the south, Denis Island is relatively remote. The nearest island is the coralline Bird Island, approximately 50 km to the west. The nearest large island in the granitic group is Praslin, 54 km to the south.

The Seychelles islands experience a seasonal humid tropical climate (Walsh, 1984). Climate data for Denis Island are incomplete. As it is low and remote from other higher islands of the granitic Seychelles, total annual rainfall is lower than on the high islands such as Mahé and Praslin; Stoddart (1971), using a series of data from 1951-1962, gives a mean annual rainfall of 1,729.5 mm for Denis. Incomplete data for the period 1976-84 gives mean annual rainfall of 1,582.0 mm (see Table 1); for the period 1978-84, Praslin Grand Anse received a mean annual rainfall of 1,757.1 mm (National Meteorological Services of Seychelles, unpublished data).

¹ Nature Seychelles, PO Box 1310, Mahé, Seychelles. Email: birdlife@seychelles.net

² 1991 Casa Marcia Crescent Victoria, British Columbia, Canada.

³ Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, UK.

The annual rainfall pattern of Denis also differs from that of the granitic Seychelles and coralline islands to the south. On Denis, rainfall is more evenly distributed through the year than on Mahé; there are fewer dry months than on islands to the south (Walsh, 1984).

Table 1. Denis Island: monthly rainfall (mm), 1976-1984.
(Data: National Meteorological Services, Seychelles, unpublished data).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	173.5	133.4	n/a	n/a	n/a	48.0	19.1	35.6	22.1	11.2	11.9	241.8
1977	366.0	341.5	n/a	168.5	71.5	45.0	56.5	64.5	8.9	272.0	58.5	332.6
1978	n/a	195.5	37.0	n/a	74.0	26.0	18.5	n/a	39.0	106.0	n/a	n/a
1983	275.0	78.0	n/a	n/a	n/a	49.6	116.5	287.1	491.5	192.0	176.5	243.7
1984	252.0	247.6	57.0	96.0	0.0	47.5	25.5	107.0	109.5	159.0	150.0	354.1
Mean	266.6	199.2	47.0	132.3	48.5	43.2	47.2	123.6	134.2	148.0	99.2	293.0

HISTORY

The island was discovered in 1773 by Denis de Trobriand and named for himself. He found an island with abundant sea turtles, land tortoises, sea lions (or dugong) and birds (Bradley, 1940). His records suggest that the original vegetation of the island was high forest with species including *Pisonia grandis* or a similar tree (Stoddart and Fosberg, 1981). The existence of extensive guano deposits (Baker, 1963) implies the presence of large colonies of nesting seabirds, possibly tree-nesters.

In the 19th and 20th centuries the island underwent complete transformation, first through the cultivation of coconuts, planted from around 1890 (Stoddart and Fosberg, 1981), then guano extraction (from 1929-41; Baker 1963), and finally by the extensive replanting of coconuts.

In 1975, the island was sold to a new owner. An airstrip was built and a small tourist lodge opened. Today, the coconut plantation on Denis is no longer managed for production and the island is managed as a resort with 25 villas. The permanent population of the island (50-70 people) is employed in the hotel and tourists travel to Denis by small plane from Mahé.

The flora, fauna and ecology of Denis (and Bird Island) were the subject of a detailed paper in the 1980s (Stoddart and Fosberg, 1981). The two islands were visited by earlier naturalists including Coppinger (1885) and Fryer (1910); unfortunately, some of the early reports seem to be characterised by confusion between the two islands.

FLORA AND VEGETATION

Flora

A total of 179 plant species were recorded on Denis Island, including four ferns, one gymnosperm (introduced) and 174 angiosperms (Appendix 1). Of the angiosperms, 119 (68.4%) species are regarded as introduced (Friedmann, 1994) and 37 (21.3%)

native. No species endemic to Seychelles was recorded. At least 55 ornamental or edible species were restricted to garden areas.

While few previous records of the flora of Denis Island exist, a number of workers have collected specimens, or made observations on the island. Many of the species recorded in 1999/2000 were not listed by previous workers; these include a number of ornamental species undoubtedly introduced to enhance the hotel grounds in recent years. Some species were probably overlooked in earlier surveys, including the fig *Ficus lutea*, tamarind *Tamarindus indica*, and agati *Adenanthera pavonina* (all represented today by large trees).

Twelve species recorded by earlier visitors were not observed (see Appendix). At least two of these species were probably synonyms of species recorded in the 1999/2000 survey; others are now extinct and some may never have occurred on Denis Island. In some early records (notably Fryer, in Christensen, 1912; Summerhayes, 1931) there appears to be some confusion between Bird and Denis Islands, thus some species which have probably never occurred on Bird (mangrove fern *Acrostichum aureum* and bulrush *Typha javanica*) are recorded for that island. *Tribulus cistoides*, listed for Denis by Summerhayes (1931), may have been a record from Bird Island where the species still occurs (or this may refer to an extinct population). Excluding locally extinct species, probable synonyms, and species that probably never occurred there, the total plant list for Denis Island stands at 185 species. Compared to the flora of the granitic islands, that of Denis is notable for its lack of endemic species and the dominance of introduced plants (of the total Seychelles flora, around 54% are introduced and 9% endemic: Procter, 1984).

Of the introduced plants established on Denis Island, only seven are generally regarded as invasive weedy species (Carlström, 1996a; Fleischmann, 1997). One of these, lantana *Lantana camara*, is present in relatively small numbers but has the potential to become a serious weed of open areas. At least two others, fatak grass *Panicum maximum* and *Passiflora suberosa*, are herbaceous species which can be displaced by native woody vegetation. The most widespread and well-established woody introduced species is casuarina *Casuarina equisetifolia*, which appears more invasive here than it is on the granitic islands. Papaya *Carica papaya* is also widespread in coconut woodland on Denis.

In addition to these alien species the coconut *Cocos nucifera*, although probably native to the Seychelles, is present in extremely high numbers to the exclusion of other plants. One species of interest is the rampant liana *Tylophora coriacea* (provisional identification), a rare native species known from Aldabra and Silhouette (Friedmann, 1984) but found to be abundant on Denis, often climbing *Casuarina* trees to a height of 15 m or more.

Vegetation

The extents of major vegetation types on Denis Island are shown in Table 2, and Figure 2. The whole island is dominated by former coconut plantations, but the north west of the island has a high proportion of *Casuarina equisetifolia*, and areas around the airstrip and the east by broad-leaved trees, especially *Terminalia catappa*.

In total, 40 vegetation plots were completed, 20 in October and 20 in April. These covered 4,000 m² or 0.28% of the island's surface. The 40 plots were located randomly within habitats excluding grassland, garden and marsh: the survey covered 0.37% of the targeted area. A summary of results is shown in Table 3.

The vegetation of Denis Island had a relatively low density of trees and the tree layer was species-poor. A total of 12 tree species was recorded, seven of which were probably native. Three species together accounted for 70% of all individuals. The most abundant tree was bwa torti *Morinda citrifolia*, a species that is possibly introduced (Friedmann, 1994); 51 of 174 trees (29.3%) were *M. citrifolia*. Other abundant species were *Cocos nucifera* (45 of 174 trees, 25.9%) and *Casuarina equisetifolia* (25 trees, 14.4%). The most widespread species of the shrub layer were *Cocos nucifera* (in 38 of 40 plots, mean cover 33.1%), *Morinda citrifolia* (in 33 plots, mean cover 16.5%), and *Carica papaya* (eight plots, mean cover 3.2%). The herb layer was particularly dense and was dominated by *Nephrolepis* sp., which occurred in 39 of 40 plots (mean cover 36.7%). Three other species occurred in more than 12 plots: *Cocos nucifera* (in 30 of 40 plots, mean cover 4.6%), *Phymatosorus scolopendra* (29 plots, mean cover 23.9%) and *Morinda citrifolia* (27 plots, mean cover 2.5%).

Table 2. Extent of major vegetation types, Denis Island.

Vegetation type	Approx. area (ha)
Coconut with scrub	73.0
Scrub (exotic)	0.3
Broadleaf woodland (exotic)	3.4
Broadleaf woodland (native)	27.7
Beach crest vegetation	5.9
Marsh	0.5
Grassland/garden	32.2

Table 3. Vegetation plot summary, Denis Island.

Habitat	Plots	Mean altitude (m asl)	Mean trees ha ⁻¹	Mean shrub layer cover (%)	Mean herb layer cover (%)	Open leaf litter cover (%)	Bare rock (%)	Dead wood (pieces per plot)
Woodland /scrub	40	<5	435	46.9	61.9	36.9	1.2	1.35

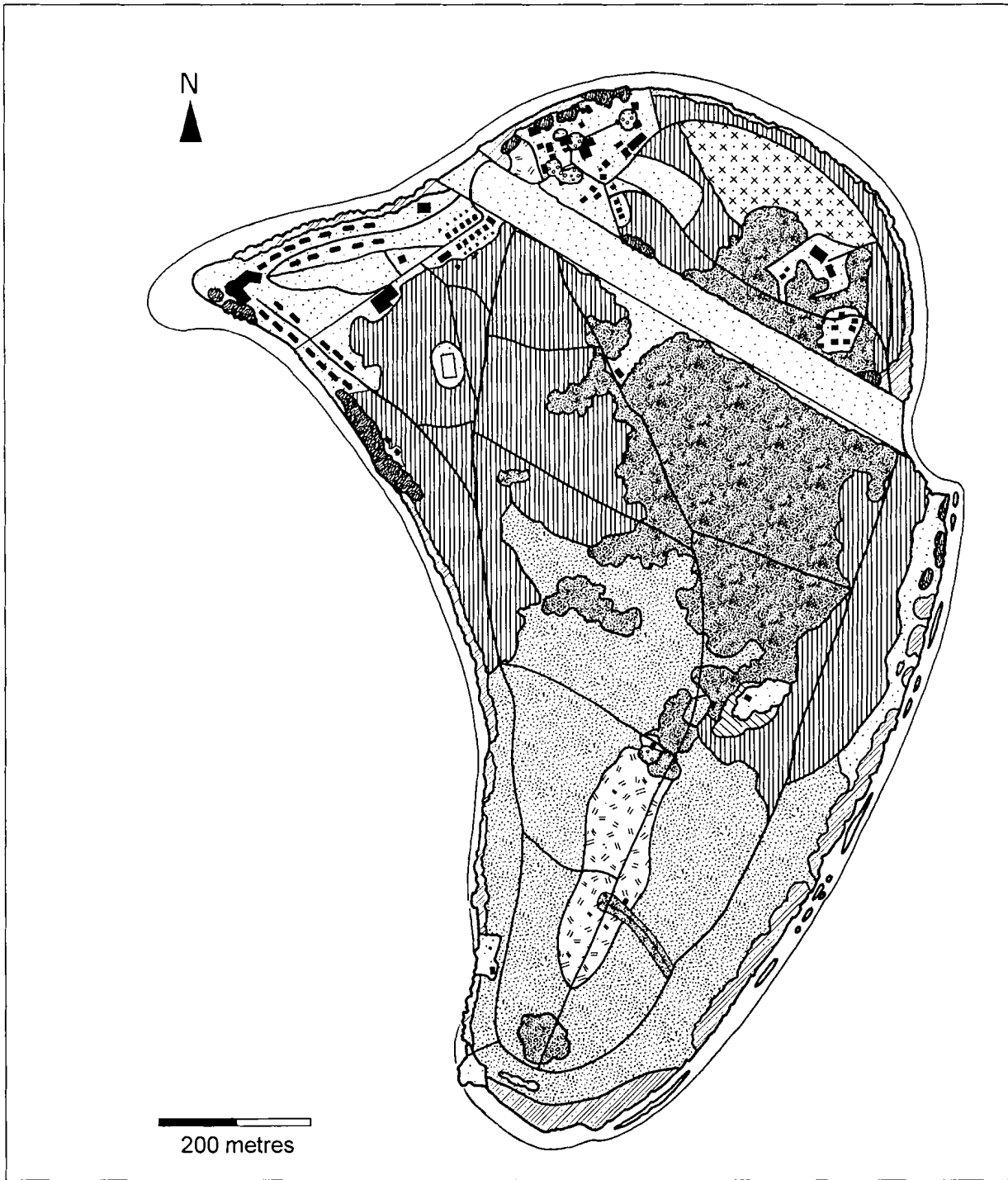


Figure 2. Denis Island: vegetation.

Compared to that of the other coralline island studied (Bird Island), the vegetation of Denis Island is rather diverse. Stoddart and Fosberg (1981) recognised four different vegetation units on Denis: Littoral hedge (beach crest), *Casuarina* woodland, coconut woodland and marsh. Today, at least three further vegetation types occur: broadleaf woodland, grassland and ornamental gardens.

Broadleaf woodland occurs in two relatively large areas, to the north and south of the airstrip. In much of this woodland *Terminalia catappa* is the dominant tree, with *Casuarina*, *Cocos* and *Calophyllum*. An area to the north of the airstrip is composed of *Tabebuia pallida*. Grassland areas, dominated by a variety of grass species and low herbs include the airstrip, village and farm. The airstrip is maintained by mowing, other areas by cattle grazing. Gardens are situated around habitation in the north and west of the island. The tourist operation, which was small at the time of Stoddart and Fosberg's visit, has grown and the area devoted to gardens has increased. A number of ornamental plants unrecorded in the 1970s are now present on the island although most are not found away from cultivated areas. The few ornamentals that have found their way into the flora of wild habitats on Denis were earlier introductions, including *Ipomoea hederifolia* and *Euphorbia cyathophora*.

The dominant vegetation type of the island is sparse open woodland of *Cocos nucifera* and *Morinda citrifolia*, with occasional trees of other species including *Casuarina*, *Ficus lutea* and *Terminalia catappa*. The shrub and herb layers of this vegetation were usually dense and were dominated by *Morinda* and *Nephrolepis*. Of the vegetation units recognised by Stoddart and Fosberg, that which has shown the most change is the marshland. Although wet areas were still present in 1999 and 2000, they appear reduced in extent (see map) and several of the marsh areas were heavily shaded by *Terminalia catappa* and *Cocos nucifera*, with few aquatic macrophytes surviving. *Acrostichum* sp. was still abundant and widespread. *Typha javanica* was restricted to one small pond, heavily shaded by coconut regrowth. Few marshes had any open water, and in these, water levels varied with the tide.

INVERTEBRATES

Pitfall Trapping

The pitfall trap assemblages were large (Table 4). Overall pitfall assemblages were larger in April than October. Assemblages on Denis Island were larger than those on the granitic islands in both seasons. As on all other islands, assemblages were dominated by ants: ants formed 54.8% of the total number of individuals in October, 76.4% in April. The most abundant species in both seasons was an ant *Odontomachus troglodytes* (which made up 52.9% of individuals in October and 70.3% in April). However, excluding the ants, assemblages on Denis were still larger than those of the granitic islands. Crustacea (mainly Amphipoda), Dermaptera and Blattodea all formed significant parts of the overall assemblage (Fig. 3). Blattodea are favoured food items of the Seychelles magpie-robin.

The crazy ant *Anoplolepis gracilipes* was present on the island, but only two individuals were collected in pitfall traps, in plots E13 and F11, suggesting that this pest species was uncommon. On nearby Bird Island, an extremely high population density of this ant has caused many conservation problems including the death of native trees (Hill, in prep.) and the eradication of native reptiles from large parts of the island (Feare, 1999a). The status of crazy ants on Denis Island should be monitored, and control methods used if necessary.

Table 4. Pitfall assemblages from Denis Island.
only invertebrates over 2 mm body length counted
(number in parentheses: excluding ants).

Island	Habitat	Mean no. individuals per 5 traps	
		SE season (Oct)	NW season (Apr)
Denis	Plateau woodland/scrub	110.0 (49.7)	137.9 (32.7)
Granitic islands (mean)		61.8 (9.4)	61.1 (16.0)

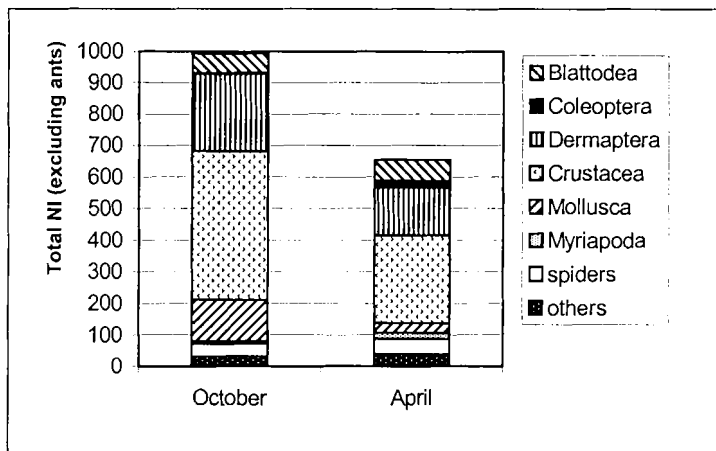


Figure 3. Composition of pitfall assemblages on Denis Island.

Leaf-insect Counts

Leaf-insect counts were carried out for 11 tree and shrub species, four of these in both seasons (Table 5). For all trees counted in both seasons, the populations of invertebrates on leaves were at a higher density in the wet north west monsoon season. The highest counts were for the native tree *Pisonia grandis*, which is uncommon on Denis Island (only one individual tree was found in the vegetation plots). As found on some other islands, the shrub *Morinda citrifolia* (status uncertain; possibly introduced) also had very high leaf counts. *Morinda* is the most abundant tree on Denis Island and dominates the island's vegetation. One introduced tree, *Tabebuia pallida*, also showed high leaf counts per square metre of leaf.

Table 5. Density of invertebrates on foliage, Denis Island.
 n = no. of leaves counted; NI = Number of individual invertebrates.

Species	SE season (October)			NW season (April)		
	n	mean NI leaf ⁻¹	mean NI m ⁻²	n	mean NI leaf ⁻¹	Mean NI m ⁻²
Introduced species						
<i>Carica papaya</i>	0			200	0.555	9.82
<i>Tabebuia pallida</i>	0			300	0.667	131.92
Native species						
<i>Calophyllum inophyllum</i>	100	0.230	23.92	50	0.300	30.81
<i>Cordia subcordata</i>	50	0.400	31.85	100	0.340	35.11
<i>Guettarda speciosa</i>	100	0.960	47.61	0		
<i>Hibiscus tiliaceus</i>	0			100	0.370	25.56
<i>Pisonia grandis</i>	0			50	63.02	3373.66
<i>Scaevola sericea</i>	0			50	0.300	28.49
<i>Terminalia catappa</i>	400	0.423	24.81	650	0.741	52.20
<i>Thespesia populnea</i>	50	0.300	23.95	0		
?Status unknown						
<i>Morinda citrifolia</i>	2450	1.118	111.14	2500	5.974	496.42

Malaise Trapping

Malaise trapping was carried out in both seasons. Four Malaise traps were run in October 1999 and five in April 2000. Assemblages were large and slightly larger in October (mean NI = 946.5) than in April (mean NI = 828). Malaise trap assemblages included members of 13 invertebrate orders. In both seasons, the Diptera were dominant (Diptera accounted for 41.3% of individuals in October, 45.9% in April). Other important orders included Hymenoptera (15.3% of the assemblage in October, 37.9% in April) and Lepidoptera (16.9% of the assemblage in October, 12.5% in April). Assemblages also contained Orthoptera and Blattodea. The majority of taxa collected have yet to be identified to species level.

Observation

Most invertebrates observed on Denis Island were of introduced or cosmopolitan species (Table 6). One Seychelles endemic cricket *Pelerinus rostratus*, not otherwise known outside the granitic islands, was probably introduced. At least four species of Odonata were observed, sometimes in large numbers. Observations were most frequent over the airstrip, but observations of dragonflies and damselflies around the island's wetlands suggest that some species may breed on the island. Few other invertebrates were observed in wetland areas: the water snail *Melanoides* was found in large numbers, along with mosquito larvae, in April.

Table 6. Invertebrates observed, Denis Island

Order	Family	Species	Notes
Mollusca:			
Gastropoda	Subulinidae	<i>Subulina octona</i> Bruguière, 1792	Very common, pitfall traps
	Thiaridae	<i>Melanoides tuberculata</i> (Müller, 1774)	Abundant, 'freshwater' marsh
Crustacea:			
Decapoda	Coenobitidae	<i>Coenobita brevimanus</i> Dana, 1852	Occasionally in rat traps
		<i>Coenobita rugosus</i> H. Milne-Edwards, 1837	Mainly close to shore
		<i>Coenobita perlatus</i> H. Milne-Edwards, 1837	Red hermit
	Grapsidae	<i>Grapsus tenuicrustatus</i> (Herbst, 1783)	On rocks, sea's edge
		<i>Geograpsus crinipes</i> (Dana, 1851)	Regularly seen near beaches
	Ocypodidae	<i>Ocypode ceratophthalmus</i> (Pallas, 1772)	On beaches
<i>Ocypode cordimana</i> Desmarest, 1825		Abundant in all habitats, diurnal and nocturnal	
Myriapoda:			
Chilopoda	Scolopendridae	<i>Scolopendra subspinipes</i> (Leach, 1918)	
Diplopoda	Paradoxosomatidae	<i>Oxidus</i> (Orthomorpha) <i>gracilis</i> (K. Koch, 1847)	In pitfall traps
	Trigoniulidae	<i>Spiromanes braueri</i> (Attems, 1900)	In pitfall traps
		<i>Spiromanes ?seychellarum</i> Saussure & Zehntner, 1902	In pitfall traps
Insecta:			
Coleoptera	Scarabaeidae	<i>Oryctes monoceros</i> (Olivier, 1789)	Frequent
		<i>Protaetia maculata</i> (Fabricius, 1775)	
Hymenoptera	Anthophoridae	<i>Xylocopa caffra</i> (Linnaeus, 1767)	
	Formicidae	<i>Anoplolepis gracilipes</i> (Smith, 1857)	In pitfall traps
		<i>Cardiocondyla emeryi</i> Forel, 1881	In pitfall traps
		<i>Odontomachus troglodytes</i> Santschi, 1914	In pitfall traps
		<i>Paratrechina</i> sp.	In pitfall traps
		<i>Plagiolepis</i> sp.	In pitfall traps
		<i>Technomyrmex albipes</i> (Smith, 1861)	In pitfall traps
		<i>Tetramorium</i> sp.	In pitfall traps
		<i>Polistes olivaceus</i> (De Geer 1773)	
	Lepidoptera	Vespidae	<i>Zizeeria knysna</i> (Trimen, 1862)
Nymphalidae		<i>Hypolimnas misippus</i> L. 1764	Observed April
Neuroptera	Myrmeleontidae	<i>Myrmeleon obscurus</i> Rambur, 1853	To light, 10/99
Odonata	Coenagrionidae	<i>Ceriagrion glabrum</i> (Burmeister, 1839)	One damselfly observed at marsh, 12/10/99
		<i>Diplacodes trivialis</i> (Rambur, 1842) or <i>Orthetrum stemmale wrightii</i> (Selys, 1877)	One individual observed over airstrip, April
		<i>?Pantala flavescens</i> (Fabricius, 1798)	Large, orange-brown dragonfly observed over airstrip, April. Several indivs. observed
	Orthoptera	Phasgonuridae	<i>Tramea limbata</i> (Selys, 1869)
<i>Ruspolia differens</i> (Serville, 1838)			To light
<i>Pelerinus rostratus</i> (Brunner, 1878)			To light

VERTEBRATES

Reptiles and Amphibians

Six reptile species were observed on Denis; four lizards, a snake and a giant tortoise (see Table 7). At least three of these species, *Gehyra mutilata*, *Geochelone gigantea*, and *Ramphotyphlops braminus*, are introduced. A giant tortoise species, presumably one of the taxa endemic to the granitic Seychelles, was present in 1773 (Bour, 1984), but this population is now extinct. Fossil giant tortoise eggs from Denis have been dated to 1308±85 yr BP (Burleigh, 1979).

In addition to the land reptiles, two species of marine turtle breed regularly on Denis Island: the green sea turtle *Chelonia mydas* (L.) (Frazier, 1984) and hawksbill *Eretmochelys imbricata* (L.).

Table 7. Reptiles observed, Denis Island.

Status: E =endemic, I = introduced, N = native (in central Seychelles).

Family	Species		Status
Gekkonidae	<i>Gehyra mutilata</i> (Wiegmann, 1835)	Pacific house gecko	I
	<i>Phelsuma sundbergi</i> Rendahl, 1939	day gecko	E
	<i>Phelsuma</i> sp. (? <i>P. astriata</i> Tornier, 1901)	day gecko	E
Scincidae	<i>Mabuya sechellensis</i> (Dumeril & Bibron, 1836)	Seychelles skink	E
Testudinidae	<i>Geochelone gigantea</i> (Schweigger, 1812)	Aldabra giant tortoise	I
Typhlopidae	<i>Ramphotyphlops braminus</i> (Daudin, 1803) Robb, 1966	Brahminy blind snake	I

Birds

In total, 17 land birds and waders were recorded of which six were resident species (Table 8). Three of these resident species were obvious introductions (barred ground dove, common mynah, Madagascar fody). One species (turtle dove) is likely to have been introduced although it was recorded on the island early in the twentieth century (Fryer, 1910). The individuals observed showed grey heads and relatively large size, characteristics of the introduced Madagascan race *S. picturata picturata* rather than the Seychelles endemic form *S. picturata rostrata* (which appears effectively extinct throughout its former range; Gaymer *et al.*, 1969). Only one endemic species was observed (Seychelles blue pigeon). Together with the moorhen, this seems to comprise the entire native bird fauna. Stoddart and Fosberg (1981) suggest that the Denis population of the latter species is introduced but, if so, the introduction must have occurred prior to 1866, when Newton obtained three live specimens (Newton, 1867).

In 1908, a sunbird *Cinnyris* sp. was recorded (Fryer, 1910), Stoddart and Fosberg (1981) suggest that this was the souimanga sunbird *Nectarinia sovimanga*. However, the nearest extant populations of this species are on Aldabra and Cosmoledo (Sinclair and Langrand, 1998): a much more likely species would appear to be Seychelles sunbird *Nectarinia dussumieri*, which is widespread on islands of the granitic Seychelles. No sunbirds were observed during the current survey, and it appears that this population is now extinct. In general, sunbirds appear relatively resistant to extinction caused by human intervention; there are no known extinctions of *N. sovimanga* populations in the

Aldabra group (Diamond, 1984), despite massive environmental degradation on some of the islands.

Two of the land bird species observed, common mynah and Seychelles blue pigeon, were not recorded by Fryer (1910), and appear to be more recent invaders or introductions. One of the introduced land bird species recorded (common mynah), is a potential nest predator of endemic birds.

Eight seabird species were recorded (Table 9). The most abundant species was the fairy tern *Gygis alba*; during the October 1999 survey, thousands were observed roosting in tall *Casuarina* trees, together with smaller numbers of brown noddy *Anous stolidus*. Other seabirds were much less abundant. In April 2000, there was evidence of breeding of fairy terns, brown noddies, and white-tailed tropic birds (the latter species nesting in *Casuarina* trees).

Domestic hens and quail are kept caged in a large poultry unit on the island; there appeared to be no free-living fowl.

Table 8. Land birds and waders observed on Denis Island.

M = migrant species; V = vagrant species; E = Seychelles endemic species.

Species		Notes
<i>Anas querquedula</i> V	garganey	One bird, east of airstrip, 10-12/10/99
<i>Gallinula chloropus</i>	common moorhen	One bird seen in freshwater marsh, 11/10/99. Not seen April 2000
<i>Dromas ardeola</i> M	crab plover	Several birds seen 11/10/99. Group of three birds on beaches, 9/4/00
<i>Charadrius leschenaultii</i> M	greater sandplover	Several birds seen regularly on airstrip, October and April. Distinguished from <i>C. mongolus</i> by call
<i>Phuialis squatarola</i> M	grey plover	Seen regularly, on airstrip and beaches, both October and April
<i>Numenius phaeopus</i> M	whimbrel	Seen regularly, especially on airstrip, both October and April. Flock of 17 birds seen, E. end of airstrip, 12/4/00
<i>Numenius arquata</i> M	Eurasian curlew	One bird on airstrip 16/04/01
<i>Tringa nebularia</i> M	common greenshank	One bird in shallow sea, eastern end of airstrip, 12/10/99
<i>Xenus cinereus</i> M	terek sandpiper	One bird with Curlew Sandpipers on airstrip, 7/10/99
<i>Actitis hypoleucos</i> M	common sandpiper	One individual, E. end of airstrip, 12/10/99
<i>Arenaria interpres</i> M	ruddy turnstone	Seen regularly, on airstrip and beaches, in groups of up to 30, both October and April
<i>Calidris ferruginea</i> M	curlew sandpiper	Seen regularly, on airstrip and beaches, in groups of up to 10 (October only)
<i>Hirundo rustica</i> V	barn swallow	One individual seen flying over airstrip, 11/4/00
<i>Streptopelia picturata</i> ssp.	turtle dove	Seen regularly. Doves on Denis Island have features close to the introduced Madagascan subspecies <i>S. p. picturata</i> , rather than the endemic <i>S. p. rostrata</i>
<i>Geopelia striata</i>	barred ground dove	Seen regularly
<i>Alectroenas pulcherrima</i> E	Seychelles blue pigeon	Seen occasionally, especially around the village. Reported common
<i>Acridotheres tristis</i>	common mynah	Seen regularly
<i>Foudia madagascariensis</i>	Madagascar fody	Seen regularly, many nests observed (some with young chicks present) in October

Table 9. Seabirds observed, Denis Island.

† = species breeding on island

Species		Notes
<i>Phaeton lepturus</i> †	white-tailed tropicbird	A few individuals seen. Reported to nest in casuarinas on the island. Observed nesting 16/04/01
<i>Fregata minor</i>	great frigatebird	One adult male seen flying low over airstrip, 11/10/99. Juvenile and female frigatebirds (<i>F. minor</i> or <i>F. ariel</i>) regularly observed in October. Both species probably occur
<i>Sterna bergii</i>	greater crested tern	Regularly seen on rocks close to island (October only)
<i>Anous stolidus</i> †	brown noddy	Roosting in casuarinas (October). Breeding April: one well-grown chick observed dead beneath casuarina 6/4/00, large fledgling observed on forest floor 6/4/00
<i>Anous tenuirostris</i>	lesser noddy	Seen flying in to roost, October and April. Around 35 birds observed roosting in tall coastal casuarina, 9/4/00
<i>Sterna anaethus</i>	bridled tern	Around 10 birds roosting in tall casuarinas, Muraille Bon Dieu, 6/4/00
<i>Sterna fuscata</i>	sooty tern	Regularly seen close to island, October and April
<i>Gygis alba</i> †	fairy tern	Large numbers of birds (hundreds) roosting in casuarinas, October. Evidence of breeding in April: chicks and eggs observed. Most nesting appears to occur in tall casuarinas

VERTEBRATES: MAMMALS

Mammals observed in the course of fieldwork were recorded (Table 10). In addition, rodent trapping was carried out in October 1999 and April 2000 (Table 11). Two traplines were established, both in coconut woodland (former plantation). Two species of rodent were trapped. Ship rat *Rattus rattus* was the most frequent, while house mouse *Mus domesticus* were taken in small numbers (a total of six mice taken in 279 trap-nights). Overall trapping rates were relatively high with higher rates in October (at the end of the dry season when food and water stress are greatest).

Table 10. Mammal species recorded on Denis.

	Status 1999/2000	Status August 2001
<i>Felis catus</i> L.	A large population present: five individuals seen on one occasion (at pig farm).	?Extinct
<i>Rattus rattus</i> L.	Widespread	Extant
<i>Mus domesticus</i> L.	Collected in rat traps, and regularly seen in woodland habitats. Also in buildings and anthropogenic habitats.	Extant
<i>Bos taurus</i> L.	c. 30 individuals, usually tethered	Extant
<i>Sus domesticus</i> Erxleben	c. 100 animals	Extant

Table 11. Results of rat trapping

Dates	Trap-nights	No. of rats	Rats per 100 trap-nights (uncorrected)	Rats per 100 trap-nights (corrected)*
7 - 12/10/99	140	50	35.7	64.9
7 - 12/4/00	139	46	33.1	34.5
All islands	1893	595	31.4	

*Corrected to account for the effect of closed traps: Cunningham and Moors, 1996

In July 2000, a rat and cat eradication programme was undertaken on the island by staff of the New Zealand Department of Conservation, in a project coordinated by the Seychelles Ministry of Environment and Transport. Initially, the project appeared to be successful in eradicating rats on Denis, but trapping in August 2001 revealed small populations of rats in at least two areas of the island, and rats have since spread to most areas of the island. It is possible that rats invaded the island following a successful eradication. Mice probably survived the eradication: although they were not recorded until early 2001, they were found to be abundant and widely distributed around the island by August 2001. A small number of cats (possibly only two individuals) survived the cat and rat eradication of 2000, but were killed in 2001. Cats now appear to be extinct on the island.

The herd of cattle on Denis Island (numbering about 30) appeared to have a limited impact on the island's ecosystems, because the animals were usually kept tethered in open grassy areas on the east coast of the island or in grassland near the pig farm. Their major impact was on fresh water marsh areas which are limited in extent and fragile. Cattle appeared to cause physical disturbance and eutrophication of the marsh (especially that at CL 5215 7915).

CONSERVATION RECOMMENDATIONS

Although Denis is a coralline island with a history as a coconut plantation, it now has relatively extensive coastal forest dominated by native tree species, and the remaining coconut plantation areas are undergoing succession to woodland. Native trees support high densities of invertebrates on their foliage which could provide food for introduced small insectivores such as Seychelles warbler *Acrocephalus sechellarum*, Seychelles white-eye *Zosterops modestus* and Seychelles fody *Foudia sechellarum*. The woodland is particularly rich in badamier *Terminalia catappa* and is rather marshy, resembling woodland on La Digue which supports the major population of black paradise flycatcher *Terpsiphone corvina* (Watson, 1981). The island could at present support around 10 pairs of this highly endangered species (Currie *et al.* in prep.), and this number would rise with appropriate management of marshland and woodland habitats. Ground-dwelling invertebrate assemblages were also relatively large and similar in composition to those of Cousin Island which supports a population of Seychelles magpie-robin *Copsychus sechellarum*, suggesting that this species could survive on Denis if translocated. Since

magpie-robins forage on the ground, some clearance of dense coconut regrowth would be necessary to increase the area of suitable habitat available to the birds.

Management for conservation on Denis Island should include the encouragement of forest succession through the removal of coconut and planting of native broadleaf trees including *Terminalia* and *Pisonia*. *Pisonia* probably made up the original vegetation of the island prior to human settlement. However, most importantly, complete eradication of introduced predators will be necessary before translocation of endemic bird populations can occur. The most important predators remaining on the island are ship rats, although mynahs might also present a hazard to an establishing population of Seychelles magpie-robin as they are known to be nest competitors and nest predators of magpie-robins.

Assessment work suggests that Denis could easily support viable populations of some of Seychelles' most endangered endemic birds, but the translocation of Seychelles endemic birds to Denis would not be a classic "reintroduction" of a species to sites in its former range where it has been extirpated by introduced predators or environmental change. None of the endangered endemic birds of the granitic Seychelles have ever been recorded on Denis Island: the endemic fauna has been restricted to two common species, the Seychelles blue pigeon and Seychelles sunbird (the latter now locally extinct). It is generally advised that translocations of endangered animals should generally be kept within the species' known range, in locations where it has died out (reintroduction rather than introduction; IUCN, 1998). Translocations within a species' known historical range have a better chance of success than those outside (Townes *et al.*, 1990). However, the conservation of species threatened with extinction may justify translocation outside the natural range. While introductions to pristine islands that have never had alien predators can be detrimental to existing habitats and species (Townes *et al.*, 1990), this is less likely to be the case where the island concerned has previously suffered major habitat disruption and the introduction of alien predators (as on Denis). In the Seychelles, at least two circumstances favour the translocation of bird species outside those islands which can be precisely defined as the species' former range:

- 1) Historical records of bird distribution are poor with very little information before 1865 (Rocamora and Skerrett, 2001) by which time much human-mediated environmental change had already occurred. Alien predators were introduced with, or even before, the first human settlement in 1770, and were responsible for the loss of island populations of several species (Newton, 1867; Diamond, 1984).

- 2) Most of the land area of the archipelago is currently unsuitable for many of the rarer species, and likely to remain so; 78% of the granitic Seychelles' land area is contained in the two islands Mahé and Praslin where it is impossible to eradicate alien predators.

While the Seychelles biota as a whole shows a high degree of endemism (Stoddart, 1984), there is little evidence of island endemism, especially on the low coralline islands where the majority of the flora and fauna is made up of widely-distributed species (Stoddart and Fosberg, 1984). The absence of endemic species on islands such as Denis can be advantageous to translocations of endemic vertebrates,

ensuring little conflict of interest with the conservation of pre-existing populations of other endemic taxa (Atkinson, 1990).

In this situation, the coralline island of Denis would appear to offer an excellent opportunity to establish additional populations of some endemic birds as part of ongoing species recovery programmes. At least two endemic land birds have been translocated to coralline islands in the past and become established; the Seychelles magpie-robin survived on Alphonse for 60 years before being driven to extinction by habitat change and/or the introduction of cats in the 1950s (Collar and Stuart, 1985). The Seychelles fody was introduced to D'Arros in 1965 (Penny, 1974).

The isolation of Denis imposes special conditions on any translocation programme. Because of the remoteness of the island, birds translocated here will remain isolated and cannot disperse to other islands in the group. Populations will necessarily be artificially managed and it is essential that any habitat management be initiated before birds are translocated.

Appendix 1. Plant species recorded from Denis (excluding seagrasses)

Taxonomy of dicotyledons as given by Friedmann (1994). Of monocotyledons, as in Robertson (1989). Families arranged in alphabetical order.

Status: E = Endemic; N = Native; I = Introduced.

Abundance: A = Abundant (>1000 individuals observed); C = Common (100 - 1000 individuals observed); F = Frequent (10 - 100 individuals observed); Occasional (3 - 10 individuals observed); R = Rare (1 or 2 individuals observed).

Habitats: PG = Grassland; W = Woodland; Sc = Scrub; BC = Beach Crest; Ma = Marsh; Cu = Garden.

Previous records (in Notes): 1 = Stoddart and Fosberg, 1981; 2 = Fryer in Summerhayes, 1931; 3 = Fryer, 1910; 4 = collections by Jeffrey (no date), cited by Stoddart and Fosberg, 1981.

	Species	Status	Abund.	Habitats	Notes
PTERIDOPHYTA					
Adiantaceae					
1	<i>Acrostichum aureum</i> L.	N	A	Ma	
Davalliaceae					
2	<i>Nephrolepis biserrata</i> (Sw.) Schott	N	A	W	
	<i>Nephrolepis</i> cf. <i>hirsutula</i> (Forst.f.) Presl.	?	-	-	Recorded 1977 ¹ , not current survey. Same as <i>N. biserrata</i> ?
Polypodiaceae					
3	<i>Phymatosorus scolopendria</i> (Burm. f.)	N	A	W	
Psilotaceae					
4	<i>Psilotum ?nudum</i> Sw.	N	F	W	
GYMNOSPERMAE					
5	<i>Cycas thuarsii</i> Gaud.	I	R	Cu	Only in gardens
ANGIOSPERMAE: Dicotyledons					
Acanthaceae					
6	<i>Asystasia</i> sp. B (<i>sensu</i> Friedmann)	?I	A	G	
	<i>Asystasia bojeriana</i> Nees	?	-	-	Recorded 1977 ¹ , not current survey. Same as <i>A. sp. B</i> ?
7	<i>Pseuderanthemum carruthersii</i> (Seem.) Guillaumin	I	F	Cu	Only in gardens
Amaranthaceae					
8	<i>Achyranthes aspera</i> (L.) DC.	I	A	W, G	
9	<i>Alternanthera brasiliana</i> (L.) O. Kuntze	I	O	Cu	Only in gardens
10	<i>Amaranthus dubius</i> Mart. ex Thell.	I	A	G	
11	<i>Celosia argentea</i> L.	I	R	Cu	Only in gardens
Anacardiaceae					
12	<i>Spondias cytherea</i> Sonn.	I	R	Cu	Only in gardens
Annonaceae					
13	<i>Annona muricata</i> L.	I	R	Cu	Only in gardens
14	<i>Annona squamosa</i> L.	I	F	W, Cu	
Apocynaceae					
15	<i>Catharanthus roseus</i> (L.) G. Don.	I	A	G, W	

	Species	Status	Abund.	Habitats	Notes
16	<i>Nerium oleander</i> L.	I	R	Cu	Only in gardens
17	<i>Ochrosia oppositifolia</i> (L.) K. Schum.	N	R	G	
18	<i>Plumeria rubra</i> L.	I	O	Cu	Only in gardens
19	<i>Thevetia peruviana</i> K. Schum.	I	R	Cu	Only in gardens
Araliaceae					
20	<i>Polyscias</i> sp.	I	R	Cu	Only in gardens
Asclepiadaceae					
21	<i>Calotropis gigantea</i> (L.) Aiton f.	I	F	G, Sc, Cu	
22	<i>Tylophora ?coriacea</i> Marais	N	C	W	
Balsaminaceae					
23	<i>Impatiens balsamina</i> L.	I	O	Cu	Only in gardens
24	<i>Impatiens wallerana</i> Hook. F.	I	F	Cu	Only in gardens
Bignoniaceae					
25	<i>Tabebuia pallida</i> (Lindl.) Miers.	I	A	W	
Boraginaceae					
26	<i>Cordia sebestena</i> L.	I	O	Cu	Only in gardens
27	<i>Cordia subcordata</i> Lam.	N	C	W, BC	
28	<i>Tournefortia argentea</i> L. f.	N	C	BC	
Cactaceae					
29	<i>Opuntia</i> sp.	I	O	Cu	Only in gardens
Caesalpinaceae					
30	<i>Caesalpinia pulcherrima</i> (L.) Sw.	I	F	Cu	Only in gardens
31	<i>Cassia/Senna</i> sp.	I	F	Cu	Only in gardens
32	<i>Delonix regia</i> (Hook.) Raf.	I	R	Cu	Only in gardens
33	<i>Senna occidentalis</i> (L.) Link	I	C	PG	
34	<i>Tamarindus indica</i> L.	I	O	Cu, W	
Campanulaceae					
35	<i>Hippobroma longiflora</i> (L.) G. Don	I	F	Ma, G	
Capparidaceae					
36	<i>Cleome gynandra</i> L.	I	F	BC, G	
Caricaceae					
37	<i>Carica papaya</i> L.	I	A	W, Cu	
Casuarinaceae					
38	<i>Casuarina equisetifolia</i> J. R. & G. Foster	I	A	W	
Combretaceae					
39	<i>Terminalia catappa</i> L.	?N	A	W	
Compositae					
40	<i>Bidens pilosa</i> L.	I	C	G	
41	<i>Coreopsis lanceolata</i> L.	I	C	Cu	Only in gardens
42	<i>Melanthera biflora</i> (L.) Wild	?N	C	G	
43	<i>Synedrella nodiflora</i> (L.) Gaertn.	I	A	G	
44	<i>Tithonia diversifolia</i> (Hemsl.) A. Gray	I	R	Cu	Only in gardens
45	<i>Vernonia cinerea</i> (L.) Less.	I	A	W, G	
Convulvulaceae					
46	<i>Ipomoea hederifolia</i> L.	I	O	G	
47	<i>Ipomoea macrantha</i> Roem. Et Schult.	N	C	W, Ma	
48	<i>Ipomoea obscura</i> (L.) Ker Gawl.	I	F	G, W	
49	<i>Ipomoea pes-caprae</i> (L.) R. Br.	N	C	BC, G	
Crassulaceae					
50	<i>Kalanchoe pinnata</i> (Lam.) Pers.	I	C	G	
51	<i>Kalanchoe blossfeldiana</i>	I	R	Cu	Only in gardens

	Species	Status	Abund.	Habitats	Notes
Cucurbitaceae					
	<i>Cucurbita</i> cf. <i>maxima</i> Duch. ex Lam.	I	-	-	Recorded 1977 ¹ , not current survey; extinct on Denis?
52	<i>Cucurbita moschata</i> (Duch. ex Lam.) Duch ex Poir	I	O	Cu	Only in gardens
	<i>Mukia maderaspatana</i> (L.) M. J. Roem.				Recorded 1910 ² (as <i>Melothria maderaspatana</i>)
53	<i>Trichosanthes cucumerina</i> L.	I	O	Cu, Ma	
Euphorbiaceae					
54	<i>Acalypha indica</i> L.	I	A	G	
55	<i>Acalypha wilkesiana</i> Muell. Arg.	I	F	Cu	Only in gardens
56	<i>Codiaeum variegatum</i> L.	I	F	Cu	Only in gardens
57	<i>Euphorbia cyathophora</i>	I	A	G	
58	<i>Euphorbia hirta</i> L.	I	A	G	
	<i>Euphorbia microphylla</i> Heyne ex Roth.	?	-	-	Recorded 1910 ² . = <i>E. stodartii</i> Fosberg? (Robertson, 1989)
59	<i>Euphorbia prostrata</i> Ait.	I	C	G	
60	<i>Jatropha pandurifolia</i> Andr.	I	O	Cu	Only in gardens
61	<i>Pedilanthus tithymaloides</i> (L.) Poit.	I	F	G, Cu	
62	<i>Phyllanthus amarus</i> Schumach. & Thonn.	I	F	G	
63	<i>Phyllanthus maderaspatensis</i> L.	I	C	G	
64	<i>Phyllanthus pervilleanus</i> (Baillon) Müll. Arg.	N	C	W	
65	<i>Ricinus communis</i> L.	I	A	G, W	
Gesneriaceae					
66	<i>Episcia cupreata</i> (Hook.) Hanst.	I	O	Cu	Only in gardens
Goodeniaceae					
67	<i>Scaevola sericea</i> Vahl.	N	A	BC	
Guttiferae					
68	<i>Calophyllum inophyllum</i> L.	N	F	W	
Hernandiaceae					
69	<i>Hernandia nymphaeifolia</i> (Presl) Kubitzki	N	O	BC	
Labiatae					
70	<i>Ocimum basilicum</i> L.	I	O	G	
71	<i>Solenostemon</i> cultivar	I	F	Cu	Only in gardens
Lauraceae					
72	<i>Cassythea filiformis</i> L.	N	A	BC, Sc, W	
73	<i>Persea americana</i> Mill	I	R	Cu	Only in gardens
Lecythidaceae					
74	<i>Barringtonia asiatica</i> (L.) Kurtz	N	F	W, BC	
Lythraceae					
	<i>Pemphis acidula</i> Forst.	?	-	-	Recorded 1910 ^{2,3} ; Never occurred?
Malvaceae					
75	<i>Abutilon indicum</i> (L.) Sweet	?I	C	W, G	
76	<i>Gossypium hirsutum</i>	I	C	W, G	
77	<i>Hibiscus rosa-sinensis</i> L.	I	F	Cu	Only in gardens
78	<i>Hibiscus tiliaceus</i> L.	N	A	W, BC	
79	<i>Malvaviscus arboreus</i> Cav.	I	R	Cu	Only in gardens

	Species	Status	Abund.	Habitats	Notes
80	<i>Sida acuta</i> Burm. f.	I	O	G	
81	<i>Sida pusilla</i> Cav.	?N	A	G	
82	<i>Thespesia populnea</i> (L.) Soland. ex Correa	N	C	W, BC	
Mimosaceae					
83	<i>Adenanthera pavonina</i> L.	I	C	W	
84	<i>Leucaena leucocephala</i> (Lam.) de Wit	I	C	W	
Moraceae					
85	<i>Artocarpus altilis</i> (Parkins.) Fosb.	I	O	G, Cu	
86	<i>Ficus benghalensis</i> L.	I	F	G	
87	<i>Ficus elastica</i> Roxb.	I	O	Cu	Only in gardens
88	<i>Ficus lutea</i> Vahl.	N	F	W	
Moringaceae					
89	<i>Moringa oleifera</i> Lam.	I	F	Cu, G	
Myrtaceae					
90	<i>Psidium guajava</i> L.	I	R	Cu	Only in gardens
91	<i>Syzygium samarangense</i> (Bl.) Merr. & Perry	I	R	Cu	Only in gardens
Nyctaginaceae					
92	<i>Boerhavia repens</i> L.	?N	A	G	
93	<i>Bougainvillea</i> sp. cultivars	I	F	Cu	Only in gardens
94	<i>Mirabilis jalapa</i> L.	I	F	G, Cu	
95	<i>Pisonia grandis</i> R. Br.	N	C	W	
Oxalidaceae					
96	<i>Averrhoa bilimbi</i> L.	I	O	G, Cu	
Papilionaceae					
97	<i>Canavalia cathartica</i>	N	F	BC	
	<i>Canavalia gladiata</i> DC.	I	-	-	Recorded 1910 ³ ; now extinct on Denis?
98	<i>Crotalaria pallida</i> Ait. (or <i>C. trichotoma</i> Bojer, H. M)	?I	C	G	
99	<i>Desmodium incanum</i> DC.	I	A	G, W	
100	<i>Gliricidia sepium</i> (Jacq.) Walp.	I	F	Cu	Only in gardens
Passifloraceae					
101	<i>Passiflora edulis</i> Sims	I	O	Cu	Only in gardens
102	<i>Passiflora foetida</i> L.	I	O	W	
103	<i>Passiflora suberosa</i> L.	I	A	W, G	
Portulacaceae					
104	<i>Portulaca grandiflora</i> Hook.	I	F	Cu	Only in gardens
105	<i>Portulaca oleracea</i> L.	N	A	G, BC	
Rhamnaceae					
106	<i>Colubrina asiatica</i> (L.) Brogn.	N	O	W	
Rubiaceae					
107	<i>Guettarda speciosa</i> L.	N	C	BC	
108	<i>Morinda citrifolia</i> L.	?I	A	W	
109	<i>Mussaenda</i> sp.	I	R	Cu	Only in gardens
	<i>Spermocoe repens</i> (DC.) Fosb. and Powell	?	-	-	Recorded 1977 ¹ ; possibly <i>Mitracarpus hirtus</i> ? (Robertson, 1989)
Rutaceae					
110	<i>Citrus</i> sp.	I	F	G, Cu	
111	<i>Murraya koenigii</i> (L.) Spreng.	I	F	G, Cu	
Sapindaceae					
112	<i>Cardiospermum halicacabum</i> L.	?N	O	W	

	Species	Status	Abund.	Habitats	Notes
Scrophulariaceae					
113	<i>Striga asiatica</i> (L.) O. Kuntze	?I	F	G	
Solanaceae					
114	<i>Capsicum frutescens</i> L.	I	R	Cu	Only in gardens
115	<i>Physalis angulata</i> L.	I	R	W	
116	<i>Solanum americanum</i> Mill.	I	O	G, W	
117	<i>Solanum lycopersicum</i> L.	I	F	Cu	Only in gardens
118	<i>Solanum melongena</i> L.	I	F	Cu	Only in gardens
119	<i>Solanum torvum</i> Sw.	I	O	G, W	
Surianaceae					
120	<i>Suriana maritima</i> L.	N	F	BC	
Turneraceae					
121	<i>Turnera angustifolia</i> Miller	I	A	W	
Verbenaceae					
122	<i>Lantana camara</i> L.	I	F	Sc, G, W	
123	<i>Phyla nodiflora</i> (L.) Greene	I	A	G, Ma	
124	<i>Stachytarpheta jamaicensis</i> (L.) Vahl.	I	C	G	
Zygophyllaceae					
	<i>Tribulus cistoides</i> L.	I	-	-	Recorded 1910 ² (as <i>T. terrestris</i>); extinct on Denis?
ANGIOSPERMAE: Monotyledons					
Agavaceae					
125	<i>Agave sisalana</i> (Perr. Ex Engelm.)	I	C	G	
126	<i>Furcraea foetida</i>	I	O	G	
Amaryllidaceae					
127	<i>Crinum ?amabile</i> Ker-Gawl.	?I	C	G, Cu	
128	<i>Crinum asiaticum</i> L.	I	F	Cu	Only in gardens
129	<i>Zephyranthes rosea</i> Lindl.	I	C	G, Cu	
Araceae					
130	<i>Alocasia macrorrhiza</i> (L.) G. Don.	I	C	W	
131	<i>Colocasia esculenta</i> (L.) Schott	I	O	Ma	
Commelinaceae					
132	<i>Commelina</i> sp.	?I	O	Ma	
133	<i>Tradescantia spathacea</i> Swartz	I	A	Cu, W	
134	<i>Zebrina pendula</i> Schnitzl.	I	R	G	
Cyperaceae					
135	<i>Cyperus conglomeratus</i> Rottb.	N	C	BC	
136	<i>Cyperus rotundus</i> L.	?	A	G	
137	<i>Cyperus</i> sp.	?	A	G	
138	<i>Fimbristylis cymosa</i> R. Br.	?	A	G, BC	
139	<i>Kyllinga alba</i> Nees.	?	F	W	
140	<i>Kyllinga polyphylla</i> Willd. ex Kunth	N	F	W	
141	<i>Mariscus dubius</i> (Rottb.) Fischer	N	A	G	
142	<i>Mariscus ligularis</i> (L.) Urb.	?N	F	G	
143	<i>Pycneus polystachyos</i> (Rottb.) P. Beauv.	?	R	Ma	
Dioscoreaceae					
144	<i>Dioscorea alata</i> L.	I	R	W	
Gramineae					
145	<i>Brachiara umbellata</i> (Trin.) W. D. Clayton	N	R	Sc	
146	<i>Cenchrus echinatus</i> L.	?	C	G	
147	<i>Chloris ?barbata</i> (L.) Sw.	?	C	G	
148	<i>Cymbopogon</i> sp.	I	O	Cu	Only in gardens
149	<i>Cynodon dactylon</i> (L.) Pers.	?	A	G, BC	

	Species	Status	Abund.	Habitats	Notes
150	<i>Dactyloctenium ctenoides</i> (Steud.) Bosser	?	C	G	
151	<i>Digitaria</i> sp. (<i>D. ?horizontalis</i> Willd.)	?	A	G	
152	<i>Eleusine indica</i> (L.) Gaertn.	?	A	G	
153	<i>Enteropogon sechellensis</i> (Baker) Dur. & Schinz	N	C	G	
	<i>Enteropogon monostachyos</i> (Vahl.) S. & E.	?	-	-	n.d. ⁴ ; same as <i>E. sechellensis</i> ?
	<i>Eragrostis ciliaris</i> (L.) R. Br.	?	-	-	n.d. ⁴
154	<i>Eragrostis tenella</i> (L.) P. Beauv.	?	A	G	
155	<i>Eragrostis tenella</i> var. <i>insularis</i> Hubb.	?	C	G	
156	<i>Lepturus</i> sp.	?	A	G, W	
157	<i>Panicum maximum</i> L.	?	F	G	
158	<i>Panicum ?repens</i> L.	?	R	G	
159	<i>Pennisetum polystachyon</i> (L.) Schult.	?	A	G	
160	<i>Pennisetum</i> sp. (purple var.)	?I	O	Cu	Only in gardens
161	<i>Rhynchelytrum repens</i> (Willd.) C. E. Hubb.	?	C	G	
162	<i>Saccharum officinale</i> L.	I	O	Cu	Only in gardens
163	<i>Sporobolus virginicus</i> (L.) Kunth.	N	C	BC	
164	<i>Stenotaphrum dimidiatum</i> (L.) Brogn.	N	A	G	
	<i>Stenotaphrum micranthum</i> (Des.) C. E. Hubb.	N	-	-	n.d. ⁴
Liliaceae					
165	<i>Dianella</i> sp.	I	R	Cu	Only in gardens
166	<i>Dracaena reflexa</i> Lam.	N	O	Cu	Only in gardens: introduced on Denis
167	<i>Pleomele reflexa variegata</i>	I	O	Cu	Only in gardens
168	<i>Sansevieria thyrsofolia</i> Thunb.	I	O	Cu	Only in gardens
169	<i>Yucca</i> sp.	I	O	Cu	Only in gardens
Musaceae					
170	<i>Musa ?sapientum</i> L.	I	F	Cu, W, G	
Orchidaceae					
171	<i>Vanilla planifolia</i> Andrews	I	C	W	
Palmae					
172	<i>?Areca catechu</i> L.	I	R	Cu	Only in gardens
173	<i>Cocos nucifera</i> L.	N	A	PG, W, Sc, BC	
174	<i>Ptychosperma macarthurii</i> (Wendl.) Nichols.	I	R	Cu	Only in gardens
175	<i>Pritchardia pacifica</i>	I	F	Cu	Only in gardens
176	<i>?Thrinax</i> sp.	I	R	Cu	Only in gardens
Pandanaeae					
177	<i>Pandanus sanderi</i> Hort.	I	R	Cu	Only in gardens
178	<i>Pandanus</i> sp.	I	R	Cu	Only in gardens
Typhaceae					
179	<i>Typha javanica</i> Schnitzl. ex Zoll.	N	O	Ma	