

Figure 1. Thérèse Island: physical, showing site of vegetation plots.

THÉRÈSE

BY

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GEOLOGY, TOPOGRAPHY AND CLIMATE

Thérèse has an area of 73.9 ha. It is situated 700 m from the east coast of Mahé, the largest of the granitic Seychelles islands. At its highest point (Thérèse Peak) it reaches 160 m above sea level. The island is dominated by sloping ground. There are two main hills: Thérèse Peak and a lower hill to the north (60 m). The south west has a raised, level area of open rock (glacis) at 50-70 m above sea level. The north east shore of the island has a sandy beach backed by a narrow coastal plain (plateau). Most of the land is sloping ground between 10 and 100 m above sea level (Table 1).

Table 1. Area of Thérèse by altitude (calculated from maps published by Directorate of Overseas Survey(UK)/Seychelles Government).

Altitude range (m. asl.)	Area (ha)	Percentage total area
>150	0.1	0.1
100 - 150	0.8	1.1
50 - 100	36.7	49.7
10 - 50	26.1	35.3
0 - 10	10.2	13.8

Geologically, the island is similar to the nearby west coast of Mahé. The hills are made up of porphyritic granite (Braithwaite, 1984) while the coastal plateau is made up of recent calcareous deposits mixed with weathering products of the granite and overlain (in places) with marsh deposits. The soils of Thérèse are mainly red earths, strongly eroded on steeper slopes. On the open glacis areas, soils are restricted to pockets.

Standing water on the island is limited. The coastal plateau has a narrow marsh (dimensions approximately 90 metres by 10 metres wide) running parallel to the coast and separated from the sea by a raised sandy berm. Water in this marsh is saline and the water level varies with tides, although the marsh is superficially not open to the sea. A small mangrove pool (see Fig. 1) is open to the sea. Behind this pool, a small fresh-water stream drains the hill and glacis, widening to form rocky freshwater pools at the base of the hill. While stream flow appeared seasonal, water was present in both September and February, and flowing or standing water is probably present here for much of the year.

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The Seychelles islands experience a seasonal humid tropical climate (Walsh, 1984). While no weather data exist for Thérèse, it could be predicted that the climate of the island follows a similar pattern to that of nearby Mahé. Port Glaud, on the west coast of Mahé opposite Thérèse, has lower annual rainfall than Beau Vallon to the north or Victoria to the east (Walsh, 1984). Although it is in the generally wetter northern part of Mahé, it is sheltered from the prevailing winds (in particular the north west wind of the rainy season) by hills.

HISTORY

In 1787, relatively soon after the first permanent human settlement of the Seychelles, Malavois recorded that landing was possible on Thérèse throughout the year and that the island had fresh water all year round. Land tortoises, which had been recorded in 1776 (Bour, 1984) were absent at that time (although still present on the nearby, less accessible Conception Island) and green sea turtles did not breed there, although hawksbill turtles were reported to visit the island (in Fauvel, 1909). The relative accessibility of the island from Mahé made exploitation of the island possible, but the small plateau was not suitable for agriculture on any scale. There are no records of the earliest settlement of Thérèse but coconut plantations were probably begun in the nineteenth or early twentieth century when a range of other species including cinnamon and vanilla were probably introduced.

Today, the island has no permanent human population and is managed as a resort with day-trippers visiting from Mahé. There are restaurant and water sports facilities. Few distinct paths exist and most tourists stay on the beach or the small coastal plateau.

FLORA AND VEGETATION

Flora

In total, 183 plant species were recorded on Thérèse, including eight ferns and 175 angiosperms (Appendix 1). Of the angiosperms, 94 (53.7%) species are regarded as introduced (Friedmann, 1994) and 65 (37.1%) native. Of the native taxa, 17 species or subspecies are endemic to the Seychelles (9.7% of the angiosperm flora).

The proportions of the total flora made up of introduced and endemic species were similar to those for the Seychelles as a whole (of the total Seychelles flora, around 54% are introduced and 9% endemic; Procter, 1984). Compared to the flora of other small islands, Thérèse is relatively rich in endemic species. This high endemism is due to the proximity of the island to Mahé, where almost all the endemic plant species of Seychelles are represented. The steep slopes of the island and presence of open glaucous and scrub on soils of little agricultural value may also have contributed to the survival of a number of endemic plants here.

Few previous botanical surveys have been carried out on the island and Robertson (1989) lists just three species for Thérèse: *Erythroxylum sechellarum* (as *E. longifolium*), *Intsia bijuga*, and *Cocos nucifera*. All were recorded in the current survey.

Of the introduced plants established on Thérèse, 17 are invasive weedy species. Several of the woody weeds which are most invasive on the smaller islands of Seychelles were present, including cocoplum *Chrysobalanus icaco* and cinnamon *Cinnamomum verum* (both abundant). *Alstonia macrophylla* was also well established in open hill woodland along with casuarina *Casuarina equisetifolia* and cashew *Anacardium occidentale*. Coconuts *Cocos nucifera* were common, especially on the plateau and lower hills. Albizzia *Paraserianthes falcataria* was represented by a few old trees on the plateau but there was strong regeneration present. One tree species which was abundant (mainly on the plateau), *Trema orientalis*, was regarded as an invasive introduced species by Carlström (1996a) but as a native species by Friedmann (1994).

At least 31 species of introduced plants (17.7% of the angiosperm flora) recorded on Thérèse were restricted to the gardens around the restaurant and were not found away from cultivation. Most are recent introductions on Thérèse and would probably become extinct were cultivation to cease.

Vegetation

The extent of major vegetation types on Thérèse is shown in Table 2 and Figure 2. The vegetation of Thérèse is varied with some habitats, such as mangrove, glacia, and native scrub, dominated by native plants.

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

	Vegetation type	Approx. area (ha)
Hill (>10 m asl)	Woodland (predominantly introduced)	10
	Native palm forest	2
	Coconut with regeneration	6
	Scrub (native)	20
	Scrub (mixed)	18
	Scrub (introduced)	1
	Bare rock	5
Plateau (<10 m asl)	Woodland (predominantly introduced)	2
	Coconut plantation	1
	Coconut with regeneration	1
	Scrub (native)	< 1
	Mangrove	< 1
	Brackish marsh	< 1
	Beach crest vegetation	1
	Grassland/garden	< 1
Bare rock	4	

The vegetation survey concentrated on areas of greatest value for endemic bird conservation: woodland and scrub. Twenty plots were carried out in hill woodland/scrub/coconut with a combined area of 2,000 m² (approximately 0.3% of the total area of hill habitats excluding bare rock) and 17 in plateau woodland/scrub/beach

crest covering 1,700 m² or 4.3% of the total area of the habitat. A summary of results is shown in Table 3.

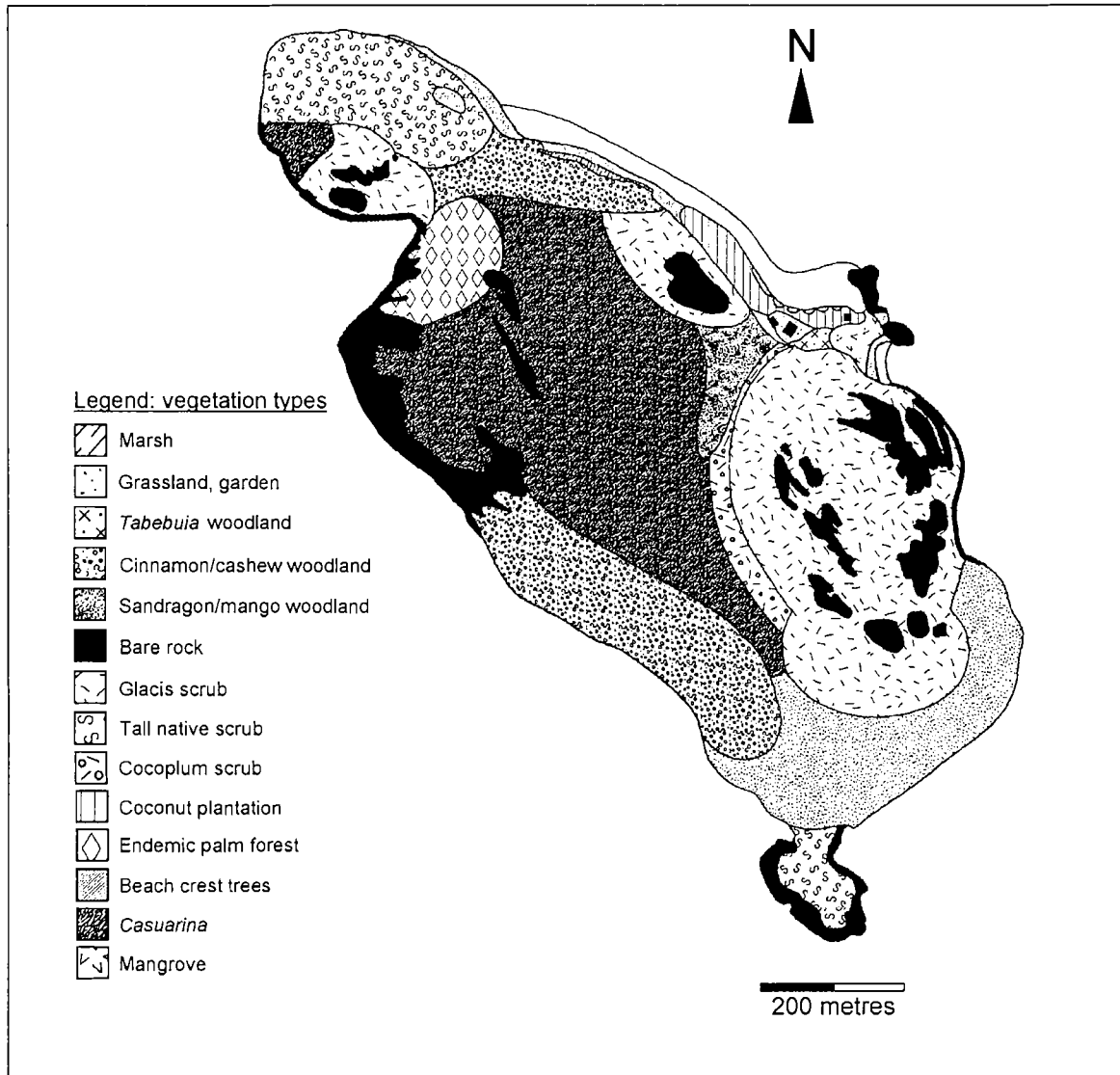


Figure 2. Thérèse Island: vegetation.

Table 3. Thérèse vegetation plot summary.

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)
Plateau	17	<5	571	45.9	78.3	14.8	9.1	1.3
Hill	20	67	625	48.9	45.4	39.3	14.9	1.2

Plateau plots had a relatively low density of trees with a relatively sparse canopy (mean canopy cover = 52%). The tree layer was dominated by two introduced species, *Tabebuia pallida* and *Cinnamomum verum* (Table 4). The shrub layer was species-rich with 29 species represented, many of them native, but the most widespread species were *Cocos nucifera* (in 13 plots) and *Cinnamomum verum* (in 10 plots) (Table 5). The dense vegetation cover in the herb layer (78%) included species of coastal grassland (such as the grasses *Stenotaphrum dimidiatum* and *Ischaemum heterotrichum*) as well as woodland herbs (such as *Nephrolepis* sp.). The most widespread species of the herb layer was *Nephrolepis* sp. in 15 (of 17) plots. *Cinnamomum* and *Phymatosorus scolopendra* each occurred in 14 plots.

Plots in low hill woodland had a higher density of stems although canopy cover was similar to that of plateau plots. As in plateau woodland, exotic trees were dominant although *Tabebuia* was not present. Nineteen species were present in the tree layer of hill plots (as opposed to 15 in plateau plots).

The shrub layer of hill woodland showed high species richness with 28 species represented, including many native and endemic plant species. The most widespread species were again *Cinnamomum verum* and *Cocos nucifera*, each in 18 plots. The introduced cocoplum *Chrysobalanus icaco* was less widespread but, where it was found, it was more dominant. It formed around 25% of the shrub layer in plots where it occurred. The most widespread native species was the endemic palm *Phoenicophorium borsigianum* (Table 5).

The herb layer of the hill woodland was less densely vegetated than that of the plateau with more open leaf litter visible. The most widespread species in the herb layer were *Cinnamomum verum* and the native fern *Nephrolepis* sp. (each in 17 of 20 plots). The fern *Phymatosorus scolopendra* occurred in 16 of 20 plots.

Table 4. Thérèse Island: most abundant tree species.
All trees having >5 stems shown.

	Hill		Plateau	
	No stems	% stems	No stems	% stems
Introduced species				
<i>Anacardium occidentale</i>	9	7.2	1	1.0
<i>Casuarina equisetifolia</i>	10	8.0	0	
<i>Cinnamomum verum</i>	54	43.2	22	22.7
<i>Tabebuia pallida</i>	0		24	24.7
Native species			0	
<i>Canthium bibracteatum</i>	7	5.6	0	
<i>Cocos nucifera</i>	5	4.0	17	17.5
<i>Dracaena reflexa</i>	7	5.6	0	
<i>Hibiscus tiliaceus</i>	0		7	7.2
<i>Paragenipa wrightii</i>	7	5.6	1	1.0
<i>Tabernaemontana coffeoides</i>	8	6.4	0	
<i>Terminalia catappa</i>	0		7	7.2
Total	125		97	

Table 5. Thérèse Island: most widespread shrub species. Shrubs occurring in >5 plots shown. Percentage shrub cover is the mean cover by the species for those plots in which the species occurs.

	Hill		Plateau	
	No. plots	% shrub cover	No. plots	% shrub cover
Introduced species				
<i>Chrysobalanus icaco</i>	8	24.5		
<i>Cinnamomum verum</i>	18	7.5	10	14.1
Native species				
<i>Calophyllum inophyllum</i>	6	4.2	6	1.3
<i>Canthium bibracteatum</i>	10	4.2		
<i>Cocos nucifera</i>	18	11.2	13	12.9
<i>Dracaena reflexa</i>			7	1.1
<i>Memecylon elaeagni</i>	10	9.5		
<i>Paragenipa wrightii</i>	13	5.2		
<i>Phoenicophorium borsigianum</i>	15	12.3		
<i>Premna serratifolia</i>	10	4.3	6	4.6
<i>Scaevola sericea</i>			5	8.8
Total	20		17	

Discussion: Flora and Vegetation

The flora of Thérèse is similar to that of nearby parts of Mahé Island. Some species present on nearby coastal areas and hills of Mahé but rare on other islands include the endemic *Allophyllus sechellensis* and the (probably) native *Dianella ensifolia*.

The vegetation of plateau forest on Thérèse is not distinct from that of the hill except for a narrow coastal strip of beach crest woodland including species such as *Hibiscus tiliaceus* and *Guettarda speciosa*. Takamaka *Calophyllum inophyllum* is still a constituent of this coastal strip and it is also found in hill woodland. However, most of the takamaka trees on the coastal strip show symptoms of takamaka wilt disease caused by the fungus *Leptographium (Verticillium) calophylli* (Ivory *et al.*, 1996; Wainhouse *et al.*, 1998). Many of the trees along the beach crest are already dead although some have shown signs of foliage regrowth after extensive dieback (J. Etienne, *pers. comm.*).

Plateau and hill forest are dominated by introduced species (especially cinnamon) but they also have a high diversity of native and endemic species including endemic palms (there is an area of endemic palm forest on the north west of the island). Native and endemic shrub species are abundant suggesting that much of the native vegetation of the island would be scrub that has been invaded by introduced trees such as cinnamon, becoming high forest in the process.

INVERTEBRATES

Pitfall Trapping

The total size of pitfall assemblages (numbers of invertebrates caught) are shown in Table 6. Only invertebrates over 2 mm body length are included (excluding minute invertebrates such as Collembola).

Both hill and plateau habitats were dominated by ants (Hymenoptera; Formicidae), which made up 63.5% of all invertebrates captured. The earwigs (Dermaptera) made up 25.5% of the invertebrates caught. The remaining 11% of individuals included spiders (Araneae), insect larvae, Lepidoptera, Blattodea, Coleoptera, Crustacea, Isoptera, Mollusca, Myriapoda, Orthoptera, Psocoptera and Hymenoptera (excluding ants). The most abundant invertebrate species was the ant *Odontomachus troglodytes*, which formed 47.5% of individuals overall. An unidentified earwig species made up 14.9% of total invertebrates and was the second most abundant taxon.

Invertebrate counts excluding ants were higher in the north west monsoon and higher on the plateau than the hill. Lowest invertebrate counts came from hill woodland in the dry south east season.

A single individual of the introduced crazy ant *Anoplolepis gracilipes* was collected in one pitfall trap on the plateau. This species is widespread on Mahé, where it is regarded as a nuisance (Haines *et al.*, 1994) and on Bird Island it has negative effects on the island's ecosystems and conservation status (Feare, 1999a; Hill, in prep.). Since only one individual was caught it is probable that the species is not established on Thérèse.

Table 6. Pitfall assemblages from Thérèse.
Only invertebrates of body length >2 mm included.
(number in parentheses = number of invertebrates excluding ants).

	Habitat	Mean no. individuals per five traps	
		SE season	NW season
Thérèse	Plateau woodland	49.7 (12.0)	44.9 (19.0)
	Hill woodland	13.2 (6.2)	24.9 (9.4)
Mean for all granitic islands		61.8 (9.4)	61.1 (16.0)

Leaf-insect Counts

Leaf-insect counts were carried out for 20 tree and shrub species, 11 of these in both seasons (Table 7). The large number of tree species counted reflected the island's high tree species richness. The highest density of invertebrates (in terms of individuals per square metre of leaf) was on the native coastal shrub *Scaevola sericea* (plants showed high levels of infestation by aphids at the time of counting in September). *Scaevola* is abundant at the beach crest and in some areas of low hill scrub. *Morinda citrifolia*, a species of doubtful status (possibly introduced in Seychelles; Friedmann, 1994) which is

uncommon on Thérèse, also showed high invertebrate densities. The endemic species *Erythroxylum sechellarum* had the highest invertebrate density in February.

Ten of the 11 species counted in both seasons showed highest density of invertebrates in September rather than February. This runs counter to the trend on most islands where leaf counts are significantly greater in the wetter north west monsoon, and may reflect weather conditions specific to Thérèse for the 1999/2000 season.

Although the trees showing highest densities of invertebrates in both seasons were native, some introduced species also showed relatively high invertebrate densities, especially *Cinnamomum* and *Tabebuia*.

Table 7. Density of invertebrates on foliage, Thérèse.
n = no. of leaves counted; NI = number of individual invertebrates.

Species	SE season (September)			NW season (February)		
	n	Mean NI Leaf ¹	Mean NI m ⁻²	n	mean NI leaf ¹	mean NI m ⁻²
Introduced species						
<i>Alstonia macrophylla</i>	50	0.36	32.55	0		
<i>Anacardium occidentale</i>	149	0.34	33.04	100	0.13	13.51
<i>Chrysobalanus icaco</i>	100	0.14	42.81	50	0.08	25.16
<i>Cinnamomum verum</i>	900	0.48	76.78	1850	0.20	29.78
<i>Psidium cattleianum</i>	50	0	0	0		
<i>Tabebuia pallida</i>	50	0.26	87.84	0		
Native species						
<i>Calophyllum inophyllum</i>	250	0.26	24.39	200	0.18	19.65
<i>Canthium bibracteatum</i>	340	0.08	48.73	300	0.01	6.94
<i>Erythroxylum sechellarum</i>	0			50	1.28	335.08
<i>Ficus lutea</i>	50	0.16	22.54	0		
<i>Guettarda speciosa</i>	0			50	0.32	11.54
<i>Hibiscus tiliaceus</i>	50	0.16	11.59	0		
<i>Memecylon elaeagni</i>	250	0.05	71.64	500	0.05	63.01
<i>Paragenipa wrightii</i>	200	0.62	90.64	500	0.12	14.20
<i>Premna serratifolia</i>	250	0.27	31.63	200	0.06	9.46
<i>Scaevola sericea</i>	100	14.02	649.68	200	0.08	4.58
<i>Tabernaemontana coffeoides</i>	100	0.18	41.47	0		
<i>Terminalia catappa</i>	50	0.46	28.29	50	0.92	45.59
<i>Trema orientalis</i>	100	0.41	61.90	200	0.09	19.50
Status unknown						
<i>Morinda citrifolia</i>	50	5.14	285.87			

Malaise Trapping

Malaise trapping was carried out in plateau and hill woodland habitats, in both seasons. Main results are summarised in Table 8. As for the leaf counts, invertebrate

assemblages were greater in September than in February. Assemblages were larger in plateau locations than in hill plots.

The most abundant taxonomic groups were Diptera, Lepidoptera, Hymenoptera and Collembola. Other Invertebrate groups represented included arachnids (spiders and mites), Blattodea, Coleoptera, Dermaptera, Embioptera, Orthoptera, Hemiptera, Psocoptera and Thysanoptera.

Table 8. Malaise trap assemblages, Thérèse.

NI = number of Individuals.

	SE (September)		NW (February)	
	Hill	Plateau	Hill	Plateau
No. traps	1	2	2	2
Mean NI trap ⁻¹	1180.0	3534.5	112.0	635.5
Total NI Diptera	891	6156	98	510
Total NI Hymenoptera	87	196	42	92
Total NI Lepidoptera	107	389	53	489
Total NI Collembola	32	137	4	31
Total NI (others)	63	191	27	149

Observation

A number of invertebrates were identified from observation and/or collection (Table 9). Among the endemic species recorded was the snail *Stylodonta unidentata* (also on Conception).

Invertebrate collection took place in and around the aquatic habitats on the island in both September and February. The large brackish marsh on the plateau had few aquatic species. The vegetation was dominated by the mangrove fern *Acrostichum aureum* and a filamentous alga. Adults of two dragonfly species were observed around this marsh, as well as the crab *Cardisoma carnifex*. The most abundant invertebrate was the water snail *Melanoides tuberculata*. Other invertebrates collected (in September) include aquatic mites.

Pools in the fresh-water stream (which had no aquatic macrophytes) had abundant invertebrate life in February, including water skaters (Hemiptera; Gerridae), water beetles, chironomid larvae (Diptera; Chironomidae) and a freshwater crab (?*Sesarma impressum*).

Discussion: Invertebrates

Invertebrate assemblages in pitfall trap assemblages were relatively large but the plateau of Thérèse, the richest area for ground invertebrates, is small. Invertebrates on vegetation and in flight-intercept (Malaise) traps were more abundant in September than in February, contrary to expectations. The fact that both methods showed this decline suggests that it was a real effect, perhaps caused by local environmental conditions (especially weather conditions) in 1999/2000.

Although few endemic species were collected in the current survey, Thérèse probably supports a large endemic invertebrate fauna in addition to the introduced or cosmopolitan species found on most islands of the Seychelles. The island is close to Mahé, which has a large endemic fauna, and supports a range of endemic plants including native palms (which provide important microhabitats for endemic invertebrate species in leaf axils).

Table 9. Invertebrates observed, Therese Island.

Order	Family	Species	Notes
Mollusca	Acavidae	<i>Stylodonta unidentata</i> (Chemnitz, 1795)	Occasional shells in hill woodland
	Achatinidae	<i>Achatina fulica</i> (Bowditch, 1822)	Abundant
	Subulinidae	<i>Subulina octona</i> Bruguière, 1792	
	Thiaridae	<i>Melanoides tuberculata</i> (Müller, 1774)	In saline marsh
Arachnida:			
Araneae	Tetragnathidae	<i>Nephila inaurita</i> (Walckenaer, 1841)	
Crustacea:			
Decapoda	Coenobitidae	<i>Coenobita brevimanus</i> Dana, 1852	
	Gecarcinidae	<i>Cardisoma carnifex</i> (Herbst, 1784)	In saline marsh and mangrove
	Grapsidae	<i>Neosarmatium ?meinerti</i> (De Man, 1887)	In mangrove
		<i>Sesarma impressum</i> H. Milne Edwards, 1837	In freshwater stream
	Ocypodidae	<i>Ocypode ceratophthalmus</i> (Pallas, 1772)	On beach
Myriapoda:			
Chilopoda	Scolopendridae	<i>Scolopendra subspinipes</i> (Leach, 1918)	
Diplopoda	Trigoniulidae	<i>Spiromanes ?braueri</i> (Attems, 1900)	
Insecta:			
Coleoptera	Scarabaeidae	<i>Perissosoma aenescens</i> Waterhouse, 1875	
	Lampyridae	<i>Luciola laeta</i> Gerstaecker, 1871	Rare, in hill woodland
Hymenoptera	Anthophoridae	<i>Xylocopa caffra</i> (Linnaeus, 1767)	
	Apidae	<i>Apis mellifera adansoni</i> Latreille, 1804	
	Formicidae	<i>Anoplolepis gracilipes</i> (Smith, 1857)	In pitfall traps
		<i>Camponotus hova</i> Forel, 1891	In pitfall traps
		<i>?Camponotus thomasetti</i> Forel, 1912	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 ?alluaudi</i> Emery, 1894	In pitfall traps
		<i>?Plagiolepis exigua</i> Forel, 1894	In pitfall traps
		<i>Technomyrmex albipes</i> (Smith, 1861)	In pitfall traps
Vespidae	<i>Polistes olivaceus</i> (de Geer, 1773)		
Lepidoptera	Lycaenidae	<i>Leptotes pirthous</i> Linnaeus, 1767	
		<i>Zizeeria knysna</i> (Trimen, 1862)	
	Hesperiidae	<i>Borbo ?gemella</i> Mabille, 1884	
Odonata	Nymphalidae	<i>Melanitis leda africana</i> (Linnaeus, 1758)	
	Agrionidae	<i>Ceriagrion glabrum</i> (Burmeister, 1839)	
	Coenagrionidae	<i>Agriocnemis pygmaea</i> (Rambur, 1842)	
	Libellulidae	<i>Diplacodes trivialis</i> (Rambur, 1842)	
		<i>Orthetrum stemmale wrightii</i> (Selys, 1877)	
		<i>Pantala flavescens</i> (Fabricius, 1798)	
		<i>Tramea limbata</i> Selys, 1878	

VERTEBRATES

Reptiles and Amphibians

Reptiles and amphibians observed during the course of fieldwork were recorded and a list of species identified is given in Table 10. The list includes three lizards, one tortoise and one frog. At least two of these species are introduced on Thérèse, the Pacific house gecko and the Aldabra giant tortoise, the latter represented by a small group of individuals kept in a pen.

One species previously recorded from the island was not seen: the bronze-eyed gecko *Ailuronyx seychellensis* (Cheke, 1984). This species is cryptic and nocturnal and is only common on rat-free islands (Cheke, 1984); it may have been overlooked. None of the three snakes known from Seychelles (Nussbaum, 1984a) were recorded, although these are rarely seen and may occur on the island. Given the proximity of Thérèse to Mahé, it is possible that one of the Seychelles' endemic caecilians survives on the smaller island (the most likely species is *Hypogeophis rostratus*: Nussbaum, 1984b).

Table 10. Reptiles and amphibians, Thérèse Island.

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

Family	Species	Status
Amphibians		
Raniidae	<i>Ptychadaena mascareniensis</i> (Dumeril & Bibron, 1836)	Mascarene frog ?I
Reptiles		
Gekkonidae	<i>Gehyra mutilata</i> (Wiegmann, 1835)	Pacific house gecko I
	<i>Phelsuma</i> spp.	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

Birds

In total, 10 land birds and waders were recorded (Table 11). Three of these were Seychelles endemics but two of these endemic species (Seychelles blue pigeon and Seychelles sunbird) are currently widespread and common within the granitic islands. One (the Seychelles kestrel *Falco araea*) is endangered.

In addition to sight records, tape playback was used to give data on presence or absence of two species. In September 1999, calls of Seychelles scops owl *Otus insularis* were played and in February 2000, calls of the scops owl and barn owl *Tyto alba* were played. There were no positive responses.

There was no evidence of seabirds breeding on Thérèse island, although it is possible that some pairs of fairy tern *Gygis alba* nest there. However, in the September study period a number of seabird species were observed off the island, between Thérèse and Mahé. These birds included feeding flocks of fairy tern and noddies (*Anous* sp.), and occasional highflying frigatebirds (*Fregata* sp.). On some evenings, large numbers of shearwaters were observed flying over this stretch of water to the North: most of these

birds appeared to be wedge-tailed shearwaters (*Puffinus pacificus*) but Audubon's shearwater (*Puffinus lherminieri*) were also present. Seabirds were also observed (although less frequently) in February: one tern (probably common tern *Sterna hirundo*) was resident on the island. Fairy terns were occasionally seen and one white-tailed tropicbird (*Phaeton lepturus*) was seen flying over the island.

Table 11. Land birds and waders observed on Thérèse.
M = migrant; E = Seychelles endemic species.

Species		Notes
<i>Butorides striatus</i>	green-backed heron	August: at least two individuals in mangrove and neighbouring beach
<i>Falco araea</i> E	Seychelles kestrel	August: at least one pair, around tall <i>Paraserianthes</i> tree. February: one individual, flying over glacis
<i>Numenius phaeopus</i> M	whimbrel	August and February: one seen regularly on beach
<i>Arenaria interpres</i> M	ruddy turnstone	August and February: on beaches and glacis. Group of 8 individuals seen on glacis 10/9/99
<i>Streptopelia picturata picturata</i>	Madagascar turtle dove	Regularly seen on plateau around settlement.
<i>Geopelia striata</i>	barred ground dove	A few birds regularly seen on plateau.
<i>Alectroenas pulcherrima</i> E	Seychelles blue pigeon	Frequently seen in woodland and scrub habitats.
<i>Nectarinia dussumieri</i> E	Seychelles sunbird	Regularly seen in mangrove and woodland.
<i>Acridotheres tristis</i>	common mynah	Regularly seen on beach, around buildings, around glacis and in woodland/scrub.
<i>Foudia madagascariensis</i>	Madagascar fody	Commonly seen.

Mammals

Mammals observed in the course of fieldwork were recorded (Table 12). In addition, rodent trapping was carried out in September 1999, and February 2000 (Table 13). Two traplines were established, one in plateau woodland (grid ref. CK 2285 8375 – CK 2250 8390) and one in hill woodland/scrub (dominated by cinnamon *Cinnamomum verum* at lower altitudes with mixed scrub at higher altitudes) (grid ref. CK 2250 8390 – CK 2232 8400). Only one species of rodent, the ship rat *Rattus rattus*, was trapped.

Trapping rates were low in September, perhaps in part due to interference with traps by resident dogs. Rates were higher in September although in general rates were lower in the north west Monsoon and higher in the south east period when food and water stress were greater and rats more likely to be trapped. The island had the largest number of mammalian predators of any of those studied.

Table 12. Mammals, Thérèse Island.

Species	Status
<i>Canis familiaris</i> L.	4-6 individuals
<i>Felis catus</i> L.	several individuals observed, also tracks and scat on beaches and glacis
? <i>Mus domesticus</i> Rutt	observed once: possibly juvenile black rat
<i>Pteropus seychellensis</i> Milne Edwards	common in February; rarely seen in September
<i>Tenrec ecaudatus</i> Schreber	fresh bones collected
<i>Rattus rattus</i> L.	Abundant

Table 13. Results of rat trapping, Thérèse Island.

Dates	Trap-nights	No. of rats	Rats per 100 trap-nights (uncorrected)	Rats per 100 trap-nights (corrected)*
9 – 14/9/99	139	20	14.39	17.47
10 – 15/2/00	140	55	39.29	63.22
Total (SE)			35.34	
Total (NW)			25.56	

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

CONSERVATION RECOMMENDATIONS

Thérèse is a relatively small island which has conservation interest principally because of its proximity to the islands of Mahé and Conception. Its proximity to Mahé (and its hilly terrain) has allowed the development of a flora (and probably invertebrate fauna) rich in endemic species. Nearby Conception has a population of the Seychelles white-eye *Zosterops modestus*, an endangered endemic bird. The white-eye has never been recorded on Thérèse, probably due to the early introduction of ship rats which are a likely nest predator (on Conception only the Norway rat *Rattus norvegicus* is present).

The introduction of white-eyes to Thérèse would require the eradication of rats and cats, which are also present. The presence of introduced predators would appear to be the chief barrier to the survival of white-eyes on the island. White-eyes feed mainly on gleaned invertebrates although they also take small fruit. The species survives on an island dominated by introduced cinnamon (Conception) so it is not dependent upon native vegetation. The high leaf invertebrate counts on Thérèse suggest food supply would not be limiting for a translocated population although planting of *Morinda citrifolia* and other native shrubs would increase the available food supply. White-eyes are currently found on only two islands and translocation to establish new populations is an urgent priority.

Calophyllum inophyllum on Thérèse is threatened by the takamaka wilt disease *Leptographium calophylli*, which is probably spread by a native bark beetle (Wainhouse *et al.*, 1998). The disease has caused dieback and death of most coastal trees on the island, although some have shown signs of recovery. To prevent enhanced erosion of the coastal plateau, planting of other native coastal trees should be carried out at the beach crest. Most trees in hill forest showed no signs of the disease but on Mahé, trees at high altitudes also suffer from the disease (personal observation). Removal of dead and dying wood may reduce the rate of spread on Thérèse but is unlikely to eradicate the disease due to the ease of reinvasion from Mahé where the disease is very well established.

Appendix 1. Plant species recorded from Thérèse

Taxonomy of dicotyledons as given by Friedmann (1994). Of monocotyledons, as in Robertson (1989). Families arranged in alphabetical order. Species observe only in cultivation around the buildings are listed separately, below.

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 = Plateau grassland; PW = Plateau woodland; HW = Hill Woodland; HSc = Hill Scrub; Gl = Glacis; BC = Beach Crest; Ma = Marsh; Mg = Mangrove; Cu = Cultivated area; Cu* = species only recorded in cultivation.

	Species	Status	Abund.	Habitats
PTERIDOPHYTA				
Adiantaceae				
1	<i>Acrostichum aureum</i> L.	N	A	Ma
Davalliaceae				
2	<i>Davallia denticulata</i> (Burm.) Mett.	N	A	HW, PW, Gl
3	<i>Nephrolepis biserrata</i> (Sw.) Schott	N	A	HW, PW, Gl
Gleicheniaceae				
4	<i>Dicranopteris linearis</i> Burm.	?	A	HSc
Polypodiaceae				
5	<i>Phymatosorus scolopendria</i> (Burm. f.)	N	A	HW, PW
Psilotaceae				
6	<i>Psilotum nudum</i> Sw.	N	O	HW
Selaginellaceae				
7	<i>Selaginella</i> sp.	N	O	HW, PW
Vittariaceae				
8	? <i>Vittaria</i> sp.	N	O	Gl
ANGIOSPERMAE: Dicotyledons				
Acanthaceae				
9	<i>Asystasia</i> sp. B (<i>sensu</i> Friedmann)	?I	A	PG, HW
Amaranthaceae				
10	<i>Celosia argentea</i> L.	I	O	Cu*
Anacardiaceae				
11	<i>Anacardium occidentale</i> L.	I	A	HW
12	<i>Mangifera indica</i> L.	I	F	PW, HW
13	<i>Spondias cytherea</i> Sonn.	I	O	PG
Apocynaceae				
14	<i>Allamanda cathartica</i> L.	I	R	Cu*
15	<i>Alstonia macrophylla</i> Wall ex G. Don.	I	C	HW, Gl
16	<i>Catharanthus roseus</i> (L.) G. Don.	I	F	Gl, Cu
17	<i>Nerium oleander</i> L.	I	O	Cu*
18	<i>Plumeria rubra</i> L.	I	R	Cu*
19	<i>Tabernaemontana coffeoides</i> Boj. ex. A. DC.	N	A	HW
20	<i>Tabernaemontana divaricata</i> (L.) Roem. & Schult.	I	R	Cu*
Araliaceae				
21	<i>Polyscias</i> spp.	I	R	Cu*

Species	Status	Abund.	Habitats
Asclepiadaceae			
22 <i>Sarcostemma viminale</i> (L.) Alton	N	F	Gl, HW
Avicenniaceae			
23 <i>Avicennia marina</i> (Forssk.) Vierh.	N	F	Mg
Bignoniaceae			
24 <i>Tabebuia pallida</i> (Lindl.) Miers.	I	C	PW
Boraginaceae			
25 <i>Cordia subcordata</i> Lam.	N	F	BC
26 <i>Tournefortia argentea</i> L. f	N	O	BC
Caesalpinaceae			
27 <i>Caesalpinia pulcherima</i> (L.) Swartz	I	O	Cu*
28 <i>Intsia bijuga</i> (Colebr.) O. Kuntze	N	F	HW, HSc
29 <i>Senna alata</i> (L.) Roxb.	I	R	Cu*
30 <i>Tamarindus indica</i> L.	I	R	PG
Campanulaceae			
31 <i>Hippobroma longiflora</i> (L.) G. Don	I	F	PG
Caricaceae			
32 <i>Carica papaya</i> L.	I	F	Cu, PW
Casuarinaceae			
33 <i>Casuarina equisetifolia</i> J. R. & G. Foster	I	A	HW, Gl
Chrysobalanaceae			
34 <i>Chrysobalanus icaco</i> L.	I	A	HW, HSc, Gl
Combretaceae			
35 <i>Lumnitzera racemosa</i> Willd.	N	F	Mg
36 <i>Terminalia catappa</i> L.	?N	C	BC, PW
Compositae			
37 <i>Emilia sonchifolia</i> (L.) Wight	I	O	PG, Cu
38 <i>Vernonia cinerea</i> (L.) Less.	I	A	PG, Cu
Convulvulaceae			
39 <i>Ipomoea macrantha</i> Roem. & Schultes	N	F	PW
40 <i>Ipomoea obscura</i> (L.) Ker Gawl.	I	F	PG
41 <i>Ipomoea pes-caprae</i> (L.) R. Br.	N	A	BC, Gl
42 <i>Ipomoea venosa</i> (Desr.) Roem. & Schultes	N	F	Gl
Crassulaceae			
43 <i>Kalanchoe pinnata</i> (Lam.) Pers.	I	F	Gl
Ebenaceae			
44 <i>Diospyros seychellarum</i> (Hiern.) Kosterm.	E	C	HSc
Erythroxylaceae			
45 <i>Erythroxylum sechellarum</i> O. E. Schulz	E	F	HW, HSc, PW
Euphorbiaceae			
46 <i>Acalypha wilkesiana</i> Müll. Arg.	I	F	Cu*
47 <i>Codiaeum variegatum</i> L.	I	C	Cu*
48 <i>Euphorbia hirta</i> L.	I	C	Cu, PG
49 <i>Euphorbia hypericifolia</i> L.	I	R	Cu
50 <i>Euphorbia pyrifolia</i> Lam.	N	C	Gl
51 <i>Jatropha pandurifolia</i> L.	I	O	Cu*
52 <i>Phyllanthus acidus</i> (L.) Skeels	I	R	PG
53 <i>Phyllanthus pervilleanus</i> (Baillon) Müll. Arg.	N	F	PG, HW
54 <i>Phyllanthus urinaria</i> L.	I	O	Cu, PG
Flacourtiaceae			
55 <i>Flacourtia jangomas</i> (Lour.) Rauschel.	I	R	PG
Goodeniaceae			
56 <i>Scaevola sericea</i> Vahl.	N	C	BC

	Species	Status	Abund.	Habitats
	Guttiferae			
57	<i>Calophyllum inophyllum</i> L.	N	C	BC [PW, HW]
	Hernandiaceae			
58	<i>Hernandia nymphaeifolia</i> (Presl) Kubitzki	N	O	BC
	Labiatae			
59	<i>Plectranthus amboinicus</i> (Lour.) Spreng.	?I	O	GI
	Lauraceae			
60	<i>Cinnamomum verum</i> Presl.	I	A	PW, HW
61	<i>Persea americana</i> Mill.	I	R	PG
	Lecythidaceae			
62	<i>Barringtonia asiatica</i> (L.) Kurtz	N	O	BC
	Malvaceae			
63	<i>Hibiscus rosa-sinensis</i> L.	I	O	Cu*
64	<i>Hibiscus tiliaceus</i> L.	N	F	BC, PW
65	<i>Sida stipulata</i> Cav.	I	R	PG
66	<i>Thespesia populnea</i> (L.) Soland. ex Correa	N	F	BC/Mg
	Melastomataceae			
67	<i>Melastoma malabathricum</i> L.	?I	O	GI
68	<i>Memecylon elaeagni</i> Blume	E	A	HSc, HW
	Meliaceae			
69	<i>Xylocarpus moluccensis</i> (Lam.) Roem.	N	O	Mg
	Mimosaceae			
70	<i>Adenanthera pavonina</i> L.	I	C	HW
71	<i>Albizia lebbbeck</i> (L.) Benth.	I	R	HW
72	<i>Paraserianthes falcataria</i> (L.) Niels.	I	F	PW
	Moraceae			
73	<i>Ficus lutea</i> Vahl.	N	C	HW, PW
74	<i>Ficus reflexa</i> Thunb. ssp. <i>seychellensis</i> (Baker) Berg	E (ss)	F	HW
75	<i>Ficus rubra</i> Vahl.	N	O	GI
	Myrtaceae			
76	<i>Eucalyptus</i> sp. (? <i>E. camaldulensis</i> Dehn.)	I	R	HW
77	<i>Eugenia uniflora</i> L.	I	O	PG
78	<i>Psidium cattleianum</i> Sabine	I	F	Cu, PW, HW
79	<i>Psidium guajava</i> L.	I	O	Cu, PW
80	<i>Syzygium malaccense</i> (L.) Merr. & Perry	I	R	PG
81	<i>Syzygium wrightii</i> (Baker) A. J. Scott	E	F	HW, HSc
	Nyctaginaceae			
82	<i>Mirabilis jalapa</i> L.	I	R	Cu*
	Oxalidaceae			
83	<i>Averrhoa bilimbi</i> L.	I	F	Cu, HW
	Papilionaceae			
84	<i>Abrus precatorius</i> L.	?N	A	PG, PW, HW
85	<i>Alysicarpus vaginalis</i> (L.) DC.	I	O	PG
86	<i>Canavalia cathartica</i> Thouars.	N	C	BC, PG
87	<i>Desmodium incanum</i> DC.	I	A	BC, PG
88	<i>Desmodium triflorum</i> (L.) DC.	I	C	BC, PG
89	<i>Indigofera suffruticosa</i> Mill.	I	F	PG
90	<i>Pterocarpus indica</i> Willd.	I	O	HW, PW
91	<i>Sophora tomentosa</i> L.	N	F	BC
92	<i>Teramnus labialis</i> (L.) Spreng.	I	O	PW, HW
93	<i>Vigna marina</i> (Burm.) Merr.	N	O	BC
	Passifloraceae			
94	<i>Passiflora edulis</i> Sims	I	F	Cu, PW
95	<i>Passiflora foetida</i> L.	I	C	PW, HW

	Species	Status	Abund.	Habitats
96	<i>Passiflora suberosa</i> L.	I	A	PG, PW, HSc, HW
	Portulacaceae			
97	<i>Portulaca grandiflora</i> L.	I	C	Cu*
	Rhamnaceae			
98	<i>Colubrina asiatica</i> (L.) Brogn.	N	F	BC, PW
	Rubiaceae			
99	<i>Canthium bibractatum</i> (Baker) Hiem.	N	A	HW, HSc, PW
100	<i>Guettarda speciosa</i> L.	N	O	BC
101	<i>Mitracarpus hirtus</i> (L.) DC.	I	A	PG, HW
102	<i>Morinda citrifolia</i> L.	?I	C	PG, HW, GI
103	<i>Paragenipa wrightii</i> (Baker) F. Friedmann	E	A	HW, HSc, GI
104	<i>Pentodon pentandrus</i> (Schumach. & Thonn.) Vatke	I	O	Cu
	Rutaceae			
105	<i>Citrus</i> spp.	I	R	Cu, PG
106	<i>Murraya koenigii</i> (L.) Spreng.	I	R	Cu*
	Sapindaceae			
107	<i>Allophyllus sechellensis</i> Summerh.	E	F	PW, HW, HSc
108	<i>Dodonea viscosa</i> Jacq.	N	O	HSc
	Sapotaceae			
109	<i>Mimusops sechellarum</i> (Oliv.) Hemsl.	E	O	HW
	Scrophulariaceae			
110	<i>Russellia equisetiformis</i> Cham. & Schlect.	I	C	Cu*
111	<i>Striga asiatica</i> (L.) O. Kuntze	?I	F	PG
	Sterculiaceae			
112	<i>Heritiera littoralis</i> Ait.	N	R	PW
	Turneraceae			
113	<i>Turnera angustifolia</i> Miller	I	A	PG, HSc, HW
	Ulmaceae			
114	<i>Trema orientalis</i> (L.) Bl.	N	F	PW, HW
	Verbenaceae			
115	<i>Clerodendron speciosissimum</i> Morren	I	O	PW
116	<i>Lantana camara</i> L.	I	O	HSc,
117	<i>Premna serratifolia</i> L.	N	A	HW, HSc, PW
118	<i>Stachytarpheta jamaicensis</i> (L.) Vahl.	I	A	HW, PG
119	<i>Stachytarpheta urticifolia</i> (Salisb.) Sims.	I	F	PG
	ANGIOSPERMAE: Monotyledons			
	Agavaceae			
120	<i>Furcraea foetida</i> (L.) Haw.	I	F	GI
	Amaryllidaceae			
121	<i>Hymenocallis littoralis</i> (Jacq.) Salisb.	?I	F	BC
122	<i>Zephyranthes candida</i> Herb.	I	F	Cu*
	Araceae			
123	<i>Alocasia macrorrhiza</i> (L.) G. Don.	I	O	Cu*
124	<i>Anthurium</i> sp.	I	O	Cu*
125	<i>Caladium bicolor</i> (Dryand.) Vent.	I	O	Cu*
126	<i>Dieffenbachia sequine</i> (Jacq.) Schott	I	R	Cu*
	Bromeliaceae			
127	<i>Ananas comosus</i> (L.) Merr.	I	F	Cu, GI
	Commelinaceae			
128	<i>Tradescantia spathacea</i> Swartz	I	F	Cu*
	Cyperaceae			
129	<i>Cyperus</i> sp.	?	F	HW
130	<i>Cyperus</i> sp. 2	?	C	Mg

	Species	Status	Abund.	Habitats
131	<i>Fimbristylis cymosa</i> R. Br.	?	A	BC, PG, HW
132	<i>Fimbristylis ?dichotoma</i> (L.) Vahl.	?	F	PG
133	<i>Fimbristylis</i> sp. (glacis sedge)	?	C	GI
134	<i>Kyllinga alba</i> Nees	?	C	PG, PW
135	<i>Kyllinga polyphylla</i> Willd. ex Kunth	N	A	PG
136	<i>Lophoschoenus hornei</i> (C. B. Cl.) Stapf.	E	C	GI
137	<i>Mariscus dubius</i> (Rottb.) Fischer	N	A	BC, PG
138	? <i>Mariscus pennatus</i> (Lam.) Domin.	N	R	Mg
139	<i>Pycreus polystachyos</i> (Rottb.) P. Beauv.	?	C	Mg, GI
Gramineae				
140	<i>Bambusa vulgaris</i> Schrad. ex Wendl. var. <i>aureo-variegata</i>	I	R	PG
141	<i>Brachiara umbellata</i> (Trin.) W. D. Clayton	N	A	PG, PW, HW, HSc
142	<i>Cymbopogon</i> sp.	I	O	Cu*
143	<i>Dactyloctenium ctenoides</i> (Steud.) Bosser	?	F	BC
144	<i>Digitaria ?horizontalis</i> Willd.	?	C	BC, PG
145	<i>Digitaria ?radicosa</i> (Presl.) Miq.	?N	F	PG
146	<i>Eragrostis tenella</i> var. <i>insularis</i> Hubb.	?	F	GI
147	? <i>Ischaemum heterotrichum</i> Hack.	?	F	PG
148	<i>Oplismenus compositus</i> (L.) P. Beauv.	N	A	HW, PW
149	<i>Panicum brevifolium</i> L.	N	A	HW
150	<i>Panicum maximum</i> L.	?	C	PG, PW, HW
151	<i>Paspalum conjugatum</i> Berg.	N	C	PG
152	<i>Pennisetum polystachyon</i> (L.) Schult.	?	C	GI
153	<i>Rhynchelytrum repens</i> (Willd.) C. E. Hubb.	?	F	GI
154	<i>Sacciolepis curvata</i> (L.) Chase	?	C	HW
155	<i>Sporobolus diander</i> (Retz.) P. Beauv.	?	O	BC
156	<i>Sporobolus virginicus</i> (L.) Kunth.	N	F	BC
157	<i>Stenotaphrum dimidiatum</i> (L.) Brogn.	N	A	BC, PG, PW
Hypoxidaceae				
158	<i>Curculigo sechellensis</i> Boj.	E	O	GI
Liliaceae				
159	<i>Cordyline fruticosa</i> L. (A. Chev.)	I	O	Cu*
160	<i>Dianella ensifolia</i> (L.) DC.	N	A	HW
161	<i>Dracaena reflexa</i> Lam. var. <i>angustifolia</i> Baker	N	A	HW, GI
162	<i>Gloriosa superba</i> L.	I	O	Cu*
163	<i>Ophiopogon ?intermedius</i> D. Don	I	R	Cu*
164	<i>Pleomele</i> sp.	I	R	Cu*
Marantaceae				
165	<i>Maranta arundinacea</i> L.	I	O	Cu*
Musaceae				
166	<i>Heliconia psittacorum</i> L.	I	O	Cu*
167	<i>Musa</i> sp.	I	F	Cu, PG
Orchidaceae				
168	<i>Angraecum eburneum</i> Bory subsp. <i>brongniartianum</i> (Thours.) H. Perrier	E (ss)	R	PW
169	<i>Cynorkis ?fastigiata</i> Thouars	N	O	HSc, HW
170	<i>Disperis tripetaloides</i> (Thouars) Lindl.	N	R	HW
171	<i>Spathoglottis plicata</i> Blume	I	O	Cu*
172	<i>Vanilla phalaenopsis</i> Reichb. f.	E	O	GI
173	<i>Vanilla planifolia</i> Andrews	I	C	HW
Palmae				
174	<i>Cocos nucifera</i> L.	N	A	PG, BC, PW, HW
175	<i>Deckenia nobilis</i> Wendl.	E	C	HW

	Species	Status	Abund.	Habitats
176	<i>Latania ?lontaroides</i> Gaertn.	I	R	PG
177	<i>Nephrosperma vanhoutteanum</i> (Wendl. ex van Houtt.) Balf.	E	C	HW, GI
178	<i>Phoenicophorium borsigianum</i> (K. Koch) Stuntz	E	C	HW
179	<i>Raphia farinifera</i> (Gaertn.) Hylander	I	R	HSc
Pandaceae				
180	<i>Pandanus balfourii</i> Mart.	E	C	GI, HW
181	<i>Pandanus multispicatus</i> Balf. f.	E	O	GI
Taccaceae				
182	<i>Tacca leontopetaloides</i> (L.) O. Kuntze	I	C	PG
Zingiberaceae				
183	<i>Alpinia purpurata</i> (Vieill.) Schumann	I	R	Cu*