

Figure 1. Conception: physical map, with locations of vegetation plots.

CONCEPTION

BY

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GEOLOGY, TOPOGRAPHY AND CLIMATE

Conception is a small granitic island with an area of approximately 60 ha, situated only 1,600 m from the east coast of Mahé, the largest of the granitic Seychelles islands. At its highest point it reaches 130 m above sea level (Fig. 1). The island is dominated by rocky, sloping ground. A single raised ridge, flat-topped at its northwestern end dominates the island. In the south east, a small lower hill (reaching only 20 m above sea level) is separated from the rest of the island by a low boulder-filled fault. There is no coastal flat land and no sandy beach. Most of the land is sloping ground between 10 and 100 m above sea level (Table 1). Geologically, the island is similar to the nearby west coast of Mahé, dominated by porphyritic granite (Braithwaite, 1984). The soils of Conception are mainly red earths, strongly eroded on steeper slopes. On the open glacial areas, soils are restricted to pockets between rocks

Standing water on the island is very limited. For much of the year a trickle of fresh water runs down rocks into the sea at the landing place (CK 1940 8432). At the height of the rainy season, ephemeral streams carry rainwater to the sea, although these were not observed during the assessment surveys of the island. A few small pools are less short-lived; in February, a shallow (1-2 cm deep) pool with an open surface of less than 2 m² was present in woodland on the eastern side of the island, and several deeper pools were observed in hollows on open rock at the top of the island (at CK 1870 8462); although exposed, some of these contained larvae of aquatic insects.

No weather data exist for Conception but the climate of the island probably follows a similar pattern to that of nearby Mahé. Port Glaud, on the west coast of Mahé opposite Conception, 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.

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

Altitude range (m. asl.)	Area (ha)	Percentage total area
100 - 150	8.2	13.7
50 - 100	21.3	35.3
10 - 50	17.7	29.3
0 - 10	13.1	21.7

HISTORY

Few early records exist for the island. Following the establishment of the first French settlement in Seychelles in 1770, the proximity of Conception to the main island of Mahé probably encouraged exploitation of the island even though landing was difficult all year round.

While Conception had at the time little interest for agriculture, it possessed other resources, including giant tortoises, which were among the principal resources of the islands. Exploitation was such that by 1787, Malavois wrote of Conception “there were formerly on this island large quantities of tortoises, which were there without having been brought there. Now there is only a small number left and these are generally small” (in Fauvel, 1909).

Despite the lack of freshwater, the island was settled, and there are now ruins of several small buildings. Coconut plantations were probably started in the nineteenth or early twentieth century, when a range of other species including cinnamon *Cinnamomum verum* and fatak grass *Panicum maximum* was introduced. Plantations throughout the Seychelles were abandoned in the late twentieth century.

Today the island (although still privately owned) has no permanent human population, and plantations are unexploited. The only visitors are staff of the Seychelles Ministry of Environment and Transport and occasional fishermen.

FLORA AND VEGETATION

Flora

A total of 92 plant species was recorded on Conception, including eight ferns and 84 angiosperms (Appendix 1). Of the angiosperms, 37 (44.0%) species are regarded as introduced (Friedmann, 1994) and 35 (41.7%) native. Of the native taxa (species and subspecies), nine are endemic to the Seychelles (10.7% of the total flora).

The proportion of the flora made up of introduced species was lower than that for the Seychelles as a whole, and the proportion of Seychelles endemics higher; of the total Seychelles flora, around 54% are introduced and 9% endemic (Procter, 1984). Compared to the flora of other small islands, Conception 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 rocky slopes of the island and

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 two species for Conception: *Premna serratifolia* (as *P. obtusifolia* R. Br.), and coconut *Cocos nucifera*. Both were recorded in the current survey.

Of the introduced plants established on Conception, 13 were invasive weedy species. Several of the woody weeds known to be particularly invasive on the smaller islands of Seychelles were present, including cocoplum *Chrysobalanus icaco* and cinnamon *Cinnamomum verum* (both abundant). Other potentially invasive introduced trees included *Alstonia macrophylla*, *Syzygium jambos* (well established on rocky areas on top of the island), *Psidium cattleianum*, and cashew *Anacardium occidentale*. Coconuts were common, especially on the south east and south west slopes of the island.

Vegetation

The extents of major vegetation types on Conception are shown in Table 2 and Figure 2. Most of Conception is dominated by mixed forest (exotic and native species), with some open glacis and scrub, and areas of coconut monoculture.

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

Altitude	Vegetation type	Appox. area (ha)
>10 m asl	Woodland (predominantly introduced)	32
	Coconut with regeneration	6
	Scrub (native)	4
	Bare rock	5
< 10 m asl	Woodland (predominantly introduced)	1
	Coconut with regeneration	1
	Bare rock	11

Thirty vegetation plots were studied in hill woodland/scrub with a combined area of 3,000 m² (approximately 0.8% of the total area of this vegetation type). A summary of results is shown in Table 3. On average, plots had a relatively high density of trees with a fairly complete canopy (mean canopy cover = 64%). The tree layer had low species richness (only nine species were recorded) and was dominated by an introduced species, *Cinnamomum verum* (see Table 4).

The shrub layer was more species-rich than the tree layer with 13 species represented, eight of them native. The most widespread species, and the species showing the greatest dominance of the plots where it occurred, was the endemic palm *Phoenicophorium borsigianum* (see Table 5). *Cinnamomum verum* was widespread in the shrub layer, occurring in 73% of plots. *Cocos nucifera* occurred in fewer than half of the plots, but in these plots it occupied 14% of the shrub layer.

The herb layer included tree seedlings and herbaceous species. Twenty-five species were present, 15 of which were native. The most widespread species were *Nephrolepis* sp. and *Cinnamomum verum* (see Table 6). Species forming the largest proportion of the ground cover were the ferns *Phymatosorus scolopendria* and *Nephrolepis* sp.

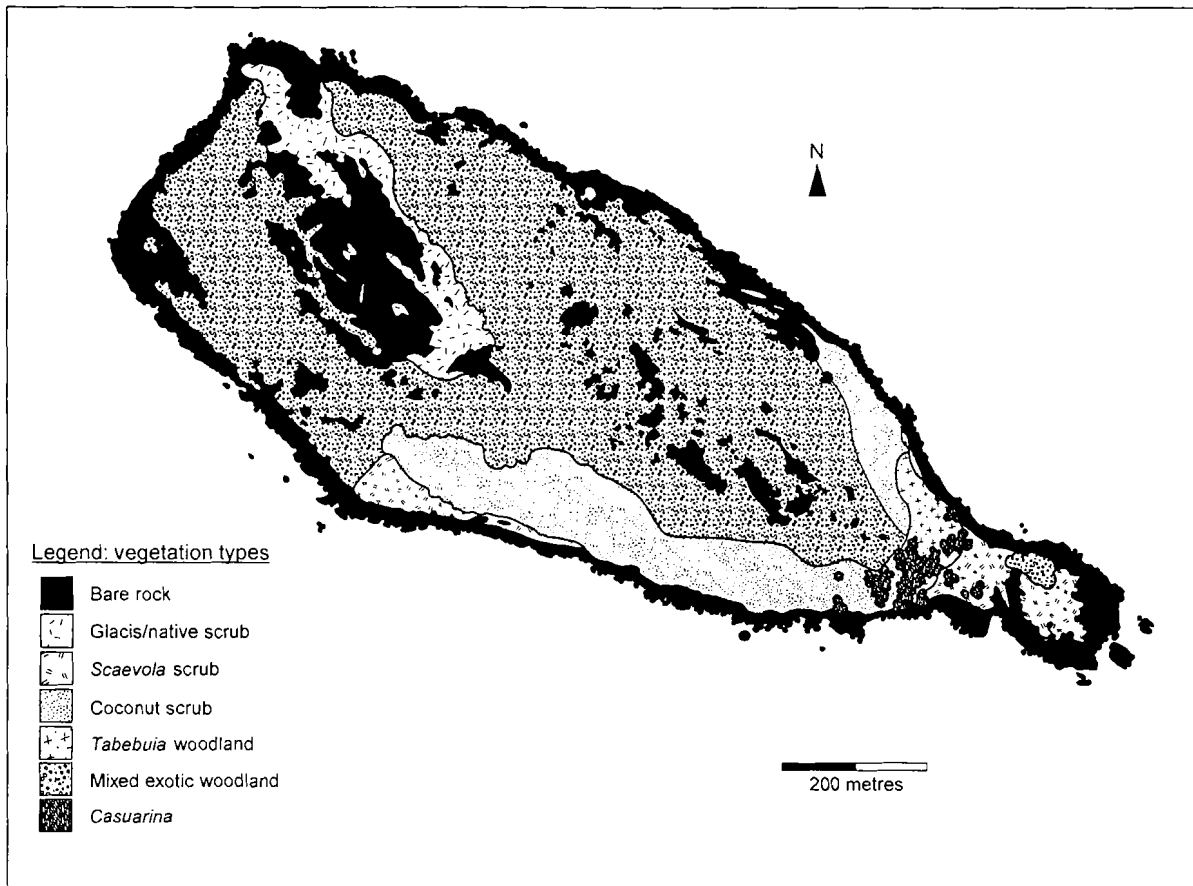


Figure 2. Conception vegetation

Table 3. Conception vegetation plot summary.

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)
30	56	667	37.3	37.9	27.9	33.8	1.8

Table 4. Conception Island: plants in tree layer (>5 m).

	No. individuals	% individuals
Introduced species		
<i>Adenanthera pavonina</i>	19	9.5
<i>Anacardium occidentale</i>	13	6.5
<i>Cinnamomum verum</i>	116	58.0
Native species		
<i>Calophyllum inophyllum</i>	15	7.5
<i>Canthium bibracteatum</i>	12	6.0
<i>Cocos nucifera</i>	15	7.5
<i>Intsia bijuga</i>	1	0.5
<i>Premna serratifolia</i>	7	3.5
<i>Tabernaemontana coffeoides</i>	2	1.0
Total	200	

Table 5. Conception Island: species of shrub layer.
Percentage shrub cover is the mean cover by the species for those
Plots in which the species occurs.

	No plots	% shrub cover
Introduced species		
<i>Adenanthera pavonina</i>	3	2.2
<i>Anacardium occidentale</i>	7	6.3
<i>Cinnamomum verum</i>	22	9.9
<i>Strychnos spinosa</i>	1	1.0
Native species		
<i>Calophyllum inophyllum</i>	10	3.4
<i>Canthium bibracteatum</i>	14	7.0
<i>Cocos nucifera</i>	12	14.0
<i>Dracaena reflexa</i>	7	2.4
<i>Ficus lutea</i>	4	1.0
<i>Ficus reflexa</i>	1	8.0
<i>Phoenicophorium borsigianum</i>	24	20.6
<i>Premna serratifolia</i>	9	3.2
<i>Tabernaemontana coffeoides</i>	2	3.0
Total no. of plots	30	

Table 6. Conception Island: species of herb layer.
Only species occurring in three or more plots shown. Percentage herb cover is the mean cover by the species, for those plots in which the species occurs.

	No plots	% herb cover
Introduced species		
<i>Adenantha pavonina</i>	14	1
<i>Asystasia</i> sp. B	11	2
<i>Cinnamomum verum</i>	28	5
<i>Panicum maximum</i>	3	2
<i>Vanilla planifolia</i>	7	2
Native species		
<i>Calophyllum inophyllum</i>	7	< 1
<i>Canthium bibracteatum</i>	11	< 1
<i>Cocos nucifera</i>	3	7
<i>Davallia denticulata</i>	8	6
<i>Dracaena reflexa</i>	6	< 1
<i>Ipomoea venosa</i>	3	2
<i>Nephrolepis</i> sp.	28	13
<i>Phoenicophorium borsigianum</i>	20	3
<i>Phymatosorus scolopendria</i>	23	19
<i>Sarcostemma viminale</i>	4	3
Total no. of plots	30	

The vegetation of Conception is dominated by low, species-poor secondary forest primarily made up of cinnamon with a shrub layer rich in *Phoenicophorium borsigianum*. Although an introduced species, cinnamon maintains a forest canopy on steep, rocky slopes and provides some shelter for endemic palms. It has probably replaced native trees such as the rare endemic *Mimusops sechellarum* and the native takamaka *Calophyllum inophyllum*, lost through timber extraction or fire. These species apparently dominated the vegetation of small islands which survived without complete clearance until the twentieth century (Vesey-Fitzgerald, 1940). The *Cinnamomum-Phoenicophorium* vegetation type found on Conception is similar to that of parts of Mahé, although perhaps more species-poor.

Other vegetation types are restricted in extent. There are currently no cultivated areas although some ornamentals, fruit trees and weeds of cultivation survive from previous settlement. There are no true plateau, marshland, or sandy beaches, although areas of "beach crest" vegetation (characterised by salt-tolerant plants such as *Scaevola*) can be identified in splash zones. Some of the habitat types listed (e.g., hill grassland) are very restricted in extent.

Like Mahé and nearby Thérèse, the flora includes a number of endemic species; on Conception, many of the endemic species are found on open glacia at the top of the island. Some of the endemics abundant on Thérèse (such as *Memecylon elaeagni* and palmiste *Deckenia nobilis*) appear to be absent or rare on Conception.

Two of the more notable plant records were *Pisonia grandis* and *Lagrezia* cf. *madagascariensis*. *Pisonia grandis* is a widespread tree particularly associated with seabird islands. In the granitic Seychelles, it is only abundant on the predator-free islands that have retained breeding populations of seabirds, particularly Cousin, Cousine and Aride; it is also present on Frégate. On Conception, two small but healthy young trees were found in a grassy area close to the old buildings beneath tall casuarinas. *Pisonia* appears to have arrived on Conception as seed carried by seabirds; during the February survey, large numbers of lesser noddies were recorded roosting in casuarinas here. Because the site is open, it is possible that *Pisonia* will become established on Conception and, if rats were eradicated, this might encourage seabird nesting. *Lagrezia* is a small, rather succulent herb found growing in cracks among rocks in the splash zone, on the south east shore of the island. The specimen collected has short, dense inflorescences (3-4 cm long) closely resembling a specimen of *L. madagascariensis* from Roche Canon, Cousin, in the Seychelles National Herbarium. The Roche Canon specimen was originally assigned to *L. oligomeroides* (a species found on Aldabra, Assumption and Cosmoledo, as well as Agalega) by Fosberg (1970). *L. madagascariensis* has an extremely disjunct distribution being found in Eastern Madagascar, Poivre (Amirantes) and Cousin Islands (Friedmann, 1994). The record for Conception is only the second from the granitic Seychelles and Carlström (1996a) lists the plant as “critically endangered” in Seychelles, on the basis of its single known population in the granitic islands. Since it is an inconspicuous plant restricted to rocky areas of the splash zone, the Conception population may be long-established.

INVERTEBRATES

Pitfall Trapping

The total sizes of pitfall assemblages (numbers of invertebrates caught) are shown in Table 7. Only invertebrates over 2 mm body length are included (excluding minute invertebrates such as Collembola). Invertebrate assemblages were higher during the north west monsoon than in the dry south east season.

Pitfall assemblages were dominated by ants (Hymenoptera: Formicidae), which made up 73.3% of all invertebrates captured. The earwigs (Dermaptera) made up 19.2% of the invertebrates caught. Other taxonomic groups present included snails (mollusca: 1.9% of individuals), spiders (Araneae: 1.1% of individuals), Orthoptera, Lepidoptera and Blattodea (each 0.9%). The following groups each made up less than 0.4% of the assemblage: Coleoptera, Diptera, Hemiptera, insect larvae, Myriapoda, Nematoda, Psocoptera and wasps (Hymenoptera).

The most abundant invertebrate species was the ant *Odontomachus troglodytes*, which formed 42.8% of individuals overall. The ant *Technomyrmex albipes* was the second most abundant species, forming 21.7% of individuals. An unidentified earwig species made up 12.2% of total invertebrates and was the third most abundant taxon.

Table 7. Pitfall assemblages from Conception. Only invertebrates of body length >2 mm included (number in parentheses = number of invertebrates excluding ants).

	Mean no. individuals per 5 traps	
	SE season	NW season
Conception Hill woodland	34.4 (9.1)	50.3 (13.5)
Mean for all granitic islands	61.8 (9.4)	61.1 (16.0)

Leaf-insect Counts

Leaf-insect counts were carried out for seven tree and shrub species, five of these in both seasons (Table 8). The highest density of invertebrates (in terms both of individuals per leaf, and per square metre of leaf) was on the native tree *Premna serratifolia*. However, the introduced *Cinnamomum verum* had high leaf counts in both seasons, and density of invertebrates observed on *Cinnamomum* leaves exceeded that of most native species in both seasons.

Three of the five species which were 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 during the wetter north west monsoon, and may reflect weather conditions specific to Conception for the 1999/2000 season.

Table 8. Density of invertebrates on foliage, Conception.
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>Anacardium occidentale</i>	310	0.606	99.77	350	0.223	39.34
<i>Cinnamomum verum</i>	1100	0.854	131.55	1300	0.978	155.34
Native species						
<i>Calophyllum inophyllum</i>	220	1.204	131.19	450	1.009	108.06
<i>Canthium bibracteatum</i>	800	0.134	62.41	550	0.098	49.94
<i>Ficus lutea</i>	0			50	0.720	43.00
<i>Premna serratifolia</i>	260	1.600	163.12	250	2.548	349.42
<i>Tabernaemontana coffeoides</i>	100	0.250	32.50	0		

Malaise Trapping

Malaise trapping was carried out in plateau and hill woodland habitats, during both seasons. Main results are summarised in Table 9. The number of individuals trapped was similar in both seasons (slightly larger in September).

The most abundant taxonomic groups were Diptera, Lepidoptera and Hymenoptera. Other invertebrate groups represented included arachnids (spiders), Coleoptera, Collembola, Hemiptera, Orthoptera and Psocoptera. The majority of taxa collected have yet to be identified to species level.

Table 9. Malaise trap assemblages, Conception.
NI = number of individuals.

	SE (Sept.)		NW (Feb.)	
	NI	%	NI	%
No. traps	2		4	
Mean NI trap ⁻¹	264.0		236.5	
Diptera	205	38.8	558	59.0
Lepidoptera	185	35.0	221	23.4
Hymenoptera	57	10.8	78	8.2
Coleoptera	43	8.1	23	2.4
Others	38	7.3	66	7.0

Observation

A list of species observed or collected is given in Table 10. In both September and February, dragonfly species were observed flying over open glacia on the top of the island. Pools here must be present for much of the year although probably not permanent. In February, mosquito larvae were abundant in these small pools so it is possible that dragonflies breed on the island.

The introduced crazy ant *Anoplolepis gracilipes* was not trapped in pitfall traps, but small numbers of ants were observed in the vicinity of the old settlement. This species is widespread on Mahé, where it is regarded as a nuisance (Haines *et al.*, 1994), and on Bird Island it has had negative effects on the island's ecosystems and conservation status (Feare, 1999a; Hill, in prep.). On Conception, it appears very restricted in distribution, suggesting that the species was recently introduced.

Table 10. Invertebrates observed and collected, Conception Island.

Order	Family	Species	Notes		
Mollusca	Acavidae	<i>Stylodonta unidentata</i> (Chemnitz, 1795)	Endemic snail		
	Achatinidae	<i>Achatina fulica</i> (Bowditch, 1822)	African land snail		
	Helicinidae	<i>Helicina theobaldiana</i> Nevill, 1871	Endemic snail		
	Subulinidae	<i>Subulina octona</i> Bruguière, 1792			
Arachnida:					
Araneae	Tetragnathidae	<i>Nephila inaurita</i> (Walckenaer, 1841)			
Crustacea:					
Decapoda	Coenobitidae	<i>Coenobita brevimanus</i> Dana, 1852	Land hermit crab		
	Grapsidae	<i>Geograpsus crinipes</i> (Dana, 1851)	Land crab		
Myriapoda:					
Chilopoda	Scolopendridae	<i>Scolopendra subspinipes</i> (Leach, 1918)			
Diplopoda	Trigoniulidae	<i>Spiromanes ?braueri</i> (Attems, 1900)			
Insecta:					
Coleoptera	Scarabaeidae	<i>Oryctes monoceros</i> (Olivier, 1789)			
		<i>Perissosoma aenescens</i> Waterhouse, 1875			
Hymenoptera	Anthophoridae	<i>Xylocopa caffra</i> (Linnaeus, 1767)			
		<i>Apis mellifera adansonii</i> Latreille, 1804			
		<i>Anoplolepis gracilipes</i> (Smith, 1857)			
		<i>Cardiocondyla emeryi</i> Forel, 1881	In pitfall traps		
		<i>?Camponotus thomasetti</i> Forel, 1912	In pitfall traps		
		<i>Odontomachus troglodytes</i> Santschi, 1914	In pitfall traps		
		<i>Pachycondyla melanaria</i> (Emery, 1894)	In pitfall traps		
		<i>Plagiolepis ?alluaudi</i> Emery, 1894	In pitfall traps		
Lepidoptera	Vespidae	<i>Plagiolepis ?exigua</i> Forel, 1894	In pitfall traps		
		<i>?Solenopsis seychellarum</i> Forel, 1912	In pitfall traps		
		<i>Tapinoma melanocephala</i> (Fabricius, 1793)	In pitfall traps		
		<i>Technomyrmex albipes</i> (Smith, 1861)	In pitfall traps		
		<i>Polistes olivaceus</i> (de Geer, 1773)			
		<i>Borbo</i> sp.			
		Odonata	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					
Phasmatodea	Phasmatidae	<i>Carausius sechellensis</i> (Bolivar, 1895)	On <i>Agave</i>		

Discussion: Invertebrates

Pitfall assemblages were slightly smaller than the mean size of assemblages on the granitic islands (Table 7). In general, plateau sites on granitic islands showed higher invertebrate catches in pitfall traps than hill sites. Conception had no plateau and little land under 10 m asl.

Leaf counts suggest that the cinnamon forest has high insect productivity: insect counts on cinnamon leaves are high, although the species is not native. This is the dominant tree species of the island. Although most of the invertebrates counted are ants, and bugs attended by ants (especially mealy bugs), the supply of invertebrates for

insectivores with a wide tolerance of small food items is good. Seychelles white-eye, for example are known to take mealy bugs (Feare, 1975).

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, Conception 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).

VERTEBRATES

Reptiles

Reptiles observed during the course of fieldwork were recorded, and a list of species identified is given in Table 11. The list includes four lizards, all endemic to the granitic Seychelles. One of the endemic giant tortoises of the granitic islands was recorded in the late eighteenth century (Bour, 1984).

Table 11. Reptiles observed on Conception.

Family	Species	Notes
Gekkonidae	<i>Ailuronyx seychellensis</i> (Dumeril & Bibron, 1836)	Observed 26/9/99 and 22/2/00
	<i>Phelsuma</i> spp.	Two morphotypes observed
Scincidae	<i>Mabuia sechellensis</i> (Dumeril & Bibron, 1836)	
	<i>Janetaescincus braueri</i> or <i>Pamelaescincus gardineri</i>	Burrowing skink

Birds

In total, nine land birds and waders were recorded during the course of fieldwork (Table 12). Three of these were Seychelles endemics, two of which (Seychelles kestrel *Falco araea* and Seychelles white-eye *Zosterops modestus*) are globally threatened. The Seychelles white-eye is only known on two islands, Mahé and Conception; the Conception population was discovered in 1997 (Rocamora, 1997). The population on Conception is at least 250 birds, the Mahé population only about 50 (Rocamora and Francois, 1999).

Four seabird species were observed (Table 13) and at least one of these (the fairy tern) probably nests on the island.

Table 12. Land birds and waders observed on Conception.

M = migrant species; E = Seychelles endemic species.

Species		Notes
<i>Falco araea</i> E	Seychelles kestrel	Two individuals observed around hill glacia, 26/9/99. One individual over hill glacia, 23/2/00
<i>Arenaria interpres</i> M	ruddy turnstone	One individual observed flying close to island (over sea), 27/2/00
<i>Streptopelia picturata</i>	Madagascar turtle dove	Observed every day in hill woodland and (occasionally) more open habitats
<i>Geopelia striata</i>	barred ground dove	A few individuals observed in hill grassland, February 2000
<i>Alectroenas pulcherrima</i> E	Seychelles blue pigeon	Observed every day
<i>Tyto alba</i>	?barn owl	Plucked feathers of Fairy Tern observed in coconut woodland, February
<i>Zosterops modestus</i> E	Seychelles white-eye	At least 200 resident birds (G. Rocamora, <i>pers. comm.</i>). Young birds observed in February
<i>Acridotheres tristis</i>	common mynah	Observed every day, especially in coastal habitats
<i>Foudia madagascariensis</i>	Madagascar fody	Regularly seen in small numbers in hill grassland, open scrub and coconut forest near camp

Table 13. Seabirds observed on Conception.

Species		Notes
<i>Phaeton lepturus</i>	white-tailed tropicbird	Observed flying in amongst trees in hill woodland on the eastern side of the island (close to point E10) on 26/9/99. Occasionally observed flying close to island in February
<i>Fregata ariel</i>	lesser frigatebird	Two individuals displaying in flight over glacia, 22/2/00
<i>Anous tenuirostris</i>	lesser noddy	Roosting in large numbers (hundreds of individuals) in large Casuarina trees, February
<i>Gygis alba</i>	fairy tern	Regularly observed in small numbers

Mammals

Only two species of mammals were recorded in the course of fieldwork: one bat and one rat. The endemic Seychelles fruit bat *Pteropus seychellensis* Milne Edwards 1887 was regularly observed and heard both in September and February, particularly in *Casuarina* trees around the old settlement area. Rodent trapping was carried out in September 1999, and February 2000 (Table 14). Two traplines were established, both in hill woodland with coconut and cinnamon. Only one species of rodent, *Rattus norvegicus* L., was trapped.

Table 14. Results of rat trapping, Conception.

Dates	Trap-nights	No. of rats	Rats per 100 trap-nights (uncorrected)	Rats per 100 trap-nights (corrected)*
22 – 29/9/99	140	82	58.57	88.65
23 – 28/2/00	112	49	43.75	59.76
Total (SE)			35.34	
Total (NW)			25.56	

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

Trapping rates were high for both trapping periods, although higher in September during the dry season when food and water stress were greater and rats more likely to be trapped. The generally high trapping rates could be due to the more terrestrial nature of Norway rats compared to ship rats (found on most other islands surveyed) which feed in trees and palms to a greater extent.

Biometric data show that the Norway rats on Conception are relatively small compared to continental populations (and possibly populations on Mahé), although larger and heavier than the ship rat *R. rattus* (which is more widespread in Seychelles). Almost all individuals showed a tail length less than the head plus body measurement, a trait which distinguishes them from ship rats.

The only natural enemy of rats on Conception is probably the barn owl. These owls were introduced to Seychelles in order to control rats (Penny, 1974) but seem to have little impact on rodent populations.

The impact of rats on other vertebrates and invertebrates is difficult to gauge, although probably severe. In both seasons, many young plants of the endemic thief palm (*Phoenicophorium borsigianum*) showed rat damage; the animals had gnawed palm petioles, causing collapse of the leaf-stem or complete loss of a leaf. This damage was seen even on palms with trunks over two metres in height.

CONSERVATION RECOMMENDATIONS

Conception is a relatively small island which has conservation interest principally because of the presence there of a population of the Seychelles white-eye *Zosterops modestus*, an endangered endemic bird. Natural populations of this species only occur on two islands, Mahé (where it is very rare) and Conception (Rocamora and Francois, 1999, 2000). Predation by mynahs, bulbuls (on Mahé) and rats may affect the breeding success of the species and rat eradication on Conception would probably be advantageous to the white-eyes, as well as other endemic elements of the flora and fauna. While eradication of rats would also reduce populations of ground-feeding birds such as doves, white-eyes would be at little risk.

Translocations of white-eyes to other islands have been proposed, and in 2001 birds were moved to Frégate (Rocamora *et al.*, in press). Because Conception remains the stronghold of the species, translocations of other endangered species to Conception should not be attempted.

The flora of Conception is of interest because of the prominence of endemic species. Probably as a result of the island's proximity to the largest island of the archipelago, Mahé, which has 65 of the granitic Seychelles endemic plant species, and the limits to human exploitation imposed by the difficulty of landing, lack of fresh water and its rocky slopes, nine endemic species occur on the island. Some of these species occur in large numbers, including the endemic palm *Phoenicophorium borsigianum* which is restricted to larger islands and their satellites. Many endemic invertebrates are found in association with endemic or native plants; Scott (1933) found a close association between endemic invertebrates and endemic vegetation, particularly native palms and *Pandanus* species. Conception is therefore likely to harbour a number of endemic invertebrates in addition to its plant species.

As with the nearby island of Thérèse, the island resembles lowland habitats of Mahé and thus presents the opportunity to conserve habitats and species present on the larger island, in more controlled (potentially predator-free) conditions. However, since the cinnamon forest of Conception appears vital for the survival of the white-eye, habitat management such as removal of exotics could not be carried out on a large scale. Some exotics (eg. *Anacardium*) and *Cocos* might be controlled in limited areas to encourage the growth of native shrubs such as *Premna*.

Appendix 1. Plant species recorded from Conception (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: HG = Hill grassland; HW = Hill Woodland/scrub; Co = Hill Coconut woodland; Gl = Glacis; BC = 'Beach Crest'.

Species	Status	Abund.	Habitats
PTERIDOPHYTA			
Adiantaceae			
1 <i>Acrostichum aureum</i> L.	N	F	BC, Co
Davalliaceae			
2 <i>Davallia denticulata</i> (Burm.) Mett.	N	A	HW, Gl
3 <i>Nephrolepis biserrata</i> (Sw.) Schott	N	A	HW, Gl
4 <i>Pellaea ?doniana</i> Hooker	N	O	HW
Lycopodiaceae			
5 <i>Lycopodium cernuum</i> L.	?N	O	HW
Polypodiaceae			
6 <i>Phymatosorus scolopendria</i> (Burm. f.)	N	A	HW
Psilotaceae			
7 <i>Psilotum</i> sp.	N	C	HW
Vittariaceae			
8 <i>Vittaria</i> sp.	N	O	Gl
ANGIOSPERMAE: Dicotyledons			
Acanthaceae			
9 <i>Asystasia</i> sp B. (<i>sensu</i> Friedmann)	?I	A	HW, Gl
Amaranthaceae			
10 <i>Lagrezia madagascariensis</i> (Poir.) Moq.	N	O	BC
Anacardiaceae			
11 <i>Anacardium occidentale</i> L.	I	A	HW
Annonaceae			
12 <i>Annona cherimola</i> Mill.	I	F	HG, HW
Apocynaceae			
13 <i>Alstonia macrophylla</i> Wall ex G. Don.	I	O	HW
14 <i>Catharanthus roseus</i> (L.) G. Don.	I	O	HW, Gl
15 <i>Plumeria rubra</i> L.	I	R	HW
16 <i>Tabernaemontana coffeoides</i> Boj. ex A. DC.	N	A	HW
Araliaceae			
17 <i>Gastonia</i> sp.	E	R	Gl
Asclepiadaceae			
18 <i>Sarcostemma viminale</i> (L.) Alton	N	F	Gl, HW
Bignoniaceae			
19 <i>Tabebuia pallida</i> (Lindl.) Miers.	I	C	HW
Cactaceae			
20 <i>Rhipsalis baccifera</i> (J. Mill.) Stearn	N	O	Gl
Caesalpiniaceae			
21 <i>Intsia bijuga</i> (Coleb.) O. Kuntze	N	O	HW
22 <i>Senna occidentalis</i> (L.) Link	I	F	HG, Gl

	Species	Status	Abund.	Habitats
Casuarinaceae				
23	<i>Casuarina equisetifolia</i> J. R. & G. Foster	I	F	HW
Chrysobalanaceae				
24	<i>Chrysobalanus icaco</i> L.	I	F	HW
Combretaceae				
25	<i>Terminalia catappa</i> L.	?N	R	HW
Compositae				
26	<i>Emilia sonchifolia</i> (L.) Wight	I	O	GI
27	<i>Vernonia cinerea</i> (L.) Less.	I	O	HW
Convolvulaceae				
28	<i>Ipomoea obscura</i> (L.) Ker Gawl.	I	F	HW
29	<i>Ipomoea pes-caprae</i> (L.) R. Br.	N	A	BC, GI
30	<i>Ipomoea venosa</i> (Desr.) Roem. & Schult.	N	C	HW, Co
Euphorbiaceae				
31	<i>Euphorbia pyrifolia</i> Lam.	N	F	GI
32	<i>Phyllanthus amarus</i> Schumach. et Thonn.	I	O	HG
Goodeniaceae				
33	<i>Scaevola sericea</i> Vahl.	N	A	BC
Guttiferae				
34	<i>Calophyllum inophyllum</i> L.	N	C	HW
Labiatae				
35	<i>Plectranthus amboinicus</i> (Lour.) Spreng.	?I	C	GI
Lauraceae				
36	<i>Cinnamomum verum</i> Presl.	I	A	HW
Lecythidaceae				
37	<i>Barringtonia asiatica</i> (L.) Kurtz	N	F	BC
Loganiaceae				
38	<i>Strychnos spinosa</i> Lam.	I	F	HW
Malvaceae				
39	<i>Abutilon indicum</i> (L.) Sweet	?I	O	HG
Meliaceae				
40	<i>Xylocarpus moluccensis</i> (Lam.) Roem.	N	R	BC, HW
Mimosaceae				
41	<i>Adenanthera pavonina</i> L.	I	C	HW
Moraceae				
42	<i>Ficus lutea</i> Vahl.	N	C	HW, GI
43	<i>Ficus reflexa</i> Thunb. ssp. <i>seychellensis</i> (Baker) Berg	E(ss)	F	HW
Myrtaceae				
44	<i>Psidium cattleianum</i> Sabine	I	R	HW
45	<i>Syzygium jambos</i> (L.) Alston	I	C	HW, GI
46	<i>Syzygium wrightii</i> (Baker) A. J. Scott	E	R	HW
Nyctaginaceae				
47	<i>Pisonia grandis</i> R. Br.	N	R	PG
Papilionaceae				
48	<i>Desmodium incanum</i> DC.	I	C	HW
49	<i>Desmodium triflorum</i> (L.) DC	I	F	HW
50	<i>Teramnus labialis</i> (L.) Spreng.	I	R	HW
Passifloraceae				
51	<i>Passiflora foetida</i> L.	I	F	HW
52	<i>Passiflora suberosa</i> L.	I	C	HG, HW
Rubiaceae				
53	<i>Canthium bibractatum</i> (Baker) Hiem.	N	A	HW, GI
54	<i>Pentodon pentandrus</i> (Schumach. et Thonn.) Vatke	I	O	BC, GI

Species	Status	Abund.	Habitats
Rutaceae			
55 <i>Citrus reticulata</i> Blanco	I	O	HW
Sapindaceae			
56 <i>Allophyllus sechellensis</i> Summerh.	E	O	HG
Sapotaceae			
57 <i>Mimusops sechellarum</i> (Oliv.) Hemsl.	E	R	GI
Tiliaceae			
58 <i>Triumfetta rhomboidea</i> Jacq.	I	F	GI
Turneraceae			
59 <i>Turnera angustifolia</i> Miller	I	F	HW
Verbenaceae			
60 <i>Clerodendron speciosissimum</i> Morren	I	R	HW
61 <i>Premna serratifolia</i> L.	N	A	HW, GI
62 <i>Stachytarpheta jamaicensis</i> (L.) Vahl.	I	F	HW
63 <i>Stachytarpheta urticifolia</i> (Salisb.) Sims.	I	C	HW
ANGIOSPERMAE: Monotyledons			
Agavaceae			
64 <i>Furcraea foetida</i> (L.) Haw.	I	F	HW
Bromeliaceae			
65 <i>Ananas comosus</i> (L.) Merr.	I	C	GI, HW
Cyperaceae			
66 <i>Cyperus compressus</i> L.	?	O	GI
67 <i>Fimbristylis cymosa</i> R. Br.	?	A	BC, GI
68 <i>Fimbristylis</i> sp. (glacis sedge)	?	C	GI
69 <i>Kyllinga polyphylla</i> Willd. ex Kunth	N	C	HW
70 <i>Mariscus dubius</i> (Rottb.) Fischer	N	A	HW, GI
71 <i>Mariscus ligularis</i> (L.) Hutchinson	?N	F	HG, HW
72 <i>Pycreus polystachyos</i> (Rottb.) P. Beauv.	?	F	HW
Gramineae			
73 <i>Axonopus compressus</i> (L.) P. Beauv.	?	F	HW
74 <i>Brachiara umbellata</i> (Trin.) W. D. Clayton	N	A	HW
75 <i>Brachiara</i> sp.	?	C	HW
76 <i>Ischaenum heterotrichum</i> Hack.	?	A	HW, GI
77 <i>Oplismenus compositus</i> (L.) P. Beauv.	N	A	HW
78 <i>Panicum brevifolium</i> L.	N	A	HW
79 <i>Panicum maximum</i> L.	?	C	HW, GI
80 <i>Paspalum scrobiculatum</i> L.	?	R	HW
81 <i>Pennisetum polystachyon</i> (L.) Schult.	?	C	GI
82 <i>Sacciolepis curvata</i> (L.) Chase	?	A	HW
83 <i>Setaria barbata</i> (Lam.) Kunth.	?	O	HG
84 <i>Stenotaphrum dimidiatum</i> (L.) Brogn.	N	A	HG, HW
Liliaceae			
85 <i>Dracaena reflexa</i> Lam. var. <i>angustifolia</i> Baker	N	C	HW, GI
Orchidaceae			
86 <i>Vanilla phalaenopsis</i> Reichb. f.	E	O	GI
87 <i>Vanilla planifolia</i> Andrews	I	F	HW
Palmae			
88 <i>Cocos nucifera</i> L.	N	A	HW, Co
89 <i>Nephrosperma vanhoutteanum</i> (Wendl. ex van-Houtt) Balf.	E	O	HW
90 <i>Phoenixophorium borsigianum</i> (K. Koch) Stuntz	E	A	HW
91 <i>Raphia farinifera</i> (Gaertn.) Hylander	I	R	HW
Pandanaeae			
92 <i>Pandanus balfourii</i> Mart.	E	F	GI, HW