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# The biodiversity of the granitic islands of Seychelles

**Indian Ocean Biodiversity Assessment 2000-2005**
Biodiversity assessment celebrating the centenary of the Percy Sladen Trust Expedition to the Indian Ocean

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## 1. Introduction

In 1905 the Percy Sladen Trust Expedition visited the islands of the western Indian Ocean, followed by a second expedition in 1908-9 concentrating on the Seychelles islands. These expeditions were organised and led by Prof. John Stanley Gardiner to complete the earlier work of the 'Challenger' expeditions which had surveyed the physical geography, hydrology, fauna and flora of island groups in all oceans except the Indian (Gardiner 1907). Gardiner's intentions were to investigate the biological relationships between the islands of the Seychelles, Mascarenes and Chagos groups and to locate evidence for former land connections between the islands. The results of the expedition still form the basis of all discussion of the region's biogeography. Gardiner and the expedition's entomologist H. Scott demonstrated that the granitic Seychelles islands formed a distinct faunal unit, with close associations with Madagascar and India. The coralline Seychelles islands and the Mascarenes also shared links with the granitic Seychelles, probably resulting from dispersal across the sunken banks at times of lower sea-levels 15,000 years ago. In contrast the Chagos and Cargados show typically low-diversity mid-oceanic Indo-Pacific assemblages (Gardiner 1936).

Although the larger Mascarene islands (Mauritius, Rodrigues and Reunion) have been studied over the last 300 years, their offshore islets are less well-known, with some rarely visited. The only recent visit to all offshore islets of Mauritius and Rodrigues was an invasive pest survey and few collections were made. The Percy

Sladen Trust Expedition remains the most extensive study of the Seychelles islands. Prior to the expedition small collections of specific animal or plant groups had been made by Dufo and Dussumier (1838), Perville (1845), Newton and Nevill (1868), Lantz (1877) and Nicoll (1905). Large collections were made on Aldabra by the Valdivia expedition under Voeltzkow (1894) and on the granitic islands by Alluaud (1894) and Brauer (1895). All of these visited only a small number of islands and collected only specific taxonomic groups.

The Percy Sladen Trust Expedition of 1905 also visited the Chagos, Mascarenes and Cargados. As noted above the Chagos and Cargados are recently emergent islands supporting low diversity, Indo-Pacific faunas, of limited interest. The larger Mascarene islands have been extensively studied and provide a useful comparative resource. In contrast the small islands off the coast of Mauritius have never been studied in detail. Small collections have been made on some of these but even recent collections include significant new records, including new vertebrate species. These islands are believed to support other undescribed taxa and provide remnants of the natural-fauna, knowledge of which is needed to interpret the biogeographical patterns of the western Indian Ocean region.

Expeditions since the Percy Sladen Trust Expedition have added large numbers of new taxa through specialist collecting of high diversity sites or specific habitats (Beniot & Van Mol - 1972, Austrian Hydrobiological Mission - 1974 and the Russian Academy of Sciences - 1984), largely unsurveyed islands (H. Legrand - 1954-6; Muhlenberg 1975) or intensive collecting on a single island (Royal Society expeditions to Aldabra - 1968). Of these expeditions only those of the Royal Society to Aldabra have resulted in an island being collected thoroughly, however, not all taxonomic groups were collected on this expedition and only a small part of the resultant identification have been published. The result of these expeditions is that collections have been made on 31 islands. A further 84 have not been studied with the exception of individual visits to record reptiles and birds. Collections made in the 1990s on Silhouette island as part of the Silhouette Conservation Project (Nature Protection Trust of Seychelles & Islands Development Company) include a significant number of new records of Malagasy and African species and alien taxa indicating major faunal changes in recent years.

The Indian Ocean Biodiversity Assessment 2000-2005 was developed in order to review the biogeography of the Seychelles islands through systematic collecting of all taxonomic groups. The assessment aims to examine the 84 unstudied islands, revisit the 17 islands not studied since 1905-9 in order to update the species lists and study the important sites on the 14 recently surveyed islands. Recent partial surveys of a small number of islands have examined only a small proportion of the biodiversity present, consequently the assessment compliments such studies rather than duplicates them. Exploring the biodiversity of all 115 Seychelles islands provides the following information:

1. Island biogeography theory - providing the largest data set for evaluation of island biogeography theory as applied to both continental and oceanic islands.

2. Evaluation of the roles of colonisation and vicariance in the distribution patterns
3. Evidence of the spread of taxa through the islands assisted by man
4. Evaluation of the effects of colonisation of islands by alien species (especially rats, mice and ants).
5. Identification of sites of special conservation interest (areas of exceptional diversity or the presence of endemic taxa)
6. Identification of faunal changes in the last 100 years, providing evaluations of natural and un-natural rates of species turn-over.
7. Relocation of endemic taxa of conservation concern
8. Identification of undescribed taxa and conservation status evaluation

These points are of interest for the following reasons:

1. Further evaluation of island biogeography theory is needed to determine the relationships between island size, altitude, location and the rates of species turn-over. This is important in evaluating the security of island reserves, particularly as many of the existing reserves have been designated to protect sea-bird colonies on small, isolated islands. These may not be the most appropriate for conserving biodiversity.
2. Evaluating colonisation patterns will influence reserve management as existing practices tend to aim to preserve a static biota whereas certain levels of change, through colonisation and extinction may be more natural and appropriate. This needs to be contrasted with the effects of the spread of alien species.
3. There is an urgent need to identify sites of special conservation interest as recent years have seen a rapid increase in the rate of development of many of the smaller islands. This is principally for tourism development. Many of these developments have been amenable to habitat management to preserve island endemics but in the absence of biodiversity surveys no such recommendations are possible at present.
4. Many taxa have not been collected since 1905-9 and their status is a cause for concern. This is at least in part a result of a lack of collecting on most islands. There is a need to determine which taxa are still present in their historical ranges, which have restricted ranges and which have undergone range contractions in the last 100 years.
5. A significant number of new invertebrate and vertebrate taxa have been described over the past 30 years. It is important to continue the search for previously undescribed species and identify their conservation status.

The first phase, collection on the granitic islands was completed in 2003 and the preliminary findings of the assessment are reported here. This first phase refers to the granitic islands in the strict sense; the coral islands of Bird and Dennis are often inlcuded in disucssions of the granitic islands due to their geographical proximity but records from these geologically and ecologically distinct islands are not included in the present report.

## 2. Methods

A wide range of sampling methods were used as discussed below:

**2.1 Terrestrial invertebrates**

**2.1.1 Pitfall trapping** - pitfall traps have been widely used in ecological studies. Although other studies have used pitfall traps (Hill 2002) these were not extensively used in the present study as they collect only cursorial species. The ecological and conservation conclusions drawn by pitfall trapping studies (Hill 2002) cannot be considered reliable as the pitfall method used excluded non cursorial species and the preservative used acted as an attractant for some taxa (most notably the ant *Odontomachus simillimus*; Bowler *et al.* 2001). In the present study pitfalls were only used on Silhouette island in an altitude transect every 50m from sea level to 550m to provide data on altitudinal zonation of cursorial terrestrial invertebrates.

**2.1.2 Leaf-litter sampling** – the most extensively used method was litter or moss invertebrate collection ($10m^2$/major habitat type) by Winkler and Tullgern extraction.

**2.1.3 Soil invertebrates** - soil (10 samples of $1000cm^3$ per major habitat type) collected and invertebrates extracted by Tullgren funnels.

**2.1.4 Rotten wood invertebrates** - rotten logs (10 branches/logs of measured diameter, 30cm long) collected, broken up and Tullgren extraction used.

**2.2 Foliage invertebrates** - sweep netting (10 samples of $1m^2$ in each major habitat)

**2.3 Aerial invertebrates** - Malaise traps and light traps employed in selected localities. Traps were placed in each major habitat type. In addition sweep netting, canopy clipping and bark brushing were carried out for selected plant species

**2.4 Aquatic invertebrates** - netting of water bodies.

**2.5 Parasites** – parasites were collected from faecal samples, blood smears and fixed material from vertebrates and invertebrate taxa for subsequent examination. Ectoparasites were collected from vertebrates.

**2.6 Vertebrates** - Vertebrates have been recorded on all islands and good species lists exist, these were supplemented with visual observation.

**2.7 Plants, lichens, terrestrial Algae & Fungi** - detailed angiosperm species lists are available for most islands, these were supplemented by new records, systematic collections of cryptogams were made on all islands and all habitats.

**Table 1.** Repeat samples for aerial invertebrates on Silhouette island

| Localities | Altitude (m) | Malaise trap dates |
|---|---|---|
| Grande Barbe | 0 | July 2000; May 2001; March 2002 |
| La Passe (Dauban marsh) | 0 | July – August 2000 |
| Jardin Marron (palms) | 350 | September 2000 – August 2001 |

## 3. Constraints and accuracy

### 3.1 Temporal variation

Studies of invertebrate abundance and diversity have been carried out in a variety of habitats and geographical localities. These tend to demonstrate seasonal influences in temperate climates due to seasonal climate changes and a response to seasonal variation in rainfall in tropical climates. Few studies have examined temporal change in invertebrates on tropical islands. Such faunas may show more extreme fluctuations due to instability of small populations and limited water resources or may be buffered from extremes by maritime influences arising from differences in geographical location and island size and height. The data collected on the granitics included repeat sampling over 12 months from selected localities (Table 1) enabling influences of seasonal change on aerial invertebrates to be determined and taken into consideration when comparing data gathered from single visits to other field sites.

A coastal site (0m a.s.l.) was studied on 4 occasions throughout the year (January, April, July and October) using a malaise trap, sticky traps and protein baits and a high altitude site (400m a.s.l.) was studied at the same time with sticky traps, protein baits and a malaise trap used continuously for 12 months, emptied every 2 weeks. In addition a wide range of sites were studied for 1 week in July 2000 providing data from a range of altitudes (0, 50, 150, 350, 400, 550m a.s.l.). The seasonal data were compared to sea level rainfall data.

On 11 other islands and localities the duration of the trapping session varied due to practical constraints on time; 6 were set for only 24 hours, 2 for 48 hours and one trap was maintained for 2 weeks. A total of 26 sites were selected to provide data from as wide a range of habitats as possible. The location and timing of sampling is shown in Table 1.

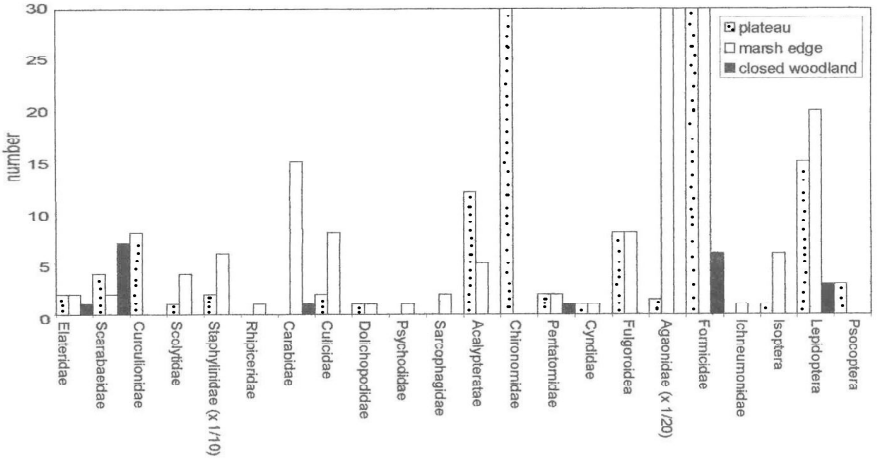


**Fig. 1.** Variation in invertebrate composition in different habitats at La Passe, Silhouette

The malaise traps were black, set at ground level and trapped invertebrates in 70% ethanol. Sticky traps and protein baits were used to investigate vertical distribution of invertebrates at 3 sites on the 4-14th July 2001. For both types three traps were suspended on a string which was pulled into the canopy, resulting in traps being suspended at 2m, 5m and 10m above the ground. The sticky traps were double sided, measured 20x30cm and were yellow. Protein baits were placed in .July 2000 at 20, 100, 350 and 500m above sea level.

In addition to the research carried out for the IOBA as described above data from two other sources were used: a malaise trap was run on Aride by J. Bowler in 2000 and a flight-interceptor trap (1×2m) used at La Passe, Silhouette by the author in 1997. This latter study separated samples into day and night catches over a 3 day period.

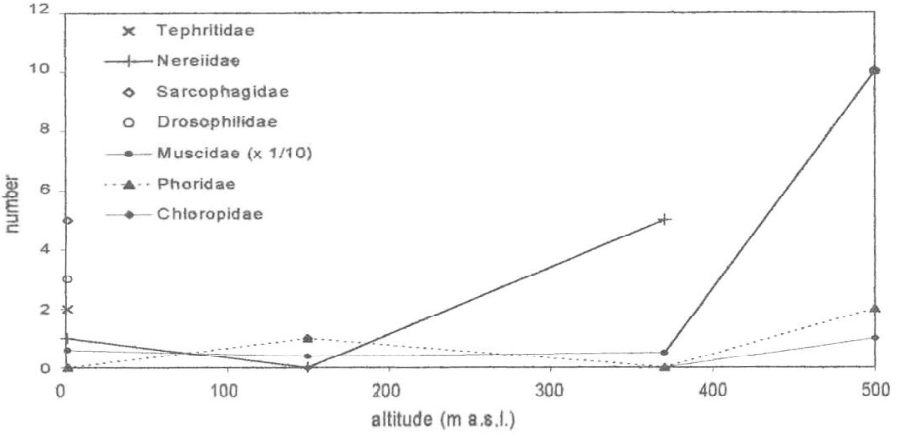


**Fig. 2** Changes in invertebrate abundance with altitude (protein trap data, Silhouette). Muscidae comprise *Dichaetomaea fasciculifera* except for the 6 specimens from 1m a.s.l.

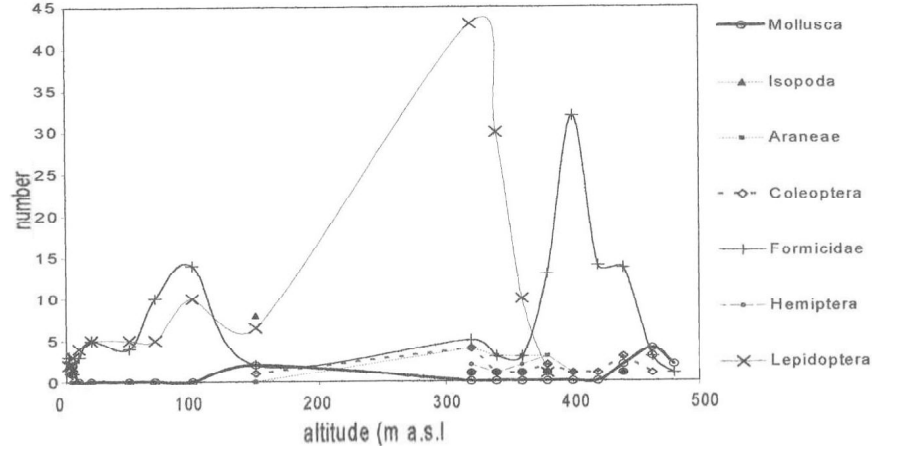


**Fig. 3** Increase in invertebrate numbers with altitude in pitfall trap data.

Seasonal effects

For all invertebrate animal classes there is a positive correlation between altitude and diversity as has been demonstrated for terrestrial taxa (Gerlach 2003b). Low altitudes show high levels of diversity of specific groups such as various Diptera (acalypterates and chironomids) and Fulgoromorpha associated with low growing herb layers (especially of *Asystasia* sp.). Closed woodland at the same altitude has a much lower diversity and fewer insects (Fig. 1). Most endemic taxa are largely altitude associated, as exemplified by the vertical zonation of the muscid fly *Dichaetomyia fasciculifera* which is scarce below 500m a.s.l. but dominates protein baited traps above this level (Fig. 2). This is also demonstrated by the pitfall trap data (Fig. 3).

Seasonal patterns are much less clear with individual taxa responding to different environmental variables. The malaise trap data (Fig. 4) show a peak of abundance of Hymenoptera, Psocoptera, Coleoptera and Lepidoptera in April, apparently due to the proximity of a fallen jak fruit (*Artocarpus heterophyllus*) during this month. This will have attracted large numbers of frugivorous Coleoptera (Rhizophagidae and Mordellidae), Diptera (Muscidae) and Lepidoptera. Subsequent fungal growth may have attracted Psocoptera and Hymenoptera.

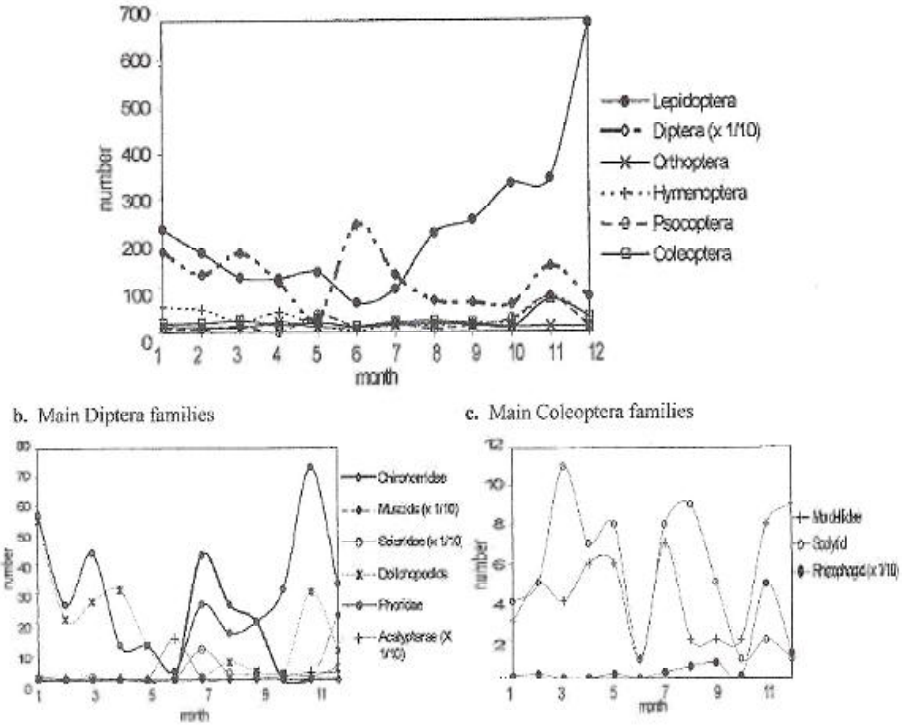


**Fig. 4** Malaise trap data from Jardin Marron, Silhouette 2000-2001
**a.** All insect orders **b.** Main Diptera familes **c.** Main Coleoptera families

Overall Diptera show no correlation to rainfall due to family-specific patterns (e.g. a Mycetophilidae peak in October). Dividing Diptera families into guilds reveals some seasonality, with most guilds being abundant in April-June and scarce in August-September. This would appear to be due to an increase in plant growth and decomposition processes after the wet season of December-March and a reduction in activity in the peak of the dry season.

Coleoptera retain relatively constant levels of abundance. The xylophagous Scolytidae are most abundant in the dry season of June-September although this is complicated by a wet season peak in November-December. However, the numbers involved are small and the pattern is not statistically significant.

These results indicate some seasonal patterns at high altitude but are confused by local effects such as fruit fall. The clearest conclusion that can be drawn is that Malaise trap data can only provide an accurate picture of invertebrate abundance if maintained for a full year. Short duration studies (including all time periods of less than a year) can only provide a partial impression of abundance or diversity.

### 3.2 Collection efficiency

Vertical zonation within habitats was studied using yellow sticky traps fixed 1.5, 5 and 10m above ground at two sites on Silhouette. The only statistically significant difference recorded was the relatively high abundance of Psychodidae at 1.5m above ground at Jardin Marron ($t=10.23$; $P_{2,2}<0.01$) (Fig. 5). This suggests that there is relatively little vertical stratification of aerial invertebrates and that ground level Malaise traps will produced a representative sample of such taxa.

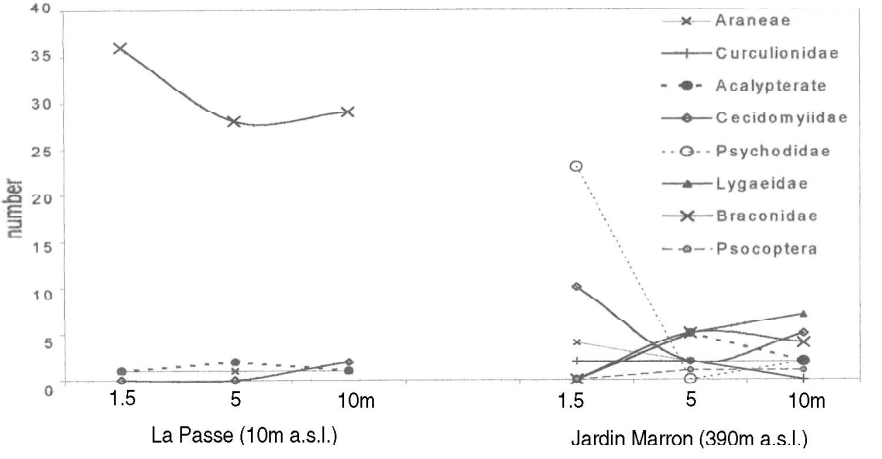


**Fig. 5** Vertical stratification of invertebrates collected by sticky traps at La Passe (10m a.s.l.) and Jardin Marron (380m a.s.l.).

## 4. Results

Over 581,200 animal specimens were collected and approximatley 500 fungi, cryptogams and plants. This compares well to the material collected by the Percy Sladen Memorial Expedition which is dominated by the approximately 100,000 insect specimens.

### 4.1 Taxa collected

Fungi Initial collections of fungi were made from the larger islands, especially Silhouette. 12 species of non-agaricoid Basidiomycetes have been identified to date (P. Roberts pers. comm.), including *Sirobasidium magnum* (not previously known outside south-east Asia) and *Pterula crassispora* (not previously known outside Africa). Smaller collections (mostly of bracket fungi) were made elsewhere, with *Pycnoporus sanguineus* and *Ganoderma applanatum* being present on most islands. The agarics remain to be identified. Ascomycetes were collected from *Lodoicea maldivica* leaves on Mahé and Praslin but were sterile and unidentifiable (A. Aptroot pers. comm).

Lichens Lichen diversity is greatest on the high islands of Mahé and Silhouette with 212 species recorded from these two islands (M. Seaward pers. comm.); 141 species have now been recorded on Silhouette (Seaward & Aptroot 2003).

Bryophyta Mosses and liverworts were most diverse in the high forests of Mahé and Silhouette. Extensive collections were made, including several new records and highly localised taxa such as the liverwort *Fissidens bistratosus* which is only recorded from the high parts of Mahé (T. Pocs pers. comm.). The highest diversity sites for liverworts were Mont Dauban on Silhouette and Mare aux Cochons and Grand Bois on Mahé, with 13 species. Calmyperaceae include *Calymperes afzelii, C. palisotii, C. tenerum, Leucophynes seychellarum, Mitthyridium micro-undulatum, Octoblepharum albidum* and *Syrrhopodon mahensis* (S. Orban pers. comm.). Some species occurred on most islands, with *C. tenerum* on islands as small as Islette and Souris.

Pteridophyta 18 species have been recorded without locality data and were not found; 84 species were located with the greatest native diversity on the high islands: Mahé (76 species) and Silhouette (63) and relativley low diversity on the lower islands (of these Praslin is the most diverse, with 17 species). There are also 4 introduced species on Mahé (4), Anonyme (1), Praslin (1) and La Digue (2).

Adiantaceae - *Adiantum capillus-veneris* (introduced: Mahé, Praslin, La Digue), *A. rhizophorum* (Mahé), *Pellaea angulosa (Mahé), P. doniana* (Mahé, Silhouette), *P. goudotii* (Mahé, Praslin, Felicite), *Pityrogramma calomelanos* (Mahé, Silhouette); Aspidaceae - *Lastreopsis hornei* (Mahé, Silhouette), *Tectaria pleiotoma* (Mahé, Silhouette); Aspleniaceae - *Asplenium aethiopicum* (Mahé, Silhouette), *A. affine* (Mahé, Silhouette), *A. inaquilaterale* (Mahé, Silhouette), *A. pellucidum* (Mahé, Silhouette), *A unilaterale* (Silhouette), *A. complanatum* (Silhouette), *A. nidus* (Mahé, Sil-

houette, Praslin), *A. caudatum* (Mahé, Silhouette); Athyriaceae - *Athyrium asperum* (Mahé, North); Cyatheaceae - *Cyathea sechellarum* (Mahé, Silhouette); Davalliaceae - *Davallia chaerophylloides* (Mahé, Silhouette), *D. denticulata* (Mahé, Silhouette), *Humata repens* (Mahé, Silhouette), *Nephrolepis acutifolia* (Mahé, Silhouette), *N. biserrata* (Mahé, Long, Silhouette, Praslin, St. Pierre, La Digue), *N. cordifolia* (introduced: Mahé and Anonyme), *N. tuberosa* (Mahé, Silhouette), *Oleandra distenta* (Mahé, Silhouette), *Rumohra adiantiformis* (Mahé, Silhouette, La Digue); Dennstaedtiaceae - *Microlepia speluncae* (Mahé, Silhouette); Gleicheniaceae - *Dicranopteris linearis* (Mahé, Long, Silhouette, Praslin, Petite Soeur); Grammitidaceae - *Ctenopteris elastica* (Mahé, Silhouette), *Grammitis albobrunneum* (Mahé, Silhouette), *G. pervillei* (Mahé), *G. serrulata* (Mahé); Hymenophyllaceae - *Hymenophyllum fumarioides* (Mahé, Silhouette), *H. hygrometricum* (Mahé, Silhouette), *H. inaequale* (Mahé, Silhouette), *Trichomanes cupressoides* (Mahé, Long, Silhouette, Praslin, La Digue), *T.* cf. *cuspidatum* (Mahé, Silhouette), *T. lamarisciforme* (Mahé); Lindsaeaceae - *Lindsaea kirkii* (Mahé, Silhouette, Praslin), *Schizolegmia ensifolia* (Mahé); Lomariopsidaceae - *Bolbitis bipinnatifidum* (Mahé, Silhouette, Praslin), *Elaphoglossum didynamum* (Mahé), *E. hornei* (Mahé, Silhouette), *E. macropodium* (Mahé, Silhouette), *E. martinicense* (Mahé, Silhouette), *Lomariopsis pervillei* (Mahé, Silhouette); Lycopodiaceae - *Huperzia phlegmaria* (Mahé), *H. squarrosa* (Mahé, Silhouette), *Lycopodium cernuum* (Mahé, Silhouette, La Digue); Marattiaceae - *Angiopteris madagascariensis* (Mahé, Silhouette); Ophioglossaceae - *Cherioglossa palmata* (Mahé, Silhouette), *Ophioglossum pendulum* (Mahé, Silhouette); Parkeriaceae - *Ceratopteris thalictroides* (Mahé, Cerf, Silhouette, Praslin, Aride, La Digue); Polypodiaceae - *Afropteris barklyae* (Mahé, Silhouette, Praslin, La Digue), *Belvisia spicata* (Mahé), *Histiopteris incisa* (Mahé), *Microsorium punctulatum* (Mahé, Silhouette), *Phymatosorus scolopendria* (Mahé, Long, Silhouette, Praslin, St. Pierre, La Digue); Psilotaceae - *Psilotum complanatum* (Mahé, Round (Mahé), Silhouette, La Digue), *P. nudum* (Mahé, Silhouette, Praslin, La Digue); Pteridiaceae - *Acrostichum speciosum* (Mahé, St. Anne, Silhouette, Praslin, St. Pierre, La Digue), *Pteris friesii* (Mahé, Silhouette, North, Praslin), *P.* cf. *longifolia* (Mahé), *P. pseudolonchitis* (Mahé, North), *P. vittata* (introduced: Mahé, La Digue), *Stenochlaena tenuifolia* (Silhouette); Schizaeaceae - *Schizaea confusa* (Mahé); Selaginellaceae - *Selaginella fissidentoides* (Mahé, Silhouette, La Digue), *S. myosorus* (Mahé, La Digue); Thelypteridaceae - *Christella dentata* (Mahé, Silhouette, Praslin), *Sphaerostephanos subtuncatus* (Mahé, Silhouette, Praslin), *S. unitus* (Mahé, Long, Silhouette, Praslin, La Digue), *Thelypteris cruciata* (Mahé, Silhouette), *T. tormentosa* (Mahé, Silhouette); Vittariaceae - *Antrophyum callifolium* (Mahé, Silhouette), *A. immersum* (Mahé, Silhouette), *Blechnum attenuatum* (Mahé), *Monogramma graminea* (Mahé, Silhouette), *Pyrrosia lanceolata* (Mahé, Silhouette), *Vittaria ensifofmis* (Mahé, Silhouette), *V. isoetifolia* (Mahé, Praslin, Silhouette), *V.*

*scolopendria* (Mahé, Silhouette), *V. zosterifolia* (Mahé).

Angiospermae No new plant species were collected but species lists were extended for most islands. Grasses were identified by S. Renvoize and sedges by D. Simpson. Notable records include *Grisollea thomasseti* at Mare aux Cochons, Mahé; *Psionia sechellarum, Psychotria silhouettae, Pseuderanthemum tunicatum, Trilepisium gynandrum* and *Piper seychellarum* on Silhouette; *Peponium vogelii* on Aride and Booby; *Boerhavia diffusa* on Ilot Fregates.

Protista Protista were collected in faecal samples from several species of reptile.

Platyhelminthes Three flatworm species have been recorded in Seychelles previously. *Dugesia* cf. *neumanii* is known from streams on Mahé and has been observed on Praslin (pers. obs.). Two endemic terrestrial species were recorded from Mahé (*A. maheensis*) and Praslin (*Amblyplana braueri*), neither of these are represented in the present collection which comprises 5 species (?*Amblyplana* sp., *Dolichoplana* cf. *mertoni* and *Rhynchodemus* sp. from Silhouette, *D*. cf. *striata* and a Rhyncodermidae sp. from Mahé), none of which have been recorded previously (L. Winsor pers. comm.).

Nemertea *Geonemertes pelaensis* was located on Mahé and Silhouette.

Annelida Oligochaeta – earthworms and aquatic oligochaetes were collected on several islands, most from Mahé and Silhouette.
Hirudinea – terrestrial leeches were recorded on Mahé (*Mahebdella miranda*) and Silhouette (*Idiobdella daubani* and *I. seychellensis*) islands. Introduced freshwater leeches (*Glossiphonia complanata* and *Barbronia weberi*) have been recorded on Mahé.

Mollusca Diversity was highest on Mahé and Silhouette islands. All previously recorded species were located, including the first *Gulella thomasseti* since 1905 (from Grand Bois and Congo Rouge, Mahé). Several new taxa were collected (Gerlach 2003a).

Crustacea

Decapoda – crabs were present on most islands, with *Grapsus tenuicrustatus* present on the coastal rocks of all islands, however small. Other widespread littoral and lowland species were found on the larger islands (*Geograpsus crinipes, C. grayi, G. stormi, Ocypode ceratopthalma, O. cordimana, O. ryderi*), marsh and mangrove crabs (*Cardisoma carnifex, Neosarmantium meinerteri, Uca annulipes, U. inversa, U. lactea, U. urvillei, U. vocans*) and freshwater crabs (*Sesarma impressa, Seychellum alluaudi*) were found on Mahé, Silhouette, Praslin and La Digue. Freshwater shrimps and crayfish are present on Mahé, Silhouette and Praslin. No new records were made.

Ostracoda – the first ostracods from the granitic islands were recorded, the most widespread species are *Cyprideis torosa* in brackish water (Wouters 2002) and the tropical African species *Strandesia vavrai* in coastal freshwater pools. *Cypricercus* sp. was collected from brackish water (K. Wouters pers. comm.).

Copepoda – one species of copepod was found in the Dauban marsh on Silhouette, this is the first record from Seychelles and has not been identified to date.

Isopoda - 42 species are recorded, one new species of the genus *Irmaos* (Irmaosidae) was found and many new locality records made (S. Taiti pers. comm.).

Amphipoda – terrestrial talitrid amphipods (the widely introduced *Talitroides topitotum*) were collected from high forest on Mahé (A. Richardson pers. comm.).

Tardigrada Of the species collected 20 are new records for Seychelles, 9 of these have not previously been recorded from Africa and 11 are new species (M. Binda pers. comm.).

Arachnida

Scorpiones - The pantropical *Isometrus maculatus* was found on Silhouette, there are records from several other islands. *Chiromachus ochropus* was present on Fregate, historical records from Praslin and Recifs could not be confirmed. *Lychas braueri* was not found, only one specimen has been found recently (Silhouette 1990) and this appears to be a very rare species.

Araneae – the Seychelles spider list has increased to 198 with the collection of extensive material, much of it collected during the IOBA. Significant collections made by the IOBA include *Nesiergus halophilus* from the type locality of Fregate. *Agyneta pogonophora* (previously known only from a male from Angola), *Ariadna ustulata* from Silhouette (previously known only from an immature specimen from Mahé) and *Conothele truncicola* (Saariso 2002).

Pseudoscorpiones – small collections were made from several islands, these include several of the 14 previously recorded species: *Afrogarypus seychellensis* (Le Niol, Mahé), *Beierolpium benoiti* (La Passe, Silhouette – first record), *Chthonius* cf. *tetrachelatus* (Mon Plaisir, Silhouette – apparently introduced), *Feaella affinis* (Vallee de Mai, Praslin); *Geogarypus ocellatus* (La Passe, Silhouette – first record); *Ideoblothrus seychellesensis* (La Passe, Silhouette); *Lamprochernes savignyi* (a specimen of Cheiridiidae sp., possibly this species from Vallee de Mai, Praslin – a first record) *Oratemnus brevidigitatus* (La Passe-Belle Vue, Silhouette and a first record from Aride) and *Withius piger* (Aride). There was also an unidentified *Tyrannochthonius* sp. from La Passe, Silhouette (M. Harvey pers. comm.).

Schizomida – *Anepsiozomus sobrinus* (Aride, Cousine), *Apozomus gerlachi* (Silhouette & North), *Bamazomus aviculus* (Fregate), *Mahezomus apicoporus* (Mahé), *Ovozomus similis* (Silhouette, also historically recorded from Long island), *Zomus bagnallii* (Mahé, Silhouette, Praslin, Petite Soeur). Unidentified juveniles were collected on Anonyme, Curieuse and Grande Soeur (M. Harvey pers. comm.).

Opiliones – Six species were collected: *Bandona palpais* (Mahé), *Biantes minimus* (Mahé), *Ibalonius bimaculatus* (Silhouette), *I. flavopictus* (Mahé, Silhouette), *I. inscriptus* (Silhouette), *Mitraceras pulchra* (Mahé), *Samoana sechellana* (Praslin). 11 species have not been collected, including two which have not been located since 1905: *Metazalmoxis ferruginea* and *Sitalcicus gardineri.*

Palpigradi – no palpigrades were located although one species has been recorded from La Digue (*Koeneniodes madecassus*)

Acari – mites are abundant in all habitats but no identifications have been secured for any except the giant Holothyrida of Mahé and Silhouette and parasitic ticks *(Amblystomma loculosum* on Aride). Other taxa collected on Aride include Argasidae (*Carios* spp.) and Sejidae (?*Epicroseius* sp.) (H. Klompen pers. comm.).

Amblypygi – *Charinus seychellarum* was collected from Mahé, Silhouette, North (first record), Praslin and Fregate (first record). *Phrynichus scaber* was recorded on Silhouette (first record) and Fregate, it has also been recorded on Mahé (not located since 1885), Aride (relatively abundant), Cousin (no recent records), Cousine (abundant) (P. Weygold pers. comm.).

Myriapoda

Chilopoda - include an unidentified Scutigeromorpha and four Lithobimorpha: *Australobius abbreviatus* (Silhouette, Aride), *A. sechellarum* (Silhouette), *Australobius* sp.n.? (Aride) and *Lamyctes albipes* (Silhouette) (P. Stoev pers. comm.). Scolopendropmorpha comprise *Cryptops* sp. (Silhouette), *Scolopendra subspinipes* (Silhouette, North, Aride), *Otostigmus insularis* (Silhouette), *O. orientalis* (Silhouette), *O. rugulosus* (Silhouette, Cousine) (J. Lewis pers. comm.).

Diplopoda – an extensive collection was made. Significant new records include *Dactylobolus birvirgatus* on Cousine (presumably introduced) and *Sechelleptus seychellarum* on Seche and Round island (Praslin). The most islands with the most species are Silhouette (24 species) and Mahé (21), the other islands have fewer than half these species, the next most diverse being Fregate (11), Praslin (9) and Felicite (8).

Symphyla – unidentified species were collected on Mahé, Cerf, Silhouette, Curieuse, Grande Soeur, Felicite and Marianne.

Insecta

Thysanura – Several specimens of Archaeognatha collected from Gratte Fesse, Silhouette comprised *Corethomachilis brevipalpis* and *C gibba*. One unidentified species of Lepismatidae was collected in a building on Silhouette, this may be the anthropophilic *Acrotelsa collaris* (H. Sturm pers. comm.). Nicolettidae and Menertellidae were collected in high forest on Silhouette.

Diplura – Japygidae were recorded on most islands, including islands as small as Seche.

Protura – only a single proturan was located on Aride island.

Collembola – a large collection was made and collembola observed on all except the smallest islands. Most endemic species represented in the collections appear to be restricted to high altitude sites, e.g. *Heteromuricus longicorns* (Congo Rouge, Mahé) and *Acanthurella braueri* (La Reserve, Mahé).

Ephemeroptera – two mayfly species have been recorded from Seychelles. *Hagenuloides braueri* has been recorded from Mahé and Praslin but was not located during the present study. *Maheathraulus scotti* was recorded from Mahé and Praslin, during the present study significant populations were recorded on these islands (Mare aux Cochons and Vallee de Mai respectively) and several populations located on Silhouette. A third species was located on Mahé (Mare aux Cochons) and Silhouette (Grande Barbe). This is a Cloeon species (Baetidae) but is not identified at present. Starmuhlner collected nymphs of this species in 1974 from the waterfall in the Vallee de Mai on Praslin (J-L. Gaillotat pers. comm.) but it is not present there now (pers. obs.).

Odonata - Most recorded species were located: *Agriocnemis pygmaea* (Mahé, Silhouette, North, Praslin, La Digue, Grande Soeur), *Allolestes maclachlani* (Mahé, Silhouette, Praslin), *Anax ephippiger* (Mahé, Aride, Fregate), *A. guttatus* (Mahé, St. Anne, Silhouette, North, Aride, Grande Soeur, Fregate), *Ceriagrion glabrum* (Mahé, St. Anne, Silhouette, North, Praslin, Aride, La Digue, Grande Soeur), *Diplacodes lefebvrei* (Mahé, Aride, La Digue), *D. trivialis* (Mahé, St. Anne, Silhouette, North, Praslin, Cousine, Aride, La Digue, Fregate), *Hemicordulia similis* (Mahé), *Ischnura seneglensis* (Mahé, Silhouette, North, Praslin, Curieuse, Cousine, Aride, La Digue), *Leptocnemis cyanops* (Mahé, Praslin, Silhouette), *Orthetrum stemmale wrightii* (Mahé, Silhouette, North, Praslin, Cousine, Aride, La Digue, Grande Soeur), *Pantala flavescens* (Mahé, St. Anne, Silhouette, North, Praslin, Aride, Cousine, La Digue), *Rhyothemis semihyalina* (Mahé, Silhouette, North, Praslin, Aride, La Digue, Grande Soeur), *Teinobasis alluaudi* (Mahé, Silhouette), *Tholymis tillarga* (Mahé, Silhouette, North, Praslin, Aride, La Digue, Fregate), *Tramea*

*continentale* (Mahé, St. Anne, Silhouette, North, Praslin, Aride, Cousine, La Digue, Fregate), *Zygonyx luctifera* (Mahé, St. Anne, Silhouette, Praslin), *Zyxomma petiolatum* (Mahé, St. Anne, Silhouette, Praslin, Aride, LaDigue). The only species not located was *Gynacantha stylata* which was recorded on Praslin recently (W. & C. Wain pers. comm.).

Orthoptera – A large range of species were located. Notable populations of *Myrmecophilus seychellensis* were found on Cousine (in association with the ant *Pheidole* cf. *punctulata*) and Felicite. An unidentified tridactyline pygmy mole cricket was collected from marshy ground on Mahé, Silhouette and North.

Phasmida – all previously recorded species were located and no new records were made. Phasmids are recorded from Mahé, Silhouette, Praslin, Curieuse and La Digue, diversity is highest on Silhouette (all 5 Seychelles species).

Dermaptera – All Seychelles species were collected with the exception of the highly localised *Chaetospania gardineri.* One new record was made (F. Haas pers. comm.). Silhouette supports the little known *Chaetolabia fryeri.*

Embioptera – web-spinners were only located on Mahé (Victoria) and Aride islands. Only one species is present, the indigenous *Oligotoma scottiana* which has previously only been recorded from high forest on Mahé.

Dictyoptera – Several species were collected, some records are of taxonomic significance including well preserved males of *Miriamrothschildia labrynthica* and the first male of *Sliferia lineaticollis. M. labyrinthica* was locally abundant at Jardin Marron, Silhouette. The collection also included the first Seychelles record of the family Nocticolidae (L. Roth pers. comm.).

Isoptera – Small numbers of termites were found on several islands, most were *Nasutitermes nigritus* and *Microcerotermes subtilis*.

Psocoptera – at least 32 species were collected, including 4 new records for the islands (C. Smithers pers. comm.).

Mallophaga – one species collected from a turtle dove *Streptopelia picturata* (Mahé).

Anoplura – one species collected from a turtle dove *Streptopelia picturata* (Mahé).

Hemiptera – an extensive collection was made, most taxa remain unidentified at present.

Alyerodidae: One species of white-fly was found in large numbers on *Asystasia* sp. on Silhouette, this was a temporary population and vanished before being collected. The spiral or giant whitefly *Aleurodicus dispersus* was also recorded in 2003 on Mahé.

Anthocoridae: Several species located.

Aphididae: At least one species was collected.
Aradidae: Small numbers of the most widespread Seychelles species, *Brachyrhynchus membranaceus*, were collected (E. Heiss pers. comm.).
Cicadidae: The small cicada *Chremistica pulverulenta* is widespread, being recorded on all islands at least as large as Round island (Mahé), the endemic *Yanga seychellensis* was observed on Praslin (an adult in the Vallee de Mai) and as nymphal skins on Mahé and Silhouette
Cimicidae: Small numbers located.
Coccoidea: Specimens were collected from a wide range of host plants on several islands and one species from leaf litter: *Nipponorthezia guadacanalia* is abundant in leaf litter from a wide range of sites on Mahé and Silhouette. Species collected include *Mutabilicoccus simmondsi* (Pseudococcidae) on *Peponium vogelii* and *Coccus* sp. (Coccidae) on *Rothmannia annae* from Aride, *Kilifia deltoides* (Coccoidea) on *Grisollea thomasseti*, *Pseudococcus* sp. (Pseudococcidae) on *Sandoricum koetjape*, *Pulvinarisca* sp. on *Euphorbia pyrifolia* and *Steatococcus* sp. (Margarodidae) on *Dillenia ferruginea* from Silhouette (C. Hodgson pers. comm.). One of the most widespread and abundant species is the margarodid *Icerya seychellarum*, including a very large form on *Dillenia ferruginea* trees on Mahé and Silhouette.
Coreidae: *Hydara tenuicornis* was collected on Silhouette (10-250m a.s.l.) (H. Brailowsky pers. comm.), this African species was previously recorded from Victoria, Mahé.
Cyndidiae: Small numbers located.
Enicocephalidae: Significant material was obtained, including the previously recorded *Cocles silhouettensis* and several new records (*Oncylocotis* cf. *curculio*, *Cocles* sp. n., Enicocephalini gen. n, sp. n.), *C. mahensis* has been recorded on Mahé but was not in the present material (P. Stys pers. comm.).
Fulgoromorpha: Several species were collected from many islands, this is only a small proportion of the species recorded.
Hydrometidae: *Hydrometra seychellensis* was found only at Mare aux Cochons, Mahé. This species has been recorded from several other localities but appears to be highly localised.
Gerridae: One species of *Halobates* was observed on the sea between Mahé and Silhouette and *Limnogonus cereiventris* was found on Mahé, Silhouette and Praslin.
Lygaeidae: Small numbers located.
Miridae: Small numbers located
Nabidae: Small numbers located.
Nepidae: A single specimen *Ranatra grandoculata* was found at

Beau Vallon, Mahé.

Notonectidae: *Anisops varius* was collected on Mahé, Silhouette and Praslin.

Pentatomidae: Small numbers of pentatomids were found: *Acrosternum heegeri* (Silhouette), *Bathycoelia praelongirostris* (Mahé, Silhouette, Aride) *Chinavia spicata* (Silhouette, North) (D. Rider pers. comm.). In addition M. Madl collected the following species: *B. fleuria* and *Parachinavia creolea*.

Psyllidae: *Heteropsylla cubana* on was collected on *Leucaena leucocephala* on Mahé and Silhouette, a second unidentified species was found on Silhouette (D. Burckhardt pers. comm.).

Pyrrhocoridae: One species of this family was found in considerable numbers on Silhouette, the African species *Dysdercus nigrofasciatus* was previously recorded from Mahé.

Reduviidae: A small number of specimens, including the first Seychelles record of *Pakesia* sp. (Stenopodainae), a genus previously know only from east Africa and the Eremian subregion (M. Baena, pers. comm.).

Saldidae: One species located (Mahé).

Tingidae: One single specimen of this family was collected. The species *Dunlinus nigrolineatus* has previously been recorded from coconut plantation at Pointe Etienne, Silhouette, the present specimen came from coastal woodland bordering old coconut plantation at Grande Barbe, Silhouette, about 200m from the type locality. The more widespread *Cantinona praecellens* has not been recorded since 1909.

Triozidae: One species, *Leptoynoptera zanzibarensis* has been collected on Mahé and Silhouette (J. Noyes pers. comm.) but was not identified in the present material.

Veliidae: At least two species were collected on Mahé and Silhouette.

Thysanoptera – A small collection of thrips was made, mostly from open grass areas and secondary habitats. Species collected include *Ecacanthothrips tibialis* (A. Goldarazena pers. comm.).

Neuroptera – The ant lion *Myrmeleon obscurus* (Myrmeleonidae) is very widespread and abundant, being found on almost all islands with sandy soils suitable for the larvae. The smallest island supporting this species is Seche island. The endemic *Distoleon ornatus* was not found but has been recently observed on Mahé (P. Matyot pers. comm.).

Two species of Conipterygidae have been recorded previously, *Semidalis africana* and *S. mascarenica*, one specis was observed on *Dicranopteris lienaris* above Grande Barbe, Silhouette, *S. africana* has previously been recorded from this habitat on Mahé. The hemerobiid *Micromus timidus* has been seen recently on Sil-

houette (historical records from Mahé, Silhouette and Praslin) but was not represented in the present collection, one *Notiobiella* sp. was collected from Praslin (apparenly different from the only Seychelles species *N. rosea* (Mahe)) (A. Whittington pres.comm.).

Of the Chrysopidae 2nd and 3rd instar larvae of *Chrysopa* sp. and a 3rd instar of *Cunctochrysa* sp. or *Suarius* sp. were collected from Jardin Marron, Silhouette; these genera have not been recorded from Seychelles). Three of the six recorded chrysopid species were collected: *Apertochrysa eurydea* (Aride), *Mallada desjardinsi* (Mahe) and *Plesiochrysa litorosa* (Grande Soeur).

Coleoptera – beetles were particularly diverse; the majority of taxa remain to be identified.

Bostrichoidea: A small number of specimens of Anobiidae, Bostrichidae and Ptinidae were located.

Buprestoidea: All five Seychelles species of Buprestidae have been recorded with the exception of the very poorly known *Agrilus owas*: *Chrysobothris dorsata, Belionota prasina, Iridotaenia mahena* and *Dicercomorpha alluaudi*.

Cantharoidea: only one Cantharidae, *Caccodes debilis* appears to be present and this is found in coastal habitat on most islands. The lampyrid fire-fly *Luciola laeta* was observed on Mahé.

Caraboidea: Carabidae included *Pentagonica perrieri* (La Passe, Silhouette) and *Tachyura bibula* (associated with marshes on Silhouette and North islands, previously recorded from Mahé) (G. Ball pers. comm.). The only recorded cicindelid (*Cicindela melancholica*) was not located in the granitics, although it is locally abundant on Aldabra (pers. obs.). It has been recorded from exposed sites on Mahé and Praslin, but not since 1909. Dytiscidae included several species, the most conspicuous was *Copelatus gardineri* (Mahé and Silhouette). The first Seychelles Gyrinidae was collected at Mare aux Cochons, Mahé. The species was identified by P. Mazzoldi as *Dineutus (Spinosodineutus) subspinosus* (Klug, 1834) previously known from Africa, the Comores, Madagascar and Mauritius (M. Madl pers. comm.).

Chrysomeloidea: Bruchidae were represented by a small number of specimens. Cerambycidae comprised a large number of species: *Anomoderus rugicollis* (Silhouette), *Ceresium albopubens* (Silhouette, North, Aride), *C. unicolor* (Silhouette), *Coptops humerosa* (Silhouette, observed on North), *Mahenes semifasciatus* (Silhouette, Praslin), *Micronoemia glauca* (Silhouette), *M.* sp. (Silhouette), *Obrium nitidicolle* (Silhouette, Praslin), *Olenecamptus bilobus* (Silhouette), *Pterolophia instabilis* (Aride), *Ropica sechellarum* (Silhouette, Fregate), *Sybra fauveli* (Silhouette) and *S. geminata* (Silhouette) (E. Vives pers. comm.). Of the Chrysomelidae subfamily Alticinae only *Aphthona* sp. and

the introduced *Chaetocnema confinis* were found (M. Biondi pers. comm.), *C. confinis* species is abundant on *Ipomoea pes-caprae* on Silhouette and Aride.

Cleroidea: Cleridae and Melyridae were represented by small numbers of specimens. Cleridae included *Pallenis laterisignatus* from Jardin Marron, Silhouette, this species is known from high forest on Mahé and Silhouette only. The cosmopolitan copra-eating *Necrobia rufipes* was the most abundant clerid collected by the Percy Sladen Memorial Expedition but in the present study it was only observed at La Passe, Silhouette. This species is probably scarce as a result of the decline in the copra industry.

Cucujoidea: Of the Coccinellidae *Chilocorus nigritus* is found on most islands, several other species were also collected. A small number of Cryptophagidae, Cucujidae, Lathrididae and Nitidulidae were located. Pedilidae were represented by a specialised larva in the axils of *Pandanus* spp. on Mahé (Mt. Sebert) and Silhouette (Gratte Fesse, Mon Plaisir) but no adults were located. These may be the *Eurgenius* species recorded from Mahé and Silhouette although the adults are considerably smaller than the larvae. Of the Cerylonidae one *Philothermus* sp. was collected on Silhouette (M. Ivie pers. comm.).

Curculionioidea: 134 weevil species have been recorded but the present collection is much less diverse. Identified species include high altitude species from Silhouette: *Acalles seychellensis*, *Cycloterinus ampliatus*, *C. humerolatus* and *C. microphthalmus*, *Lepydnus nepenthicola* (from *Nepenthes pervillei* on Mt. Dauban), the mid-altitude *Phoenicobates flexirostris* from the *Impatiens* site and the lowland *Cratopus grisovittatus*, *Phoenicobates stricticollis* and *Stenotrupis flexirostris* from North island (C.W. O'Brien & F. Pelsue pers. comm.). Small numbers of Dryophthoridae were collected from high altitudes on Silhouette, including *Dryophthorus ecarinatus* from the *Impatiens* site (det. C. W. O'Brien, F. Peluse pers. comm.). Scolytids and platypodids were abundant on Silhouette but relatively scarce on most other islands.

Dermestoidea: A small number of species were located.

Dryopoidea: The only Elmidae recorded from Seychelles (*Microlara mahensis*) was not located. The Callirhipidae comprise one Seychelles species, *Callirhipis philiberti*, which is abundant in high forests on Mahé and especially Silhouette.

Elateroidea: included the Elateridadae *Alaus mahenes* (Silhouette), *Propsephus alluaudi* (Silhouette), *Cardiphorus lutosus* (Silhouette, North), *Melanoxantus frivolus* (Silhouette), the Throscidae *Trixagus* sp. (Silhouette) and the Eucnemidae *Fornax sternalis* (Silhouette) (P. Johnson pers. comm.).

Histeroidea: three species were located in the granitic islands: *Hypocaccus brasiliensis* (in *Sargassum* sea-weed on Cousine), *Hololepta* cf. *minuta* (Silhouette) and *Platylomalus gardineri* (Cousine) (S. Mazur pers. comm.).

Hydrophiloidea: A wide range of species were collected, including the mist-forest endemic *Bourdonnasia* (Mahé, Silhouette).

Lymexyloidea: The effects of *Melitomma insulare* on coconut palms were observed on many islands but adult beetles were only located at Grande Barbe, Silhouette.

Scarabaeoidea: Scarabaeidae included *Orycteres monoceros*, *Aphodius lividus* (11 specimens from 2 islands), *A.* cf. *nigritus* (83, 1 island), *Ataenius lodoiceae* (1), *Saprosites laticeps* (9, 1 island), *Rhyssemus* sp. (4, 2 islands), *Trichiorhyssemus* sp. (24, 6 islands), *Onthophagus* sp. (10, 3 islands), *Parastasia coquereli* (4, 2 islands), *Adoretus versutus* (17, 3 islands), *Oxycetonia versicolor* (1), *Protaetia aurichalcea* (3, 2 islands) (B. Smith pers. comm.). One species of Lucanidae (*Figulus striatus*) was collected in high forest rotting wood on Silhouette.

Staphylinoidea: Large numbers of staphylinids were collected but these are particularly difficult to identify and only *Scopaeus punctatellus* and *S. limbatus* have been identified (J. Frisch pers. comm.). Pselaphidae were locally abundant (in high forest).

Tenebrionoidea: A small number of Anthicidae, Oedmeridae and Tenebrionidae were collected and of the Aderidae one *Aderus* sp. was collected on Silhouette (M. Ivie pers. comm.).

Siphonaptera – one flea species is recorded; *Ctenocephaloides felis felis* was found on Silhouette and Mahé.

Diptera – The most abundant animals in the collection are Diptera. The most conspicuous flies are *Musca domestica* and Sarcophagidae, being observed on almost all islands.

Anthomyzidae: A single endemic species, *Echidnocephalodes barbatus* is present on Mahé and Silhouette (J. Deeming pers. comm.).

Asilidae: Three species have been recorded previously (*Cophinopoda pulchripes*, *Heligmoneura insularis* and *Leptogaster tenuis*). The present collection includes at least two species, including *Leptogaster* sp. from coastal sites, including Silhouette (J. Londt pers. comm.).

Bombyliidae: A small number of specimens.

Calliphoridae: The most conspicuous calliphorid is *Rhinia scotti*, which hovers in shade on a range of islands (Mahé, Anonyme, Silhouette and La Digue). Collections include *Hemipyrellia fernandica* (Silhouette, Cousine) and *Chrysomya megacephala* (Silhouette, La Digue) (Verves 2003)

Ceratopogonidae: Large collections were made, particularly in

the high forests of Silhouette.

Chironomidae: All species located were intertidal, all were recorded on Silhouette: *Clunio* sp. n., *Polypedilum (Polypedilum) brunneicornis*, *P*. (*Tripodura*) sp. n., *Pseudosmittia triangula*, *Semiocladius brevicornis*, *Tanytarsus esakii* and ?*Smittia* sp.n. All were new records for Seychelles, except *Polypedilum brunneicornis* (O. Saether pers. comm.). In addition *T. esakii* was observed on other islands, including Mahé.

Chloropidae: A small number of species, including the genus *Oscinella* are present (J. Deeming pers. comm.).

Culicidae: The most abundant and widespread species are *Aedes albopictus* and *Culex fatigans*. The endemic *Pseudoficalbia pandani* was found in high forest on Silhouette.

Dolichopodidae: Dolichopodids are widespread and diverse.

Drosophilidae: Drosophilids are diverse and locally abundant. These are the subject of the "Review of the current biodiversity of fruitflies (Diptera, Drosophilidae) of Seychelles" (CNRS, Laboratoire Populations, Génétique & Evolution, Nature Protection Trust of Seychelles and Island Conservation Society).

Empidoidea (text provided by A. Stark): According to the "Catalogue of the diptera of the Afrotropical region" (Smith 1980), only 5 hybotid species have been hithertho recognised from the Seychelles Archipelago. This seems to be a rather poor diversity of these flies in comparision with other parts of the Afrotropical region. The material from the granitic islands contains only one specimen belonging to *Crossopalpus* (1 male; La Passe (above Dauban mousoleum), Silhouette, 1-4 July 2000, Malaise trap). Collin (1922) described two *Drapetis* from Seychelles; both transferred to *Crossopalpus* by Smith (1980). A comparision of this specimen with the descriptions given by Collin (1922) led me to the conclusion, that the specimen belongs to *Crossopalpus angustata.* As Collin did not mention anything on the shape of the male genitalia there may remain some doubt of my determination. Nevertheless, all other characters - eg. the wing (Fig. 6) - mentioned by Collin fit well with the recent specimen.

**Fig. 6** Wing venation of *Crossopalpus angustata*, Silhouette 2000 (photo: A. Stark)

As imagoes *Crossopalpus* are ground dwelling predators of small, soft bodied insects. The larvae are probably predators of other diptera larvae (Cumming & Cooper 1993). They live in moist soil, leaf litter or debris.

Hippoboscidae: The single Seychelles species *Lynchia maura* was not located; bird parasties have not been adequately studied in Seychelles.

Lauxaniidae: Several specimens of a range of species are present, including *Homoneura laticosta* (Silhouette and North). This abundant Oriental and Australasian species has not previoulsy been recorded in Seychelles and appears to be a recent introduction (J. Deeming pers. comm.).

Lonchaeidae: A small number of species collected, including the high altitude *Dasiops vibrissifer* and *Lonchaea minuta.* (J. Deeming pers. comm.).

Milichidae: One endemic species, *Neophyllomyza approximatonervis* was collected (J. Deeming pers. comm.).

Muscidae: A diverse collection, apparently including most of the species recorded in 1905-9. Since the Percy Sladen Memorial Expedition there have been collections of two additional species (*Atherigonia* sp. and *Morellia* sp.). *Atherigona* sp. is widespread in lowland areas (A. Pont per. comm.).

Mycetophilidae: Fungus-gnats were abundant in some localities and include *Leia* sp. (Cerf, St. Anne, Silhouette 0-550m a.s.l., North, Curieuse), *Epicypta* 2 spp. (390-550m), *Pseudexechia* sp. (Silhouette 390m a.s.l.), *Neoplatyura* sp. (Cerf, St. Anne, Silhouette 350m a.s.l., North), *Manota flavipes* (from Silhouette 390m a.s.l.; previously recorded from high forest on Mahé and Silhouette), *Phronia* sp. (Silhouette 390m a.s.l.), *Allactoneura argenteosquamosa* (from Jardin Marron, Silhouette; previously recorded from high forest on Mahé and Silhouette) (U. Kallweit pers. comm.). Scott (1910) previously noted the abundance of Mycetophilidae in high forest, the occurrence of *Leia* sp. and *Neoplatyura* sp. in coastal areas are notable departures from this pattern.

Neriidae: The endemic *Chaetonerius allaudi* is highly abundant in forest areas with abundant rotten fruit.

Phoridae: Several species have been collected, including pantropical species, long-term resident cosmpolitan species, recent introductions and endemics. The new material is resulting in a major revision of the Seychelles Phoridae (e.g. Disney 2002).

Pipunculidae: None were collected.

Psychodidae: were not suitably preserved for full identification. The collection included *Brunettia* spp. (Silhouette 10-550m), one undescribed *Clogmia* sp. (North), *Psychoda* spp. (Silhouette 0-

550m and North), *Setomima* spp. (Silhouette 390m and North) *Telematoscopus* sp. (*Calophyllum* woodland on North), *Trichomyia* sp. (coastal Silhouette and North) and *Trichopsychoda* sp. (coastal Silhouette) (L. Quate pers. comm.).

Sarcophagidae: A small number of species were collected, including *Transvaalomyia seychellica* (Silhouette), *Liosarcophaga tibialis* (Silhouette, North, Aride) and *Boettcherisca peregrina* (Silhouette) (Verves 2003).

Scatopsidae: A small number of specimens were located.

Scenopodidae: One species was located on Silhouette, this may be the only species reported from Seychelles; *Scenopinus balteatus* (previously recorded from Mahé).

Sciaridae: A small number of specimens were located.

Simuliidae: The only Seychelles species, *Simulium (Nevermannia) speculiventre* was collected on Mahé and Silhouette (R. Crosskey pers. comm.).

Sphaeroceridae: Few specimens have been collected, these are identifiable as *Poecilosomella angulata* (J. Deeming pers. comm.).

Stratiomyidae: 5 species were collected, 4 on Silhouette: *Argyrobrithes albopilosellus*, *Cephalochrysa hovas*, *Lophoteles plumula* and *Microchrysa flaviventris*, and one on Mahé (Mare aux Cochons): *Tinda javana*. All species were recorded in high-altitude forest where stratiomyiid larvae are among the most abundant detritivores, *C. hovas* and *M. flaviventris* were also present in coastal sites. The 5 other species recorded in Seychelles have not been identified from the collection to date (N. Woodley pers. comm.).

Platystomatidae: One specimen was collected, four species have been recorded previously (3 endemic); *Scholastes vicarious*, *Plagiostenopterina cyanosoma*, *P. ruficeps* (also Madagascar) and *Parardelio pilosus* (only from Seychelles). Of these only *S. vicarious* and *Plagiostenopterina cyanosoma* have been collected recently (on Cousine; A. Whittington pers. comm.).

Syrphidae: Of the four Seychelles species *Melanostoma annulipes* and *Ischiodon aegyptium* were common at low altitudes on Silhouette. *I. aegyptium* was also present on Aride (C. Thompson pers. comm.).

Tabanidae: Three species have been recorded in the granitic islands, of these the lowland *Tabanus albipectus* has the widest distribution (Mahé, Silhouette, Praslin, Aride), the endemic *Bouvierella alluaudi* was locally abundant in forests on Silhouette and Mahé (previously also recorded on Praslin and Felicite) and the similar but duller *B. inornata* was also present on Mahé and Silhouette although often overlooked.

Tachinidae: These are locally abundant, but not presently identi-

fied.

Tephritidae: *Ceratitis capitata* was collected widely (from small islands like Cocos to Mahé), being locally highly abundant; the species has been recorded on Mahé previously (M. de Meyer pers. comm.).

Tipulidae: A small number of species were collected, mostly from high forest on Mahé and Silhouette.

Ulidiidae (=Otitidae): One specimen was collected, representing the first record of this family in Seychelles.

Lepidoptera – An extensive collection was made, comprising the majority of species recorded in Seychelles. New records for the granitic islands included *Achaea violaceofaciata* (Noctuidae). Many species have not been recorded since 1909 but most of these are inconspicuous and probably under-recorded. A small number of large, easily identifiable taxa are of note: *Cephonodes tamsi* (Sphingidae), *Macroglossum alluaudi* (Sphingidae) and *Euploea mitra* (Danaidae). The butterfly *Phalanta philiberti* could not be located, it has not been found for over 50 years and there remains little doubt that this species is extinct. The IOBA collected the first Gracillaridae to be recorded in the islands; *Neolithocolletis pentadesma* is a leaf-miner in *Pterocarpus indicus* on Mahé and Fregate.

Trichoptera – few caddisflies were found. Larvae of *Helicopsyche* spp. are common in streams on Mahé and *Hydromanicus seychellensis* larvae were found in the Riviere Machabee on Silhouette. The only adult caddisflies were found at Mare aux Cochons (Mahé) – *Oecetis michaeli* and *H. seychellensis* (H. Maliky pers. comm.)

Hymenoptera – The majority of the hymenoptera remain unidentified.

Apoidea: include honey bees (*Apis mellifera*) from Mahé, St. Anne, Silhouette, Praslin, Aride and Cousine, *Eupetersia scotti* and *Lasioglossum mahense* on Silhouette, *Xylocopa caffra* on Silhouette and Cousine, and *Ceratina madecassa* on Mammelles (A. Pauly pers. comm.). *Megachile seychellensis* was widely observed (Mahé, Silhouette, Praslin).

Chrysoidea: the family Chrysidae was represented by one species, *Chrysis licea* on Silhouette (Gerlach & Madl 2003).

Formicoidea: ants comprised at least 33 of the 38 recorded species (R. Snelling pers. comm.). The most widespread ants found on all islands at least as large as Round island were *Technomyrmex albipes, Odontomachus simillimus, Camponotus grandidieri, C. hova*. The crazy ant *Anoplolepis gracilipes* was recorded on Mahé, St. Anne, Anonyme, Praslin, Marianne, Felicite, Petite Soeur and La Digue.

Ichneumonoidea: A small number of species were collected.

'Microhymenoptera': Few microhymenoptera were collected,

significant specimens include an apparently endemic species of *Cheliloneurus* (Encyrtidae) from Jardin Marron, Silhouette. The paucity of specimens may be associated with a high abundance of ants in all survey locations; most species collected by the Percy Sladen Memorial Expedition have not been collected subsequently; recent collections have included 77 species from Mahé and 73 from Silhouette: Aphelinidae – 5 Mahé, 10 Silhouette (*Aphelinus* sp., *Aphytis* spp., *Coccophagus* sp., *Encarsia* spp., *Eretmocerus* sp., *Marietta* sp.); Chalcididae – 5 Mahé, 5 Silhouette (*Brachymeria* sp., *Dirhinus* sp., *Hockeria* sp., *Psilochalcis* sp., *Proconura* sp.); Elasmidae – 1 Mahé, 2 Silhouette (*Elasmus* spp.); Encyrtidae – 33 Mahé, 33 Silhouette (*Achalcerinys* sp., *Adelencyrtus moderatus*, *A.* ?*odonaspidis*, *Anagyrus* ?*quadrii*, *A.* spp., *Anicetus* spp., *Anomalicornia tenuicornis*, *Anusoidea* sp., *Blepyrus insularis*, *Cerchysiella* sp., *Cheiloneurus cupreicollis*, *C.* ?*cyanonotus*, *C.* aff. *Gonatopodis*, *C.* aff. *elegans*, *C.* ?*orbitalis*, *C.* ?*bifasciata*, *C.* sp., *Coccidencyrtus* sp., *Cryptanusia albiclava*, *Diversinervus cervantesi*, *Echthrogonatopus* sp., *Encyrtus aurantii*, *E. infelix*, *Exoristobia* sp., *Gyranusoidea* sp., *Homalotylus* sp., *Leptomastidea* ?*abnormis*, *Leptomastix dactylopii*, *L.* sp., *Mahencyrtus occultans*, *Metaphycus* spp., *Microterys* sp., *Neodusmetia sangwani*, *Ooencyrtus* sp., *Parablatticida* sp., *Plagiomerus* sp., *Prochiloneurus pulchellus*, *Rhopus gramineus*, *Syrphophagus* sp., *Tetracnemoidea* sp.); Eulophidae – 17 Mahé, 13 Silhouette (*Achrysocharis cardigaster*, *Aprostocetus* (*Ootetrastichus*) sp., *Asecodes* sp., *Ceranisus* sp., *Cirrospilus* sp., *Closterocerus* sp., *Entedonomorpha* sp., *Euderus aemula*, *Euplectrus* sp., *Neochrysocharis* sp., *Nesolynx phaeosoma*, *Notanisomorphella borbonica*, *Pediobius* sp., *Pediobomyia darwini*, *Sympiesis* sp., *Sympiesomorpha modesta*, *Stenomesius japonicus*, *Tetrastichus dispar*); Eupelmidae – 1 Mahé (*Eupelmus* spp.); Eurytomidae – 2 Mahé, 1 Silhouette (*Bruchophagus* sp., *Tetramesa* sp.); Mymaridae – 2 Mahé, 2 Silhouette (*Chartocerus* sp., *Gonatocerus* sp., *Polynema* sp.); Mymarommatidae – 1 Silhouette (*Palaeomymar* sp.); Perilampidae – Mahé 1 (*Chrysolampus* sp.); Pteromalidae – 11 Mahé, 5 Silhouette (*Callitula* sp., *Cleonymus* sp., *Cryptoprymna* sp., *Merallus* sp., *Metastenus* sp., *Moranilla californica*, *Neocalosoter* sp., *Notoglyptus scutellaris*, *Pachycrepoideus vindemmiae*, *Pteromalus morio*, *Scutellista coerulea*, *Spalangia* sp.); Signiphoridae – 1 Mahé (*Signiphora* sp.); Tetracampidae – 1 Silhouette (*Epiclerus* sp.) (J. Noyes pers. comm.).

Scolioidea: The introduced *Scolia ruficornis* was recorded on Silhouette and La Digue (Gerlach 2003).

Sphecoidea: Several species were located.

Vespoidea: widespread with *Polistes olivaceus* recorded on islands ranging in size from Cachée to Mahé ; *Delta alluaudi* on Mahé, Round island, Silhouette, Praslin; *Euodynerus seychellensis* was found on Mahé, Round island, Silhouette, Praslin; *Rhynchium brunneum* and *Subancistrocerus sichelii* were more localised, being recorded from Mahé, Cerf, Round island (Mahé), Silhouette and Praslin.

Chordata

Amphibia – The distribution of the Amphibia has been accurately reported by Nussbaum (1984), the only addition is *Sooglossus pipilodryas* on Silhouette (Gerlach & Willi 2002) and populations of *Praslina cooperi* and *Grandisonia brevis* on Silhouette (Hedges *et al.* 1993; pers. obs.).

Reptilia – Significant observations were made on the morphological diversity of *Mabuya seychellensis* and *M. wrightii*. A population of *Janetascincus braueri* was found on Curieuse. *Ailuronxy tachyscopaeus* was identified on Conception and *Hemidactylus mercatorius* on Fregate. All recorded species were located, except the probably extinct terrapin *Pelusios seychellensis*.

Aves – No significant records were made, all bird distributions have been well determined (Skerrett *et al.* 2001).

Mammalia – No new records of mammals were made.

### 4.2 Key sites

Sites of immediate importance for all biodiversity

Mahé: **Morne Seychellois National Park** – high forest covering the important areas of Mare aux Cochons (a unique high-altitude marsh fauna), Morne Blanc (a small area of good quality mist forest but extensively degraded), Morne Seychellois (highly degraded except for the plateau with several *Rapanea seychellarum* trees) and Congo Rouge (the only significant and relatively healthy area of mist forest on Mahé).

**Beau Vallon** – important terrapin habitat, also important for aquatic insects in the marsh near the Fisherman's Cove hotel.

**Mont Sebert** – an inselberg with an exceptionally important flora.

**Grand Bois** – a relict *Vateriopsis seychellarum* forest; one of the most important biodiversity refugia on Mahé.

**La Reserve** – the most important palm forest on Mahé.

**Police Bay** - the largest marsh in the granitic islands, important for aquatic fauna.

Cerf - the marsh is important habitat for terrapins

Silhouette: **Mt. Corgat** – high quality moss forest, significant populations of high altitude fungi, plants and animals.

**Jardin Marron, 'Coco de Mers'** – one of the highest diversity areas of

palm woodland.

**Mon Plaisir** – high altitude forest, exceptionally diverse Mollusca, Orthoptera, Myriapoda and Amphibia.

**Mt. Pot a Eau** – moss forest with an exceptional fern flora and specialised animals.

***Pisonia* forest** – a unique forest type with important endemic plants and animals. Only site for *Pisonia sechellarum.*

**Mt. Dauban** – the highest quality moss forest in Seychelles.

***Impatiens* site** – a microhabitat with important floral and fauna diversity. The key site for *Impatiens gordonii.*

**Gratte Fesse** – High altitude *Pandanus hornei*, with a specialised fauna and high amphibian diversity, the only known locality for the endemic hydrobiid snail.

**Grande Barbe** – One of the largest semi-natural marshes in Seychelles.

**South coast** – the only substantial area of primary coastal forest in Seychelles.

Felicite - good quality lowland forest.

Grande Soeur – important for Odonata

Praslin: **Praslin National Park** – the largest *Lodoicea maldivica* forest, with associated fauna.

Frégate – a biogeographically unique island with an important invertebrate fauna, also important terrapin habitat

Islands with sea-bird ecosystems

**Sèche**
**Isle aux Vaches Marines**
**Cousin**
**Cousine**
**Aride** – also notable for *Rothmannia annae* and *Peponium vogelii*
**Booby** – also notable for *Peponium vogelii*
**Mammelles**
**Ave Maria**
**Recifs**
**Ilot Fregate** – also notable for *Boerhavia diffusa*

Islands currently of low conservation value but high potential

**Anonyme**
**North**
**Marianne**

Sites with important plants

Souris – the only locality for *Ficus densifolia.*

Silhouette: **Peak south of Mt. Corgat** – important glacis vegetation

**Jardin Marron, 'glacis'-** high altitude glacis with a rare combination of hygrophilic and xerophytic plants and lichens

Sites with importance for single animal species

Conception - important for the Seychelles white-eye *Zosterops modesta*.

Silhouette: **Belle Vue** – important for the Seychelles fineliner damselfly *Tenibasis alluaudi.*

Curieuse - the only Seychelles locality for the spider *Atrophonsia intertidalis*, also the main population of the plant *Secamone schimperiana.*

## 5. Discussion

The preliminary assessment of the material collected by the IOBA indicates that a number of sites are of great importance for biodiversity conservation (section 4.2), most notably on the high islands of Mahé and Silhouette. The assessment further supports earlier reports that the use of biodiversity indicators needs to be approached with caution. Few taxa make good indicators and the widespread use of vertebrates, and birds in particular, is not reliable. This is demonstrated from data on all invertebrates and vertebrates on Silhouette island (Gerlach 2003b) and larger scale studies of continental data sets that demonstrate that large Lepidoptera can be useful indicators whilst birds do not provide accurate indications of overall biodiverity levels (Lund & Rahbek 2002).

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## References

Bowler, J., Blackman, S., Bradbury, G., Dixon, W. & Hannah, L. 2001 Invertebrates of the top-soil and leaf litter, and their use by the Seychelles Magpie Robin *Copsuchus sechellarum*. In: Bowler, J. & Hunter, J. *Aride Island Nature Reserve Seychelles, Annual Report 2000.* RSNC unpublished.

Collin, J.E. 1922 Empididae from Seychelles. *Ent. Monthly Mag.* **3**(8): 184-189

Cumming, J. M. & Cooper, B. E. 1993 Techniques for obtaining adult-associated

immature stages of predacious Tachydromiinae flies (Diptera: Empidoidea), with implications for rearing and biocontrol. *Entomol. news* **104**: 93-101

Disney, R.H.L. 2002 Revisionary notes on *Chonocephalus* Wandolleck (Diptera: Phoridae) with keys to species of the Holatrctic. *Zootaxa* **60**; 1-36

Gardiner, J.S. 1907 The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner. I - Description of the expedition. *Trans. Linn. Soc. Lond*. **12**; 1-25

1936 Concluding remarks on the distribution of the land and marine fauna, with a list of the water temperature observations. *Trans. Linn. Soc. Lond* **19**; 447-464

Gerlach, J. 1992 The conservation of Silhouette island, Seychelles. I. Plants *Phelsuma* **1**; 18-28

1995 Tropical leaf litter inhabiting invertebrates, patterns of abundance and sampling methods. *Phelsuma* **3**; 23-30

2003a New terrestrial Gastropoda from Seychelles. *Phelsuma* **11**; 39-48

2003b The presence of *Scolia ruficornis* in Seychelles (Scoliidae: Hymenoptera). *Phelsuma* **11**; 76

2003c (in press) Patterns of species diversity in Seychelles . *Biota.*

Gerlach, J. & Madl, M. 2003 First record of the family Chrysidae (Insecta: Hymenoptera) from Seychelles. *Phelsuma* **11**; 77

Gerlach, J. & Willi, J. 2002 A new species of frog, genus *Sooglossus* from Silhouette Island, Seychelles. *Amphibia-Reptilia* **23**; 445-458

Hedges, S.B., Nussbaum, R.A. & Maxson, L.R. 1993 Caecilain phylogeny and biogegoraphy inferred from mitochondrial DNA sequens of the 12S rRNA and 16S rRNA genes. *Herpet. Monogr.* **7**; 64-76

Hill, M.J. 2002 Biodiversity surveys and conservation potential of inner Seychelles islands. *Atoll Res. Bull*. **495**

Lund, M.P. & Rahblek, C. 2002. Cross taxon congruence in complementarity and conservation of temperate biotas. *Anim. Cons*. **5**; 163-171

Saaristo, M. 2002 New species and interesting new records of spiders from Seychelles (Arachnida, Araneae). *Phelsuma* **10A**; 1-32

Scott, H. 1910 Eight months' entomological collectin in the Seychelles islands, 1908-9. *Trans. Linn. Soc. Lond*. **14**; 21-39

Seaward, M.R.D. & Aptroot, A. 2003 Lichens of Silhouette Island (Seychelles). *Bib. Lichenol*. **86**; 423-439

Skerrett, A., Bullock, I. & Disley, T. 2001 *Birds of the Seychelles*. Princeton University Press. 320 p.

Smith, K. G. V. 1980 32. Family Empididae. – Pp. 431-444 in: Crosskey, R. W. (ed.): *Catalogue of the diptera of the Afrotropical region*. British Museum (Natural History) London.

Verves, Y. 2003 A preliminary list of species of Calliphoridae and Sarcophagidae (Diptera) of the Republic of Seychelles. *Phelsuma* **11B**

Wouters, J. 2002 On the distribution of *Cyprideis torosa* (Jones) (Crustacea, Ostracoda) in Africa, with the discussion of a new record from the Seychelles. *Bull. Inst. R. Sci. Nat. Belg. Biol*. **72**; 131-140

## Appendix I. Island accounts

The following accounts give breif summaries of the main charactersitics of the islands and sites visited. Plant and vertebrate records are comparativley well known and are consequenlty not discussed in detail.

### Mahé

Mahé is the most extensively studied of all Seychelles islands as all expeditions and collectors have at least passed through the island. It has the highest biodiversity of the islands due to its size and height and to the influx of introduced species in areas of human habitation. This includes species such as the crazy ant *Anoplolepis gracilipes* which was a species of conservation concern in the 1970s, but has now reached a balance in most areas and is of little consequence. Surveys have aimed to collect the most important sites for native biodiversity and also investigate areas if alien invasion. The important conservation areas are concentrated in the central highlands, except for Grand Bois and La Reserve at lower altitudes.

Important species on the island include the Seychelles scops owl (*Otus insularis*), the large population of Seychelles kestrel (*Falco araea*), the relict Seychelles white-eye (*Zosterops modesta*) population, the amphibians, the endemic snail genus *Imperturbatia* and the plants *Vateriopsis sechellarum, Gastonia crassa, G. lionneti* and *Medusagyne oppositifolia*.

**Mare aux Cochons -** The marsh at Mare aux Cochons is one of the most important habitats on Mahé. The small marsh fringed with *Pandanus hornei* supports a wide diversity of aquatic invertebrates, including flies, 6 Odonata species, beetles (diving beetles and the whirligig gyrinid beetle), abundant crabs (*Seychellum alluaudi*), pond skaters, the very localised water measurer *Hydrometra seychellarum*, and several species of shrimps. Vertebrates include the tree frog *Tachycnemis seychellensis*, Mascarene frog *Ptychadena mascariensis* (one white frog seen, believed to be this species), with *Sooglossus gardineri* and *S. sechellensis* being abundant in the surrounding forest. Streams nearby support the damselfly *Leptocnemis cyanops*. The localised fern *Schizea confusa* is present and a range of rare plants, included a substantial planted population of *Vateriopsis seychellarum*.

**Mare aux Cochons – Casse Dent** - The damp forest east of Mare aux Cochons supports significant plant populations, with a wide variety of orchids, *Seychellaria thomasseti* and a single tree of *Grisollea thomasseti*.

**Casse Dent** - The small area of open vegetation next to the stream is significant for its number of recorded invertebrates. This is largely due to accessibility and most species are probably present in other areas of high altitude forest and stream.

**Trois Frerès** - The high forest of Trois Freres is dominated by introduced plants

although a relict population of *Impatiens gordonii* survives. The fauna is typical of the higher parts of Mahé.

**Morne Blanc** - The mist forest on Morne Blanc has the largest remaining population of *Janetascincus braueri* and *Pamelascincus gardineri* skinks. The flora is diverse at the summit, although heavily invaded on the lower slopes. The site retains important invertebrate populations, such as the snail *Pilula mahesiana*.

**Morne Seychellois** - Although this is the highest mountain in Seychelles much of the slopes are highly degraded by invasive plants and the biodiversity value is much reduced. The small plateau on the summit is of great important, with rare plants such as *Rapanea seychellarum* and associated invertebrates.

**Congo Rouge** - The mist forest of Congo Rouge has a high degree of alien plant invasion but retains a diverse and important flora and a highly diverse endemic invertebrate fauna. The site is also important for the Sooglossid frogs.

**Beau Vallon** Historically Beau Vallon was a large marsh system. This is now restricted to the Rivère Mare Anglaise and a shallow western marsh. The river is highly degraded but retains the last significant *Pelusios castanoides* terrapin population on Mahé. The marsh supports a small number of terrapins, a wide range of dragonflies and damselflies (4 species, including the highly localised *Agrionemys pygmaea*) and the water stick insect *Ranatra grandoculata.*

**Roche Caiman Bird Sanctuary -** Material from the Bird Sanctuary was accumulated over a number of years as part of other studies. Initially this represented an area of planted *Casuarina equisetifolia* woodland and open seasonal marsh. The fauna was dominated by cosmopolitan and introduced species. In the last few years the open ground has become covered with *Typha javanica* and faunal diversity has declined. The site is no longer of any biodiversity significance.

**Le Niol -** Suburban habitat was studied. A wide range of cosmopolitan and introduced species were present. Endemic taxa were restricted to some small beetles, pseudoscorpions, schizomids and the snail *Helicina theobaldiana.*

**Mont Sebert** - The specialised environment of this inselberg is well known for its flora, including *Medusagyne oppositifolia.* The localised fern *Schizea confusa* is present just below the inselberg and in the vegetation in the granite fissures the undescribed epiphytic orchid *Bulbophyllum* sp. is present. The fauna is relatively sparse but a number of localised species are known from the site.

**Grand Bois** - The relict *Vateriopsis seychellarum* forest is one of the most important biodiversity refugia on Mahé. The site deserves full protection for its *Vateriopsis* forest alone, it also supports abundant *Gastonia seychellarum* and *Canthium carinatum.* A small but significant fauna (especially Coleoptera, including the weevil *Cratops muticus* – P. Matyot pers. comm.) is present and the site supports the snail *'Gulella' thomasseti*.

**La Reserve** - The palm forest at La Reserve is the most important area of this habitat on Mahé. It supports a wide range of endemic plants and a specialist, palm-associated fauna.

**Police Bay** - This is the largest marsh in the granitic islands and is an important site for the aquatic fauna. Dragonflies and damselflies are abundant and 7 species observed (*Ceriagrion glabrum, Diplacodes trivialis, Hemicordulia similis, Ischnura senegalensis, Orthetrum semmale, Rhyothemis semihyalina* and *Tramea limbata*).

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**St. Anne**

Of all the Seychelles islands St. Anne has the longest history of human settlement and this is reflected in the highly disturbed nature of its habitats. There are no areas of intact natural habitat with the exception of a small patch of *Pheonicophorium borsigianum* palm forest. Other habitats are largely alien, although there are significant numbers of regenerating native plants, including the endemic *Tarrena seychellarum* which is rare on the islands around Mahé.

The animal life also includes many introduced species and relatively few endemics. A small population of fruit bats *Pteropus seychellensis* (20 were observed) are present as are blue pigeons (*Alectroenas pulcherrima*) and Seychelles kestrel (*Falco araea*). The most significant species recorded was the crazy ant *Anoplolepis gracillipes*. These were highly localised in December 2001 and appeared to be a recent colonisation. This is likely to have a major impact on the fauna over the next few years before a balance is reached (compare with the situations described for Mahé, Praslin, Petite Soeur, Marianne, Felicite and La Digue). The introduced carnivorous snail *Gonaxis quadrilateralis* is also abundant in lowland area. The most important species recorded on St. Anne is the endemic snail *Stylodonta unidentata*, however this is represented by sub-fossil material only.

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**Cerf**

Cerf island supports a diversity of habitats, much of the plateau is extensively modified by habitation and the hill is largely eroded *Chrysobalanus icaco* scrub with areas of woodland, all heavily invaded by *Memecylon caeruleum* and *Ochna kirkii*. The most important habitat on the island is the marsh which supports the island's most important species: the terrapins *Pelusios subniger parietalis* and *P. castanoides intergularis* and the giant tortoises (mostly Aldabra tortoises *Dipsochelys dussumieri* but also a single male *D. hololissa*). The marsh habitat also encourages the development of a diverse dipteran fauna, including important populations of Phoridae and Caecidomyiidae. The endemic skink *Pamelascincus gardineri* is also present.

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**Cachée**

Cachée is distinctive in being dominated by Pterocarpus indicus, although currently uninhabited the vegetation has been extensively modified by human settlement and visitation and native plants are restricted to *Ficus lutea, Calophyllum inophyllum* and *Cocos nucifera.* Although the island is very small it has a deep laterite soil, full of *Cardisoma carnifex* crab burrows. No significant species of animal or plant were located.

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**Long**

Access to Long island is restricted and it was not visited. The island was studied in 1905 when the Percy Sladen Memorial Expedition visited it on 27-29th October. The island was studied thoroughly but only a small range of species were found. All species collected in 1905 have been found to be widespread on Mahé.

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**Moyenne**

Moyenne was not visited as part of the IOBA. The island has been extensively planted and modified by human occupation. No significant animal or plant populations have been reported from the island. Moyenne was visited by the Percy Sladen Memorial Expedition but no records were made.

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**Round (Mahé)**

Round island is dominated by alien vegetation and most of the animal life comprises cosmopolitan species. The only notable records are the pteridophyte *Psilotum complanatum* and the Seychelles endemic snail *Helicina theobaldiana*. Rat eaten snail shells are abundant indicating a high rat population density.

Cryptogamic plants are present but not diverse or abundant. The only pteridophyte present is *Psilotum complanatum* and only 28 angiosperms are present. There is a high proportion of alien species with few native plants (notable natives include *Xylocarpus granatum* and *Intsia bijuga*).

Animal life is similarly restricted, with most species being cosmopolitan. Identified exceptions are the endemic spider *Myrmarachne constrictus,* and the potter wasps *Delta alluaudi* and *Euodynerus seychellensis.*

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**Sèche**

Sèche is one of the smallest islands but is significant for supporting breeding sea-birds and the associated fauna typical of larger sea-bird islands. There is a deep layer of humus and guano in pockets on the granite boulder base. The vegetation is dominated by sedge with a small area of *Pisonia grandis* and *Ficus lutea*

trees. The most notable plant present is *Boerhavia repens.*

Giant millipedes *Sechelleptus seychellarum* are abundant. The *Pisonia grandis* trees support a drosophilid fly, margarodid mealy bugs (?*Icerya seychellarum*) and large numbers of small biting ants.

Birds observed in December 2001 (outside of the main sea-bird breeding season) comprised Audubon's shearwater (*Puffinus lherminieri*), common noddies (*Anous stolidus*), bridled terns (*Sterna athanaeus*). Seychelles skinks (*Mabuya seychellensis*) are of the sea-bird island morphotype, distinct from those on other islands of the Mahé group except of Isle aux Vaches Marines.

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**Anonyme**

Anonyme has a high proportion of its area dedicated to buildings and gardens but retains a diversity of native coastal plants (e.g. *Pandanus balfouri, Cordia subcordata, Thespesia populenea, Hibiscus tiliacaeus, Canthium bibracteatum, Morinda citrifolia*). Glacis vegetation is notably healthy. The most important plant species located was *Ipomoea venosa.*

Animal life is moderately diverse. The most significant was the calliphorid *Rhinia scotti*. A small fresh-water fauna was present in temporary pools of rain-water, comprising dragonflies (*Orthetrum stemmale wrighti, Diplacodes trivialis*), water boatmen (*Anisops varius*) and pond skaters *Gerris* sp. The crazy ant *Anoplolepis gracilipes* is present throughout the island but at moderate densities and coexisting with a diverse leaf-litter fauna. This appears to be a long-established stable introduction of little ecological consequence. The introduced tenrec *Tenrec ecaudatus* is present.

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**Rat**

Despite its name there is no evidence of mammals on Rat island. This island is a single dome of granite with a thin covering of leaf litter produced by the dominant *Scaevola sericea* plants. The most abundant animals are the littoral isopod *Ligia exotica* and the crabs *Grapsus tenuicrustatus*. There are no resident vertebrates although waders use the island as a high-tide roost and Indian mynahs (*Acridotheres tristis*) visit occasionally.

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**Hodoul**

Hodoul is one of the most important of the smallest islands due to its grey heron (*Ardea cinerea*) and cattle egret (*Bubuculus ibis seychellarum*) colony. These nest in the *Cordia subcordata* tree and roost in the *Casuarina equisetifolia,* making it very difficult to survey without causing disturbance to this important colony. No skinks were found despite the island's proximity to Mahé and the only animals

seen other than herons and egrets were barred ground doves (*Geopelia striata*).

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**Souris**

Souris is one of the smallest islands. A fire in the 20th century destroyed most of the vegetation and the island is dominated by *Casuarina equisetifolia*. A *Ficus densifolia* was planted on the island in 1937 from a parent tree on Mahé. The Souris tree remains and is at present the only *F. densifolia* recorded outside of the Mascarenes. It is not known if this species is indigenous or was introduced from the Mascarenes.

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**Chauve Souris (Mahé)**

This is the smallest of the granitic islands. It supports only 5 plant species (2 *Ficus lutea* and 3 coconuts). There is no real leaf litter but pockets of accumulated leaves support a small number of spiders. In addition one cricket, the ant *Camponotus grandidieri* and the crabs *Grapsus tenuicrustatus* and *Geograpsus stormii* were located. This depauperate fauna is due to the small size of the island and its occasional inundation. A singe *Xylocopa caffra* bee was observed visiting the island.

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**Isle aux Vaches Marines**

This is one of the most exposed islands, with only shrubby vegetation over most of its surface. These shrubs are almost entirely *Ficus reflexa* (1-1.5m tall). There are patches of fern and sedge and some coconuts at the sea-edge. The most obvious animals are the sea-birds and the skinks (the sea-bird island form of *Mabuya seychellensis*). Invertebrates are generally scarce although they may be locally diverse. The giant millipede *Sechelleptus seychellarum* is present, as is the introduced snail *Achatina fulica.*

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**Thérèse**

Most of the island has been modified through human occupation and much of the island is dominated by coconut scrub. The northern end has interesting glacis vegetation, with much *Diospiros seychellarum.* To the south there is a small beach with some good *Tournefortia argentea* (unusually for one of the southern granitic islands) and there is an excellent fringe of coastal forest. Two species of Odonata were associated with a small mangrove swamp.

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**Conception**

This rocky island has been extensively modified by coconut plantation (now abandoned). Important areas of *Phoenicophorium borsigianum* palm forest are present and the south side of the island has a diverse native lowland forest, including *Intisa bijuga.* The fauna includes the most important population of Seychelles white-eye *Zosterops modesta*, the dwarf bronze gecko *Ailuronxy tachyscopaeus* and the snail *Stylodonta unidentata*.

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**Islette**

Islette was almost entirely modified by human habitation in the past. This is now ruined and the gardens overgrown. The island has a mixture of introduced species and dense regrowth of ferns and *Alophyllus seychellensis*. The fauna is not significant.

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**L'Ilot**

This small rock supports only a small number of trees (coconuts, *Ficus lutea* and *Hibiscus tiliacaeus*) and a similarly poor fauna. The most remarkable record is the ornamental plant *Monstera deliciosa*.

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**Silhouette**

The available identifications indicate that the majority of undescribed taxa on Silhouette are located in the high forest areas of Gratte Fesse, Mon Plaisir and Mt. Dauban. The latter two sites appear to represent a single ecological unit although some unique microhabitat specialisation is apparent on Mt. Dauban. The north of the island, between Belle Vue and the Anse Mondon valley supports some species not observed elsewhere. The presence of extremely rare taxa at La Passe demonstrates that all areas of Silhouette are of high conservation value even though lowland areas appear to have a lower biodiversity.

Silhouette's flora is remarkable, the island having the highest endemic plant diversity per island area in the region (Gerlach 1992). Several Silhouette endemics are present: *Piper seychellarum, Pisonia sechellarum, Psychotria silhouettae.* There are important populations of *Achyrospermum seychellarum, Impatiens gordonii, Mimusops seychellarum, Trilepisium gynandrum.* Non-endemics with large populations include *Wielendia elegans* and *Intsia bijuga.*

The island's endemic fauna include leeches, 12 snails (of which two are endemic genera), and large numbers of other taxa. Important populations of the giant millipede *Sechelleptus seychellarum* are present, as are all the stick-insect and leaf insect species (including the island's endemic stick-insect *Caruausius scotti*). The most notable Silhouette moths are the Seychelles hummingbird hawkmoth *Macroglossum alluaudi,* the bee hawkmoths *Cephonodes hylas, C. tamsi* and the butterfly *Euploea mitra*. The amphibian fauna of Silhouette is extremely important

with all Seychelles species being recorded (one, *Sooglossus pipilodryas*, being endemic to the island). Reptiles include important populations of skinks and the giant bronze gecko *Ailuronxy trachygaster.* The most important vertebrate population is probably the Seychelles sheath-tailed bat *Coleura seychellensis*, the only known roost for this species is on Silhouette.

**La Passe** – The main settlement area of Silhouette comprises coastal and lowland habitat, with extensive areas of coconut plantations. Insect diversity was extremely high in areas of *Asystasia* sp.

**Pte. Varreur** – An area of low diversity in exposed grass, under *Casuarina equisetifolia*.

**Mt. Corgat** – moss forest, with significant populations of high altitude taxa, especially fungi.

**Peak south of Mt. Corgat** – an exposed peak with a diverse flora of exposed rock associated species.

**Jardin Marron, 'Coco de Mers'** – one of the highest diversity areas of palm woodland.

**Jardin Marron, 'glacis'**- an exposed area of rock on the ridge, the flora represents a mixture of endemic and introduced species with an interesting lichen at this site.

**Mon Plaisir** – high altitude forest with a highly diverse fauna and a flora regenerating after *Clidemia hirta* dominance. This site produced an exceptionally large collection of diverse Orthoptera, the undescribed house-centipede *Ballonema* sp., the new *Dupontia* snail species and the frog *Sooglossus pipilodryas.*

**Mt. Pot a Eau** – moss forest with an exceptional fern flora and specialised animals.

***Pisonia* forest** – a unique forest type with important endemic plants and animals. Two moths with entomopathogenic fungi were observed.

**Mt. Dauban** – moss forest with local endemic animals and a significant fern flora. Diversity and abundance were both extremely low and only very small collections were made. The taxa located appear to be mostly highly localised.

**Belle Vue** – an abandoned agricultural area with an interesting mix of plants and animals. The most significant taxa are the spider *Conothele truncicola* and the damselfly *Tenibasis alluaudi*.

**Anse Mondon** – coastal secondary habitat.

**Anse Mondon valley** - only isolated specimens were collected

***Impatiens* site** - The flora is exceptional at this site: *Impatiens gordonii*, *Pseuderanthemeum tunicatum*, *Piper seychellarum* and *Psychotria silhouettae*. Fauna include a the stick insect *Caruausius scotti* and the spider *Conothele truncicola.*

**Chemin Montagne Possee** – the path passes through a range of habitat types with notable populations of rare plants.

**Gratte Fesse** – High altitude forest with an area of *Pandanus hornei*, the site has an interesting and diverse fauna and is the only known locality for the

endemic hydrobiid snail.

**Above Grande Barbe** – the old fire-created slopes of *Dicranopteris linearis* scrub are very species poor; only a single ichneumonoid wasp was collected and the coniopterygiid *Semidalis africana* observed. There are areas of xerophytic endemic plants.

**Grande Barbe** – The coastal woodland and marsh is an extremely rich environment and one of the most important marsh habitats in Seychelles.

**South coast** – The south coast near Pointe Civine is the only substantial area of primary coastal forest in Seychelles. It is botanically interesting and a diverse invertebrate fauna is present.

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**North**

North island supports a highly degraded flora and predictably the fauna is very restricted. Notable points are the high diversity of dragonflies and damselflies, the absence of alien snails and the presence of at least 2 Seychelles endemic cockroaches. The most valuable habitats on the island appear to be the central marsh area and the *Calophyllum inophyllum* woodland. The rock areas are probably also of conservation significance although their contribution to general biodiversity appears to be low. The value of the *Calophyllum* woodland may be reduced by its lack of floral diversity and the rapid spread of takamaka wilt across the island. This disease was not apparent in 1999 but has had a dramatic impact since 2000. The presence of the endemic slug *Vaginula seychellensis* may indicate that the island originally supported a wider range of molluscs. A record of the original mollusc and vertebrate fauna may be preserved in the soils of the plateau and marsh. Investigation of these would be a valuable source of information for use in planning any future animal reintroductions.

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**Mamelles**

Mamelles is notable for its sea-bird colonies, including shearwaters, fairy terns and common noddies. The flora is not diverse, being dominated by sedge and low *Pisonia grandis, Ficus lutea* and *F. reflexa*, with a ground cover of *Portulaca oleracea*. The fauna is typical of small sea-bird islands with Wright's skink *Mabuya wrightii* and giant millipedes *Sechelleptus seychellarum.* Moths are abundant in the low vegetation. The endemic *Pisonia* associated moth *Epicroesa* sp. is present.

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**Praslin**

Praslin is one of the most frequently collected islands due to the significance of the Vallee de Mai. The island is known to be of conservation importance due to the dominance of the coco-de-mer *Lodoicea maldivica* in the forests, the associaiton

of several animal species with this palm and the presence of the Seychelles black parrot *Coracopsis nigra barklayi*. The IOBA collected in the Vallee de Mai and a range of other sites around the island. From the results it is clear that the Praslin National Park is the most significant area for biodiversity on Praslin. The flora is of limited significance except of the palms and much of the fauna is associated with the palms.

The Praslin National Park supports a highly diverse, but largely alien flora. The fauna is generally scarce due to the dry nature of the woodland. A comparison with the Vallee de Mai demonstrated that there are no significant differences in the fauna of the intensively managed Vallee and the rest of the National Park.

Diversity was relatively low in the leaf litter and was dominated by spiders, schizomids, pseudoscorpions, ants and woodlice. Leaf litter inhabiting beetles were unusually scarce. The earwig *Euborellia annulipes* was highly abundant, there are no published reports of this species from Praslin (it is probably introduced) and it appears to be a successful recent invader. Few invertebrates were located on the vegetation except for remarkably large numbers of the giant crab spider Heteropoda venatoria in a night visit in 2002. A repeat visit in 2003 found fewer spiders and an apparent associated increase in nocturnal orthoptera.

The impression of low diversity is in marked contrast to the material collected in the Vallee de Mai in 1905-8 which can be explained by two factors. Firstly much of the 1908 material was obtained from a coco-de-mer that was felled specifically for collecting purposes, this biases the samples of the time towards species which are inaccessible to modern collecting. Secondly, the vegetation of the national park changed considerably over the last 100 years with a dramatic reduction in open areas. In 1905-8 there would have been significant areas of herbaceous vegetation with associated insects, these are now virtually absent.

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**Cousin**

Cousin was not visited during the present study. From previous visits it is apparent that the island is comparable to other granitic sea-bird islands such as Aride and Cousine but supports a degraded vegetation. Introduced species are abundant (including the highly invasive *Quiscalis indica*). More natural parts of the island are dominated by *Pisonia grandis* woodland and *Ochrosia oppositifolia*. There are no significant plant records. Animal life includes significant bird populations, Wright's skink (*Mabuya wrightii*) and the giant millipede (*Sechelleptus seychellarum*). Terrapins (*Pelusios subniger*) have been present on the island but appear to have declined to extinction in the 1990s.

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**Cousine**

Extensive collections have been made on Cousine in recent years and it was expected that few species would be added by the present study. The existing

Cousine collections remain largely unidentified and should be re-examined to obtain the maximum information from this valuable resource. Cousine is typical of the smaller granitic islands, with a highly diverse fauna and a relatively restricted flora. The most obvious examples of the granitic fauna are the highly abundant *Zarceus* crickets and the abundance of native reptiles.

Cousine supports three principal habitats: *Pisonia grandis* woodland, coastal woodland and grass. The *P. grandis* woodland on the hill is mature, but supports very thin leaf litter on a rocky substrate. Locally there is a dense growth of *Nephrolepis biserrata* ferns, otherwise the herbaceous layer is sparse. Most of the coastal woodland has been planted in the last 5-6 years, this has grown exceptionally rapidly and is already showing signs of maturing in some areas. The grass areas comprise small lawns and paths on the plateau and an area of long grass on the eastern end of the island which contains abundant fulgoroid frog-hoppers and small flies.

Artificial pools of water on the plateau support dragonflies in open areas but the only pool found with a permanent fauna was a densely shaded one by the agricultural area. The seasonal pool on the beach crest was investigated and found to support only a single species of fly and unidentified fish. The flies are a common species found running over shallow water margins, the larvae are probably present in the mud and algal mats but were not located.

Important species include the birds, reptiles, the whip-scorpion *Phyrinictus scaber* and the giant millipede *Sechelleptus seychellarum*. The striped millipede *Dactylobolus bivirgatus* found in the southern atolls is present on Cousine. This is the only population in the granitic island sand its presence is something of a mystery.

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**Aride**

Aride is famous as a bird island due to its exceptional sea-bird population and the populations of threatened land birds. The flora is typical of a sea-bird island with a well developed *Pisonia grandis* woodland. In terms of conservation the most important component of the vegetation is Wright's gardenia *Rothmannia annae*. The creeper *Peponium vogelii* is seasonally abundant and this represents the largest population of the Seychelles form of this species.

The fauna is dominated by birds, skinks (both *Mabuya seychellensis* and *M. wrightii*) and bronze geckos *Ailuronxy seychellensis*. The invertebrate fauna is very poor due to the historical clearance of the forests; the plateau fauna is regenerating rapidly. One apparently endemic spider genus is present; *Aridella bowleri*. Important species include the whip-scorpion *Phrynictus scaber* and the giant millipede *Sechelleptus seychellarum*. Insects on vegetation are far more diverse and abundant, significant populations of Hemiptera, Diptera and Lepidoptera are present.

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**Booby**

This small rocky outcrop is an important sea-bird nesting site although heavily poached. The vegetation is dominated by *Pisonia grandis.* A small number of plants of *Peponium vogelii* are present. The fauna is poor, but includes the sea-bird island form of Seychelles skink *Mabuya wrightii.*

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**Curieuse**

The survey results indicate the high diversity of the south coast of Curieuse. The fauna at Baie Laraie includes diverse flies, moths and a large number of beetles associated with dead wood. The beetles are probably abundant at present due to the dead *Calophyllum* trees in the area. The leaf litter at Anse Joseph contains a highly diverse and abundant fauna. Particularly notable are the abundance of isopods and detritivorous moth larvae. This areas has the highest density of invertebrates of any woodland in the Praslin group and represents an exceptionally rich habitat despite its small area. The endemic snail *Gonaxis souleyetianus* is locally abundant. One of the most important Curieuse species is the trap-door spider *Atrophonsia intertidalis,* this was recorded in 1972 but has not been located since. The island has the main population of the endemic plant *Secamone schiperiana*.

Under a rock old remains were found of the giant millipede *Sechelleptus seychellarum* and the snail *Stylodonta unidentata*. No new remains of the Curieuse form of *S. studeriana* were found. These three species have been extinct on the island for at least 150 years, probably as a result of the extensive fires in the 1800s. Whilst *S. studeriana* requires a damp high, closed forest and would not be expected to survive on Curieuse at present, the woodland along the south coast appears to be able to support populations of *S. unidentata* and the giant millipede. Consideration could be given to reintroductions of these invertebrates from source populations of Round island (giant millipede) and Praslin (*S. unidentata*). This would be particularly important for the Praslin form of *S. unidentata* which is on the verge of extinction due to predation by tenrecs.

Both species of burrowing skink (*Pamelascincus gardineri* and *Janetascincus braueri*) are present. *J. braueri* had not been recorded from Curieuse previously. In addition the caecilian *Hypogeophis rostratus* is present.

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**St. Pierre (Praslin)**

St. Pierre is too small to have a diverse fauna or flora, it is notable for its previously unrecorded population of Wright's skink (*Mabuya wrightii*). The rock has pockets of dry leaf litter but no soil.

The invertebrate fauna comprises only 11 species, all widespread lowland species. The fauna is very limited with only spiders (2 species) Hymenoptera (Formicidae - *Camponotus grandidieri, C. hova, Technomyrmex albipes, Odontomachus simillimus*), Dictyoptera (*Pycnoscelus indicus*), Coleoptera

(Scolytidae), Hemiptera (Miridae) and Diptera. Vertebrates are restricted to Wright's skink and birds. There are no resident bird species although fairy terns (*Gygis alba*) breed.

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**Chauve Souris (Praslin)**

Chauve Souris was not visited by the IOBA. Fairy terns *Gygis alba* breed on the island but nothing is known of its fauna or flora. It is very small and mostly occupied by buildings.

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**Round (Praslin)**

This island was inhabited historically and much of the island has been modified. There is little of note on the island other than a population of giant millipede *Sechelleptus seychellarum*. The vegetation is largely a mixutre of coastal species, with a high proportion of coconuts and *Casuarina equisetifolia.*

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**Ave Maria**

This small island is composed of vertically fissured rocks with a few *Pisonia grandis*, *Ficus lutea* and *F. reflexa* growing in a thin leaf-litter. The flora is restricted to these trees and the fauna similarly poor (the ant *Camponotus grandidieri*, a dolichopodid fly, a cricket, a moth and the crab *Grapsus tenuicrustatus*) other than the significant colony of nesting sea-birds. The island is exceptional in lacking skinks and millipedes. The vertical nature of the shore probably makes colonisation by rafting animals impossible.

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**La Digue**

La Digue supports several different habitats but is dominated by secondary forest, with extensive *Cinnamomum verum* and *Chrysobalanus icaco* invasion. Surveys were carried out at La Reunion, Mare Soupape, Belle Vue and Nid d'Aigles. The most significant species on the island is the Seychelles black paradise flycatcher (*Terpisphone corvina*). The Seychelles giant millipede (*Sechelleptus seychellarum*) is present but only locally abundant.

Notable plant records include an isolated plant of *Gastonia seychellarum* and *Lycopodium cernuum* on the high parts of the island. *Tarrena seychellarum* is present in significant numbers on the north side of the island.

Most studies of La Digue have concentrated on the plateau, especially the woodland near the marsh. The greatest biodiversity on the island is concentrated in a very small area just below the island's summit. The slightly damper habitat is

almost entirely alien but is diverse and this allows the relict endemic fauna to survive (the endemic subspecies of the snail *Stylodonta unidentata*, the giant millipede *Sechelleptus seychellarum* and the burrowing skink *Pamelascincus gardineri*). Few endemic animals were located in any other part of the island. The endemic flora is almost entirely restricted to the northern rocky slopes. Most original vegetation is almost completely replaced by introduced species or historically planted habitats.

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**Felicite**

The collecting was carried out on the northern side of the island in lowland/coastal forest. This forest is exceptional, being one of very few areas of semi-natural lowland habitat present in Seychelles. Despite the presence of coconuts throughout the forest and evidence of the wild cows, floral diversity was high with many rare species being significant components of the vegetation (*Diospyros seychellarum, Gastonia seychellarum, Intsia bijuga, Tarrena seychellarum, Tabernamontana coffeiodes, Pandanus balfouri*). *Mucuna gigantea* was found in profusion, with more plants present in this area than have been seen anywhere else in Seychelles, some with stems 20cm in diameter. *Deckenia nobilis* was also seen. With the exception of the remnants of coconut plantation the only introduced trees found in the area were mangos.

Leaf litter invertebrates were moderately diverse. Several interesting species were found in termite nests, including the cricket *Myrmecophilus seychellensis.* Two interesting snails were found: the widespread endemic *Gonaxis souleyetianus* which was moderately common, and *Priodiscus costatus* which is a new record for the island. A sparassid spider was found in the axils of a *Pandanus balfouri*.

The crazy ant *Anoplolepis gracilipes* was found to be present on the island. Many ants were carrying dead insects which is normally noted only in recent introductions in the process of spreading.

Felicite is known to have a diverse endemic flora and fauna although records of the flora suggest that most of the island is degraded with native woodland persisting only at the north end. The present observations contradict this and indicate that exceptionally important lowland forest extends throughout the northern half of the island. The remarkable historical records of snails and giant millipedes from Felicite were partly confirmed by the present study although no evidence could be found of the continued survival of the snails *Stylodonta unidentata* and *Nesokaliella subturritula*, or the giant millipede *Sechelleptus seychellarum*. It is possible that *N. subturritula* persists at low densities, the other two species may be vulnerable to predation by crazy ants. Even with the presence of crazy ants Felicite remains the best preserved and biologically most important island in the west of Praslin.

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**Marianne**

Most of Marianne is covered in secondary vegetation dominated by *Cocos nucifera* and *Tabebuia pallida.* Plant diversity is greatest around the old settle-

ment, mostly garden escapes. The woodland from the highest point to the south-west coast has a mixture of native trees (*Calophyllum inophyllum* in particular) but its understorey is uniformly coconut. Given the coconut abundance and the diversity of introduced plants this area is characterised as mixed secondary woodland. A small patch of original vegetation (principally *Mimusops seychellarum*) is present.

Invertebrate diversity is low diversity. Two Hymenoptera dominate the fauna: in the air the yellow wasp *Polistes olivaceus* and on the ground the crazy ant *Anoplolepis gracilipes*. The habitat structure and dominance of coconuts favours the wasps and their abundance may have a negative impact on other animal species. The date of introduction of the crazy ant is not know but it appears to have spread rapidly between the islands of the Praslin group since the late 1970s. The leaf litter fauna of the most diverse area retains several other widespread ant species, centipedes and highly abundant snails (*Subulina octona* and *Opeas pumilum*). *Achatina immaculata* is also present. Leaf litter elsewhere is too shallow to support a significant fauna. One male *Hypolimnas missipius* butterfly was seen.

Of the reptiles *Mabuya seychellensis* and *Phelsuma sundbergi* were observed, both have been recorded previously. Birds were scarce with only sunbirds and Indian mynahs observed. Fruit bats were present in the mango tree at the top of the island. Evidence of the presence of rats was also found.

In the past there have been numerous suggestions that Marianne could be restored and used to reintroduce the endemic birds which once lived there. The highly degraded nature of the habitats and the reduced faunal and floral diversity would make such an undertaking a long and costly process. Vegetation management would have to include removal of coconuts and *Tabebuila pallida* from the hill and reintroduction of the original vegetation. Accounts of the island from the 1800s, before the coconuts were planted, describe it as being poorly vegetated with only a very small area of low forest on the south-east end. This description and the presence of sea-bird associated animals (Wright's skink and Seychelles fody) indicate that the island was originally a tern colony with open rock and sparse *Pisonia grandis* woodland. The original vegetation could be re-created through intensive management over many years but any attempt to encourage terns to return to the island would need to take into account the introduced animals now resident on the island (especially rats and crazy ants). Replacement of the coconuts and *Tabebuia pallida* with *Pisonia grandis* would produce an open habitat which would be less favourable to crazy ants.

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**Fouche**

These rocks support a small range of native coastal trees. Access to the island is extremely difficult. Both fauna and flora are very limited and the most notable species are nesting lesser noddies *Anous tenuirostris* and fruit bats *Pteropus seychellensis*. The crab *Geograpsus grayi* is present.

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**Cocos**

The rocky island is covered by a range of native coastal trees. Despite the varied flora there is little faunal diversity and no significant records were made. The island is a nesting site for the white-tailed tropicbird *Phaeton lepturus* and a breeding roost for the fruit bat *Pteropus seychellensis*.

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**Grande Soeur**

Grande Soeur has been intensively managed for at least 100 years, no primary vegetation remains but management has resulted in the creation of some extremely valuable habitat. The north-east coast retains high quality coastal scrub of *Tournefortia argentea*. The northern headland is of little interest, being dominated by old coconut plantation with dense *Asystasia* sp. growth. The most important habitat is the marsh, this has a good range of aquatic insects and ostractods, but no aquatic snails. Dragonflies are highly abundant, with 5 species present (including the highly localised *Agriocnemys pygmaea*). This island is very significant for Odonata conservation.

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**Petite Soeur**

Much of the habitat of this island was destroyed by fire in the 20th century. Consequently a large part of the island is occupied by *Dicranopteris linearis, Chrysobalanus icaco* scrub and coconuts. The flora is not diverse, with the exception of coastal vegetation on the rocky eastern shore. The fauna is very restricted. Crazy ants *Anoplolepis gracilipes* are present and an unusually high density of rat-damaged coconuts were noted.

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**Recifs**

This island has an important sea-bird colony and associated with this is a large population of Wright's skink *Mabuya wrightii*. The plateau of the island is dominated by dense *Scaevola sericea* scrub and a scattering of *Pisonia grandis* and *Cordia subcordata*. The slopes are tussocks of sedge, interspersed with lumps of phosphatic rock. Animal life is scarce, other than the sea-birds, grasshoppers and the orb-web spider *Argiope trifasciata*. A small patch of *Sporobolus virginicus* grass is heavily grazed by rabbits.

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**Ilot Frégates**

This small island has a very distinctive habitat, lacking the sedge of the other small sea-bird islands. *Portulaca olearacea* and *Ipomoea littoralis* is abun-

dant and *Boerhavia repens* and *B. diffusa* are present. The fauna is relatively diverse for such a small island (conspicuous species include two Orthoptera, including *Acrotylus patruelis*, three Lepidoptera and two small Diptera). Skinks are locally abundant, being the sea-bird island form of *Mabuya seychellensis* (not *M. wrightii* as previously recorded).

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**Frégate**

Fregate has changed much in recent years, due to extensive replanting of native plants. Much of the island remains dominated by *Pterocarpus indicus* woodland and old coconut plantations. Important re-established plant species include *Carissa edulis, Drypetes risleyi, Ficus bojeri, Gastonia seychellarum, Rothmannia annae* and *Vateriopsis seychellarum*. The most famous components of the island's fauna are the bird but more important in terms of biodiversity conservation are the endemic invertebrate species, such as the snail *Pachnodus fregatensis*. The highest priority for conservation should be the endemic snail genus *Conturbtia crenata* (although this may be extinct following the broadcast of rat poison). Other important species currently restricted to, or most abundant on the island are the giant tenerbrionid beetle *Pulposipes herculeanus* and the giant scorpion *Chiromachus ochropus*. The island also has significant populations of the whip-scorpion *Phyrnictus scaber*, the terrapin *Pelusios subniger* and introduced Aldabra giant tortoises *Dipsochelys dussumieri.*

## **Appendix II.** Island names

| **Island** | **Alternatives** | **Notes** |
|---|---|---|
| Mahé | Mahé | |
| St. Anne | - | |
| Cerf | - | Note confusion with Cerf (Providence) |
| Long | Longue | |
| Moyenne | - | |
| Round (Mahé) | Ronde | Note confusion with Round (Praslin) |
| Cachée | Cachee | |
| Sèche | Beacon | |
| Anonyme | - | |
| Hodoul | - | |
| Rat | Aux Rats | |
| Souris | - | |
| Chauve Souris (Mahé) | - | |
| Isle aux Vaches Marines | Vache | Note confusion with Bird (as Isle aux Vaches) but Isle aux Vaches Marines very rarely visited) |
| Thérèse | Therese | |
| Conception | - | |
| Islette | - | |
| Ilot | - | |
| Silhouette | - | |
| North | Nord | Note confusion with southern atolls |
| Mamelles | - | |
| Praslin | - | |
| Cousin | North Cousin | |
| Cousine | South Cousin | |
| Aride | - | |
| Curieuse | - | |
| Booby | Fous | |
| St. Pierre (Praslin) | - | |
| Chauve Souris (Praslin) | - | |
| Round (Praslin) | Rond | Note confusion with Round (Mahé) |
| Ave Maria | Zave | |
| La Digue | - | |
| Félicité | - | |
| Marianne | Marie Anne | |
| Fouche | - | |
| Grande Soeur | Big Sister | |
| Petite Soeur | Little Sister | |
| Cocos | Albatross | |
| Recifs | - | |
| Ilot Frégates | L'Ilot Fregate | |
| Frégate | Fregate, Frigate | |