

Terrestrial and freshwater Mollusca of the Seychelles islands

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Seychelles Fauna Monographs

The Indian Ocean Biodiversity Assessment 2000-2005 reviewed the biogeography of the Seychelles islands through systematic collecting of all taxonomic groups. Biodiversity collecting for this assessment started in 2000 under a Memorandum of Understanding with the Seychelles government with taxonomic support from 87 expert taxonomists in 20 countries. These taxonomists reported the identification of a large number of previously undescribed species and the material initiated taxonomic revisions of most of the groups concerned. These revisions are being published in widely dispersed academic journals, most of which are not available in Seychelles. The only comprehensive taxonomic treatments available cover dicotyledon plants and vertebrates. The information generated by the project has been collated into a monographic series on the Seychelles fauna. The aim of these monographs is to disseminate taxonomic information in a form that can be easily utilised by future workers in the region and by conservationists and researchers in Seychelles. This high quality biodiversity information is essential for future sustainable biodiversity management.

Further details of the Indian Ocean Biodiversity Assessment can be found on the Nature Protection Trust of Seychelles web-site: <http://members.aol.com/jstgerlach>.

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Introduction

The Seychelles islands comprise 115 islands in the western Indian Ocean. These form two main groups; the northern granitic islands and the southern, coralline islands (Fig. 1-3). The southern islands are less than 10m above sea level, representing raised coral atolls or sand cays (Matthews & Davies 1966; Stoddart *et al.* 1971). This results in limited habitat variation and correspondingly low species diversity. The granitic islands (Fig. 2) are the remnants of the Seychelles microcontinent which was isolated following the break-up of Gondwanaland 65-100 million years ago. These are high islands reaching 905 metres above sea level. This results in great habitat diversity and high rainfall, contributing to the growth of diverse rain forest habitats. The terrestrial and freshwater mollusc fauna of these islands includes a high proportion of ancient endemic taxa with affinities to Africa, Madagascar and India; this fauna is reviewed in full here.

The following account concerns the terrestrial and freshwater species, using a strict definition of those species that pass their entire life cycle in these environments, lacking a marine larval stage. Some terrestrial or brackish-water taxa are found in the islands but not considered here as they have marine larvae and are best considered semi-terrestrial or estuarine (these species are shown in Plate 1):

Prosobranchia	Littorinidae	<i>Littorina glabrata</i> Philippi, 1846
		<i>Littorina scabra</i> (Linnaeus, 1758)
	Ellobiidae	<i>Auriculastra cf. radiolata</i> (Morelet, 1860)
		<i>Melampus caffra</i> (Küster, 1844)
		<i>Melampus fasciatus</i> Deshayes, 1830
		<i>Melampus graniferus</i> (Mousson, 1849)
		<i>Melampus lividus</i> (Deshayes, 1830)
		<i>Melampus luteus</i> Quoy & Gaimard, 1832
		<i>Melampus (Tralia) semiplicatus</i> Pease, 1869
		<i>Pedipes affinis</i> Féussac, 1821
	Assimineidae	<i>Assiminea (Syncera) nitida</i> (Pease, 1864)
		<i>Assiminea parvula</i> Morelet, 1877
	Truncatellidae	<i>Truncatella guerinii</i> Villa, 1841
		<i>Truncatella cf. valida</i> Pfeiffer, 1846 var. <i>minor</i> Nevill, 1878
Pulmonata	Potamididae	<i>Terebralia palustris</i> (Linnaeus, 1767).

There are 89 terrestrial and freshwater mollusc species recorded from Seychelles. Of the 77 terrestrial taxa listed, eight (11%) are probably introduced and, of the 69 species considered native, 50 (88%) are endemic species or subspecies and 17 (22%) are indigenous. A further two are of uncertain origin, possibly introduced. The 12 freshwater species comprise five (42%) introduced, one (14% of native species) endemic and six (86%) indigenous species. Seven freshwater and 59 terrestrial species are found in the granitic islands compared to only four terrestrials in the Amirantes and one freshwater and 17 terrestrials in the southern atolls. The distribution of endemic species matches this pattern of diversity, with 88% of terrestrial species in the granitics being endemic and 40% in the southern atolls, but no endemics in the Amirantes. The fauna of the granitic islands appears to be an ancient one with 44% of taxa having Gondwanan affinities and a further 23% with Asian affinities, probably also reflecting continental drift. Only 21% appear to originate in the western Indian Ocean and only 2% are Palaeotropical. In contrast 40% of the southern atolls species are derived from Malagasy genera, with 20% from Africa and 33% from the Indo-Pacific.

The largest and highest islands support the most native species: 7 freshwater and 44 terrestrial on Mahé, 6 freshwater and 31 terrestrial on Silhouette and one freshwater and 15 terrestrial on Praslin. Aldabra supports one freshwater and 16 terrestrial species, but all other coral islands have very low diversity (the next closest being Assumption with 6 species).

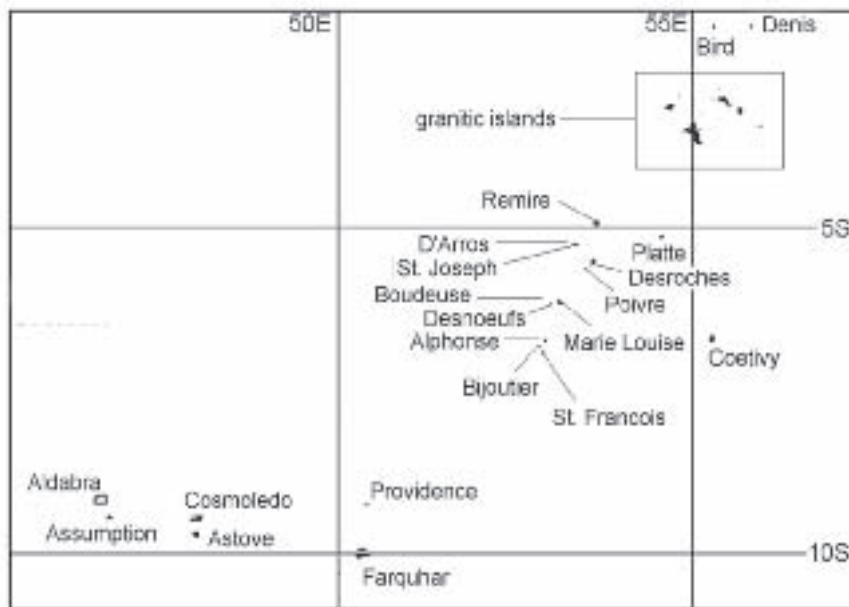


Fig. 1. The Seychelles islands



Fig. 2. The granitic islands

For each endemic species the type specimens are listed where these can be located. Distributions are given and the conservation status discussed using the IUCN Red List criteria (IUCN 2001) and following the assessment in Gerlach *et al.* (2005). Non-native species have not been assessed. For some species (especially the Subulinidae) this distinction between native and non-native species is difficult to make, and for these native status is indicated by widespread distributions, including in areas with little human impact, and/or the presence of subfossil specimens believed to predate human occupation of the islands.

Abbreviations

Institutional abbreviations used in the text are as follows:

BM(NH) - British Museum (Natural History)

MNHN - Muséum national d'Histoire naturelle, Paris

MRAC - Musée Royal de l'Afrique Centrale, Tervuren

NPTS - Nature Protection Trust of Seychelles

RMNH - Rijksmuseum van Natuurlijke Historie, Leiden

SMF - Senckenberg Museum, Frankfurt am Main

UMZC - University Museum of Zoology, Cambridge

ZMB - Museum für Naturkunde, Berlin

Measurement abbreviations are as follows:

H - shell height

D - shell diameter

All species are illustrated; all plates depict adult shells and distribution maps. Where possible live animals have been figured and anatomical drawings included, these comprise reproductive anatomy and selected radula teeth. Reproductive anatomy is given in a standard view, with parts labelled as in Fig. 3. For Streptaxidae illustrations of penial spinules are also included. The scale bar on the plates represents 1cm and refers to the shell illustration only. Distribution maps are given for the relevant area corresponding to one of the maps in Fig. 1-2 (all Seychelles islands, detail of the granitic islands or detail of the southern atolls).

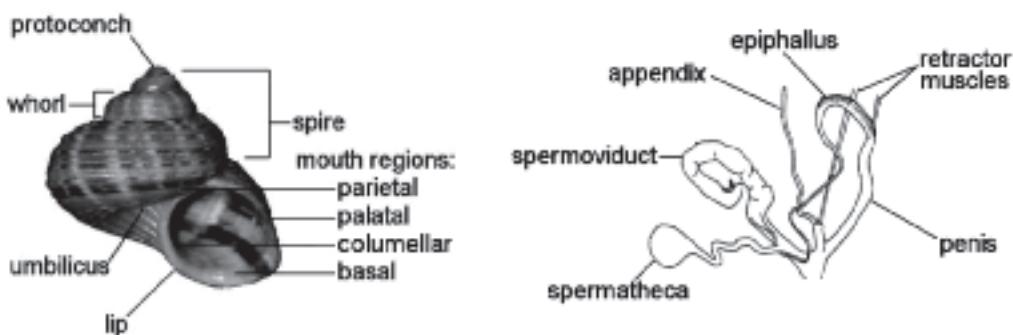


Fig. 3. Generalised features of the mollusc shell and generalised reproductive anatomy

History of collecting in Seychelles

The first mollusc to be recorded from Seychelles was *Stylodonata unidentata* (Holten, 1802), named as *Helix unidenta* by Chemnitz in 1795. The origin of this specimen is not known, it was probably sent to France by one of the early settlers or explorers, the islands having been settled only 3 years before Chemnitz's figuring of the species. The next record of Seychelles specimens is the collection made by Henri Dufo on Mahé and Praslin in 1838-9. Dufo was a remarkable observer for the time, making interesting notes on the habitats and behaviour of some species, including gestation in *S. unidentata* (Dufo 1840). Further collections were made in the 19th century by Geoffrey Nevill (1868) and especially by August Brauer (1895). Although for most phyla the Percy Sladen Memorial Expeditions of 1905 and 1908-9 collected more material than any other expedition, the Mollusca add few species not already collected in greater numbers and with better data by Brauer. The Percy Sladen collections appear to have been made largely, if not exclusively, by J.S. Gardiner. A small collection from Aldabra and Cosmoledo by H.P. Thomasset was reported by Connolly (1925) but no further collections were reported until G.A.S. Barnacle in 1962 and the Royal Society expeditions to Aldabra in 1967 (collected by J.F. Peake). A small collection was made in 1984 by the Soviet Zoological Expedition, but little of this material has been published. The most notable collection of the time was amassed by J.G. Lionnet in the second half of the 20th century. Lionnet facilitated the work of F. Starmühlner (1974) on the freshwater molluscs, and of J.-J. Van Mol and P.L.G. Benoit who collected extensively in 1972 and encouraged the author who started research on Seychelles Mollusca in 1986. Additional small collections on Aldabra have been made by K. Beaver (1989) and R. Chapman (1997). Comprehensive surveys of all islands were undertaken as part of the Indian Ocean Biodiversity Assessment 2000-2005 which provides the basis for the present publication.

Classification of Seychelles Mollusca

Families and subfamilies are listed with the following classification of Seychelles Mollusca (family numbers correspond to the order in which they are treated in the systematic section, as this is divided into freshwater and terrestrial taxa it does not follow a strictly taxonomic order):

MOLLUSCA

Class Gastropoda

Subclass ORTHOGASTROPODA (including PROSOBRANCHIA)

Superorder NERITOPSINA

Order NERITOIDEA

1. NERITIDAE

8. HELICINIDAE

Superorder CAENOGASTROPODA

Order CERITHIOIDEA

2. THIARIDAE

Order CYCLOPHOROIDEA

9. CYCLOPHORIDAE

Infraorder LITTORINIMORPHA

Order RISSOOIDEA

10. HYDROBIIDAE

Order LITTORINOIDEA

11. POMATIASIDAE

Subclass PULMONATA

Superorder BASOMMATOPHORA

Order LYMNAEOIDEA

3. PHYSIDAE
4. LYMNAEIDAE
5. PLANORBIDAE
6. BULINIDAE
7. ANCYLIDAE

Superorder SYSTELLOMMATOPHORA

Order RATHOUISIOIDEA

12. VERONICELLIDAE

Superorder STYLOMMAТОPHORA

Order ACHATINOIDEA

13. ACHATINIDAE
14. FERUSSACIIDAE
15. SUBULINIDAE

Order ACHATINELLOIDEA

16. ACHATINELLIDAE

Order STREPTAXOIDEA

17. STREPTAXIDAE

Order SUCCINEOIDEA

18. SUCCINEIDAE

Order OLEACINOIDEA

19. SPIRAXIDAE

Order HELICOIDEA

20. BRADYBAENIDAE

Order ACAVOIDEA

21. ACAVIDAE

Order PUNCTOIDEA

22. PUNCTIDAE

Order ZONITOIDEA

23. ZONITIDAE

Order GASTRODONTOIDEA

24. family unknown
25. EUCONULIDAE
26. CHRONIDAE

Order HELICARIONOIDEA

27. HELICARIONIDAE
28. UROCYCLIDAE

Order PUPILLOIDEA

29. PUPILLIDAE

Order BULIMINOIDEA

30. CERASTIDAE

The Seychelles mollusc fauna is notable for its relatively high number of species of Streptaxidae (29% of species) and Cerastidae (17%), all other families are represented by only 1-5 species.