

Two new species of *Tropidophora* (Mollusca: Gastropoda: Pomatiidae) and new records of land snails from the Aldabra group, Seychelles

JUSTIN GERLACH¹, OWEN GRIFFITHS² & F. B. VINCENT FLORENS³

¹ Peterhouse, Trumpington Road, Cambridge CB2 1RD, UK (jg353@cam.ac.uk)

² Bioculture Ltd, Seneville, Rivière des Anguilles, Mauritius

³ Tropical Island Biodiversity, Ecology and Conservation Pole of Research, Faculty of Science, University of Mauritius, Réduit, Mauritius
Corresponding author: Justin Gerlach (jg353@cam.ac.uk)

Abstract. New and overlooked records from the Aldabra group of islands, Seychelles (Aldabra, Assumption, Cosmoledo, and Astove) extend the species list for the islands by four species, two of which are described as new: *Tropidophora fryeri* from Aldabra and *Tropidophora menai* from Cosmoledo. Records of *Melampus caffra* (Küster, 1843) are re-identified as *M. parvulus* L. Pfeiffer, 1856 and *Truncatella* cf. *valida* var. *minor* G. Nevill, 1878 as *Truncatella marginata* Küster, 1855. *Dupontia* sp. is confirmed to be *Microcystina rowsoni* E. Gittenberger & van Bruggen, 2013. Thirty-five species are now recorded from the islands, 33 from Aldabra and smaller numbers on the other islands.

Key words. Aldabra, Astove, Assumption, Cosmoledo

ZooBank registration. urn:lsid:zoobank.org:pub:7BC9C84F-2323-42E0-A9CA-35442949CE60

DOI. <https://doi.org/10.61733/jconch/4572>

INTRODUCTION

The Seychelles islands contain three distinct groups of islands: the main granitic islands, the coral cays of the Amiantes to the south-west, and the coral atolls of the Aldabra group at the extreme south-west. The granitic islands are continental in origin and have a high proportion of old lineages and endemic species. In the case of terrestrial molluscs, 89% of recorded species are endemic (Gerlach 2006a). The coral cays are largely occupied by tramp species which have colonised since the islands last emerged 6,000 years ago (Stoddart 1984), with no endemic mollusc species (Gerlach 2006a). The coral atolls have a longer history of emergence, going back 118,000 years (Braithwaite 1984) and support a mixture of tramp species, regional endemics, and island endemics (Peake 1971; Cogan 1984; Gerlach & Griffiths 2002; Gerlach 2006a); of recorded mollusc taxa, 16% are single island endemics, 15% are regional endemics, and 69% non-endemic indigenous or introduced (Gerlach 2006a). These atolls comprise the large atoll of Aldabra, the single island of Assumption, the fragmented atoll of Cosmoledo, and the small intact atoll of Astove (Fig. 1).

Aldabra has been a centre of scientific research since 1969, due to its many exceptional features such as being the

world's second largest coral atoll and home to the world's largest population of surviving giant tortoises. The first record of terrestrial molluscs was Martens' (1898) description of *Rhachistia aldabrae* (E. von Martens, 1898), followed by records from collections made in 1907 (Connolly 1925; Barnacle 1962), 1967–1974 (van Bruggen 1975, 1986; Patterson 1975; Naggs 1994; Gerlach & van Bruggen 1999), and subsequent synoptic lists (Lionnet 1984; Gerlach 1987). In 2002, extensive material formed the basis of a review of all records from the atoll (Gerlach & Griffiths 2002). This reviewed all available material collected between 1895 and 1999, recording 31 species: five endemic, 24 indigenous (including one endemic subspecies), and two introduced.

Assumption's ecosystems were largely destroyed by guano mining from 1907 (Stoddart *et al.* 1970). Its mollusc fauna was overlooked until 1967 when *Gulella gwendoliniae aldabrae* van Bruggen, 1975 was collected (van Bruggen 1975). In 2002, five species were listed (Gerlach & Griffiths 2002).

Cosmoledo comprises only very small islands, except for its main island, Menai. Coconuts were planted on Menai in the 1890s, and the island was probably degraded by introduced goats in the early 20th century (Bayne *et al.* 1970a). Snails have rarely been recorded: an enigmatic record of

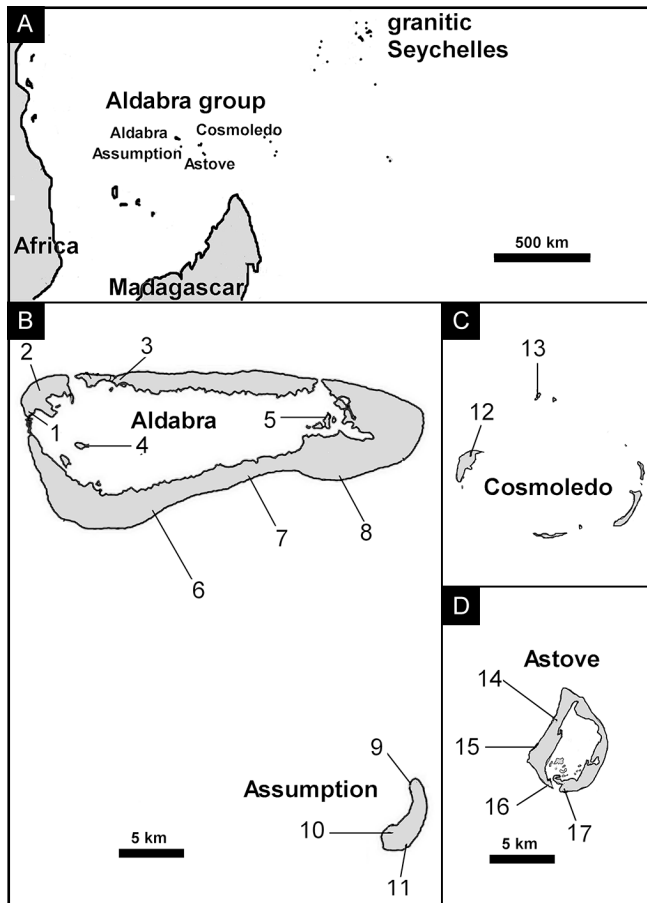


Figure 1. A, the Granitic and Aldabra group of islands in the SW Indian Ocean. B, Aldabra and Assumption. C, Cosmoledo atoll. D, Astove atolls, showing localities of material reported here (details in the Appendix). 1: “upside down jellyfish pool”, Picard (A2803); 2: Bassin Cabri, Picard (J Becker 1987); 3: Gionnet, Malabar (A2126); 4: Ile Esprit; 5: Ile Michel (A2778); 6: Dune D’Messe, Grande Terre (A2130); 7: Dune Jean Louis, Grande Terre (A2120); 8: Takamaka, Grande Terre (A2115); 9–11: Assumption; 9: 7/23; 10: 8/23; 11: 8a/23; 12: Menai (3/23); 13: Ile du Nord (A5764); 14–17: Astove; 14: A2114; 15: 9/23; 16: 11/23; 17: 10/23.

Tropidophora ligata (O.F. Müller, 1774) in 1907 (Connolly 1925) was followed by *Gulella gwendolinae aldabrae* in 1983 (Gerlach & Griffiths 2002). In 2002 five species were recorded (Gerlach & Griffiths 2002).

Astove was settled in 1895; some agriculture started then, and guano mining was carried out in the early 20th century. The island became a focus for agriculture in 1960, and habitat modification was extensive (Bayne *et al.* 1970b). No snail collections were made until 1987, when five species were recorded (Gerlach & Griffiths 2002).

By 2002, 31 species had been recorded in the Aldabra group, with numerous records coming from the collections

made by Roselle Chapman on Aldabra in 1997 (Gerlach & Griffiths 2002). Some material from this collection was overlooked, and a small number of additional samples have been made available subsequently. This material led to a reappraisal of the species present on the atolls, identifying two species not previously recorded in the group, several additional island records, and two undescribed species of *Tropidophora*. A species of *Tropidophora* was recorded on Aldabra atoll in 1962 based on material collected in 1908 (Barnacle 1962). This was described as *T. gardineri* Gerlach, 2006b based on old shells from Esprit island (broken but well preserved) and worn, bleached shells from Picard and Grande Terre islands. The collections made by Fryer in 1908 were subsequently located in the NHM; whilst most of these are also worn, they do include some fresh specimens. This material reveals the presence of two distinct species on Aldabra, one corresponding to the Esprit island population (and the holotype of *T. gardineri*), the other to Picard and Grande Terre specimens previously assumed to be conspecific.

A species of the genus was also collected on Cosmoledo in 1907 (Connolly 1925). Specimens from this atoll were originally identified as *T. ligata* (O.F. Müller, 1774) but later referred to under the *nomen nudum* of *T. rogatum* by Barnacle (1962). Connolly’s material has not been located but fresh material from Cosmoledo is now available, allowing the identity of this taxon to be resolved.

MATERIALS AND METHODS

The new material was examined and compared to existing collections. Measurements were made using digital callipers, accurate to 0.1 mm. Aperture dimensions are taken from the inside of the aperture, excluding the lip. The umbilicus is taken from the inner edge of the last whorl to the columellar margin of the lip. Whorls are counted from the line across the semicircle of the apex to the outer edge of the lip, recorded to the nearest 10% of a whorl. These are summarised in Table 1 and were used in conducting a principal components analysis along with the sculptural characters of the number of ridges on the base and on the last whorl, and the number of ridges developed into keels. The first principal component accounts for almost all the variance (98.5%) and is dominated by shell size (height and diameter). The second component (0.8% of variance) relates to shell sculpture (Table 2). These separate the specimens into three groups (Fig. 2) which are described as separate species based on size, shape and sculpture. Differences are summarised in Table 3.

Table 1. Measurements of *Tropidophora* species recorded from the Aldabra group. Mean values with standard deviation given in brackets.

Species	Specimen	Height (mm)	Diameter (mm)	Height / diameter	Aperture height/width	Umbilicus / diameter	Whorls	Ridges, no.		Keels	n
								Base	Last whorl		
<i>T. gardineri</i>	Holotype UF 593613	12.3	12.1	1.02	1.04	0.16	4.2	12	12	2	2
	All material	10.5–(10.98±0.28)–12.3	11.0–(11.55±0.28)–12.1	0.90–(0.95±0.02)–1.02	0.96–(1.01±0.02)–1.04	0.10–(0.14±0.02)–0.17	3.2–4.2	10–12	10–12	2	12
<i>T. fryeri</i> sp. nov.	Holotype NHMUK 20240300	11.2	10.9	1.03	1.44	0.09	4.2	8	6	0	0
	Picard material	8.7–(10.53±1.50)–15.7	9.4–(10.94±1.46)–15.7	0.91–(0.96±0.03)–1.03	1.21–(1.36±0.06)–1.45	0.09–(0.10±0.01)–0.13	3.2–4.2	8–10	6	0	18
	Grande Terre material	8.7–(10.05±1.69)–12.3	9.4–(10.55±1.28)–12.1	0.90–(0.95±0.05)–1.03	1.21–(1.36±0.06)–1.45	0.09–(0.11±0.01)–0.13	3.2–4.2	8–10	6	0	4
	All material	8.7–(10.45±1.51)–15.7	12.1–(10.87±1.41)–15.7	0.90–(0.96±0.04)–1.03	1.21–(1.33±0.12)–1.45	0.09–(0.10±0.01)–0.13	3.2–4.2	8–10	6	0	22
<i>T. menai</i> sp. nov.	Holotype UF 593615	14.0	14.8	0.95	1.10	0.13	4.2	0	0	0	0
	All material	11.2–(12.06±0.87)–14.0	11.4–(12.32±1.18)–14.8	0.93–(0.98±0.04)–1.08	1.08–(1.15±0.04)–1.18	0.13–(0.16±0.02)–0.19	4–5	0	0	0	14

Table 2. Principal component analysis of *Tropidophora* from the Aldabra group.

Factor	PC1	PC2
Eigenvalue	80.09135	0.679209
Cumulative %	98.5	99.3
Height	–0.61070	–0.06958
Diameter	–0.63293	0.02029
Aperture height	–0.31202	–0.21046
Aperture width	–0.26655	0.27140
Whorls	–0.22172	–0.07969
Umbilicus diameter	–0.08192	0.10884
Basal ridges	–0.02610	0.81920
Keels	–0.03544	0.14057
Body whorl ridges	–0.01305	0.40960

The species descriptions are followed by an updated list of species from the Aldabra group, including new records.

Abbreviations. FLMNH: Florida Museum of Natural History, University of Florida, Gainesville (specimen prefix UF). NHM: The Natural History Museum, London (specimen prefix NHMUK); NMW: National Museum of Wales, Cardiff.

TAXONOMY

Caenogastropoda L.R. Cox, 1960

Pomatiidae Newton, 1891

Tropidophora Troschel, 1847

Tropidophora gardineri Gerlach, 2006b

Figures 3A, 4A, 5A, 6A

Tropidophora gardineri (*nomen nudum, partim*) Barnacle 1962: 56; Lionnet 1984: 242; Gerlach 1987: 35.

Tropidophora sp. “*gardineri*” (*partim*) Gerlach & Griffiths 2002: 671.

Tropidophora gardineri (*partim*) Gerlach 2006a: 29; Gerlach 2006b: 102.

Type specimens. Holotype, UF 593613 (transferred from Nature Protection Trust of Seychelles, specimen M2001.2) Esprit, Aldabra, Seychelles, J. Gerlach 16.xii.2000 (complete but damaged). Specimens listed as paratypes (Gerlach 2006b) are misidentifications of the next taxon.

Additional material. NHM, 5 specimens (Ile Esprit, Aldabra, Seychelles, J.C.F. Fryer 26/xii/08 [1908]); FLMNH, 8 specimens, UF 593618 (Esprit, Aldabra, Seychelles, J. Gerlach 16.xii.2000).

Diagnosis. A thin-shelled *Tropidophora* with distinct sculp-

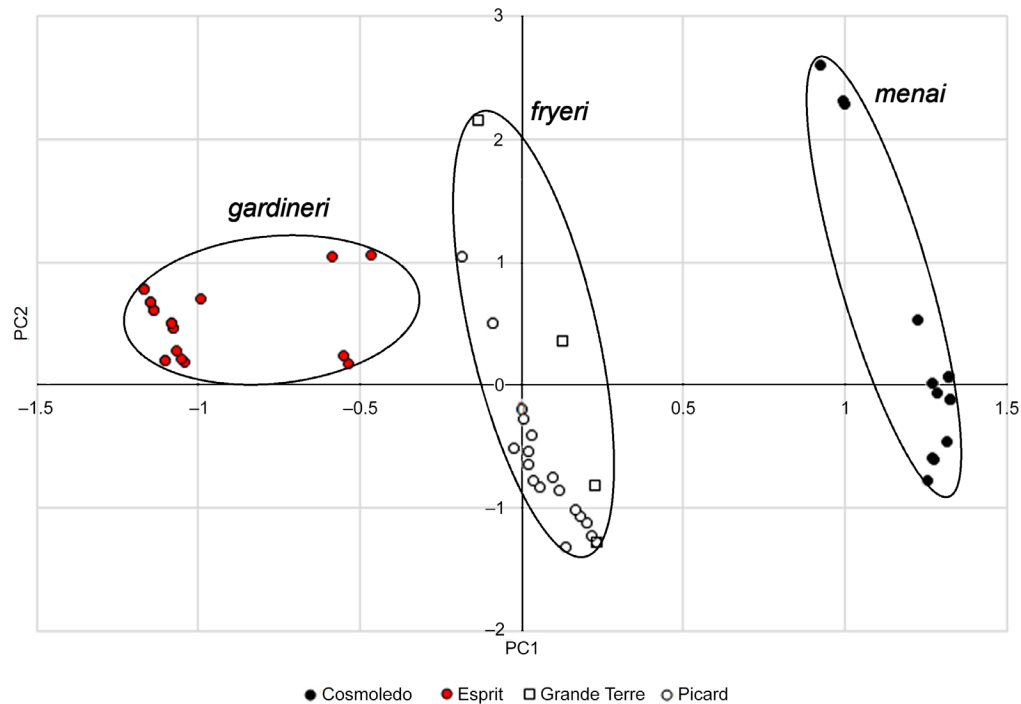


Figure 2. Principal components of atoll *Tropidophora* species from the Aldabra group.

ture of radial striae and prominent spiral cords on all teleoconch whorls; slight scalloping where radials cross spiral cords. Cords developing into 1 or 2 low keels.

Description. Medium-sized, thin shell (measurements in Table 1). Conical; apex rounded. 3.2–4.2 convex whorls. Protoconch of 1.2 smooth whorls. Teleoconch ornamented with fine radial striae, giving a velvety appearance. Strong spiral cords on all whorls, some radials raised into a scalloped pattern where they cross the spirals. Spirals fully developed on all whorls and equally distinct on base and into umbilicus. 10–12 spiral cords on upper half of last whorl. cords at periphery and halfway between periphery and suture most prominent, forming low keels. Supra-peripheral keel as prominent as peripheral in 30% of specimens, less prominent in others. Umbilicus open, 12–17% of shell diameter. Aperture almost perfectly round, flaring at periphery, lip slightly thickened. Lip serrated by the spiral cords at columellar margin, shiny internally.

Off-white with irregular grey radial streaks. Internally pale orange-brown, some slightly darker spiral lines. Lip white externally.

Operculum spiral, with a depressed centre, and off-white, with darker centre. Holotype lacks the operculum.

Distribution. Endemic to Aldabra atoll, apparently restricted to Esprit island. No shells with this sculpture have been found on any other island, although there are subfos-

sils of several different forms of *Tropidophora*, some with prominent cords.

Comparison. This species is most similar to *Tropidophora jugia* Gerlach, Griffiths & Slapcinsky, 2023 of north-western Madagascar but smaller (largest *T. gardineri* has a diameter 12.0 mm compared to the smallest *T. jugia* of 19.6 mm), but that species lacks the radial striae of *T. gardineri* sp. nov. In comparison to the other species from the atolls, it is thinner than either of them and has very distinct sculpture of spiral cords and radial striae, and its aperture is almost perfectly circular, whereas in the other species it is slightly higher than wide. See the species descriptions below for further details.

Note. This appears to be the species referred to by Fryer (1910: 424) as “A fresh species of land shell, a Helicinid, was found on Esprit Island, but it did not seem to occur on any other part of the atoll.” Fryer’s use of “helicinid” here is likely to refer simply to a large helicoid snail, rather than to Helicinidae.

***Tropidophora fryeri* sp. nov.**

Figures 3B, 4B, 5B, 6B

Tropidophora sp. “*gardineri*” (*partim*) Gerlach & Griffiths 2002: 671.

Tropidophora gardineri (*partim*) Gerlach 2006a: 29; Gerlach 2006b: 102.

ZooBank registration. urn:lsid:zoobank.org:act:CD2BD77A-BC11-4357-8264-0A0FD6098FAC

Table 3. Summary of differences between Aldabra and Cosmoledo *Tropidophora*

Species	Thick-ness	Size (mean diameter, mm)	Shape		No. whorls	Spire sculpture				Colour		
			Aperture (height/width)	Umbilicus (% shell diameter)		Radials	Spirals	Keels	Base Ridges	Apex	Spire	Aperture
<i>T. gardineri</i>	Thin	Intermediate (11.55)	Circular (0.96–1.04)	Variable (10–17)	3.2–4.2	Prominent	10–12	2	10–12	Off-white	Off-white	Orange-brown
<i>T. fryeri</i> sp. nov.	Thick	Smallest (10.87)	Subcircular (>1.21)	Narrow (9–13)	3.2–4.2	Fine	8–10	0	Obsolete	Red-brown	White	Orange
<i>T. menai</i> sp. nov.	Thin	Largest (12.34)	Subcircular (1.08–1.18)	Wide (13–19)	4–5	Absent	0	0	Absent	White	Bluish white	Purple-brown

Type locality. Seychelles: Picard island, Aldabra atoll.

Type specimens: Holotype NHMUK 20240300, 1 recent specimen, Picard “only avg[?] species living; 18.[?].08” (label not clearly legible, inferred to be 18.x.1908 from information in Fryer (1910)) (“draw smallest spc.” noted on a “Det. JF Peake” label).

Paratype NHMUK 20240301, 1 old specimen, same data as holotype.

Additional material. 24 specimens. UF 593612, 6 specimens misidentified as “*T. gardineri*”: Dune d’Messe, Grande Terre; R. Chapman *leg.*, 23.vi.1997 and Picard, Aldabra . NHM 20 specimens in several un-numbered lots: 1 old specimen, Dune d’Messe path old, 20–23/8/1969; 1 fresh specimen, Dune d’Messe path recent 20–23.viii.1969; 10 old specimens, Chemin de la Plaine Cabris, Ile Picard 8.10.08 [1908]; 5 old and 3 fresher specimens, Aldabra. NMW Z.2002.027.00023, 1 specimen, badly worn; Dune d’Messe, Grande Terre, Aldabra; R. Chapman *leg.*, 23.vi.1997.

Diagnosis. A *Tropidophora* with sculpture restricted to radial striae and spiral cords on the spire and within the umbilicus; grey, with a brown-tinted apex and yellow-orange inside the aperture; aperture edge white.

Description. Medium-sized, conical shell (measurements in Table 1). Thick, conical; last whorl very slightly angled; juveniles and subadults distinctly angled. Whorls 3.2–4.3, convex. Apex acute, rounded. Protoconch of 1.0–1.5 whorls, smooth, and shiny. Teleoconch with fine radial striae, giving a velvety appearance; striae cross crossed by 8–10 spiral cords on spire, extending onto second whorl but barely discernible on smooth, shiny last whorl. Spiral cords obsolete on base but reappearing within umbilicus. Cords not developed into keels. Umbilicus open, 9–13% of shell diameter. Aperture rounded but very slightly higher than wide, margin at insertion of lip slightly angled; lip slightly flaring, hardly thickened.

Shell white to light grey; spire often tinted red-brown; 6 or 7 spiral chords on last whorl sometimes indistinctly highlighted with white spiral bands. Lip white. Aperture shell yellow-orange, near edge white, sometimes most intense in lines corresponding to spiral cords (see Dune d’Messe).

Operculum spiral, off-white, and with a depressed, darker centre.

Etymology. Named after John Claud Fortescue Fryer, who collected most of the best material of this species in 1908–1909 during the Percy Sladen Memorial Trust Expedition.

Distribution. Endemic to Aldabra atoll and recorded on Picard and Grande Terre islands.

Comparison. *Tropidophora fryeri* sp. nov. is most similar to

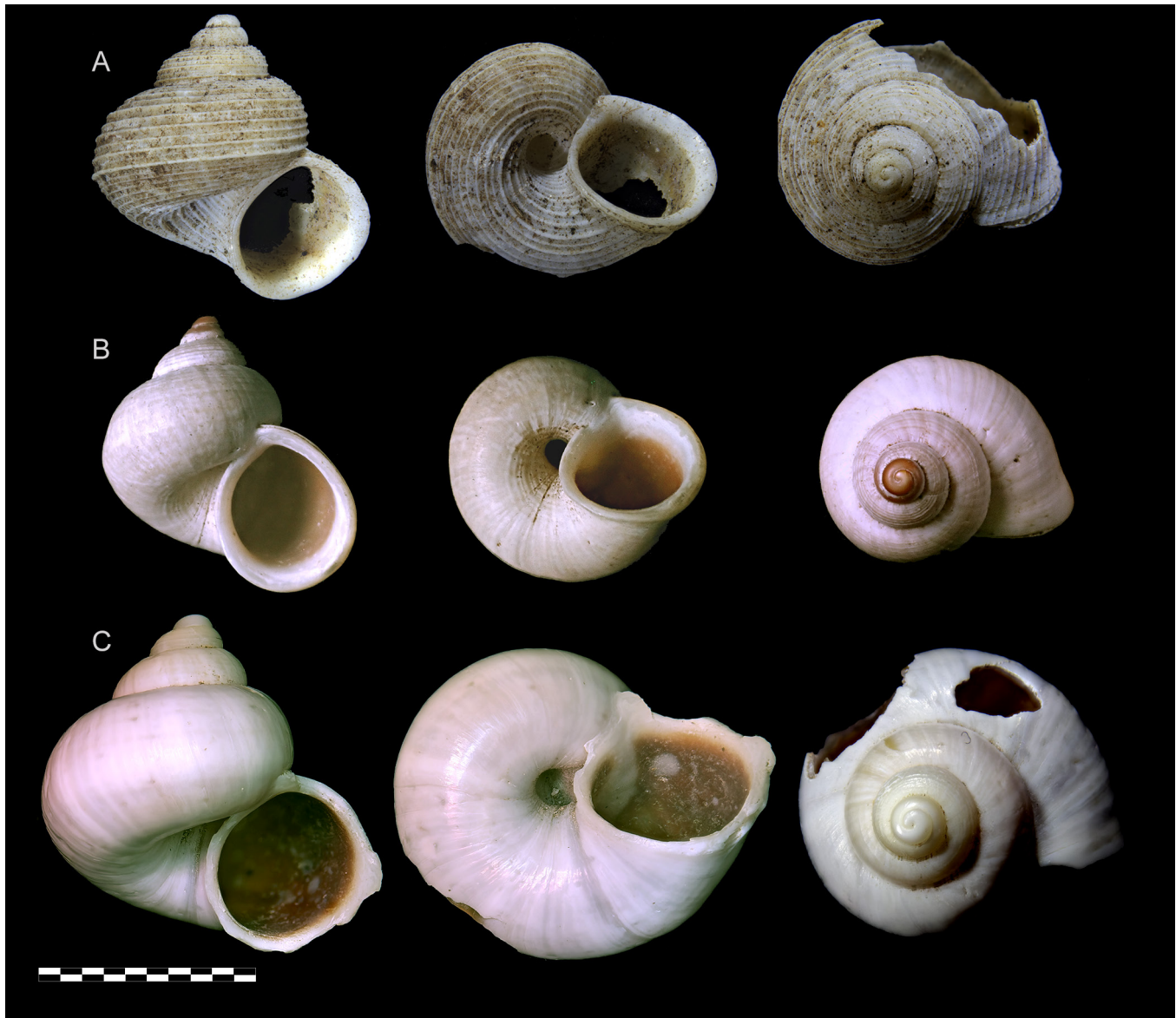


Figure 3. Atoll *Tropidophora* holotypes in apertural, basal and apical views. **A**, *T. gardineri* (UF 593613). **B**, *T. fryeri* sp. nov. (holotype NHMUK 20240300). **C**, *T. menai* sp. nov. (UF 593615). Scale bar: 10 mm.

T. menai sp. nov., the species from Cosmoledo; see below for a detailed comparison. It differs from the other Aldabran species in lacking the prominent sculpture; fresh specimens can easily be distinguished where the sculpture is visible, and *T. gardineri* also has a much thinner shell and a more flared aperture.

***Tropidophora menai* sp. nov.**

Figures 3C, 4C, 5C, 6C

Tropidophora (Ligatella) ligata (Mull.) var. *affinis* Sow.—Connolly 1925: 265.

Tropidophora rogatum Barnacle 1962: 56 (*nomen nudum*).

Tropidophora ligata—Barnacle 1962: 56; Lionnet 1984: 242;

Gerlach 1987: 35.

Tropidophora rogatum Barnacle—Lionnet 1984: 242; Gerlach 1987: 35.

Tropidophora (Ligatella) ligata (Müller, 1774) var. *affine* (Sowerby, 1847)—Gerlach & Griffiths 2002: 671; Gerlach 2006a: 31; Gerlach 2006b: 103.

ZooBank registration. urn:lsid:zoobank.org:act:C463EBFC-D0C3-46AB-96ED-27F7BFDCD4C7

Type locality. In leaf litter under low bushes growing on calcarenite, on NW side of Menai Island, Cosmoledo, Seychelles; 09.7048° S 047.5152° E; O. Griffiths & F. B. V. Florens leg., May 2023.

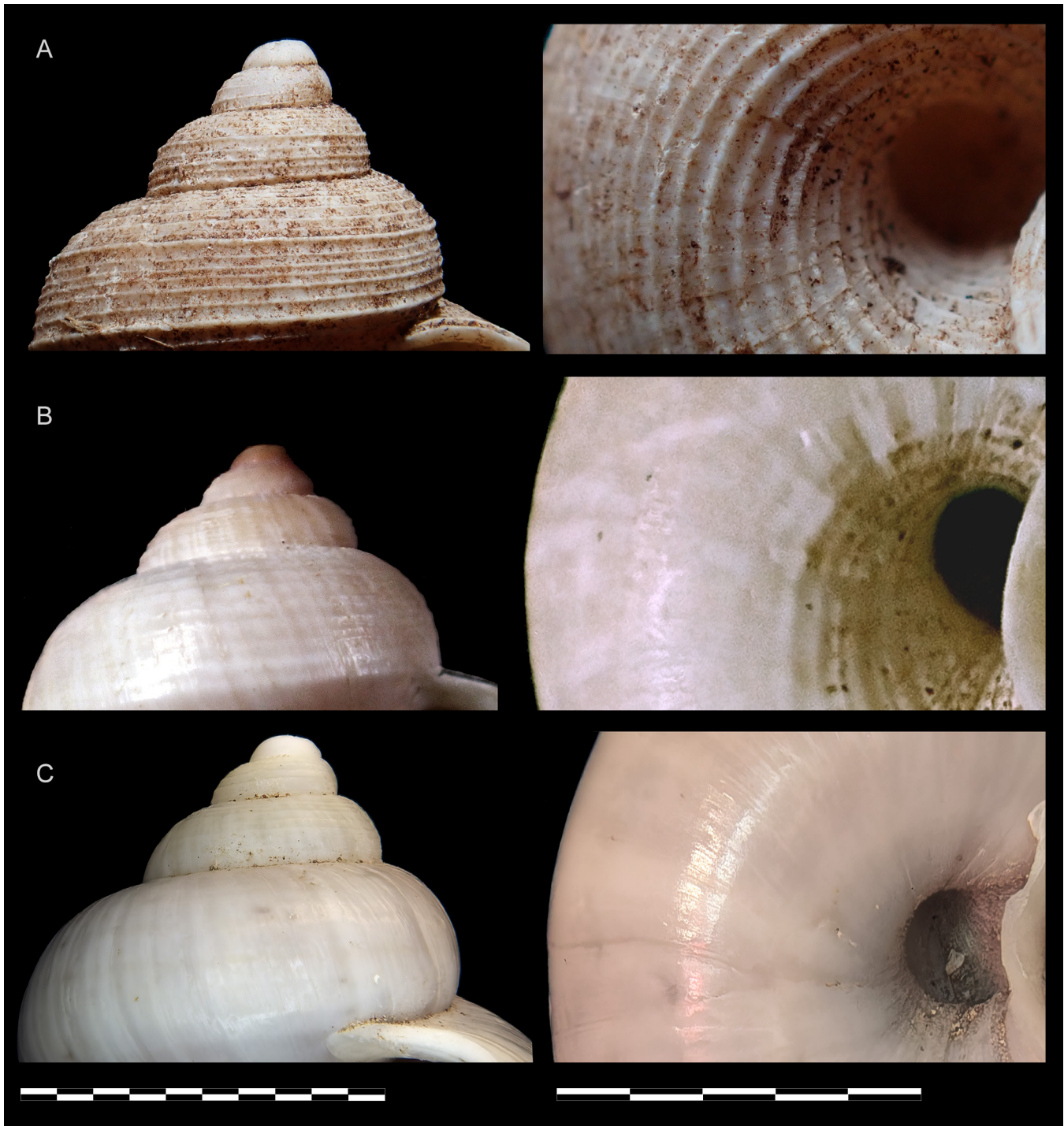


Figure 4. Spire and umbilicus of atoll *Tropidophora* species. **A.** *T. gardineri*(UF 593613). **B.** *T. fryeri* sp. nov. (NHMUK 20240300). **C.** *T. menai* sp. nov. (UF 593615). Scale bar: 10 mm for spire, 5 mm for umbilicus.

Type specimens. Holotype: UF 593615. Paratypes: UF 593616, 13 specimens, same data as holotype.

Additional material. JG collection, 1 apertural fragment collected on Menai, 2005 (misidentified as *T. ligata* by Gerlach 2006a, b).

Diagnosis. A largely smooth shelled *Tropidophora*, with sculpture of radial striae and spiral cords restricted to the first two teleoconch whorls; bluish white with a white apex and a distinctly purple inside aperture.

Description. Shell medium-sized (measurements in Table

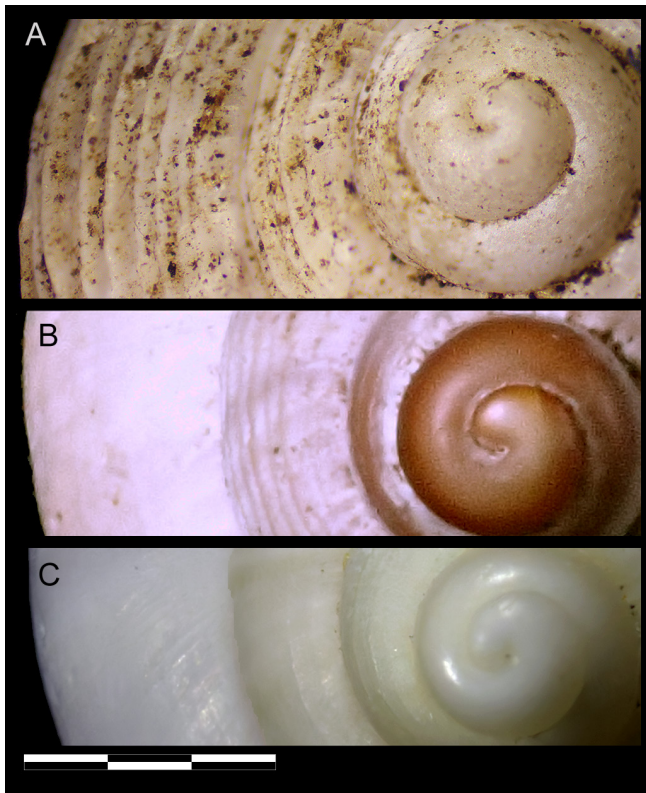


Figure 5. Sculpture of atoll *Tropidophora* species. **A**, *T. gardineri* (UF 593613). **B**, *T. fryeri* sp. nov. (NHMUK 20240300). **C**, *T. menai* sp. nov. (UF 593615). Scale bar: 3 mm.

1), thick, globosely conical, shiny or dull. Apex rounded. Last whorl rounded, a slight angle in one specimen. Whorls 4–5, convex, including protoconch of 1.2–1.5 smooth, shiny whorls. Teleoconch with very fine radial striae, only distinct on first whorl; 9 low spiral ridges present on first whorl, abruptly fading on second whorl, and not detectable on last whorl. Last whorl only crossed by irregular growth lines, without radial or spiral striae. Base and into umbilicus perfectly smooth. Aperture circular. Lip slightly narrowly expanded. Umbilicus open, 3–19% of shell diameter.

Shell pale bluish-white; apical 2 whorls white. Rest of shell with indistinct paler and darker radial steaks; on base radial steaks purplish and running into umbilicus. Some specimens with 2–4 very faint, bluish spiral bands. Aperture deep purple-brown; lip white.

Distribution. Endemic to Menai island, Cosmoledo. Only recorded on Menai (Connolly 1925 and present material).

Comparison. *Tropidophora fryeri* is the most similar species in shape and size, and is geographically closest, but it differs in sculpture and colouration, and is slightly smaller than *T. menai* (Table 1). However, sizes of these species overlap, and they do not notably differ in shape. The aperture in *T. menai*

is more variable and almost always more circular (aperture height / width 1.08–1.18 compared to 1.21–1.45). The last whorl of *T. fryeri* is slightly angled, whereas in *T. menai* it is even curved. Both species have spiral ridges on the spire but the number of cords differ. The cords are more variable (8–12) in *T. fryeri*, and both the radial striae and spiral cords are better developed. These species are superficially similar in colour but differ in detail: both are pale, but *T. menai* has a distinct bluish tint with fainter spiral bands than *T. fryeri*. Both have an orange tinted apex, although it is only faintly so in *T. fryeri*, and the inside of the shell of *T. fryeri* is orange rather than the dark purple-brown of *T. menai*. *Tropidophora gardineri* is also geographically close, but it has a thinner shell, more flared aperture, and very prominent sculpture.

Etymology. *Menai*, after the type locality, Menai island, Cosmoledo. Used as a noun in apposition.

Remarks. This species was probably first recorded by Connolly (1925), who listed shells collected by H.P. Thomasset in 1907 as *T. ligata* var. *affinis*. Connolly's specimens have not been located in NHM or in the KwaZulu-Natal Museum which has much of his material (Muratov pers. comm.). Connolly's brief description differs from the present species only in a marginal difference in reported shell proportion (height/diameter) of 1.2, compared to 0.9–1.1. Subsequent mentions of *T. ligata* from Cosmoledo (Barnacle 1962; Lionnet 1984; Gerlach 1987, 2006a, 2006b; Gerlach & Griffiths 2002) all repeated Connolly. There is therefore no evidence that true *T. ligata* ever existed on Cosmoledo. Barnacle (1962: 56) listed "*Tropidophora rogatum* Sykes" (a *nomen nudum*) from Cosmoledo describing it as "almost smooth . . . Numerous narrow brown spiral lines". Barnacle's records from the atolls were derived from Ernest Ruthven Sykes' collection, which comprised material collected there by Fryer in 1908–1909. No Cosmoledo material from the Sykes collection has been identified, although there are several lots from Aldabra. In the NHM there is one tray labelled "*Tropidophora picardense* gardineri prob of Ile Picard, Type (& large shell weathered)". Other than Barnacle's citation, there is no evidence that Fryer collected any *Tropidophora* on Cosmoledo, and Fryer (1910: 430) made no mention of any molluscs of note ("The fauna seemed rather poor"); it seems unlikely that he would not have recorded collecting the largest atoll snail outside of Aldabra. If Fryer did not collect *Tropidophora* on Cosmoledo, it may be that the shells referred to by Barnacle were those collected by Thomasset. Sykes may have asked for information on these specimens and noted the Cosmoledo as "rogatum", meaning asked or questioned, suggesting this may indicate unresolved



Figure 6. Atoll *Tropidophora* variation. **A.** *T. gardineri* (holotype UF 593613; NHM; NHM Ile Esprit JCFF 26/xii/08). **B.** *T. fryeri* sp. nov. (holotype NHMUK 20240300; NHM “rogatum” Picard; NHM “rogatum” Picard; NHM Dune d’Messe path 1969). **C.** *T. menai* sp. nov. (holotype UF 593615 and three paratypes UF 593616). Scale bar: 10 mm.

identity, rather than this being a genuine manuscript name. The present location of the specimens remains unknown.

Notes. Some of the shells are fresh, but 11 of the 14 are rat damaged. This indicates that the species still persists but is probably at high risk of extinction.

NON-MARINE MOLLUSCS OF THE ALDABRA GROUP

(Locality codes for new records are listed in the Appendix)

Caenogastropoda Cox, 1960

Assimineidae H. Adams & A. Adams, 1856

Angustassiminea nitida (Pease, 1865). Aldabra (A2803 - subfossil, J. Becker, March 1987 - subfossil), Cosmoledo (Menai A5764). Indo-Pacific. The fresh specimen is a first record for Cosmoledo.

“*Assiminea parvula* Morelet, 1877”. Aldabra (Picard, Malabar, Esprit, Ile Michel (A2778); Grande Terre A2094, A2115, A2130); Assumption (A5767), Astove (9/23); Cosmoledo (Menai A5757). This species has been identified as *Assiminea parvula* Morelet, 1877. However, this is a junior homonym of *Assiminea parvula* (Mousson, 1865). The taxonomy of western Indian Ocean Omphalotropidinae is currently being reviewed, including the nomenclature of this taxon (Gerlach, Griffiths & Florens in prep.).

Paludinella hidalgoi (Gassies, 1869). Cosmoledo (Ile du Nord), Astove (A5770), Amirantes (D'Arros – Resource Island 13/23), Indo-Pacific. First record for the Amirantes.

Truncatellidae J.E. Gray, 1840

Truncatella guerinii A. Villa & J.B. Villa, 1841. Aldabra (Ile Michel A2778), Assumption (8a/23), Cosmoledo (A5757), Astove (A5770). Indo Pacific.

Truncatella marginata Küster, 1855. Astove (A2114, A5771). Indo-Pacific. Previously recorded as *Truncatella* cf. *valida* var *minor* G. Nevill, 1878 (Gerlach & Griffiths 2002)

Pomatiidae R.B. Newton, 1891 (1828)

Tropidophora gardineri Gerlach, 2006b. Aldabra endemic (Esprit).

Tropidophora fryeri sp. nov. Aldabra endemic (Picard, Grande Terre).

Tropidophora menai sp. nov. Cosmoledo endemic (Menai A5757).

Cyclophoridae J.E. Gray, 1847

Cyathopoma picardense Gerlach, 2006b. Aldabra endemic.

Heterobranchia Burmeister, 1837

Ellobiidae L. Pfeiffer, 1854 (1822)

Auriculastra radiolata (Morelet, 1860). Aldabra (Ile Michel A2778). East and southern Africa.

Blauneria gracilis Pease, 1860. Aldabra (Ile Michel A2778). Indo-Pacific. First record for Aldabra.

Laemodonta bella (H. Adams & A. Adams, 1855)—Aldabra (Picard A2803 & J. Becker, March 1987—all subfossil), Astove. Indo-Pacific. First record for Aldabra and Astove, only recorded from the islands as subfossil specimens.

Melampus parvulus L. Pfeiffer, 1856. Aldabra (Picard A2803—subfossil), Amirantes (D'Arros, Ressource Island 13/23). Previously reported as *M. caffra* (Küster, 1843) (Gerlach & Griffiths 2002). True *M. caffra* is a synonym of *M. lividus*, as noted by Herbert & Kilburn (2004). Small, dark Indo-Pacific shells correspond to “*Auricula caffra* var. *minor*” (Küster 1844), this is identifiable as *M. parvulus*. First record for D'Arros.

Melampus semiplicatus Pease, 1860. Aldabra. Indo-Pacific.

Melampus granifer (Mousson, 1849). Aldabra (Picard A2803—subfossil), Astove. Indo-Pacific.

Table 4. Terrestrial mollusc species recorded on the Aldabra group, number of species endemic to the atolls given in parentheses.

Family	Aldabra	Assumption	Cosmoledo	Astove
Ellobiidae	8		1	3
Assimineidae	2	1	2	1
Truncatellidae	1	1	1	2
Pomatiidae	2 [2]		1 [1]	
Cyclophoridae	1 [1]			
Cerastidae	2 [1]			
Streptaxidae	2	1	1	
Succineidae	1 [1]	1 [1]		
Gastrocoptidae	1	1	1	1
Vertiginidae	3	2	2	1
Valloniidae	1	1	1	
Achatinidae	3	1		
Achatinellidae	1			
Ariophantidae	1	1	1	
Euconulidae	2			
Chronidae	1 [1]			
Bulinidae	1			
Total	33 [6]	10 [1]	11 [1]	8 [0]

Melampus lividus (Deshayes, 1830). Aldabra (Picard A2803—subfossil), Astove, Cosmoledo (Menai A5764). Also Amirantes (D'Arros 13/23). Indo-Pacific. First record for Aldabra and D'Arros.

Pedipes affinis A. Férussac, 1821. Aldabra. Indian Ocean.

Cerastidae Wenz, 1923

Rhachistia aldabrae (E. von Martens, 1898). Aldabra endemic.

Gittenedouardia tumida (J.W. Taylor, 1877). Aldabra. Africa.

Streptaxidae J.E. Gray, 1860

Gulella gwendolinae (Preston, 1910) *aldabrae* van Bruggen, 1975. Aldabra, Assumption, Cosmoledo (Menai A5757), Astove. The subspecies is endemic to these islands, but there are several other subspecies on continental Africa.

Streptostele acicula (Morelet, 1877). Aldabra. Also Amirantes (Poivre, Desroches 1/23). Africa and western Indian Ocean. First record for Desroches.

Succineidae H. Beck, 1837

Quickia aldabraensis Patterson, 1975. Aldabra, Assumption (8/23).

Gastrocoptidae Pilsbry, 1918

Gastrocopta seignaciana (Crosse & P. Fischer, 1879). Aldabra, Assumption (A5767), Astove, Cosmoledo (Menai A5757), Amirantes (Desroches, Alphonse). Western Indian Ocean. Previously recorded as *G. microscopica* (Nevill, 1878) (Gerlach 2006a).

Vertiginidae Fitzinger, 1833

Insulipupa peilei (Madge, 1938). Aldabra, Assumption (A5767), Cosmoledo (Menai, Ile du Nord), Astove. Western Indian Ocean.

Afripupa rodriguezensis (Conolly, 1925). Aldabra, Assumption, Cosmoledo (Menai A5757). Western Indian Ocean.

Nesopupa cf. micra Pilsbry, 1920. Aldabra. Western Indian Ocean.

Valloniidae E.S. Morse, 1864

Pupisoma cf. misaliensis E. Gittenberger & van Bruggen, 2013. Aldabra, Assumption, Cosmoledo (Menai: A5757). Africa and western Indian Ocean. Previously recorded as *P. orcula* (W. H. Benson, 1850) (Gerlach & Griffiths 2002; Gerlach 2006a), re-identified by Gittenberger & Bruggen (2013).

Achatinidae Swainson, 1840

Opeas hannense (Rang, 1831). Aldabra (Grande Terre A2115), Assumption, Amirantes (Desroches 1/23), widely introduced.

Paropeas achatinaceum (L. Pfeiffer, 1846). Aldabra, widely introduced.

Subulina octona (Bruguière, 1789). Aldabra. Amirantes (Desroches 1/23), widely introduced. First record for Desroches.

Achatinellidae Gulick, 1873

Tornatellinops sp. Aldabra.

Ariophantidae Godwin-Austen, 1883

Microcystina rowsoni E. Gittenberger & van Bruggen, 2013. Aldabra, Cosmoledo (Menai A5757), Assumption (A5767). Pemba and Mascarenes. Rowson *et al.* (2010) suggested that *Dupontia* sp. (Gerlach & Griffiths 2002) was *M. minima* (H. Adams, 1867) from Mauritius and Pemba. Gittenberger & Bruggen (2013) separated the Pemba and east African snails as *M. rowsoni* E. Gittenberger & van Bruggen, 2013 but were uncertain about the identity of the Aldabra specimen. The new material confirms that the Aldabra ariophantids are *M. rowsoni*, being smaller than *M. minima* (1.0–1.2 mm diameter) and having a wider umbilicus.

Euconulidae H.B. Baker, 1928

Louisia barclayi (W.H. Benson, 1850). Aldabra (Grande Terre A2115 & 2120). Western Indian Ocean

Louisia duponti Godwin-Austen, 1908. Aldabra (Malabar A2126). Indo-Pacific.

Chronidae Thiele, 1931

“Kaliella” aldabrana Gerlach, 2009. Aldabra endemic.

Bulinidae P. Fischer & Crosse, 1880

Bulinus bavayi (Dautzenberg, 1895). Aldabra. Madagascar.

DISCUSSION

The material reported here expands the species list for the Aldabra group by two species, bringing the total for all the islands of the group to 35. Of these, one is known from the islands only from subfossil material (*Laemodonta bella*). In particular, the material reported here gives a more accurate representation of the fauna of the largely neglected islands of the group: Assumption, Cosmoledo, and Astove. Those islands must have existed for a comparable period of time to Aldabra (Braithwaite 1984), but they appear to have far fewer species and very few endemics (Table 4). This may be explained in part by island size: Aldabra is considerably bigger than the other islands at 155.4 km² compared to Assumption 11.6 km², Astove 7.8 km², and Cosmoledo 5.2 km². It is notable that the smallest atoll, Cosmoledo, has the second highest number of species. This is more remarkable when the structure of the atoll is considered; it is a highly fragmented ring of islets with only having two islands of any notable area: Menai at 2.5 km² and Grande Ile at 1.6 km². Cosmoledo's relatively diverse fauna and the presence of its endemic *Tropidophora* species are probably relicts from the pre-erosional stage of the atoll when its land area could be estimated to have been at least 100 km². The number of species on Assumption and Astove may be artificially low, due to their extensive environmental degradation: guano strip mining across almost all of Assumption (Stoddart *et al.* 1970) and over half of Astove, the other half having been largely converted to plantation (Bayne *et al.* 1970b).

The terrestrial mollusc fauna of the islands is a mixture of western Indian Ocean and widespread Indo-Pacific species. Excluding littoral taxa with pelagic larvae (Assimineidae, Truncatellidae, Ellobiidae), the largest proportion of species have western Indian Ocean (Madagascar-Mascarenes-Seychelles) affinities (14 species, 6 endemic); followed by African (4 species, 1 endemic) and those found in both mainland African and the western Indian Ocean islands (3 species).

Only one fully terrestrial species has an Indo-Pacific range (*Louisia duponti*; probably partly due to introduction) and three species may be introduced. Species with pelagic larvae are largely Indo-Pacific (10 species), with a further 3 or species found on the African–western Indian Ocean coasts.

ACKNOWLEDGEMENTS

We are grateful to Roselle Chapman for her extensive collection of shells made in 1987. We are also grateful to Julian Hume for making available the material collected by John Becker. Jon Ablett facilitated examination of material in the NHM. Igor Muratov provided information on specimens in the KwaZulu-Natal Museum.

REFERENCES

- BARNACLE GAS. 1962. The land and freshwater shells of the Seychelles group of islands (including the Amirantes, Coetivy, Farquhar, Cosmoledo and Aldabra). *Journal of the Seychelles Society* **2**: 53–57.
- BAYNE CJ, COGAN BH, DIAMOND AW, FRAZIER J, GRUBB P, HUTSON A, POORE MED, STODDART DR, TAYLOR JD. 1970a. Geography and ecology of Cosmoledo Atoll. *Atoll Research Bulletin* **136**: 37–56.
- BAYNE CJ, COGAN BH, DIAMOND AW, FRAZIER J, GRUBB P, HUTSON A, POORE MED, STODDART DR, TAYLOR JD. 1970b. Geography and ecology of Astove Atoll. *Atoll Research Bulletin* **136**: 83–99.
- BRAITHWAITE CJR. 1984. Geology of the Seychelles. Pp. 7–33 in: Stoddart DR (Ed.) *Biogeography and Ecology of the Seychelles Islands*. Dr W. Junk, The Hague.
- COGAN BH. 1984. Origins and affinities of Seychelles insect fauna. Pp. 245–258 in: Stoddart DR (Ed.) *The Terrestrial Ecology of the Seychelles Islands*. Dr.W. Junk, The Hague.
- CONNOLLY M. 1925. Notes on a collection of nonmarine Mollusca from the islands of the Indian Ocean. *Journal of Conchology, London* **17**: 257–266
- FRYER HCF. 1910. The structure and formation of Aldabra and neighbouring islands—with notes on their fauna and flora. *Transactions of the Linnean Society of London (2nd Series: Zoology)* **14**: 397–442. doi: 10.1111/j.1096-3642.1911.tb00536.x
- GERLACH J. 1987 *The Land Snails of Seychelles. A Field Guide*. Privately published.
- GERLACH J. 2006a. *Terrestrial and Freshwater Mollusca of the Seychelles Islands*. Backhuys Publishers, Leiden
- GERLACH J. 2006b. Cyclophoridae and Pomatiasidae (Mollusca: Prosobranchia) of the Seychelles Islands. *Journal of Conchology* **39** (1): 1–6.
- GERLACH J, VAN BRUGGEN AC. 1999. Streptaxidae (Mollusca: Gastropoda: Pulmonata) of the Seychelles Islands, western Indian Ocean. *Zoologische Verhandlungen, Leiden* **328**: 1–60.
- GERLACH J, GRIFFITHS OL. 2002. The land snails of the Aldabra Islands, western Indian Ocean. *Journal of Conchology* **37** (6): 667–673.
- GITTENBERGER E, VAN BRUGGEN AC. 2013. Land snails of the islet of Misali, off Pemba Island, Zanzibar, Tanzania. *Zoologische Mededelingen, Leiden* **87** (3): 235–273.
- HERBERT D, KILBURN D. 2004. *Field guide to the land snails and slugs of eastern South Africa*. Natal Museum, Pietermaritzburg, 336 pp.
- KÜSTER HC. 1843–1844. Die Ohrschnecken (Auriculacea). In *Abbildungen nach der Natur mit Beschreibungen*. In: *Systematisches Conchylien-Cabinet von Martini und Chemnitz*. Ersten Bandes, sechzehnte Abtheilung, erster Theil. (1) 16 (1, 42): pls 4–6 (1843); (1) 16 (1, 49): 31–46, pls 1, 7–9 (1844). Bauer & Raspe, Nürnberg.
- LIONNET JFG. 1984. Terrestrial testaceous molluscs. Pp. 239–244 in: Stoddart DR (Ed.) *The Biogeography and Ecology of the Seychelles Islands*. W. Junk, The Hague.
- MARTENS E VON. 1898. Land- und Süßwasser-Mollusken der Seychellen nach den Sammlungen von Dr. Aug. Brauer. *Mitteilungen aus der Zoologischen Sammlung des Museums für Naturkunde in Berlin* **1** (1): 1–94.
- NAGGS F. 1994. The reproductive anatomy of *Paropeas achatinaceum* and a new concept of *Paropeas* (Pulmonata: Achatinoidea: Subulinidae). *Journal of Molluscan Studies* **60**: 175–190.
- PATTERSON CM. 1975. *Quickia aldabrensis*, a new species of land snail from Aldabra Atoll, Western Indian Ocean. *Bulletin of the British Museum (Natural History)* **28**: 177–186.
- PEAKE JF. 1971. The evolution of terrestrial faunas in the western Indian Ocean. *Philosophical Transactions of the Royal Society of London, B* **260**: 581–610.
- ROWSON B, WARREN BH, NGEREZA CF. 2010. Terrestrial molluscs of Pemba Island, Zanzibar, Tanzania, and its status as an “oceanic” island. *ZooKeys* **70**: 1–30. doi: 10.3897/zookeys.70.762
- STODDART DR. 1984. Coral reefs of the Seychelles and adjacent regions. Pp. 63–81 in: Stoddart DR (Ed.) *Biogeography and Ecology of the Seychelles Islands*. W. Junk, The Hague.
- STODDART DR, BENSON CW, PEAKE JF. 1970. Ecological change and effects of phosphate mining on Assumption Island. *Atoll Research Bulletin* **136**: 121–145.
- VAN BRUGGEN AC. 1975. Streptaxidae from Aldabra Island, Western Indian Ocean. *Bulletin of the British Museum (Natural History)* **28**: 157–176.
- VAN BRUGGEN AC. 1986. Additional notes on *Gulella* (Gastropoda, Pulmonata: Streptaxidae) from the Aldabra group, western Indian Ocean. *Basteria* **50**: 71–77.

Manuscript submitted: 19 April 2026

Revised manuscript accepted: 21 May 2026

Editor: Robert Forsyth

APPENDIX

Localities of material recorded here.

Astove

A2114—in large pile behind beach, Astove Island, Aldabra Group; R. Chapman; 3.xii.1997.

9/23—in low scrub on calcarenite, SW end of Astove island, Aldabra group; 10.08680° S, 047.72281° E; O. Griffiths & V. Florens; May 2023.

A5770—in low scrub on calcarenite, Astove island on E side of pass entrance, Aldabra Group; 10.10784° S, 047.73677° E; O. Griffiths & V. Florens; May 2023.

A5771—under logs and flotsam, inland side of mangroves on land side, W side of Astove Island, Aldabra Group; 10.07570° S, 047.73889° E; O. Griffiths & V. Florens; May 2023.

Cosmoledo

A5757—in leaf litter under low bushes growing on calcarenite, on NW side of Menai (Cosmoledo) Island, Cosmoledo Group; 09.70477° S, 047.51521° E; O. Griffiths & V. Florens; May 2023.

A5764—in leaf litter under low bushes growing on sand and calcarenite, on NW side of Ile du Nord (West), Cosmoledo Group; 09.66112° S, 047.57206° E; O. Griffiths & V. Florens; May 2023.

Assumption

A5767—under calcarenite rocks on calcarenite pavement amongst low bushes at NW end of Assumption Island, Aldabra Group; 09.70362° S, 046.51433° E; O. Griffiths & V. Florens; May 2023.

8/23—in leaf litter in grassy area at Settlement, SW side of Assumption island, Aldabra Group; 09.73511° S, 046.49892° E; O. Griffiths & A. Meunier; May 2023.

8a/23—in leaf litter behind beach by brackish lake at SE end of runway of Assumption island, Aldabra Group;

09.74801° S, 046.51211° E; O. Griffiths & A. Meunier; May 2023.

Aldabra

A2094—Dune D'Messe, Grande Terre, Aldabra; R. Chapman; 23.vi.1997.

A2115—in grassland and mixed scrub Takamaka, SE Grande Terre, Aldabra; R. Chapman; 3.xi.1997.

A2120—extracted from soil beneath limestone mushroom, Dune Jean Louis, central S coast, Grande Terre, Aldabra; R. Chapman; 19.x.1997.

A2130—Dune D'Messe, Grande Terre, Aldabra; R. Chapman; 27.ix.1997.

A2126—Gionnet coast mixed scrub, NW side of Malabar Island, Aldabra; R. Chapman; 27.xi.1997.

A2778—leaf litter under casuarina trees, sandy area, Ile Michele, Aldabra; J. Becker; 22.iii.1987; *ex* J. Hume 2021.

A2803—Picard: from clay deposits near “upside down jellyfish pool”, Pocket D, Ile Picard, Aldabra; J. Becker, 26.iii.1987. Subfossil material deposited over 136,000 ybp (Middle Pleistocene).

J Becker 1987—Bassin Cabri, Ile Picard, Aldabra; J. Becker; 26.iii.1987. Subfossil material deposited over 136,000 ybp (Middle Pleistocene).

Amirantes

1/23—in leaf litter in former plantation and filao, growing on sand, approx. 20 m inland on NW side of Ile Des-roches, Amirantes; 05.68332° S, 053.67568° E; O. Griffiths & V. Florens; May 2023.

13/23—Ressource Island, near Saint Joseph Island, Amirantes Group; 05°24'33" S, 053°19'37" E; O. Griffiths & V. Florens; May 2023.