

# Surveys of terrestrial gastropods in three nature reserves in southeast Brazil

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**Abstract.** Though only a small fraction of its original natural cover remains, the Atlantic Forest is considered a land snail diversity hotspot. While this biome has been widely explored by malacologists in the past, modern surveys of important conservation areas are lacking. Here we report the results of surveys conducted in two nature reserves and one national park in Espírito Santo state: Parque Nacional Caparaó (a fraction of which is located in Minas Gerais state), Reserva Biológica Córrego do Veado, and Reserva Biológica Sooretama. In total, 15 families of terrestrial gastropods were represented, with 35 species identified, plus another five additional morphospecies that could not be fully determined; 16 species-level taxa in Caparaó, 23 in Córrego do Veado, and 22 in Sooretama. The following are new records for Espírito Santo state (or Minas Gerais state in the case of Caparaó): *Rectartermo piquetensis*, *Anthinus multicolor*, *Burringtonia labrosa*, *Rhinus velutinohispidus*. Only two non-native species were found, *Subulina octona* in Sooretama and the marsh slug *Deroceras laeve* in Caparaó. Anecdotal natural history records are also provided, including depigmented individuals of *Leiostracus perlucidus*. The importance of local faunal surveys, particularly in preservation areas, cannot be overstated as we endeavour to understand our molluscan fauna.

**Keywords.** Espírito Santo; Minas Gerais; Parque Nacional Caparaó; Reserva Biológica Córrego do Veado; Reserva Biológica Sooretama.

## INTRODUCTION

The Atlantic Forest in Brazil is recognised as a biodiversity hotspot, harbouring a large number of endemic species while suffering from a long history of exploitation; presently, only a small fraction of its original natural cover remains (estimates range from 7% to 36%; e.g., de Lima *et al.*, 2020; Marques *et al.*, 2021; Rosa *et al.*, 2021; Vancine *et al.*, 2024). In its original extension, the Atlantic Forest is thought to have been the second largest rainforest on the planet, with an area of up to 1,500,000 km<sup>2</sup> covering the eastern coast of South America from the Brazilian states of Rio

Grande do Norte to Rio Grande do Sul and as far inland as Paraguay and northeastern Argentina (Marques *et al.*, 2021).

The Atlantic Forest also has a long and complex biogeographic history that resulted in high rates of endemism across several taxa (Mittermeier *et al.*, 2004). This high biodiversity is also unevenly distributed between the northern and southern portions of the Atlantic Forest, with the former having a greater historical biotic exchange with the Amazon rainforest (Sobral-Souza & Lima-Ribeiro, 2017; Faria *et al.*, 2021; Lins-e-Silva *et al.*, 2021; though such faunal connections have not yet been demonstrated in terrestrial gastropods).

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This distinction influences the patterns of endemism across the biome, and the main biogeographic barrier between northern and southern Atlantic Forest seems to be the Doce River ('Rio Doce' in Portuguese), which crosses the states of Minas Gerais and Espírito Santo in Brazil (Sobral-Souza & Lima-Ribeiro, 2017; Carlucci *et al.*, 2021; Faria *et al.*, 2021). The northern part of Espírito Santo state is part of the "Hileia Baiana" region, together with southern Bahia state, and it is acknowledged as the central corridor of the Atlantic Forest, with a diverse biota and high levels of endemism (Faria *et al.*, 2021). As such, the areas surrounding the Doce River are key in understanding the patterns of biodiversity in the Atlantic Forest (Sobral-Souza & Lima-Ribeiro, 2017; Faria *et al.*, 2021).

The high biodiversity of the Atlantic Forest is also reflected in its numerous species of land snails, which are among the world's most threatened organisms (Lydeard *et al.*, 2004; Régnier *et al.*, 2009, 2015). The Atlantic Forest has been widely explored by past malacologists, which partially explains its high number of taxa (Salvador, 2019b). However, new Atlantic Forest land snail species are still frequently described, and it is estimated that only a fraction of its real biodiversity is currently known (Salvador, 2019b; Machado *et al.*, 2023). Interestingly, the area around the border between the states of Bahia, Minas Gerais and Espírito Santo (part of the "Hileia Baiana" mentioned above) seems to be especially rich in endemic and newly described land snails (Salvador & Cavallari, 2014; Cavallari *et al.*, 2016; Simone & Salvador, 2016; Simone & Amaral, 2021). Nonetheless, modern surveys focusing on land snails from the Atlantic Forest remain scarce, despite their utmost importance as data sources for research in critical areas such as taxonomy, distribution, basic biology, and conservation of land snails.

In this paper, we describe the results of surveys conducted in three key conservation areas in Espírito Santo state, comparing their species composition, reporting new records, and discussing our findings in the broader context of molluscan research and conservation in Brazil. We particularly highlight the importance of this new survey given that: (I) the Atlantic Forest is a biodiversity hotspot and also one of the most threatened ecosystems in Brazil (Marques *et al.*, 2021); (II) land snails are among the world's most threatened organisms (Lydeard *et al.*, 2004), which is likely true for the little-studied Brazilian species as well (Machado *et al.*, 2023); (III) the land snail biodiversity of this specific area of the Atlantic Forest seems to be especially important both for taxonomy and biogeography, as evidenced by discoveries in the past decade (*e.g.*, Cavallari *et al.*, 2016).

## MATERIAL AND METHODS

Surveys were conducted between 2010 and 2012 in three conservation areas in Espírito Santo state, including two nature reserves and one national park, namely: Parque Nacional Caparaó ("Caparaó National Park", henceforth 'Caparaó', a fraction of which is located in Minas Gerais state), Reserva Biológica Córrego

do Veado ("Córrego do Veado Biological Reserve", henceforth 'Córrego do Veado'), Reserva Biológica Sooretama ("Sooretama Biological Reserve", henceforth 'Sooretama'). Collection permits were granted by Ministério do Meio Ambiente (MMA), Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) and Sistema de Autorização e Informação em Biodiversidade (SISBIO), with the following licence numbers: 13425-1, 25036-1 and -2, 26690-1, 30657-1 to -7, 40153-1 and -2.

Caparaó has an area of 31,762 hectares and has predominantly "tropical highland" weather, characterised by rainy summers (November-January) and dry winters (June-August), with mean annual temperatures between 19 and 22°C (maximum 36°C and minimum -4°C on the highest peaks; ICMBio, 2025). The landscape is a series of tabular hills with characteristic flattened forms, intersected by broad valleys. The area is partly conserved, but the vegetation is almost entirely secondary.

Córrego do Veado is located in the northernmost Espírito Santo state and has an area of 2,800 hectares of Atlantic Forest. Sooretama has 24,000 hectares and is located in the northern part of the state as well. In both Córrego do Veado and Sooretama areas, the climate is hot and humid tropical, with a rainy season in the summer and a dry season in the winter. The vegetation (Atlantic Forest) is classified as a dense ombrophilous forest, characterised by an evergreen forest of hydrophilic character, formed by two or more overlapping layers.

Table 1 summarises the areas visited during the surveys in each main location (Caparaó, Córrego do Veado, and Sooretama), including coordinates, altitude, and specific dates of each visit. Collection stations were chosen in each location in a manner to include both the internal area of the reserves/park and more peripheral areas as well. A visual search was conducted at each station, with the aid of sieves (mesh size 0.3 mm). Gastropod specimens were collected by hand, with the help of forceps. Selected individuals were photographed *in vivo* in the field or in the laboratory. Supplementary File 1 has photographs exemplifying the study sites and habitats in each main location.

Live animals were euthanized and preserved partly in ethanol 70% (more favourable preservation mode for anatomical studies) and partly in ethanol 96% (for molecular studies). Empty shells were cleaned and preserved dry. The specimens were deposited in the malacological collection of the Museu de Zoologia da Universidade de São Paulo (MZSP; São Paulo, Brazil). See Supplementary File 2 for a full list of specimen lots, their registration numbers, and further collection data.

Identification of the specimens was done to species level (with a few exceptions, see below) using (1) specialized literature, including original descriptions, the catalogue of Simone (2006), and further taxonomic studies and revisions (*e.g.*, references in Table 2); and (2) comparative specimens, available in the MZSP collection or through high quality photographs (including type specimens). The classification scheme used here follows the Brazilian checklist of terrestrial gastropods (Salvador *et al.*, 2024).

**Table 1.** List of specific collection localities surveyed in each park/reserve.

State, Municipality	Locality name	Coordinates	Altitude
<b>PARQUE NACIONAL CAPARAÓ</b>			
MG, Alto Caparaó	Trilha da Gruta do Vale Verde	-20.41989, -41.84603	1,300 m
MG, Alto Caparaó	Trilha da Sede	-20.50318, -41.8176	997 m
MG, Manhumirim	Patrimônio São João do Príncipe	-20.34083, -41.81694	1,214 m
ES, Irupi	Poço da Piscina/Santa Clara	-20.39861, -41.73361	1,053 m
ES, Lúna	Trilha do Poço do Desejo	-20.35611, -41.83888	1,002 m
ES, Pedra Menina	Cachoeira da Farofa	-20.47208, -41.82825	1,970 m
<b>RESERVA BIOLÓGICA CÓRREGO DO VEADO</b>			
ES, Pinheiros	Estrada do Contorno	-18.37096, -40.13798	32 m
ES, Pinheiros	Trilha Água Limpa	-18.36909, -40.14917	29 m
ES, Pinheiros	Trilha do Jabuti	-19.02472, -40.23583	32 m
<b>RESERVA BIOLÓGICA SOORETAMA</b>			
ES, Sooretama	Estrada do Meio	-19.03530, -40.16172 to -19.03552, -40.16167	30 m
ES, Sooretama	Trilha do Jequitibá	-19.04758, -40.14818 to -19.05110, -40.14788	35 m
ES, Sooretama	Trilha do Quirinão	-19.00507, -40.11688	30 m
ES, Sooretama	Trilha do Quirininho	-19.03565, -40.15838	30 m

A few specimens from the present material have been used in other studies to obtain genetic data (Salvador *et al.*, 2023b). In the present study, we selected further specimens for DNA barcoding, including specimens of *Sanniostracus obliquus* and *Solaropsis planior*. While further suitable specimens were available in the present material for DNA sequencing, those species either already had published sequences in the literature (*e.g.*, *Leiostracus perlucidus*) or the shells would need to be broken to reach the soft tissue (*e.g.*, *Burrowingtonia* spp.), which we preferred not to do to singleton specimens. The targeted markers were: the COI barcoding fragment, the mitochondrial 16S marker, and the nuclear H3 and ITS2+28S markers, which have been commonly used in previous phylogenetic studies (Breure & Romero, 2012; Calcutt *et al.*, 2020; Salvador *et al.*, 2023b; Breure *et al.*, 2024; Rosa *et al.*, 2025). The methodology for DNA extraction, amplification, sequencing, proofing, and assembly follows Calcutt *et al.* (2020) and Salvador *et al.* (2023b). Sanger sequencing was done at MacroGen Europe (Amsterdam, The Netherlands); sequences were submitted to GenBank (Table 3) after proofing and assembly using Geneious Prime (v.2025, Biomatters Ltd.).

In the present study, we provide photographs of live individuals taken in the field or the base camp during the collection trips (Fig. 1), as images of live animals are typically absent from the academic literature and useful details of the soft body (colour patterns, textures, etc.) for species identification often remain undocumented and unused (*cf.*, Rosa *et al.*, 2022; Breure *et al.*, 2024). We also document shells of some species of greater interest (Fig. 2), such as those that are not often figured in the literature or are known mostly by eroded shells, as these images should be useful for future studies.

## RESULTS AND DISCUSSION

In total, 15 families were represented, with 35 species identified (Table 2), plus five additional morphospe-

cies that could not be fully identified due to the specimens being juveniles or too fragmentary, but which are deemed not to belong to any of the other taxa.

### Diversity

In Caparaó, 16 species-level taxa were found; in Córrego do Veado, 23; and in Sooretama, 22. Such numbers are apparently low, but are equivalent to numbers found in other similar Atlantic Forest areas in southeast Brazil: *e.g.*, Rio de Janeiro (Santos & Monteiro, 2001; Rangel *et al.*, 2021), Minas Gerais (Castro & Silva, 2001), and Espírito Santo (Silva & Castro, 2003). The number is markedly low, however, when compared to a survey in an Atlantic Forest reserve in northeast Brazil, which recovered over 40 species (Salvador *et al.*, 2018). The lower number of species could be related to: (1) the history of exploitation and deforestation in Espírito Santo state (and southeast Brazil in general), with mostly secondary forest available in the surveyed areas. Thus, a potentially depauperate fauna would be the norm in these areas, though that is difficult to demonstrate with the scarce survey data available in the literature. Still, some areas in southeast Brazil with a worst record of deforestation can have a somewhat inflated species total due to a greater number of anthropochoric and non-native species (*e.g.*, Rangel *et al.*, 2021). (2) Methodological issues, as very few specimens and species of microgastropods were found (*e.g.*, Achatinidae, Scolodontidae, Pupilloidea, Punctoidea, Euconulidae) in our surveys (Table 2), since leaf litter and soil sampling were not thoroughly conducted. This is particularly true for Sooretama, where a higher species diversity was expected, given the size of the reserve, but where no microgastropods were collected (Table 2). Still, microgastropods have been historically undersampled in most studies in Brazil, which have favoured larger and more colourful snails and thus have likely underestimate local diversity (see Salvador, 2019b; Machado *et al.*, 2023). Case in point, a recent survey in Sooretama (Esteves *et al.*, 2025)

**Table 2.** List of species found, presence in each surveyed location (marked by an 'X'), and information on the species' known distribution (with references). An 'O' indicates that individuals were observed *in situ*, but voucher material was not preserved. An interrogation mark '?' means that specimens belonging to that genus were found but could not be allocated to one species with confidence due to being juvenile or fragmentary. Country abbreviations: ARG, Argentina; BRA, Brazil; PRY, Paraguay; URY, Uruguay. Brazilian state abbreviations: AL, Alagoas; BA, Bahia; ES, Espírito Santo; MG, Minas Gerais; PB, Paraíba; PE, Pernambuco; PI, Piauí; RJ, Rio de Janeiro; SC, Santa Catarina; SP, São Paulo.

Species	Caparaó	Córrego do Veado	Sooretama	Known distribution	References
<b>NERITIMORPHA</b>					
<b>Superfamily Helicinoidea</b>					
<b>Family Helicinidae</b>					
<i>Helicina boettgeri</i> Wagner, 1910	—	X	—	ES, MG, RJ	Birckolz et al., 2016; Rosa et al., 2022
<i>Helicina leopoldinae</i> Wagner, 1905	X	X	X	ES	Simone, 2006
<i>Helicina variabilis</i> Wagner, 1827	—	X	X	AL, BA, ES, MG, PB, PE, RJ	Birckolz et al., 2016; Salvador et al., 2018; Simone, 2018; Rosa et al., 2022
<b>SYSTEMLOMMATOPHORA</b>					
<b>Superfamily Veronicelloidea</b>					
<b>Family Veronicellidae</b>					
<i>Sarasinula plebeia</i> (Fisher, 1868)	X	—	—	Neotropics	Daglio et al., 2020
Veronicellidae indet.	—	X	—	—	—
<b>STYLOMMATOPHORA</b>					
<b>Superfamily Achatinoidea</b>					
<b>Family Achatinidae</b>					
<i>Obeliscus carphodes</i> (Pfeiffer, 1855)	—	X	—	ES, SP	Salvador, 2019a
<i>Subulina octona</i> (Bruguière, 1789)	—	—	O	Neotropics	Massemin et al., 2009
Subulininae indet.	—	X	—	—	—
<b>Superfamily Scolodontoidea</b>					
<b>Family Scolodontidae</b>					
Scolodontidae indet. 1	—	X	—	—	—
Scolodontidae indet. 2	X	X	—	—	—
<b>Superfamily Streptaxoidea</b>					
<b>Family Streptaxidae</b>					
<i>Rectartemon depressus</i> (Hyneman, 1868)	—	X	—	Southern BRA, PRY, URY, ARG	Parodiz, 1957; Figueiras, 1963; Quintana, 1982; Simone, 2006; Salvador, 2018
<i>Rectartemon piquetensis</i> (Pilsbry, 1930)	—	X	X	MG, RJ, SP	Birckolz et al., 2016; Salvador, 2018
<i>Rectartemon regius</i> (Löbbecke, 1881)	X	X	X	MG, ES, RJ	Simone, 2006; Salvador, 2018
<b>Superfamily "Punctoidea"</b>					
Punctoidea indet.	X	—	—	—	—
Cystopeltidae indet.	—	X	—	—	—
<b>Superfamily Succineoidea</b>					
<b>Family Succineidae</b>					
<i>Omalonyx cf. convexus</i> (Martens, 1868)	—	—	O	Southern BRA, PRY, URY, ARG	Arruda & Thomé, 2008; Coscarelli et al., 2018
<b>Superfamily "Rhytidoidea"</b>					
<b>Family Odontostomidae</b>					
<i>Anthinus multicolor</i> (Rang, 1831)	X	—	—	ES, RJ, SP	Simone, 2006, 2022; Rosa et al., 2022
<b>Family Strophocheilidae</b>					
<i>Megalobulimus bronni</i> (Pfeiffer, 1847)	X	—	—	ES, MG, SP	Simone, 2006; Fontenelle & Salvador, 2023
<i>Megalobulimus</i> sp.	X	—	—	—	—
<b>Superfamily Orthalicoidea</b>					
<b>Family Bulimulidae</b>					
<i>Auris bilabiata</i> (Broderip & Sowerby, 1830)	—	—	X	BA, ES, MG, RJ, SE	Birckolz et al., 2016
<i>Cochlorina aurisleporis</i> (Bruguière, 1792)	O	X	X	BA, ES, MG, RJ	Simone, 2006
<i>Cochlorina cf. lateralis</i> (Menke, 1828)	—	X	X	ES	Simone, 2006
<i>Drymaeus papyraceus</i> (Mawe, 1823)	X	X	X	Eastern BRA, PRY, URY, ARG	Simone, 2006
<i>Pseudoxychona pileiformis</i> (Moricand, 1836)	—	X	X	BA, ES	Simone, 2006
<i>Pseudoxychona polytricha</i> (Ihering, 1912)	—	X	—	ES	Simone, 2006
<i>Sanniostracus cf. obliquus</i> (Reeve, 1849) [variety 6 of Dohrn (1883)]	—	X	—	BA, ES, MG, RJ	Macedo et al., 2023
<i>Sanniostracus poecilogramma</i> (Ancey, 1901)	—	—	X	ES, MG	Ancey, 1901; Simone & Salvador, 2016
<b>Family Cycloodontinidae</b>					
<i>Bahiensis albofilosus</i> (Dohrn, 1883)	—	—	X	BA, RJ	Simone, 2006
<i>Bahiensis bahiensis</i> (Moricand, 1834)	—	—	X	BA, RJ	Simone, 2006
<i>Burringtonia labrosa</i> (Menke, 1828)	—	—	X	BA, RJ	Simone, 2006
<i>Burringtonia pantagruelina</i> (Moricand, 1834)	—	X	—	BA, ES, RJ	Salvador & Simone, 2015
<i>Moricandia willi</i> (Dohrn, 1883)	—	—	X	ES, MG, PR, SC	Salvador, 2019a

Table 2. Continued.

Species	Caparaó	Córrego do Veado	Sooretama	Known distribution	References
<b>Family "Megaspiridae"</b>					
<i>Thaumastus taunaisii</i> (Férussac, 1822)	X	—	—	ES, MG, PI(?), RJ, SC, SP	Jurberg et al., 1988; Simone, 2006; Fernandes et al., 2025
<b>Family Simpulopsidae</b>					
<i>Leiostracus goniotropis</i> (Ancey, 1904)	—	—	X	ES	Simone, 2006
<i>Leiostracus perlucidus</i> (Spix, 1827)	—	X	X	BA, ES, MG; RJ, SP	Simone & Salvador, 2016
<i>Rhinus velutinohispidus</i> (Moricand, 1836)	—	—	X	BA	Simone, 2006
<i>Simpulopsis miersi</i> Pfeiffer, 1857	X	?	?	ES	Araujo & Breure, 1977
<i>Simpulopsis tryoni</i> Pilsbry, 1899	X	?	?	BRA	Simone, 2006
<b>Superfamily Arionoidea</b>					
<b>Family Agriolimacidae</b>					
<i>Deroceras laeve</i> (Müller, 1774)	0	—	—	Non-native	Salvador et al., 2024
<b>Superfamily Sagdoidea</b>					
<b>Family Solaropsidae</b>					
<i>Solaropsis cf. brasiliana</i> (Deshayes, 1832)	X	X	X	BA, ES, MG, RJ, SP	Simone, 2006; Cuzzo et al., 2018
<i>Solaropsis planior</i> (Pilsbry, 1890)	X	X	X	ES, SP	Simone, 2006

Table 3. Species from Caparaó and Sooretama for which genetic data are available, either already published or obtained during the present study. \*Identified as *Pseudoxychona dulcis* (Ihering, 1912) in Salvador et al. (2023b), which is very likely a synonym of *P. pileiformis* (cf., Simone, 2006).

Species	Area of origin	GenBank accession numbers				Reference
		COI	16S	H3	ITS2+28S	
<i>Burringtonia labrosa</i> (Menke, 1828)	Sooretama	OP361013	—	OP381235	OP355599	Salvador et al., 2023b
<i>Pseudoxychona pileiformis</i> (Moricand, 1836)	Sooretama	—	—	OP381284	OP355648	Salvador et al., 2023b*
<i>Sanniostracus cf. obliquus</i> (Reeve, 1849) [variety 6 of Dohrn (1883)]	Córrego do Veado	PX588459	—	TBD	PX588442	This study (MZSP106613)
<i>Simpulopsis miersi</i> Pfeiffer, 1857	Caparaó	OP361053	—	OP381290	OP355653	Salvador et al., 2023b
<i>Simpulopsis tryoni</i> Pilsbry, 1899	Caparaó	OP361055	—	OP381292	OP355655	Salvador et al., 2023b
<i>Solaropsis planior</i> (Pilsbry, 1890)	Caparaó	PX588460	PX588441	—	—	This study (MZSP106526)

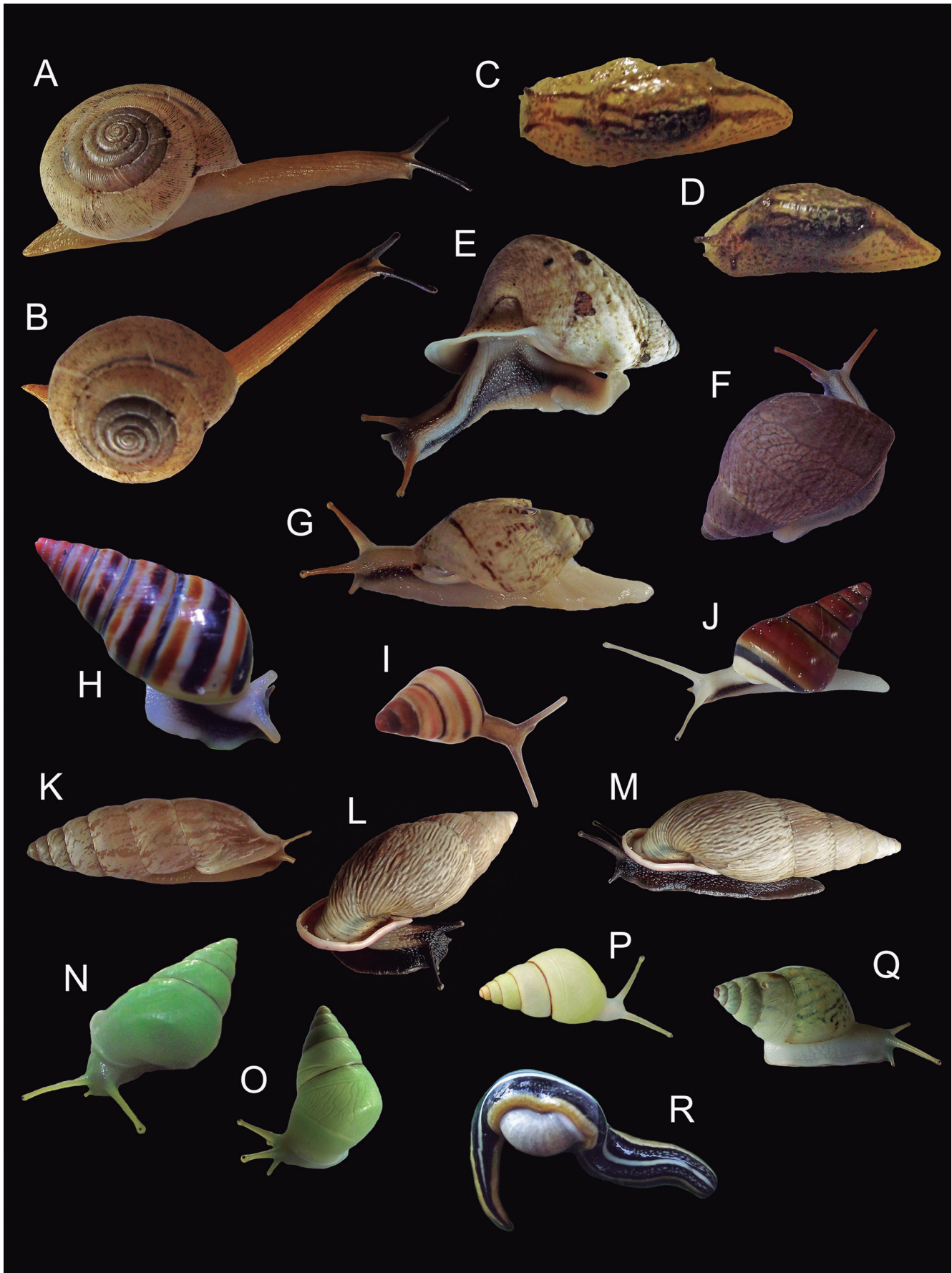
recovered 34 species in total, of which 12 are small animals belonging to Achatinidae, Scolodontidae, Punctoidea, and Euconulidae. (3) Chance. Even though the trips were scheduled in spring and summer (the rainy season, when snails and slugs are more active and thus, more easily found; cf., Esteves et al., 2025), the season was unexpectedly extremely dry, which has a notable impact on how many gastropods can be found (e.g., Silva et al., 2021).

When comparing the surveyed areas, the most notable difference (Table 2) was the reduced diversity found in Caparaó, which was certainly an effect of the unusually dry period during the collection trips. This is particularly evident in the Orthalicoidea diversity; this superfamily is the most diverse in Brazil (Salvador, 2019b; Machado et al., 2023; Salvador et al., 2024) and is represented by several species in Córrego do Veado and Sooretama, while only three species were found in Caparaó (Table 2). Even so, members of Odontostomidae and Strophocheilidae, as well as *Thaumastus taunaisii*, which are large animals overall, were only found in Caparaó despite the dry spell (Table 2). As mentioned above, few microgastropods (e.g., Achatinidae, Scolodontidae, Punctoidea) were collected due to methodological shortcomings, and no microgastropod whatsoever was collected in Sooretama. Euconulidae, a relatively commonly found family of microgastropods, was not found in any of the areas (though it is known from Sooretama; Esteves et al., 2025). The semi-slug *Omalonyx cf. convexus* was only found in Sooretama, although that could also be a methodological bias, e.g., a reflection of the type of (micro-)habitats surveyed.

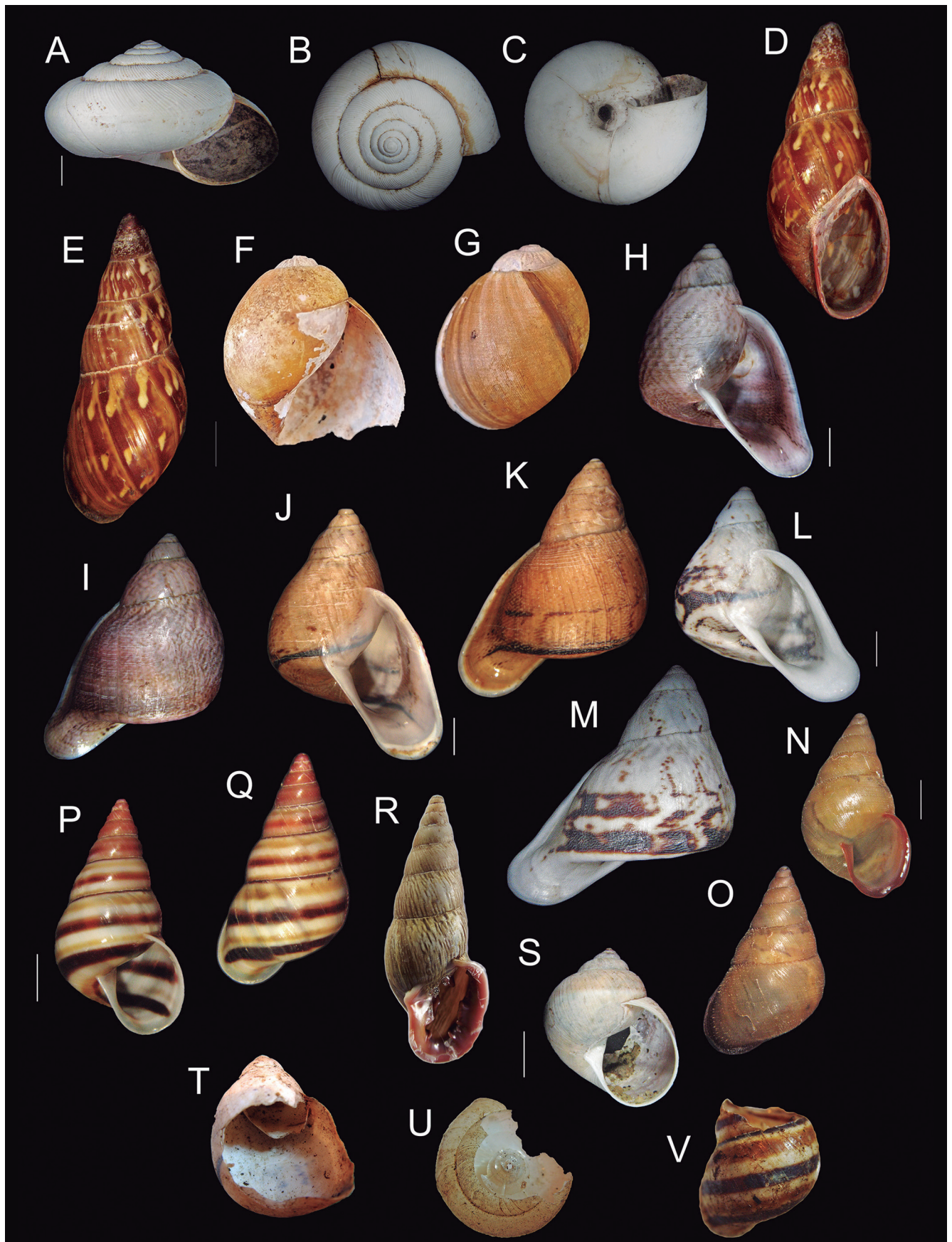
Even though the sample from Caparaó was reduced, some differences in faunal composition (i.e., exclusive species) can already be observed in relation to the other two areas (Table 2). Caparaó is located to the south of Doce River, while the other areas are to the north. As mentioned above, this river is thought to act as a geographic barrier that leads to faunal differences between the two regions of the Atlantic Forest (Sobral-Souza & Lima-Ribeiro, 2017; Carlucci et al., 2021; Faria et al., 2021).

### New records

Some of the species found during our surveys represent new records for Espírito Santo state (or Minas Gerais state in the case of Caparaó, which borders the two states): *Rectartemon piquetensis*, *Anthinus multicolor*, *Burringtonia labrosa*, *Rhinus velutinohispidus*. *Rectartemon piquetensis* (Figs. 1A, B and 2A-C) and *Burringtonia labrosa* (Figs. 1L, M and 2R) are known from Atlantic Forest areas in neighbouring states (Table 2), so it is not surprising that they were found in our surveys in Espírito Santo state. Likewise, *Rhinus velutinohispidus* (Fig. 2S) is known only from Bahia state, but its occurrence in Sooretama (Table 2), in the northern portion of Espírito Santo, is also unsurprising. Still, not much is known about this species in comparison to other similar *Rhinus* spp. (Simone & Salvador, 2016; Salles & Oliveira, 2022). *Anthinus multicolor* is a more complex case: we found a morphotype that is commonly attributed to



**Figure 1.** Photographs of live snails taken during fieldwork. Not to scale. (A-B) *Rectartemon piquetensis*; (C-D) *Omalonyx* cf. *convexus*; (E-G) Adult and juvenile *Cochlorina aurisleporis*; (H-I) Adult and juvenile *Sanniostracus* cf. *obliquus*, variety 6 of Dohrn (1883); (J) Juvenile *Sanniostracus poecilogramma*; (K) *Bahiensis bahiensis*; (L-M) *Burringtonia labrosa*; (N-O) *Leiostracus perlucidus*; (P-Q) Individuals of *Leiostracus perlucidus* showing depigmentation; (R) *Cratera* flatworm preying upon a *Helicina* sp.



**Figure 2.** Shells of species of interest. (A-C) *Rectartemon piquetensis* MZSP 106561; (D-E) *Anthinus multicolor* MZSP 106521; (F-G) *Megalobulimus* sp. (potentially *M. ovatus* (O.F. Müller, 1774)) MZSP 106514; (H-I) *Cochlorina aurisleporis* MZSP 106903; (J-K) *Cochlorina aurisleporis* MZSP 106621; (L-M) *Cochlorina* cf. *lateralis* MZSP 106715; (N-O) *Pseudoxychona polytricha* MZSP 106911; (P-Q) *Sanniostracus* cf. *obliquus* [variety 6 of Dohrn (1883)] MZSP 106618; (R) *Burringtonia labrosa* MZSP; (S) *Rhinus velutinohispidus* MZSP 106690; (T-V) Examples of shells of *Cochlorina*, *Rectartemon*, and *Sanniostracus* showing breakage patterns typical during predation by terrestrial vertebrates. Scale = 5 mm.

this species (Fig. 2D, E) in Caparaó, on the border between Minas Gerais and Espírito Santo states. This species is known from Espírito Santo, Rio de Janeiro and São Paulo states, but not Minas Gerais (Table 2). However, it is important to highlight it here because Simone (2022) remarked that “real” *A. multicolor* is restricted to Rio de Janeiro and other records of the species are mistaken; he could not find the type material of the species for consultation to corroborate his hypothesis, so the taxonomy of this species (or species complex) will need further study.

### Problematic taxa

A few species were left with “open” identifications, as their identity could not be determined with certainty: *Omalonyx* cf. *convexus*, *Cochlorina* cf. *lateralis*, *Solaropsis* cf. *brasiliana*, and *Sanniostracus* cf. *obliquus*. No specimen of *Omalonyx* cf. *convexus* was collected; thus, our identification was based on field observations alone (Fig. 1C, D) and remains tentative.

*Cochlorina* cf. *lateralis* was found in both Córrego do Veado and Sooretama; our specimens (Fig. 2L, M) are morphologically closest to *C. lateralis*, an endemic species to Espírito Santo (Table 2). However, some of its morphological features do not conform to what is known of that species (e.g., Simone, 2006), namely, a more abapically inclined aperture, a more attenuated angulation instead of a marked keel, and the spire apex having a black colour. The specimens seem more like an intermediate between *C. aurisleporis* (Fig. 2H-K) and *C. lateralis* rather than *C. lateralis* proper. As we do not know whether this represents simple morphological variation, a new taxon, or a forgotten synonymised taxon, we prefer to leave our identification in open nomenclature until these species can be revised. Finally, our specimens identified as *Solaropsis* cf. *brasiliana* conform to other shells typically assigned to this species (e.g., Simone, 2006) and the type specimens (housed in the Muséum national d’Histoire naturelle, Paris, France). However, the species lacks a precise type locality in Brazil, making a definitive identification uncertain. Thus, we prefer to leave our specimens in open nomenclature.

Our specimens of *Sanniostracus* Salvador, Silva & Cavallari, 2023 belong to two species and require further clarification. Individuals of this genus from Córrego do Veado and Sooretama were identified as *S. carnavalescus* Simone & Salvador, 2016 in the study that described this species from Nanuque, Minas Gerais, though they were not included in the type series of the species (Simone & Salvador, 2016). After the revision of *Leiostracus obliquus* by Macedo *et al.* (2023) and the phylogenetic study of Orthalicoidea of Salvador *et al.* (2023b) that established the genus *Sanniostracus*, it became clear that there was an issue with the identification of the additional material of Simone & Salvador (2016). Salvador *et al.* (2024) then reinstated *S. poecilogramma* for the so-called “red morph” of *S. carnavalescus*, which is known to occur from Minas Gerais (Ancey, 1901) and Sooretama in Espírito Santo (Simone & Salvador, 2016; this study; Fig. 1J). The specimens from

Córrego do Veado (Fig. 1H, I and 2P, Q), however, belong to what is currently understood as *Sanniostracus obliquus*. That is, they do not belong to the typical morph (as defined by the species original description and lectotype; Reeve, 1849; Dohrn, 1883 [variety 2]; Breure, 1978; Macedo *et al.*, 2023); instead, they belong to the multi-banded ‘variety 6’ described by Dohrn (1883). Macedo *et al.* (2023) considered all of Dohrn’s varieties (which in their interpretation included *S. carnavalescus*, *S. poecilogramma*, and the long-synonymised *Bulimus jeffreysi* Pfeiffer, 1852) to be synonyms of nominate *obliquus*. Although there is currently no genetic data available for the nominate taxon, the data from the others shows a more complex story. There are genetic sequences available for *S. carnavalescus* and *S. poecilogramma* (Salvador *et al.*, 2023b), and here we add data on ‘variety 6’ of *S. obliquus* from Córrego do Veado (Table 3). The ITS2+28S genetic sequence of ‘variety 6’ is a 99.8% match to the others, and the H3 is, respectively, a 99.3% and 99.6% match. However, the COI sequences have only 82.5% and 84.2% similarity to those species, respectively. Thus, it is clear that ‘variety 6’ is a distinct taxon, which is in line with the conchological differences. Whether ‘variety 6’ really is the same as nominate *obliquus* or a still-unnamed species remains to be defined when sequences of the typical morph become available. For that reason, we leave our identification in open nomenclature, as *Sanniostracus* cf. *obliquus* (Reeve, 1849) [variety 6 of Dohrn (1883)].

One notable missing species from our surveys was *Pseudoxychona faerie* (Salvador & Cavallari, 2014), which could not be found. This species was described from a single shell from a museum collection, collected in 1914 in the Doce River area, and no further specimens are known (Salvador & Cavallari, 2014). We hoped that at least the survey in Sooretama would produce some specimens, given its proximity to Doce River, but that did not happen. Thus, whether this species is still alive in the wild remains unknown for now.

The species list of Esteves *et al.* (2025) for Sooretama, while overall similar to ours regarding the macrogastropods, has meaningful differences (besides using outdated classification). Their study was more ecological, assessing diversity and abundance of snails throughout the seasons and across different areas of the reserve, and not focusing on precise species determination. Thus, we believe that some of their species identifications are problematic, some even quite unusual, and should be revisited. To keep the flow of the text, we discuss these issues in more detail in the Appendix. Still, it is worth noting that, besides the microgastropods mentioned above, they found *Orthalicus prototypus* Pilsbry, 1899, a large snail that was not observed during our surveys. Notably (and thankfully, if correct), they did not find the non-native *Subulina octona* (see below).

### Non-native species

Of all species found during our surveys, only two are non-native: (1) *Subulina octona*, native to Central

America and widespread in South America (Darrigran *et al.*, 2020), was observed in Sooretama. This species is hypothesised to be a fierce competitor that can outperform native snails due to its sheer abundance (*e.g.*, Sherley, 2000), but no studies have actually demonstrated this so far. While common in Brazil, very few specimens of *S. octona* were observed in the present survey. (2) The marsh slug *Deroceras laeve* (Müller, 1774) was observed in Caparaó National Park, which is under more anthropic influence. Only one individual slug was observed during our survey. The survey was conducted over a decade ago, and there are a few recent (2023) records of *D. laeve* from nearby municipalities in the citizen science online platform iNaturalist (<https://www.inaturalist.org>). While *D. laeve* can impact agriculture and be intermediate hosts to nematodes (Maurer *et al.*, 2002), as many other slugs, it is not known to impact the native fauna so far, as it is mostly restricted to disturbed environments. Still, its presence within a protected area (no matter how disturbed) is a cause for concern and future surveys should pay closer attention to exotic species in the area.

### Natural history observations

Some anecdotal observations deserve further mention. A notable case involves the genus *Burrowingtonia*: *B. pantagrueina* was found only in Córrego do Veado, while *B. labrosa* was found only in Sooretama (Table 2). Both species are distributed from Bahia to Rio de Janeiro (Table 2), and it is unknown why each species seems to inhabit only one of the surveyed reserves; we know too little of these animals' biology at the moment to postulate a hypothesis. Either way, based on known conchological features, we also cannot discard the possibility that these two species are synonyms.

Another interesting observation is a predation event: a flatworm of the genus *Cratera* Carbayo *et al.*, 2013 (Geoplanidae) feeding on a *Helicina* snail (Fig. 1R). Flatworms seem to be an important class of predators of land snails in Brazil, though records of predation are scarce (Rosa *et al.*, 2022) and knowledge on predator-prey interactions still incipient (*e.g.*, Boll *et al.*, 2016, 2018). Although no predation by vertebrates was observed, shells with breakage patterns indicative of such predation (*cf.*, Salvador *et al.*, 2018) were commonly found (*e.g.*, Fig. 2T-V).

A notable find was two juvenile individuals of *Leiostracus perlucidus* lacking the typical green pigmentation of the soft body (the shell is whitish translucent), one from Córrego do Veado and one from Sooretama. These individuals display a certain degree of depigmentation, with an overall more whitish head-foot, with a more attenuated (and, in one specimen, more uneven) green colour of the visceral mass (Fig. 1P, Q; compare to the usual green individuals in Fig. 1N, O). The differences in depigmentation patterns could indicate two distinct conditions or two different degrees of the same condition. Depigmented or unpigmented individuals are known in multiple other land snail species; they are

more rarely found in nature, potentially due to stronger selection against them (*e.g.*, Yamagishi *et al.*, 2020; Salvador *et al.*, 2025; Forsyth *et al.*, 2015), but are commonly observed in lineages kept as pets, such as the giant African land snails *Lissachatina fulica* (Bowdich, 1822) and *Archachatina marginata* (Swainson, 1821). Such individuals are typically called "albinos" in the malacological literature and in the pet trade, even though the term might not be entirely appropriate in many cases, as different types of depigmentation (of the soft body and/or shell) might be involved.

### Genetic data

Since their collection in 2012, some specimens from these surveys were used to obtain genetic data for other studies by some of the present authors (Salvador *et al.*, 2023b). To integrate the data and make it more easily findable for future researchers, we list those species in Table 3, alongside the GenBank accession numbers for the sequences of each genetic marker. To those, we add the data of *Solaropsis planior* and the colour morph representing 'variety 6' of *Sanniostracus obliquus* (Reeve, 1849) *sensu* Dohrn (1883).

### CONCLUSION

The importance of faunal surveys cannot be overstated. While we have a reasonable (albeit still incomplete) grasp of the taxonomy and diversity of terrestrial gastropods in southeast Brazil, our knowledge of their distribution, abundance, and basic biology is still incipient (Salvador, 2019b; Machado *et al.*, 2023). We are still on a level in which such basic science must be funded, and field studies conducted, if we aim to better understand our native molluscan fauna.

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**DATA AVAILABILITY:** The authors confirm that the data supporting the findings of this study are available within the article and its supplementary material. Genetic sequences are available from GenBank.

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## APPENDIX

Comparison with Esteves *et al.* (2025): as explained in the main text, there are several inconsistencies in the species list Esteves *et al.* (2025) presented from Sooretama. Such issues can be divided into three main categories, as follows.

**(1) Similar-looking species:** Esteves *et al.* (2025) reported *Cochlorina intensior* (Pilsbry, 1898) in addition to *C. aurisleporis*. There is little to distinguish these two species in terms of morphology, and they might as well be synonymous; the former is also only reported from Rio de Janeiro (Simone, 2006). We also identified a different morph of this genus that we ascribed to *C. cf. lateralis*. Likewise, there is little consensus separating specimens that are referred to as *Helicina angulata* Sowerby, 1842 and the common *H. variabilis*.

Esteves *et al.* (2025) listed *Burringtonia pantagruelina* from Sooretama. We identified this species only in Córrego do Veado, while specimens from Sooretama were assigned to *B. labrosa* (Table 2). This was done mostly due to the more delicate and sculptured look of the parietal and palatal teeth. Nevertheless, we would not be surprised if this character proves to be variable and the two species are shown to be synonyms.

The report of *Rhinus ciliatus* (Gould, 1846) by Esteves *et al.* (2025), a species so far restricted to Rio de Janeiro (Simone, 2006; Salles & Oliveira, 2022), is not unlikely, though we could only find *R. velutinohipidus* in our survey, which is a larger animal. Their report of *Simpulopsis atrovirens* (Moricand, 1836) is a bit more unlikely, as the species is known from Alagoas and Bahia (Salvador *et al.*, 2018). We could not identify our specimens of *Simpulopsis* from Sooretama (and Córrego do Veado) due to their being juveniles or fragmentary specimens; however, in Caparaó, we only found *S. miersi* and *S. tryoni*. Identifying *Simpulopsis* species based on the shell alone is difficult, and most identifications are tentative. The morphology of the soft body of the animal, including colouration, is potentially good for diagnosis (The Authors, pers. obs.) and deserves further investigation.

Family Streptaxidae are notable for its confusing taxonomy in Brazil, with species being almost randomly assigned to *Rectartemon* Baker, 1925, *Streptartemon* Kobelt, 1905, and *Streptaxis* Gray, 1837, and with species being ill-defined, with juveniles and adults being described as more than one taxon, on top of misassignment of species to family Scolodontidae (Machado *et al.*, 2023; Roosen *et al.*, 2025). Esteves *et al.* (2025) listed *Rectartemon iguapensis* (Pilsbry, 1930) and *R. iheringi* (Thiele, 1927) from Sooretama, two species which are not known from Espírito Santo (Simone, 2006; Salvador, 2018). We identified the two species of *Rectartemon* present in Sooretama as *R. piquetensis* and *R. regius* (Table 2). The latter is already documented from Espírito Santo (Table 2), and its shell is similar to *R. iheringi*. Likewise, *R. piquetensis* and *R. iguapensis* are very similar conchologically; furthermore, they have nearly the same distribution (Simone, 2006; Salvador, 2018) and could very well be synonyms.

**(2) Probable misidentifications:** The report of *Drymaeus flexilabris* (Pfeiffer, 1853) by Esteves *et al.* (2025) is strange, as this species is known only from northeast Brazil, from the states of Pernambuco and Alagoas (Salvador *et al.*, 2018). This is likely a misidentification of *Sanniostracus poecilogramma*, a member of the same family that we report here, and which has previous records from Espírito Santo (Table 2). Likewise, their record of *Helicina inaequistriata* Pilsbry, 1900 (a species known only from São Paulo to central Rio de Janeiro state; Salvador *et al.*, 2014) could be the same as that we referred to *H. leopoldinae*, a species endemic to Espírito Santo (Table 2).

Esteves *et al.* (2025) identified two species of *Solaropsis*: *S. amazonica* (Reeve, 1854) and *S. rosarium* (Pfeiffer, 1850). As one of the names already gives away, these species are from the Amazon region (Simone, 2006). There are records of *Solaropsis* aff. *rosarium* from the Midwest region of Brazil, as well as from Minas Gerais state, close to the border with mid-western Goiás state (Salvador *et al.*, 2015, 2021; Cavallari *et al.*, 2024). But even so, the species' occurrence in Sooretama is unlikely. We identified two species of *Solaropsis* in Sooretama, *S. cf. brasiliiana* and *S. planior*, whose occurrence in Espírito Santo are well documented (Table 2).

**(3) Unlikely records:** These are species whose known distribution is very far from Sooretama and usually in a different type of biome. At present, and without access to photos or the voucher material of Esteves *et al.* (2025), we cannot suggest the most likely identities of these taxa.

*Radiodiscus goeldii* (Thiele, 1927) is known only from southernmost Brazil (Simone, 2006); although such a record is not entirely unlikely, it needs further verification and more detailed reporting. *Pseudoguppya aenea* (Hylton Scott, 1948) is an Argentine species that has never been recorded in Brazil (Hylton Scott, 1948); most likely, it belongs to one of the other euconulid species reported by Esteves *et al.* (2025). *Tamayoa decolorata* (Drouët, 1859) is a species from French Guiana and the Antilles (Delannoye *et al.*, 2015); it likely is *Tamayoa banghaasi* (Thiele, 1927), the only species of the genus that occurs in Brazil, known from Paraíba state to Rio de Janeiro, with Espírito Santo being one of its type localities (Salvador *et al.*, 2023a).

### SUPPLEMENTARY FILE 1

This is a supplement to the article “*Surveys of terrestrial gastropods in three nature reserves in southeast Brazil*” by R.B. Salvador; R.F.S. Antunes; H.C. Herculano; R.J. Marconcini; R.A. Primo; R.M. Rosa; F.S. Silva; B.M. Tomotani, and F.N. dos Santos.

This file compiles photographs taken during collection fieldwork, exemplifying the types of habitats found in each location and which were surveyed for this study.



**Reserva Biológica Córrego do Veados**



**Reserva Biológica Córrego do Veados**



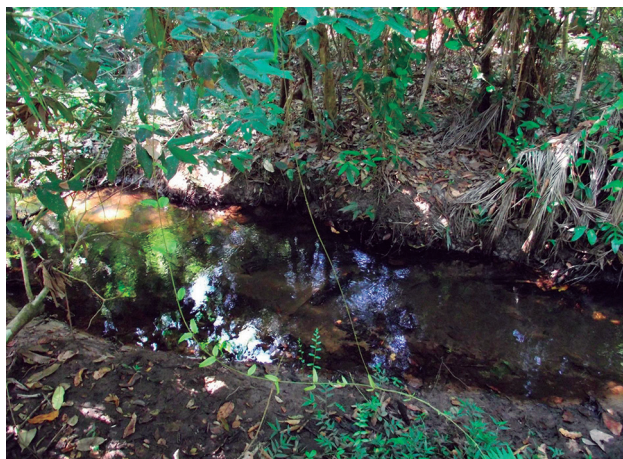
**Reserva Biológica Córrego do Veados**



**Reserva Biológica Córrego do Veados**



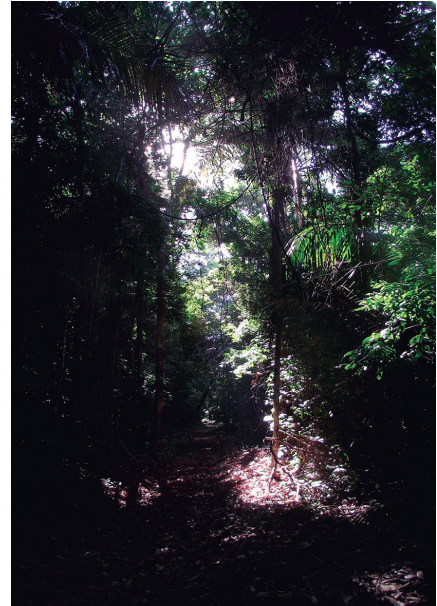
**Reserva Biológica Córrego do Veados**



**Reserva Biológica Córrego do Veados**



**Reserva Biológica Sooretama**



**Reserva Biológica Sooretama**



**Reserva Biológica Sooretama**



**Reserva Biológica Sooretama**



**Reserva Biológica Sooretama**



**Reserva Biológica Sooretama**



**Parque Nacional do Caparaó**



**Parque Nacional do Caparaó**



**Parque Nacional do Caparaó**



**Parque Nacional do Caparaó**

## SUPPLEMENTARY FILE 2

This is a supplement to the article “*Surveys of terrestrial gastropods in three nature reserves in southeast Brazil*” by R.B. Salvador; R.F.S. Antunes; H.C. Herculano; R.I. Marconcini; R.A. Primo; R.M. Rosa; F.S. Silva; B.M. Tomotani, and F.N. dos Santos.

The voucher specimens are housed in the malacological collection of the Museu de Zoologia da Universidade de São Paulo (MZSP), São Paulo, Brazil. Note that some species were observed in the field but not collected, and that not all collected specimens were kept as vouchers.

The following abbreviations are used below for the three protection areas: **PNC** = Parque Nacional do Caparaó; **RBCV** = Reserva Biológica Córrego do Veado; **RBS** = Reserva Biológica Sooretama. The number in brackets indicates the number of specimens in the lot.

### NERITIMOPRHA

***Helicina boettgeri* Wagner, 1910:** MZSP 106907 RBCV, 20/viii/2011, [01].

***Helicina leopoldinae* Wagner, 1905:** MZSP 106507, PNC, Trilha do Poço do Desejo, 29/iv/2012, [01]; MZSP 106528, PNC, Patrimônio São João do Príncipe, 27/iv/2012, [01]; MZSP 106530, PNC, Trilha da Sede, 12/xi/2011, [01]; MZSP 106605, RBCV, Estrada do Contorno, 29/v/2011, [01]; MZSP 106612, RBCV, 29/v/2011, [02]; MZSP 106645, RBS, Trilha do Quirinão, 14/iv/2011, [02]; MZSP 106677, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106924, RBCV, Córrego das Moças, 20/xi/2010, [01]; MZSP 106927, RBCV, Trilha Água Limpa, 20/xi/2010, [03].

***Helicina variabilis* Wagner, 1827:** MZSP 106538, RBCV, 20/viii/2011, [01]; MZSP 106565, RBCV, 29/v/2011, [15]; MZSP 106569, RBCV, 29/v/2011, [01]; MZSP 106576, RBCV, 29/v/2011, [08]; MZSP 106579, RBCV, 29/v/2011, [04]; MZSP 106585, RBCV, 29/v/2011, [01]; MZSP 106611, RBCV, 29/v/2011, [02]; MZSP 106623, RBCV, 28/v/2011, [01]; MZSP 106668, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106669, RBS, Trilha do Jequitibá, 18/vi/2012, [07]; MZSP 106676, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106689, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106693, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106702, RBS, 14/iv/2012, [03]; MZSP 106705, RBS, 14/iv/2012, [02]; MZSP 106711, RBS, 14/iv/2012, [07]; MZSP 106714, RBS, 14/iv/2012, [03]; MZSP 106918, RBS, Estrada do Contorno, 14/iv/2012, [02].

***Helicina* sp.:** MZSP 106916, RBS, Trilha Jabuti, 20/vi/2011, [01]; MZSP, 106922, RBS, Estrada do Contorno, 14/iv/2012, [01]; MZSP 106928, RBCV, Água Limpa, 20/xi/2010, [03].

### SYSTELLOMMATOPHORA

***Sarasinula plebeia* (Fisher, 1868):** MZSP 106523, PNC, Trilha da Gruta do Vale Verde, 08/iv/2012, [01]; MZSP 106525, PNC, Patrimônio São João do Príncipe, 27/iv/2012, [01].

**Veronicellidae indet.:** MZSP 106607, RBCV, 29/v/2011, [02].

### STYLOMMATOPHORA

***Obeliscus carphodes* (Pfeiffer, 1855):** MZSP 106563, RBCV, 29/v/2011, [05].

**Subulininae indet.:** MZSP 106597, RBCV, 29/v/2011, [01].

**Scolodontidae indet. 1:** MZSP 106601, RBCV, 29/v/2011, [01].

**Scolodontidae indet. 2:** MZSP 106512, PNC, Santa Clara, Poço da Piscina, 28/iv/2012, [01]; MZSP 106515, PNC, Santa Clara, Poço da Piscina, 28/iv/2012, [01]; MZSP 106517, PNC, Santa Clara, Poço da Piscina, 28/iv/2012, [01]; MZSP 106593, RBCV, 29/v/2011, [01]; MZSP 106598, RBCV, 29/v/2011, [02]; MZSP 106602, RBCV, 29/v/2011, [02]; MZSP 106604, RBCV, 29/v/2011, [02].

***Rectartemon depressus* (Hyneman, 1868):** MZSP 106574, RBCV, 29/v/2011, [02].

***Rectartemon piquetensis* (Pilsbry, 1930):** MZSP 106561, RBCV, 29/v/2011, [01]; MZSP 106567, RBCV, 29/v/2011, [01]; MZSP 106570, RBCV, 29/v/2011, [01]; MZSP 106586, RBCV, 29/v/2011, [01]; MZSP 106588, RBCV, 29/v/2011, [01]; MZSP 106628, RBCV, Trilha Água Limpa, 20/viii/2011, [01]; MZSP 106642, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106648,

RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106652, RBS, Trilha do Quirininho, 14/iv/2012, [01]; MZSP 106673, RBS, Trilha do Jequitibá, 18/vi/2012, [02]; MZSP 106692, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106696, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106697, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106704, RBS, 14/iv/2012, [01]; MZSP 106712, RBS, 14/iv/2012, [02]; MZSP 106713, RBS, 14/iv/2012, [03].

***Rectartemon regius* (Löbbecke, 1881):** MZSP 106516, PNC, Poço da Piscina, 28/iv/2012, [01]; MZSP 106524, PNC, Trilha da Gruta do Vale Verde, 08/iv/2012, [01]; MZSP 106527, PNC, São João do Príncipe, 27/iv/2012, [01]; MZSP 106584, RBCV, 29/v/2011, [01]; MZSP 106592, RBCV, 29/v/2011, [01]; MZSP 106694, RBS, Estrada do Meio, 14/iv/2012, [01].

***Rectartemon* sp.:** MZSP 106912, RBCV, Trilha Jabuti, 20/vi/2011, [01]; MZSP 106913, RBCV, Trilha Jabuti, 20/vi/2011, [05].

***Punctoidea* indet.:** MZSP 106632, PNC, Trilha da Anta, 10/xii/2010, [01].

***Cystopeltidae* indet.:** MZSP 106594, RBCV, 29/v/2011, [01]; MZSP 106600, RBCV, 29/v/2011, [01]; MZSP 106603, RBCV, 29/v/2011, [02]; MZSP 106631, RBCV, 10/xii/2010, [01].

***Anthinus multicolor* (Rang, 1831):** MZSP 106521, PNC, Trilha da Gruta do Vale Verde, 08/iv/2012, [01].

***Megalobulimus bronni* (Pfeiffer, 1847):** MZSP 106504, PNC, Trilha do Poço do Desejo, 29/iv/2012, [03]; MZSP 106518, PNC, Santa Clara, Poço da Piscina, 28/iv/2012, [01].

***Megalobulimus* sp.:** MZSP 106514, PNC, Santa Clara, Poço da Piscina, 28/iv/2012, [01]; MZSP 106529, PNC, Patrimônio, São João do Príncipe, 27/iv/2012, [01].

***Auris bilabiata* (Broderip & Sowerby, 1830):** MZSP 106636, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106655, RBS, Estrada do Contorno, 14/iv/2012, [03]; MZSP 106685, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106717, RBS, 14/iv/2012, [02].

***Cochlorina aurisleporis* (Bruguière, 1792):** MZSP 106573, RBCV, 29/v/2011, [01]; MZSP 106621, RBCV, 20/vi/2011, [01]; MZSP 106637, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106639, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106640, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106664, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106682, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106699, RBS, 14/iv/2012, [01]; MZSP 106700, RBS, 14/iv/2012, [01]; MZSP 106708, RBS, 14/iv/2012, [01]; MZSP 106895, RBS, 17/vii/2012, [01]; MZSP 106903, RBS, 14/iv/2012, [01].

***Cochlorina cf. lateralis* (Menke, 1828):** MZSP 106578, RBCV, 29/v/2011, [01]; MZSP 106660, RBS, Estrada do Contorno, 14/iv/2012, [01]; MZSP 106715, RBS, 14/iv/2012, [02]; MZSP 106716, RBS, 14/iv/2012, [01].

***Cochlorina* sp.:** MZSP 106562, RBCV, Pinheiros, Espírito Santo, 29/v/2011, [03]; MZSP 106667, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106701, RBS, 14/iv/2012, [01]; MZSP 106606, RBCV, 29/v/2011, [01]; MZSP 106923, RBS, Estrada do Contorno, 14/iv/2012, [01].

***Drymaeus papyraceus* (Mawe, 1823):** MZSP 106532, PNC, Trilha da Sede, 12/xi/2011, [01]; MZSP 106695, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106932, RBCV, 21/xi/2010, [03].

***Pseudoxychona pileiformis* (Moricand, 1836):** MZSP 106590, RBCV, 29/v/2011, [01]; MZSP 106641, RBS, Trilha do Quirinão, 14/iv/2011, [02]; MZSP 106659, RBS, Estrada do Contorno, 14/iv/2012, [01]; MZSP 106670, RBS, Trilha do Jequitibá, 18/vi/2012, [05]; MZSP 106671, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106683, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106710, RBS, 14/iv/2012, [03].

***Pseudoxychona polytricha* (Ihering, 1912):** MZSP 106911, RBCV, 20/viii/2011, [01].

***Sanniostracus cf. obliquus* (Reeve, 1849) [variety 6 of Dohrn (1883)]:** MZSP 106566, RBCV, 29/v/2011, [03]; MZSP 106568, RBCV, 29/v/2011, [02]; MZSP 106587, RBCV, 29/v/2011, [01]; MZSP 106589, RBCV, 29/v/2011, [02]; MZSP 106591, RBCV, 29/v/2011, [01]; MZSP 106608, RBCV, 29/v/2011, [01]; MZSP 106613, RBCV, 29/v/2011, [01]; MZSP 106618, RBCV, 29/v/2011, [06]; MZSP 106626, RBCV, Trilha Água Limpa, 20/viii/2011, [02]; MZSP 106629, RBCV, Trilha Água Limpa, 20/viii/2011, [01]; MZSP 106917, RBCV, Trilha Jabuti, 20/vi/2011, [01]; MZSP 106930, RBCV, Trilha do Tatu Assado, 11/xii/2010, [03].

***Sanniostracus poecilogramma* (Ancey, 1901):** MZSP 106650, RBS, Trilha do Quirininho, 14/iv/2012, [01]; MZSP 106666, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106920, RBS, Estrada do Contorno, 14/iv/2012, [01].

***Bahiensis albofilosus* (Dohrn, 1883):** MZSP 106647, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106674, RBS, Trilha do Jequitibá, 18/vi/2012, [06]; MZSP 106681, RBS, Estrada do Meio, 14/iv/2012, [02]; MZSP 106684, RBS, Estrada do Meio, 14/iv/2012, [01].

***Bahiensis bahiensis* (Moricand, 1834):** MZSP 106653, RBS, Trilha do Quirininho, 14/iv/2012, [03]; MZSP 106678, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106698, RBS, Estrada do Meio, 14/iv/2012, [02]; MZSP 106706, RBS, 14/iv/2012, [01].

***Burringtonia labrosa* (Menke, 1828):** MZSP 106663, RBS, Trilha do Jequitibá, 18/vi/2012, [02]; MZSP 106675, RBS, Trilha do Jequitibá, 18/vi/2012, [01].

***Burringtonia pantagruelina* (Moricand, 1834):** MZSP 106580, RBCV, 29/v/2011, [01]; MZSP 106581, RBCV, 29/v/2011, [01]; MZSP 106582, RBCV, 29/v/2011, [01].

***Moricandia willi* (Dohrn, 1883):** MZSP 106686, RBS, Estrada do Meio, 14/iv/2012, [03]; MZSP 106687, RBS, Estrada do Meio, 14/iv/2012, [01].

***Thaumastus taunaisii* (Férussac, 1822):** MZSP 106519, PNC, Trilha da Gruta do Vale Verde, 08/iv/2012, [05]; MZSP 106520, PNC, Trilha da Gruta do Vale Verde, 08/iv/2012, [01]; MZSP 106522, PNC, Trilha da Gruta do Vale Verde, 08/iv/2012, [01]; MZSP 106535, PNC, Cachoeira da Farofa, x/2011, [01]; MZSP 106537, PNC, 12/xi/2011, [01].

***Leiostracus goniotropis* (Ancey, 1904):** MZSP 106921, RBS, Estrada do Contorno, 14/iv/2012, [01].

***Leiostracus perlucidus* (Spix, 1827):** MZSP 106564, RBCV, 29/v/2011, [02]; MZSP 106575, RBCV, 29/v/2011, [03]; MZSP 106577, RBCV, 29/v/2011, [02]; MZSP 106609, RBCV, 29/v/2011, [02]; MZSP 106610, RBCV, 29/v/2011, [03]; MZSP 106615, RBCV, 29/v/2011, [08]; MZSP 106616, RBCV, 29/v/2011, [01]; MZSP 106617, RBCV, 29/v/2011, [03]; MZSP 106625, RBCV, Trilha 90°, 28/v/2011, [04]; MZSP 106627, RBCV, Trilha Água Limpa, 20/viii/2011, [02]; MZSP 106638, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106643, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106644, RBS, Trilha do Quirinão, 14/iv/2011, [02]; MZSP 106656, RBS, Estrada do Contorno, 14/iv/2012, [01]; MZSP 106658, RBS, Estrada do Contorno, 14/iv/2012, [01]; MZSP 106661, RBS, Estrada do Contorno, 14/iv/2012, [02]; MZSP 106665, RBS, Trilha do Jequitibá, 18/vi/2012, [03]; MZSP 106672, RBS, Trilha do Jequitibá, 18/vi/2012, [01]; MZSP 106688, RBS, Estrada do Meio, 14/iv/2012, [02]; MZSP 106691, RBS, Estrada do Meio, 14/iv/2012, [05]; MZSP 106703, RBS, 14/iv/2012, [04]; MZSP 106921, RBS, Estrada do Contorno, 14/iv/2012, [01]; MZSP 106925, RBCV, Córrego das Moças, 20/xi/2010, [05]; MZSP 106926, RBCV, Córrego das Moças, 20/xi/2010, [01].

***Rhinus velutinohispidus* (Moricand, 1836):** MZSP 106657, RBS, Estrada do Contorno, 14/iv/2012, [01]; MZSP 106690, RBS, Estrada do Meio, 14/iv/2012, [02].

***Simpulopsis miersi* Pfeiffer, 1857:** MZSP 106506, PNC, Trilha do Poço do Desejo, 29/iv/2012, [01]; MZSP 106508, PNC, Trilha do Poço do Desejo, 29/iv/2012, [01]; MZSP 106509, PNC, Trilha do Poço do Desejo, 29/iv/2012, [001]; MZSP 106510, PNC, Trilha do Poço do Desejo, 29/iv/2012, [02]; MZSP 106533, PNC, Patrimônio, São João do Príncipe, 27/iv/2012, [01]; MZSP 106536, PNC, Pedra Roxa, 01/x/2011, [01].

***Simpulopsis tryoni* Pilsbry, 1899:** MZSP 106513, PNC, Poço da Piscina, 28/iv/2012, [01]; MZSP 106531, PNC, Trilha da Sede, 12/xi/2011, [04]; MZSP 106539, PNC, Trilha do Poço do Desejo, 29/iv/2012, [01].

***Simpulopsis* sp.:** MZSP 106542, PNC, 2011, [01]; MZSP 106595, RBCV, 29/v/2011, [03]; MZSP 106599, RBCV, 29/v/2011, [01]; MZSP 106620, RBCV, 29/v/2011, [02]; MZSP 106646, RBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106649, RRBS, Trilha do Quirinão, 14/iv/2011, [01]; MZSP 106651, RBS, Trilha do Quirininho, 14/iv/2012, [01]; MZSP 106909, RBCV, 20/viii/2011, [01]; MZSP 106915, RBCV, Trilha Jabuti, 20/vi/2011, [09].

***Solaropsis* cf. *brasiliiana* (Deshayes, 1832):** MZSP 106505, PNC, Trilha do Poço do Desejo, 29/iv/2012, [01]; MZSP 106583, RBCV, 29/v/2011, [01]; MZSP 106709, RBS, 14/iv/2012, [01].

***Solaropsis planior* (Pilsbry, 1890):** MZSP 106526, PNC, Patrimônio São João do Príncipe, 27/iv/2012, [01]; MZSP 106554, RBCV, 29/v/2011, [04]; MZSP 106555, RBCV, 29/v/2011, [01]; MZSP 106557, RBCV, 29/v/2011, [01]; MZSP 106559, RBCV, 29/v/2011, [02]; MZSP 106560, RBCV, 29/v/2011, [01]; MZSP 106622, RBCV, Trilha do Jabuti, 20/vi/2011, [02]; MZSP 106680, RBS, Estrada do Meio, 14/iv/2012, [01]; MZSP 106718, RBS, 14/iv/2012, [01]; MZSP 106719, RBS, 14/iv/2012, [01]; MZSP 106914, RBCV, Trilha Jabuti, 20/vi/2011, [02].