

Reassessment of the Brazilian species of *Miradiscops* H.B. Baker, 1925, with the description of *Paradiscops* gen. nov. (Stylommatophora, Scolodontidae)

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Abstract. Recent revisions of Scolodontidae genera have split the genus *Miradiscops* H.B. Baker, 1925 in two: *Miradiscops* proper and the newly coined *Mayadiscops* Roosen, Salvador & Breure, 2025. Several species were removed from *Miradiscops* and assigned to other pre-existing scolodontid genera. However, three Brazilian species that had been previously classified in *Miradiscops* could not be assessed at that time: *M. fruhstorferi* (Boettger, 1889), *M. sublenticularis* (Boettger, 1889), and *M. parana* (F. Baker, 1914). They are, thus, revised here. “*Miradiscops*” *fruhstorferi* and “*Miradiscops*” *sublenticularis*, known only from their type locality in Greater Rio de Janeiro, are considered to represent juveniles of *Streptartemon cookeanus* (F. Baker, 1914), family Streptaxidae. As Boettger’s names have priority over Baker’s, and making use of the Principle of the First Reviser, the new classification *Streptartemon fruhstorferi* (Boettger, 1889) comb. nov. is proposed for the species. “*Miradiscops*” *parana*, on the other hand, presents a unique set of features that allows the description of a new genus to contain it, *Paradiscops* gen. nov., resulting in the new classification *Paradiscops parana* (F. Baker, 1914) comb. nov. Thus, the only actual *Miradiscops* species currently known from Brazil is *M. brasiliensis* (Thiele, 1927).

Key words. Amazon biome, Gastropoda, land snails, Streptaxidae

ZooBank identifier. urn:lsid:zoobank.org:pub:1D877402-FBCD-44E7-AFE5-A48AF2856627

DOI. <https://doi.org/10.61733/jconch/4582>

INTRODUCTION

Following up on the assessment of Ravalo *et al.* (2023) and van Leeuwen & Salvador (2024) of the inconsistencies in the Scolodontidae genus *Miradiscops* H.B. Baker, 1925, Roosen *et al.* (2025b) conducted a revision of the genus and split it in two: *Miradiscops* proper, and the newly coined *Mayadiscops* Roosen, Salvador & Breure, 2025. Furthermore, several species were removed from *Miradiscops* and assigned to other pre-existing genera within Scolodontidae.

The study of Roosen *et al.* (2025b) assigned only one Brazilian species to *Miradiscops*, namely *M. brasiliensis* (Thiele, 1927), which is present in southern Brazil, Paraguay, Uruguay, and northern Argentina (Thiele 1927; Simone 2006, 2008; Miquel *et al.* 2007; though records from outside Brazil should be reassessed, cf. Roosen *et al.* 2025b). The other three Brazilian species that had been classified in *Miradiscops* were deemed to not belong to either *Miradiscops* or *Mayadiscops*. They were complex cases that deserved more in-depth attention and full consideration within the larger

scenario of the ongoing revision of Scolodontidae (Roosen & Breure 2024a, b; Roosen *et al.* 2025a, b).

These three species are *M. fruhstorferi* (Boettger, 1889), *M. sublenticularis* (Boettger, 1889), and *M. parana* (F. Baker, 1914). Both *M. fruhstorferi* and *M. sublenticularis* were transferred from their original classification in *Hyalinia* Charpentier, 1837 to *Miradiscops* by Zilch (1983). *Miradopsis parana* was provisionally moved from its original position in *Zonitoides* Lehmann, 1862 to *Miradiscops* by Salvador *et al.* (2024) when compiling the checklist of the terrestrial molluscs of Brazil. Not much is known about these three species other than their type specimens. In the present study we analyse the type materials and reassess their classification.

MATERIALS AND METHODS

The studied type specimens are housed in the following natural history collections: ANSP, Academy of Natural Sciences of Drexel University (Philadelphia, USA); CAS, California Academy of Sciences (San Francisco, USA); SMF, Naturmuseum Senckenberg (Frankfurt am Main, Germany); ZMB, Museum für Naturkunde Berlin (Germany).

This study is part of a series of studies revising the Scolodontidae (Salvador & Cavallari 2020; Salvador 2021a; Roosen & Breure 2024a, b; Roosen *et al.* 2025a, b, in prep.; Weijssenfeld *et al.* 2025; Salvador *et al.* 2026) and draws much of the information and knowledge obtained from that process.

RESULTS AND DISCUSSION

“Miradiscops” fruhstorferi (Boettger, 1889) was originally described as *Hyalinia* (*Polita*) *fruhstorferi* (holotype SMF 225593, Fig. 1D–F). Similarly, *“Miradiscops” sublenticularis* (Boettger, 1889) was originally described as *Hyalinia* (*Polita*) *sublenticularis* (holotype SMF 225594, Fig. 1A–C). The type locality of both species is Ilha das Flores, in Rio de Janeiro, Brazil (Boettger 1889: 28), and both species are to this day only known from their type specimens and, thus, from only their type locality (Simone 2006).

Considering size, shell shape, and shell sculpture (smooth protoconch, transition to teleoconch marked by clear arrested growth line, and teleoconch generally smooth, except for growth lines and irregular eventual thickened lines of growth arrest; Zilch 1960; Schileyko 2000; Salvador & Cunha 2020), it is evident that both holotypes represent juvenile individuals of a *Streptartemon* Kobelt, 1905 species. Notably, the holotype of *sublenticularis* (Fig. 1A–C) represents a younger individual than *fruhstorferi* (Fig. 1D–F).

Streptartemon snails start their life with discoid shells, which become more globular as they grow, and then have an abrupt change in coiling axis inclination on the last whorls (e.g. Salvador & Cunha 2020). The shape of the aperture, and its relative placement in relation to the preceding whorl, also change during growth (e.g. Salvador & Cunha 2020; Salvador 2021b; see also Fernandes *et al.* 2025), and thickened lines representing growth arrest are common along the shell (Zilch 1960; Schileyko 2000; Salvador & Cunha 2020; Salvador 2021b; Brown 2023; see also photographs of multiple streptaxid species in Simone 2006; Brown 2023). Other Brazilian Streptaxidae are more globular when young and present a more clearly defined axial ribbing pattern from the beginning of the teleoconch (e.g. Simone 2006; Salvador 2018; Fernandes *et al.* 2025). As argued in earlier studies (Salvador 2021b; Salvador *et al.* 2024; Roosen *et al.* 2025a, b), this confusion in classification between Scolodontidae and Streptaxidae is quite common and is slowly being untangled by recent revisions.

Given that most *Streptartemon* species are conchologically very similar when young, it would be difficult to determine which species exactly *sublenticularis* and *fruhstorferi* are synonyms of. However, considering their type locality (and only known occurrence) is Ilha das Flores, we can restrict the possibilities to a single known species and propose that *sublenticularis* and *fruhstorferi* represent juveniles of *Streptartemon cookeanus* (F. Baker, 1914) (Fig. 1G–I; lectotype ANSP MO109304, paralectotypes ANSP 458095 and CAS IZN66416). *Streptartemon cookeanus* is a synanthropic species spread throughout Brazil (Fernandes *et al.* 2025) and the only species of this genus recorded from the urban “Greater Rio” (Rio de Janeiro Metropolitan Region), as reported by surveys in the region (e.g. Lima *et al.* 2017; Oliveira *et al.* 2023). Previous records of *S. waukeen* Salvador & Cunha, 2020 from Rio de Janeiro (Salvador & Cunha 2020) are likely incorrect and deemed to represent *S. cookeanus* instead.

Ilha das Flores is a small island (c. 1 km²), now contiguous with the continent, and was the main entryway for foreign immigrants starting in the 1880s (CMIIF 2019; Kushnir 2005a). Over the 20th century, it became a place for quarantine, isolation, political prisoners and a torture centre under the military dictatorship (Kushnir 2005a, b). Today, it contains a navy base and the Immigration Museum. The islands’ small area and (dark) history means that it has been highly affected by anthropic activity since the mid-19th century (CMIIF 2019) and, thus, potentially acted as a gateway to “immigrant snails” as well. We hypothesise that *S. cookeanus* could be one of such cases, as the dates align with Boettger’s

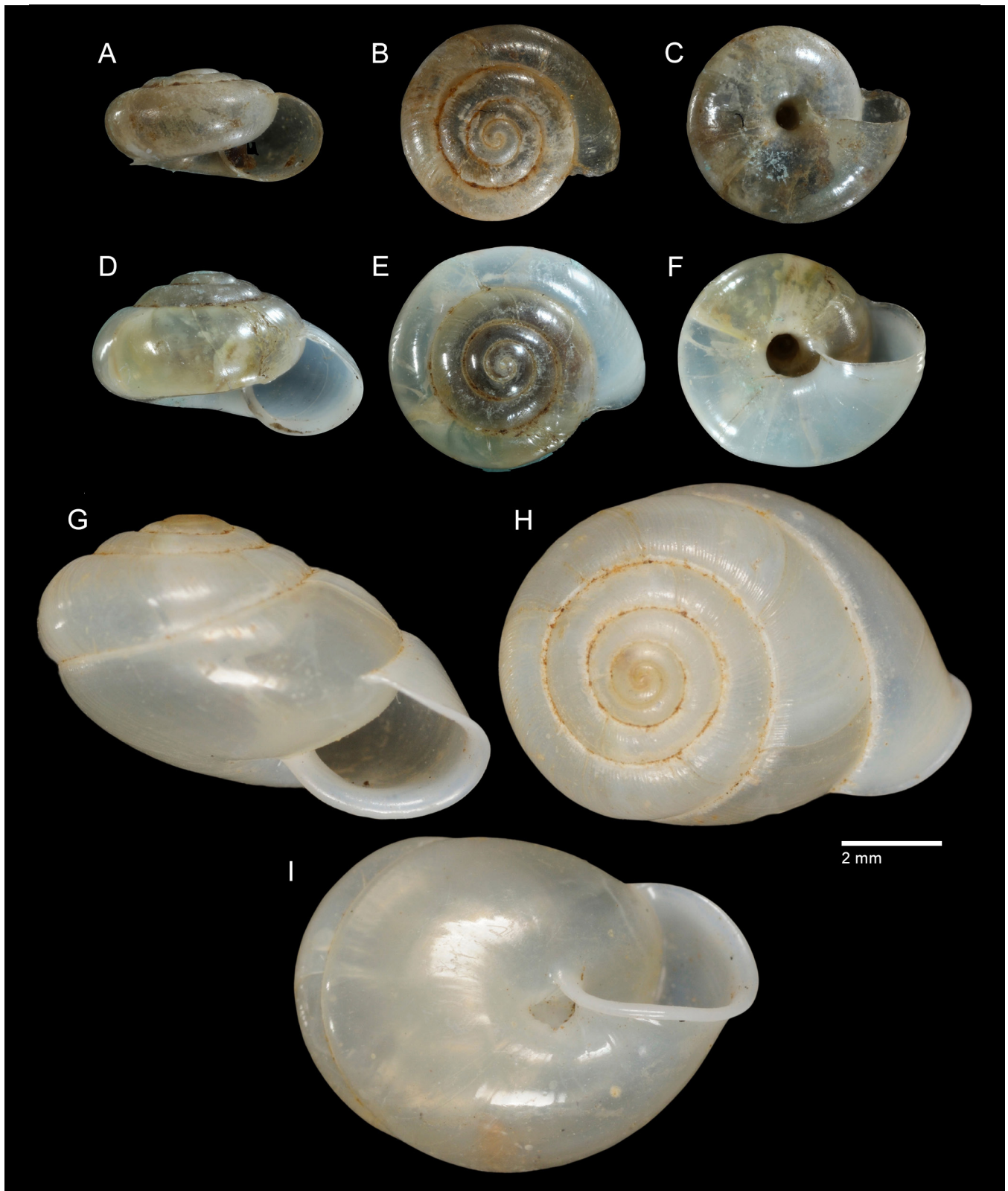


Figure 1. *Streptartemon fruhstorferi* (Boettger, 1889) comb. nov. **A–C**, holotype of *Hyialinia* (*Polita*) *sublenticularis* Boettger, 1889 (SMF 225594) in **(A)** apertural, **(B)** apical, and **(C)** umbilical views. **D–F**, holotype of *Hyialinia* (*Polita*) *fruhstorferi* Boettger, 1889 (SMF 225593) in **(D)** apertural, **(E)** apical, and **(F)** umbilical views. **G–I**, lectotype of *Streptaxis cookeana* F. Baker, 1914 (ANSP 109304) in **(G)** apertural, **(H)** apical, and **(I)** umbilical views.

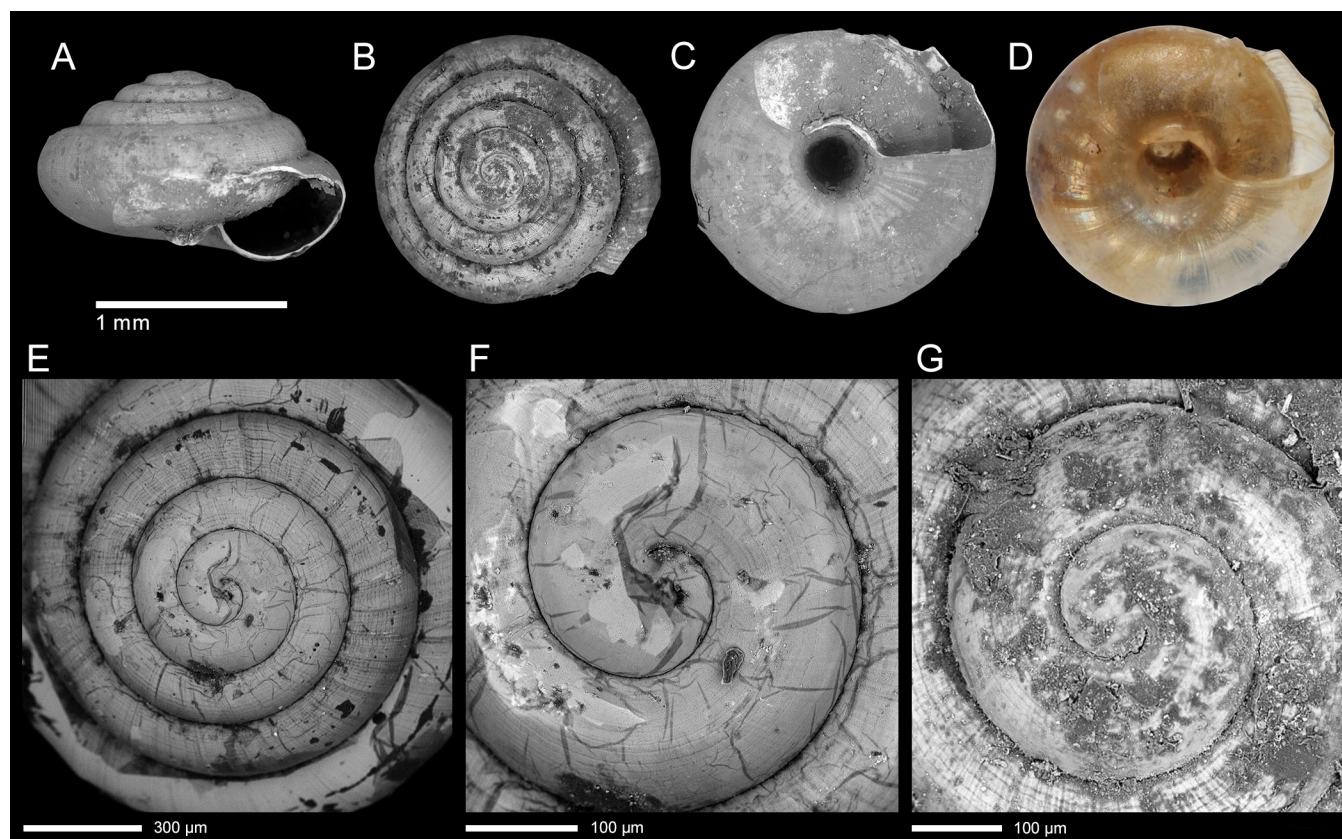


Figure 2. *Paradiscops parana* (F. Baker, 1914) comb. nov., holotype ANSP 109314. **A–C** SEM images in **(A)** apertural, **(B)** apical, and **(C)** umbilical views; **(D)** stereomicroscope image, in umbilical view, showing shell colour. **E–G**, SEM images, at increasing magnification, showing details of sculpture and protoconch. **A–D** at same scale.

and F. Baker's specimens; this could be tested with multi-populational genetic data in the future.

Finally, one issue remains: Boettger's (1889) names have priority over Baker's (1914) name, so either *sublenticularis* or *fruhstorferi* should be retained. By the Principle of the First Reviser (International Code of Zoological Nomenclature, Article 24.2), we prefer to retain the latter, as its holotype (Fig. 1D–F) represents an older individual, with a more developed shell, resulting in the new classification *Streptartemon fruhstorferi* (Boettger, 1889) **comb. nov.** Both *Hyalinia (Polita) sublenticularis* Boettger, 1889 and *Streptaxis cookeana* F. Baker, 1914 are thus considered its junior synonyms.

***Miradiscops parana* (F. Baker, 1914)** (Fig. 2) seems to present a mixture of features from the similar-sized *Miradiscops* and *Mayadiscops* Roosen, Salvador & Breure, 2025, the latter of which has recently been split from the former (Roosen *et al.* 2025b). Still, it presents a diagnostic combination of features, including a unique sculpture pattern (both in the proto- and teleoconch), that suggests it belongs

to a distinct lineage. Thus, a new genus is proposed here to accommodate this species.

Systematics

Family Scolodontidae H.B. Baker, 1925

Genus *Paradiscops* gen. nov.

ZooBank identifier. urn:lsid:zoobank.org:act:9BB7BAD6-A1FF-46DF-97EC-9A2377D05418

Type species. *Zonitoides parana* F. Baker, 1914.

Etymology. The genus name borrows the suffix *-discops* from other scolodontid genera (e.g. *Miradiscops* and *Mayadiscops*) and joins it with “Para”, referring to the state in Brazil from which the type species was described. The prefix *para-*, from the Greek, also means “near” or “beside”, and can also serve to illustrate the affinity of this genus to other similar scolodontids. Grammatical gender: masculine.

Species included in the genus. *Paradiscops parana* (F. Baker, 1914) **comb. nov.**

Geographic range. Pará state, Brazil.

Diagnosis. Shell minute, lenticular-globose. Unique shell sculpture pattern: protoconch sculpture consists of numerous spiral striae; teleoconch sculpture with spiral striae (as in protoconch) plus strongly marked axial growth lines, resulting in sinuous reticulate pattern.

Description. See *Paradiscops parana* comb. nov. below.

Remarks. *Paradiscops* gen. nov. can be easily diagnosed from other scolodontids by a combination of its minute size, its lenticular-globose shell, and the fine (and so far unique in the family) sculpture pattern on both the proto- and teleoconch.

Paradiscops gen. nov. has an overall more lenticular-globose shell shape than the discoid *Miradiscops*; its raised spire is more akin to *Mayadiscops*, but it exceeds the shell spires of the latter genus (which presents more discoid shells) (Roosen *et al.* 2025b). Its narrower and deeper umbilicus is also more akin to *Mayadiscops* rather than the shallow, wider umbilicus of *Miradiscops* (Roosen *et al.* 2025b). Its protoconch sculpture is reminiscent of (but not the same as) that of *Miradiscops*, which displays a protoconch sculptured by multiple closely spaced spiral rows of microscopic pits (punctae) (Thiele 1931; Zilch 1960; Schileyko 2000; Ravalo *et al.* 2023; Roosen *et al.* 2025b), while *Paradiscops* gen. nov. has only continuous spiral grooves. These grooves are reminiscent of the regular, very faint spiral lines observed with difficulty, as they are typically obfuscated in adult shells, in the teleoconch (but not protoconch) of *Mayadiscops* (van Leeuwen & Salvador 2024; Roosen *et al.* 2025b). In *Paradiscops* gen. nov., these grooves continue onto the teleoconch, where they are joined by the axial striation of growth lines, resulting in a unique and diagnostic reticulate pattern. Its overall shape is also similar to *Radiadiscops* Weijnsfeld, Büttner & Roosen, 2025, but the latter genus is characterised by a smooth protoconch followed by a teleoconch sculpture of strong, well-marked axial ribs that fade away towards the base of the shell (Weijnsfeld *et al.* 2025).

***Paradiscops parana* (F. Baker, 1914) comb. nov.**

Figure 2

Zonitoides parana F. Baker 1914: 632, pl. 21 figs 12–14—Haas 1939: 268; Baker 1963: 239; Salgado & Coelho 2003: 254.

Pseudohyalina parana—Lange de Morretes 1949: 137; Simone 2006: 237, fig. 912.

Miradiscops parana—Salvador *et al.* 2024: 153.

“*Miradiscops*” *parana*—Roosen *et al.* 2025b: 609.

Type material. ANSP 109314 (holotype).

Type locality. Pará, Brazil. While no precise locality besides “Pará” was given in this species’ entry, Baker (1914) noted the “Pará station” with the coordinates 01°35’S 048°25’W, which is c. 10 km south of the city of Belém. This is in line with: (1) most specimens from Pará collected during the Stanford Expedition (in the ANSP and CAS databases) and which bear precise localities always refer to Belém, either within the city or from its outskirts; (2) Baker’ (1914) text, as he seemed to understand that Pará was the name of the city (also known as Belém do Pará). Thus, here we restrict the type locality of the species to the Belém region.

Redescription. Shell minute (diameter c. 1.5 mm), discoid, with c. 5 whorls, with broad-conic spire; translucent, of light ochre colour (Fig. 2D). Protoconch (Fig. 2E–G) with c. 1.5 whorls, sculptured with numerous spiral striae; protoconch sculpture faint near apex and gradually stronger towards teleoconch. Transition to teleoconch seemingly marked by a stronger growth line. Teleoconch sculptured with numerous spiral striae (same as in protoconch) and strongly marked axial growth lines, forming a sinuous reticulate pattern (Fig. 2E–G). Spire angle c. 110°; whorl profile strongly convex; suture deep. Umbilicus deep, c. 1/5 of shell diameter. Aperture seemingly D-shaped (broken in holotype).

Distribution and habitat. Known only from type locality, which is located within the Amazon Forest biome.

There are vague records of the species from northeast Brazil (van Benthem-Jutting 1944; Jaeckel 1952b), though Haas (1939) commented he could not find it in that region. However, Jaeckel (1952a) referred to specimens from Schubart (1938a, b), which came from Brejão, near Guaranhuns, in Pernambuco state. These records are c. 1500 km from Belém, in Pará state, and belong to a completely different biome (Caatinga). There is a single specimen from Schubart’s study referred to as “*Zonitoides parana*” in the ZMB collection (ZMB 90705). On examination, it shares a similar size with *Paradiscops parana* comb. nov. but has fewer whorls, a white colour, and completely lacks the diagnostic proto- and teleoconch, having instead a smooth protoconch and coarse growth lines typically observed in other Scolodontidae (and Streptaxidae). Schubart’s specimen has about one-quarter of its body whorl broken, which precludes a precise identification; thus, we refer it simply to Scolodontidae indet.

Remarks. With its shell morphology and unique sculpture, *Paradiscops parana* comb. nov. is, so far, a one-of-a-kind species in the diverse Brazilian fauna. However, considering that microgastropods remain underrepresented in surveys and studies in the country (Salvador 2019; Machado *et al.*

2023; Castro *et al.* 2026), we expect that more *Paradiscops* species will be found in the Amazon biome of Brazil and potentially elsewhere.

Conclusion

The “pending” Brazilian *Miradiscops* species not assessed by Roosen *et al.* (2025b) were revised here. “*Miradiscops*” *fruhstorferi* (Boettger, 1889) and “*Miradiscops*” *sublenticularis* (Boettger, 1889), known only from their type locality in Greater Rio, are considered to represent juveniles of *Streptartemon cookeanus* (F. Baker, 1914), family Streptaxidae. As Boettger’s (1889) names have priority over Baker’s (1914), the new classification *Streptartemon fruhstorferi* (Boettger, 1889) comb. nov. is proposed for the species. Both *Hyalinia* (*Polita*) *sublenticularis* Boettger, 1889 and *Streptaxis cookeana* F. Baker, 1914 are thus considered its junior synonyms.

“*Miradiscops*” *parana* (F. Baker, 1914), on the other hand, presents a unique set of features that allows the description of a new genus to contain it, *Paradiscops* gen. nov., resulting in the new classification *Paradiscops parana* (F. Baker, 1914) comb. nov. Thus, as argued by Roosen *et al.* (2025b), the only actual *Miradiscops* species currently known from Brazil is *M. brasiliensis* (Thiele, 1927).

ACKNOWLEDGEMENTS

We are grateful to the following colleagues for sharing images and data of type specimens: Paul Callomon (ANSP), Elizabeth Kools (CAS), Sigrid Hof (SMF), Thomas von Rintelen and Christine Zorn (ZMB).

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Manuscript submitted: 29 May 2026

Revised manuscript accepted: 21 July 2026

Editor: Robert Forsyth