




SHORT COMMUNICATION

New occurrences of *Mirinaba unidentata* (G.B. Sowerby II, 1825) from southeastern Brazil, with comments on the distribution of *M. planidens* (Michelin, 1831) (Gastropoda: Eupulmonata: Strophocheilidae)

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Abstract. Here, we report new occurrences of *Mirinaba unidentata* (G.B. Sowerby II, 1825) and review of the occurrence records *M. unidentata* and *M. planidens* (Michelin, 1831). A single shell of *M. unidentata* was collected in the Parque Estadual Caverna do Diabo, southern São Paulo state, Brazil. Moreover, material of both species deposited at the Museum of Zoology of University of São Paulo were observed. These two seem to have allopatric distributions, and not overlapping. *Mirinaba planidens* occurs in the mountain ranges shared by São Paulo, Rio de Janeiro, and Minas Gerais in southeastern Brazil, whereas *M. unidentata* occurs in the chain of mountains in southern São Paulo and southern Brazil. The regions where these species occur are approximately 500 km distant from each other. Due to the similarity of the shells and their distributions, it is tempting to think about these species as examples of divergence by allopatric speciation.

Key words. Atlantic Rainforest, land snail, inaccurate records, allopatry, São Paulo

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Mirinaba Lange de Morretes, 1952, a genus in the family Strophocheilidae Pilsbry, 1902, currently has 10 valid species (Simone 2006; Salvador et al. 2024a, b). It was originally described as a subgenus of *Strophocheilus* Spix, 1827 through shell morphology (Lange de Morretes 1952) and latter considered to be a separate genus based on these and anatomical characters (Leme 1973). Its monophyly has been recently corroborated by morphological phylogenetic investigation (Simone 2022). *Mirinaba* species are distributed in the Atlantic Forest in the northeastern, southeastern, and southern Brazilian regions, and there has been a series of new records recently published (Birckolz et al. 2013; Birckolz & Gernet 2016; Gernet et al. 2022, 2024).

Some *Mirinaba* species—*M. erythrosoma* (Pilsbry, 1895), *M. cuspidens* (Lange de Morretes, 1952), *M. jaussaudi* (Lange de Morretes, 1937), and *M. porphyrostoma* (Clench

& Archer, 1930)—present a thickened medial portion of the outer lip, which can be more developed to form a tooth in *M. planidens* (Michelin, 1831) and *M. unidentata* (G.B. Sowerby II, 1825). The latter two species have a history of imprecise records in the Serra do Mar, a system of mountain ranges and escarpments shared between the states of Espírito Santo to Santa Catarina, more precisely in the Brazilian southeastern and southern regions (Oliveira & Almeida 1999; Agudo-Padron 2008; Simone 2006). Simone (2006) believed that these species have overlapping distributions in the states of Rio de Janeiro and São Paulo. Here, we record new occurrences of *M. unidentata* from southern São Paulo state, and review of the occurrence records *M. unidentata* and *M. planidens*.

A single shell of *M. unidentata* was collected on the main trail that leads to the Caverna do Diabo (24°38'13.0"S 48°

24°11.3'W) in the Parque Estadual Caverna do Diabo, Eldorado Municipality, southern São Paulo state, Brazil, on 10 February 2024. The shell was photographed with a Nikon Coolpix L820 camera and deposited in the molluscan collection of the Museum of Biological Diversity of the State University of Campinas (ZUEC-GAS 8348). The specimen was identified by comparison with the figure contained in Simone (2006), as well as the review of Bequaert (1948). Moreover, material of *M. unidentata* and *M. planidens* deposited at the Museum of Zoology of University of São Paulo (MZSP) were also studied to better differentiate these species.

Family Strophocheilidae Pilsbry, 1902

Genus *Mirinaba* Lange de Morretes, 1952

***Mirinaba unidentata* (G.B. Sowerby II, 1825)**

Figures 1, 2

Material examined. ZUEC GAS 8348, Parque Estadual Caverna do Diabo, Eldorado Municipality, 24°38'13.0"S 048°24'11.3"W, 10/ii/2024, A.R. Batistão leg., M.S. Miranda det., 1 shell; MZSP 8014, Poço Grande, Vale do Ribeira, Ribeira Municipality, H. Hempell leg., 1 shell;

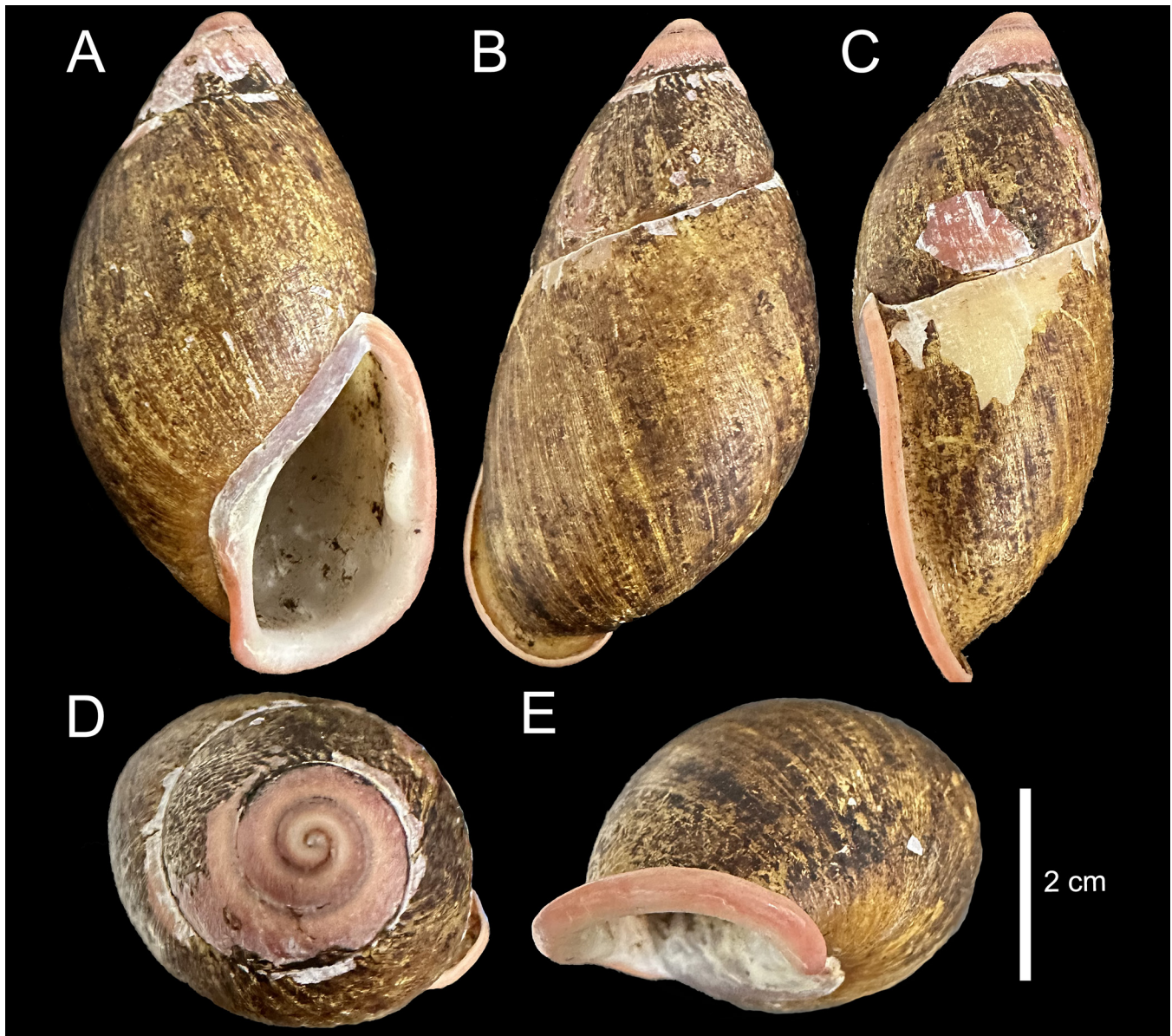


Figure 1. *Mirinaba unidentata*, Museum of Biological Diversity of the State University of Campinas, ZUEC-GAS 8348, from Parque Estadual Caverna do Diabo, Eldorado Municipality. A, apertural view showing the tooth on the outer lip. B, abapertural view. C, right side. D, apical view. E, basal view.

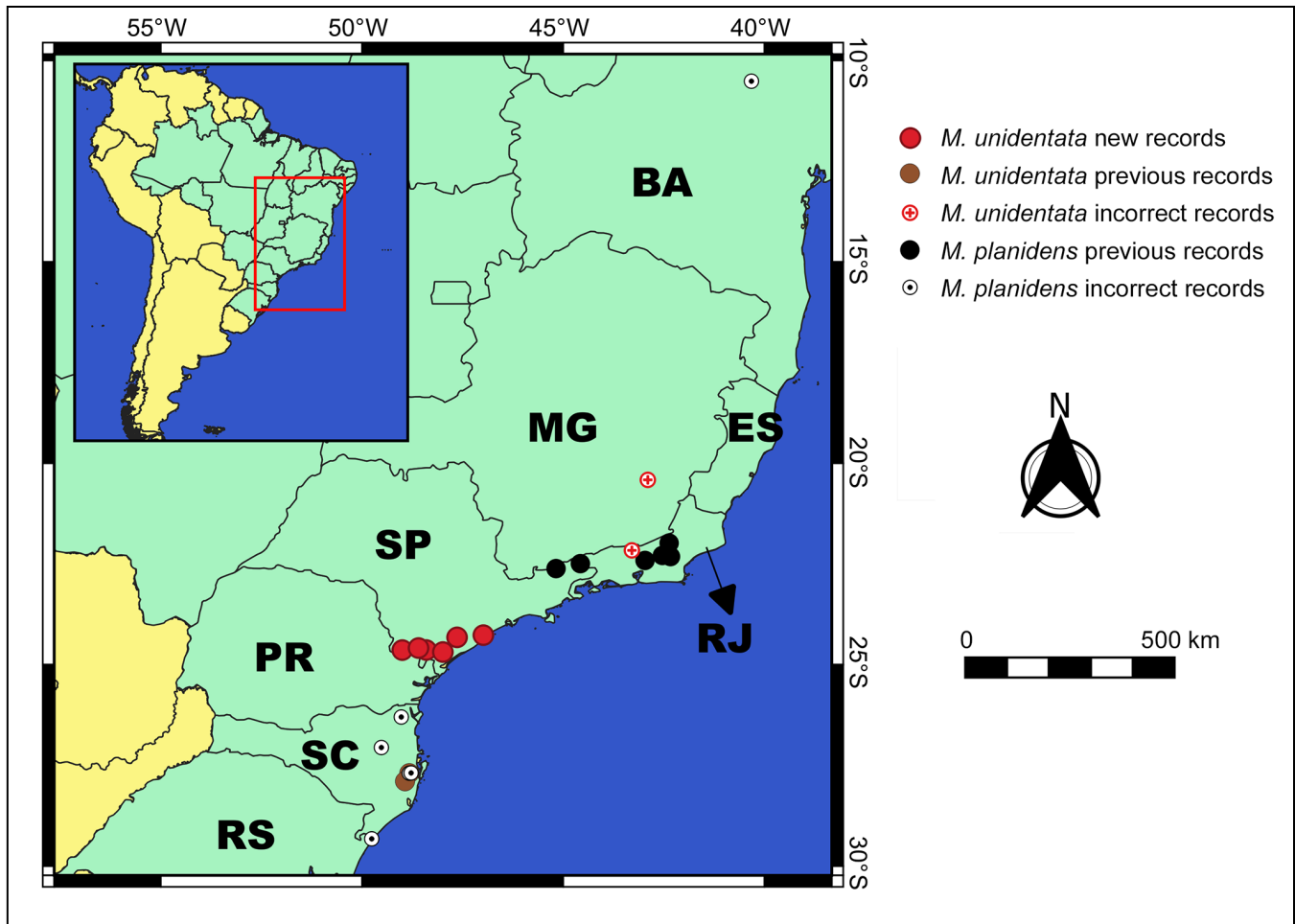


Figure 2. Correctly and incorrectly identified records of *Mirinaba unidentata* and *M. planidens* from the states of Bahia (BA) in Northeast Brazil; Minas Gerais (MG), Rio de Janeiro (RJ), São Paulo (SP), and Espírito Santo (ES) in Southeastern Brazil; and Paraná (PA), Santa Catarina (SC), and Rio Grande do Sul (RS) in Southern Brazil.

MZSP 16624, Juquiá, Cachoeira do Lagarto, Rio Juquia-Guassu, Prainha SP, xi/1941, 2 shells; MZSP 29437, Jacupiranga Municipality, 1 shell; MZSP 29450, Iguape-SP, xi/1993, Lecy Elloi leg., 2 shells; MZSP 29455, Peruíbe Municipality, ix/1975, M.U.P. Rodrigues leg., 1 shell; MZSP 29474 Iporanga Municipality, São Paulo, vii/1970, D.H. Guilherme leg., 1 shell; MZSP 111369, Brasil, São Paulo, Jacupiranga, 30/iv/1978, Eugênio Santos leg., J. Vaz det., 22 shells; MZSP 111370, Brasil, São Paulo, Jacupiranga, ix/1967, F. Mühen leg., J. Vaz det., 10 shells; MZSP 118320, 24°16'S 046°59'W, Brasil, São Paulo, Peruíbe, Jorge Vaz collection, 24/viii/1979, Toyomi Naruto leg., J. Vaz det., 1 shell.

Comparative examined material. *Mirinaba planidens*. MZSP 29432, Brasil, Rio de Janeiro, Teresópolis, Fazenda Revolta, ii/1996, F.A.G Melo & S.S. Nihei leg., M.S. Miranda det., 6/iii/2024, 1 shell; MZSP 88572, Rio de

Janeiro, Maromba, xi/1945, O. Schubart & Marcel Miranda leg., 6/iii/2024, 1 specimen preserved in 70% alcohol.

Description of the shell collected. Shell up to 58.67 mm long × 29.66 mm width, fusiform, with a high spire, imperforate; whorls about 5, with weakly marked axial growth lines (Fig. 1A, B, E). Dorso-ventral profile flattened, greatest width 23.93 mm (Fig. 1C). Periostracum brownish, lost on first 3 whorls, with fine granulations, which become malleations on last whorl (Fig. 1A–C). Protoconch worn, inflated, smooth on the first 1½ whorls; first whorl almost immersed in apex; second and third whorl with well-marked axial ribs (Fig. 1D). Sculpture on last three whorls with well-marked axial ribs that become hidden by malleations (Fig. 1A, B). Suture shallow but well marked. Body whorl slightly convex. Aperture ½ of shell length, 31.00 × 23.93 mm, oval-elliptical in outline; peristome rose but with whitish where abraded. Outer lip with a well-developed, medial

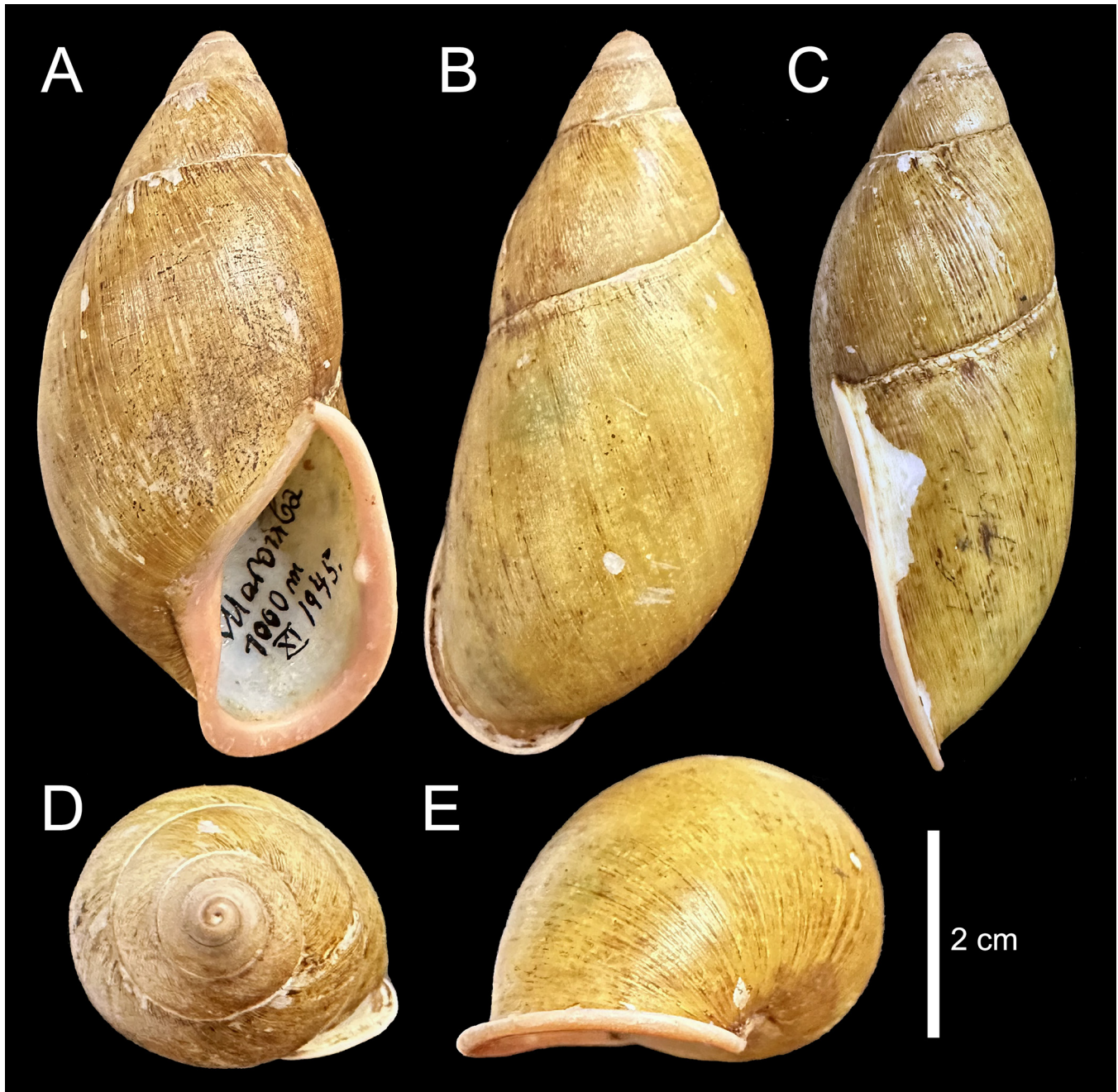


Figure 3. *Mirinaba planidens* (Michelin, 1831), Museum of Zoology of the University of São Paulo, MZSP 88572, from Rio de Janeiro, Maromba. **A**, apertural view, showing the tooth in the outer lip. **B**, abapertural view. **C**, lateral (right side) view. **D**, apical view. **E**, basal view.

tooth, wider at the base than high. Outer lip reflected, thickened, almost straight (Fig. 1A).

Distribution. *Mirinaba unidentata* is recorded from Teresópolis (part of the municipality of Águas Mornas) and São Bonifácio, both close to mainland part of Florianópolis, Santa Catarina, Brazil (Bequaert 1948; Lange de Morretes 1949, 1953) (Fig. 2). *Mirinaba unidentata* has been reported

from an unspecific locality in La Plata Valley, Argentina (Pilsbry 1895 in 1895–1896). Simone (2006) wrongly attributed the Brazilian records from the Teresópolis, a municipality in the state of Rio de Janeiro, Brazil. Oliveira & Almeida (1999: 28) reported shells identified as *Strophocheilus (Metara) unidentatus* from the municipalities of Paraíba do Sul (state of Rio de Janeiro) and Ponte Nova

(Minas Gerais), but their figured shell has a length of 90 mm and is more globose, with strong, well-developed ribs and malleations, and a whitish peristome with a well-developed tooth on both lips, which corresponds well to *Megalobulimus auritus* (G.B. Sowerby I, 1838), rather a *Mirinaba* species. Therefore, records of *M. unidentata* from Rio de Janeiro and Minas Gerais are not valid (Fig. 2). Based on the materials examined from the municipalities of Eldorado, Iguape, Iporanga, Jacupiranga, Juquiá, Peruibe, and Ribeira in the state of São Paulo, *M. unidentata* occurs about 500 km north of the previous records.

Comparison with *Mirinaba planidens*. *Mirinaba unidentata* is very similar in shell outline, sculpture, and tooth morphology to *M. planidens*, but it is differentiated by its smaller and shorter shell (up to 70 mm in *M. planidens* and 60 mm in *M. unidentata*), more obese body whorl, slightly deeper sutures, and relatively shorter aperture mainly due to the shortened columella, as pointed out by Bequaert (1948) (Figs 1, 3). Since these differences are difficult to observe, especially by non-specialists, these species are frequently confused, and incorrectly identified. Records of *M. planidens* have been confirmed from the municipalities of Nova Friburgo, Cantagalo, Teresópolis (state of Rio de Janeiro), Rio de Janeiro, and Itatiaia, as well as the Serra do Macaé region in the state of Rio de Janeiro and the municipality of Piquete in the state of São Paulo (Pilsbry 1895 in 1895–1896; Bequaert 1948; this work). All these records are in the Serra da Mantiqueira, a chain of mountains in the states of São Paulo, Rio de Janeiro, and Minas Gerais.

Haas (1935) mentioned the occurrence of *S. (Strophocheilus) planidens* from “Therezópolis”, Santa Catarina, without mentioning voucher material on which it was based. Oliveira & Almeida (1999: 27) recorded *S. (Metara) planidens* from the municipalities of Paraíba do Sul (state of Rio de Janeiro), Torres (Rio Grande do Sul), and Campo Formoso (Bahia), but the measurements and figured shell appears to be a species of *Megalobulimus* K. Miller, 1878. Agudo-Padron (2008) mentioned the occurrence of *M. planidens* in the municipalities of Joinville (Salto Pirajá), Ibirama (Alto Vale do Itajaí), and Santo Amaro da Imperatriz, all in Santa Catarina, with materials supposedly deposited at the Departamento de Ecologia e Zoologia, Centro de Ciências Biológicas, Universidade Federal de Santa Catarina. However, no collection of molluscs appears to exist in this institution (K. Saalfeld pers. comm. 2024).

Consequently, all records of *M. planidens* in Santa Catarina still need confirmation, and they should not be considered for the distribution of this species (Fig. 2). *Mirinaba planidens* and *M. unidentata* seem to have allopatric distri-

butions, distinct as previously thought. *Mirinaba planidens* occurs in the mountain ranges shared between the states of São Paulo, Rio de Janeiro, and Minas Gerais in southeastern Brazil, whereas *M. unidentata* occurs in the chain of mountains in the southern part of São Paulo state and Paraná and Santa Catarina states. The regions where these species live are approximately 500 km apart.

Finally, due to the similarity of their shells and the pattern of distribution, it is tempting to regard these species as an example of divergence by allopatric speciation. Future phylogenetic investigations with divergence times added to the geological history of these mountain ranges may elucidate the relationship between these lineages and the probable scenarios of cladogenesis.

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