

First record of *Pacourina edulis* Aubl. (Asteraceae, Vernonieae) from the state of Maranhão, northeastern Brazil

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Abstract. We report the first record of *Pacourina edulis* Aubl. from the state of Maranhão, northeastern Brazil. The species was found in seasonally flooded habitats within the Baixada Maranhense Environmental Protection Area, which is in the municipality of São Bento. A morphological description, *in situ* photographs, and a distribution map are presented. This new record expands the known geographic range of *P. edulis* in Brazil and underscores the importance of continued floristic inventories in underexplored regions of the Brazilian Amazon, especially in Maranhão.

Key words. Baixada Maranhense, eastern Amazon, floristic studies, geographical distribution, new occurrence

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INTRODUCTION

Asteraceae Bercht. & J.Presl is a monophyletic lineage of Asterales and is considered one of the largest families of angiosperms, comprising approximately 32,000 species distributed across 16 subfamilies, 50 tribes, and roughly 1,700 genera (Funk et al. 2009; Panero et al. 2014; APG IV 2016; Susanna et al. 2020). The family has confirmed occurrence on all continents except Antarctica (Funk et al. 2009). In Brazil, more than 2,300 species are currently recognized, with approximately 60% of them endemic to the country; they are distributed across 28 tribes and around 350 genera (Roque et al. 2017). The greatest diversity of Asteraceae is found in the Cerrado; however, the family is quite diverse in rocky outcrops (campos rupestres) and in the southern grasslands (campos sulinos), where it stands out as one of the main floristic components (Funk et al. 2014; Freitas et al. 2014; Roque et al. 2017; BFG et al. 2021).

Among the tribes of Asteraceae, Vernonieae Cass. stands out for its diversity in tropical and subtropical regions, with about 1,300 species grouped into 126 genera and distributed across 21 subtribes (Bremer 1994; Funk et al. 2009; Keeley and Robinson 2009). It is particularly well represented in the Americas and Africa (Keeley and Robinson 2009). In Brazil, Vernonieae constitutes the second most diverse group within the family, with 51 genera and 459 species, 347 of which are endemic; this tribe occurs across all phytogeographic domains, regions, and states (Esteves et al. 2017).

Pacourina Aubl. is a monotypic genus of Vernonieae, comprising only *Pacourina edulis* Aubl., an aquatic species distributed across tropical America, from the Guianas to northern Argentina (Keeley and Robinson 2009; POWO 2025), with numerous records in the Amazon Forest and the Brazilian Pantanal (CRIA 2025). The genus is morphologically distinctive from others in the tribe by the unique structure of its pollen, which is triporate and psilolophate with smooth crests, and lacks a perforated tectum (Robinson 1999). This combination corresponds to pollen type “E”, a classification used by Robinson (1999) to describe a rare morphological pattern found mainly in certain African and Asian Vernonieae taxa. Due to the lack of clear affinities with any other subtribe, *Pacourina* was assigned to the monogeneric subtribe Pacouriniinae H.Rob. (Robinson 1999), whose phylogenetic position remains partially unresolved, as its sister group is currently recognized as *Acilepidopsis echitifolia* (Keeley et al. 2021).

Pacourina edulis occurs in seasonally flooded environments such as riverbanks, flooded forests, and temporary lakes (Souza-Souza et al. 2025). In Brazil, the species had previously been recorded in the states of



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Acre, Amazonas, Amapá, and Pará (North), Mato Grosso and Mato Grosso do Sul (Central-West), and São Paulo (Southeast), within the Amazon, Atlantic Forest, Cerrado, and Pantanal domains (Souza-Souza et al. 2025). Here, we report the first occurrence of *P. edulis* in the state of Maranhão, northeastern Brazil, based on specimens collected during a floristic survey of aquatic and palustrine plants in the municipality of São Bento, located in the Maranhão Amazon. A morphological description, photographs, and a distribution map are provided below.

METHODS

Study site. The municipality of São Bento (02°41'S, 045°50'W) is located in the Baixada Maranhense microregion, Maranhão, Brazil (IMESC 2014; IBGE 2025). It lies within the floodplain of the Aurá River and is surrounded by extensive freshwater bodies and seasonally inundated grasslands (Barbieri and Pinto 1999; IMESC 2014). São Bento is part of the Baixada Maranhense Environmental Protection Area (BM EPA), a Ramsar Site of international importance designated for the sustainable use of natural resources (IMESC 2020). The BMEPA encompasses a complex wetland mosaic composed of seasonally flooded herbaceous vegetation, both permanent and temporary freshwater lakes, and gallery forests (Brasil 2008). These aquatic environments are subject to pronounced hydrological seasonality, with widespread inundation during the rainy season (December to May) and substantial water drawdown during the dry season (June to November), which strongly affects the connectivity and dynamics of aquatic habitats (Brasil 2008). The regional climate is classified as Tropical with dry winter (Aw), with a mean annual temperature of 26.4 °C and an average annual precipitation of 1,774 mm, distributed irregularly throughout the year (Barbieri and Pinto 1999).

Field sampling and specimen processing. Fieldwork was conducted in January, April, and May 2025 as part of an ongoing study on aquatic and palustrine plants in the BM EPA. Specimens of *Pacourina edulis* were collected following standard procedures for taxonomic studies (Fidalgo and Bononi 1989) and deposited in the SLUI herbarium at the State University of Maranhão, São Luís campus. Authorizations for the collection of botanical material were granted by the State Secretariat for the Environment and Natural Resources (number A34-2024) and by the Biodiversity Authorization and Information System (number 96470-1). Morphological characteristics were recorded in the field. Floral structures were measured from fresh or rehydrated flowers and buds using a digital caliper (precision 0.01 mm) and a millimeter ruler. Measurements were taken from both fresh and dried material. Descriptive terminology follows Beentje (2016) and Esteves et al. (2017). The present species description is based on specimens collected in the municipality of São Bento.

Species identification was based on diagnostic morphological characters observed in the field and under a stereomicroscope and was confirmed through consultation of the original species description (Aublet 1775), besides information available in Flora e Funga do Brasil (Souza-Souza et al. 2025). Habitat characteristics, water depth, ecological interactions, and phenological information were recorded during fieldwork and complemented with data from herbarium specimen labels. The species name and author abbreviation follow the International Plant Names Index (IPNI 2025).

Distribution map. Geographic distribution data were compiled from the literature and complemented by the new occurrence reported here. A distribution map was generated using QGIS v. 3.42.0 (QGIS Development Team 2024), based on georeferenced collection data available through the speciesLink database (CRIA 2025).

RESULTS

***Pacourina edulis* Aubl., Hist. pl. Guiane 2: 800. 1775.**

Figures 1–3

New records. BRAZIL — MARANHÃO · São Bento, Porto Grande; 02°42'04.3"S, 044°49'13"W; 14 m alt.; 11 Jan. 2025; C.S.B. Vale, R.V.C. Saraiva, L. Brito, W.P. Neto, E.C.S. Ferreira, M.C.A. Pestana & G.C.D. Furtado 03 leg.; SLUI 10384 · *ibid.*, Porto Grande; 02°42'4.3"S, 044°49'13"W; 14 m alt.; 11 Jan. 2025; C.S.B. Vale, R.V.C. Saraiva, L. Brito, W.P. Neto, E.C.S. Ferreira, M.C.A. Pestana & G.C.D. Furtado 04 leg.; SLUI 10385 · *ibid.*, Orla; 02°41'58.2"S, 044°49'13.7"W; 15 m alt.; 13 Apr. 2025; C.S.B. Vale, R.V.C. Saraiva, W.P. Neto, E.C.S. Ferreira & H.A.P. Aroucha 01 leg.; SLUI 10382 · *ibid.*; 02°41'57.7"S, 044°49'13.7"W; 14 m alt.; 13 Apr. 2025; C.S.B. Vale, R.V.C. Saraiva, W.P. Neto, E.C.S. Ferreira & H.A.P. Aroucha 02 leg.; SLUI 10383 · *ibid.*; 02°41'57.9"S, 044°49'13.7"W; 14 m alt.; 13 Apr. 2025; C.S.B. Vale, R.V.C. Saraiva, W.P. Neto, E.C.S. Ferreira & H.A.P. Aroucha 05 leg.; SLUI 10386.

Identification. Emergent aquatic subshrub, 1–1.6 m tall. **Branches** glabrous or pubescent, 5–6 cm in diameter, erect, sometimes hollow, even filled with aerenchymatous tissue, light green. **Leaves** alternate, simple, sessile; **blades** 10–23 × 4–7 cm, ovate or oblong-lanceolate, coriaceous, light green, base decurrent,

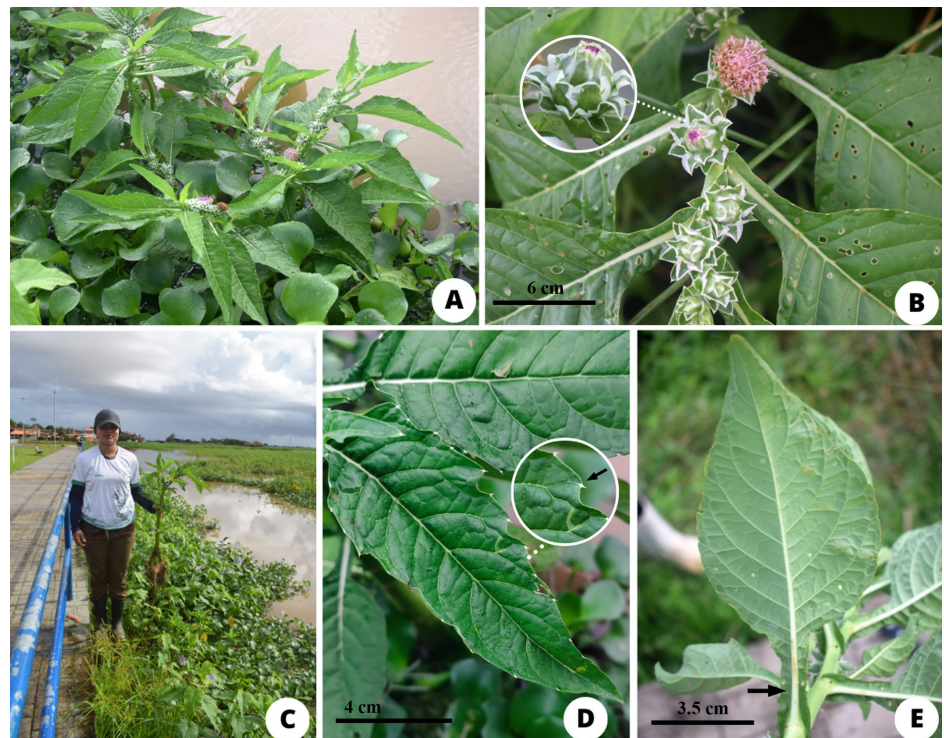
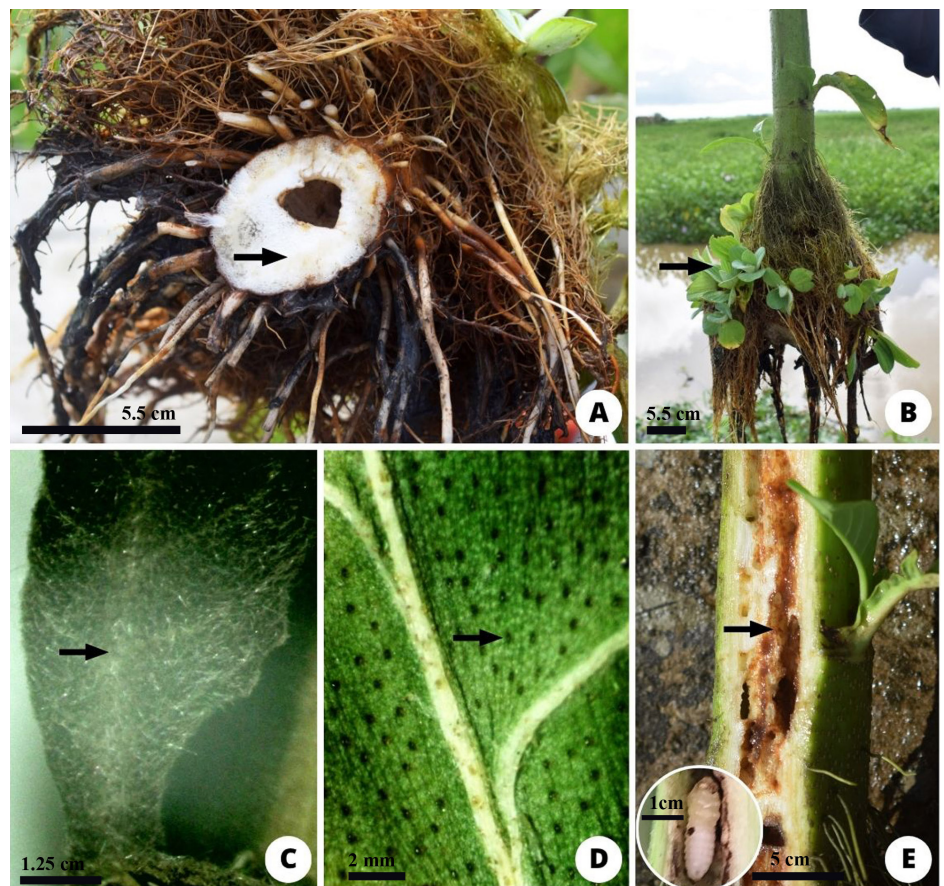


Figure 1. *Pacourina edulis* Aubl. in the municipality of São Bento, Maranhão, Brazil. **A.** Species at the collection site in a flooded field. **B.** Fertile branch with mature inflorescence and buds (image in the circle). **C.** The first author Emille Ferreira holding an individual of the species in the collection area in April 2025. **D.** Adaxial side of the leaf with prominent spines on the margins (image in the circle), lanceolate leaf blade. **E.** Abaxial surface of the leaf, ovate leaf blade, with prominent decurrent base, auriculate, semi-amplexicaule (arrow). Photos: Raysa Saraiva (A–C, E); Emille Ferreira (D).

Figure 2. *Pacourina edulis* Aubl. in the municipality of São Bento, Maranhão, Brazil. **A.** Root neck in cross section, highlighting the aerenchyma (arrow). **B.** General appearance of the stem base and roots, with the presence of *Pistia stratiotes* L. attached to the root portions (arrow). **C.** Adaxial surface of the leaf with emphasis on the indumentum (arrow). **D.** Abaxial surface of the leaf with punctuations (arrow). **E.** Stem in longitudinal section, highlighting cavities (arrow), where invertebrates were found (image in circle). Photos: Raysa Saraiva.



semi-amplexicaul, margin spinose, and apex acuminate, spines ca. 2 mm long, whitish; venation pinnate, 13–15 pairs of secondary veins, prominent on the abaxial surface; surface glabrous to sparsely pubescent abaxially, glandular-punctate on both surfaces, glands brown, numerous. **Capitula** 2–3 cm long, axillary or terminal, inserted on upper nodes, sessile, solitary; involucre imbricate, 3.5–4.0 cm in diameter; involu-

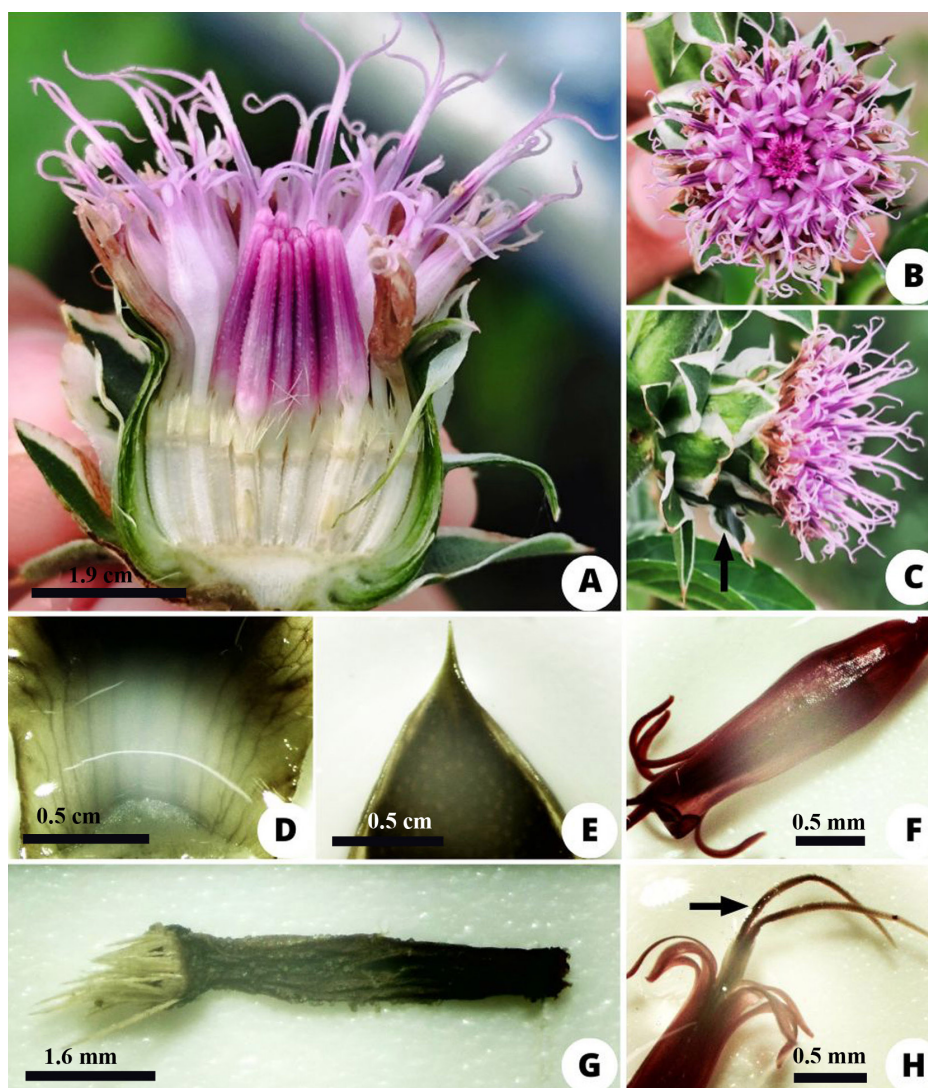


Figure 3. *Pacourina edulis* Aubl. in the municipality of São Bento, Maranhão, Brazil. **A.** Capitula in cross section. **B.** Capitula in front view. **C.** Capitula in side view, highlighting involucre bracts (arrow). **D.** Involucre bract base. **E.** Apex of involucre bract. **F.** Capitula flower. **G.** Cypsela oblong. **H.** Capitula flower with filiform style, 2-branched (arrow). Photos: Emille Ferreira (A–C); Raysa Saraiva (D–H).

cral bracts $1.5\text{--}2.2 \times 0.7\text{--}1.1$ cm, 3–4-seriate, ovate, apex mucronate, often recurved, light green with white margins; surface hispidulous, glandular-punctate; receptacle flat, epaleaceous, glabrous. **Flowers** 69–76 per capitulum; corolla actinomorphic, ca. 0.5 mm in diameter, 5-lobed, pink or purple, lobes slender, glabrous, reflexed; anthers ca. 7 mm long, connate, base sagittate; style bifid, subulate distally. **Cypsela** oblong, 5–6 mm long, brown, 10-ribbed, ribs slightly prominent and longitudinally aligned; visibly glandular-punctate, with hyaline papillae uniformly distributed along the ribs; apex truncate, with a persistent cartilaginous ring at the tip. **Pappus** ca. 2 mm long, with numerous internal capillary bristles, numerous-seriate, inserted on the cartilaginous ring; outer bristles scale-like, deciduous.

Notes. *Pacourina edulis* can be recognized in the field by its large and showy capitula, with pink or purple flowers; involucre bracts 3–4 seriate (Figure 1A), with scarious margins and mucronate apex (Figure 3E); dentate leaves commonly with deep, irregular sinuses and spines at the tips of the teeth (Figure 1D); glandular-punctate leaf surfaces (Figure 2D); and thickened, typically hollow stem base (Figure 2A).

Habitat and ecology. *Pacourina edulis* was collected along the margins of temporary lakes, where water depths ranged from 30 to 40 cm. The local vegetation is composed of herbaceous, emergent species adapted to seasonal flooding, such as *Cyperus* spp., *Hymenachne amplexicaulis* (Rudge) Nees, *Pontederia crassipes* Solms, *P. reflexa* Sousa, and *P. rotundifolia* L.f., along with the free-floating species *Salvinia auriculata* Aubl. and *Pistia stratiotes* L. The hollow stems of *P. edulis* frequently housed ant colonies, with numerous individuals and pupae observed inside. Although no reports of myrmecophily were found in the literature for this species, these field observations suggest a potential ecological interaction. Beetles belonging to the family Coccinellidae were also seen visiting the flowers. The species is heavily grazed by water buffaloes, which are commonly raised in the alluvial plains of the region.

Phenology. Flowering and fruiting of *Pacourina edulis* occur throughout the year in Brazil (CRIA 2025). In São Bento, the species was collected with flowers and fruits during field campaigns (January, April, and May 2025).

Uses and common name. *Pacourina edulis* has potential for ornamental and culinary use (Pott and Pott 2000). It is commonly known as “Erva-da-alegria” in Brazil (Souza-Souza et al. 2025).

DISCUSSION

Pacourina edulis occurs in Central and South America, with documented records in Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Nicaragua, Panama, Paraguay, Peru, Suriname, and Venezuela (POWO 2025). In Brazil, the species has numerous records in the Amazon and Pantanal domains and is less frequent in the Atlantic Forest and Cerrado (CRIA 2025; Souza-Souza et al. 2025; Figure 4). This study presents the first record of *Pacourina edulis* in the state of Maranhão and extends its known geographic distribution to northeastern Brazil, also within the Brazilian Amazon.

The closest previously documented occurrence is from Combu Island in Belém (Pará), approximately 425 km west in a straight line of the collection site in Porto Grande and Orla, municipality of São Bento, Maranhão (CRIA 2025). According to the speciesLink database (CRIA 2025), the most recent record in the Amazon was made in 2023 on Combu Island. Prior to that, the last specimen had been collected in 2001 in the state of Amazonas, indicating a 22-year gap without collection records. In the Central-West region, the last record in the Pantanal was in 2016, and in the Southeast, in 2007.

In Maranhão, the number of newly documented aquatic plants has increased in recent years. Examples of such species are *Lemna valdiviana* Phil., *Wolffia brasiliensis* Wedd., and *Wolffiella lingulata* (Hegelm.) Hegelm (Araceae), reported in Caxias, São João do Sóter, and Igarapé do Meio (Ferreira et al. 2019); *Utricularia breviscapa* C. Wright (Lentibulariaceae) and *Bacopa egensis* (Poepp.) Pennell (Plantaginaceae), in Chapadinha (Pestana et al. 2022, 2023); and *Echinodorus scaber* Rataj (Alismataceae), in Brejo (Pestana et al. 2024a). In São

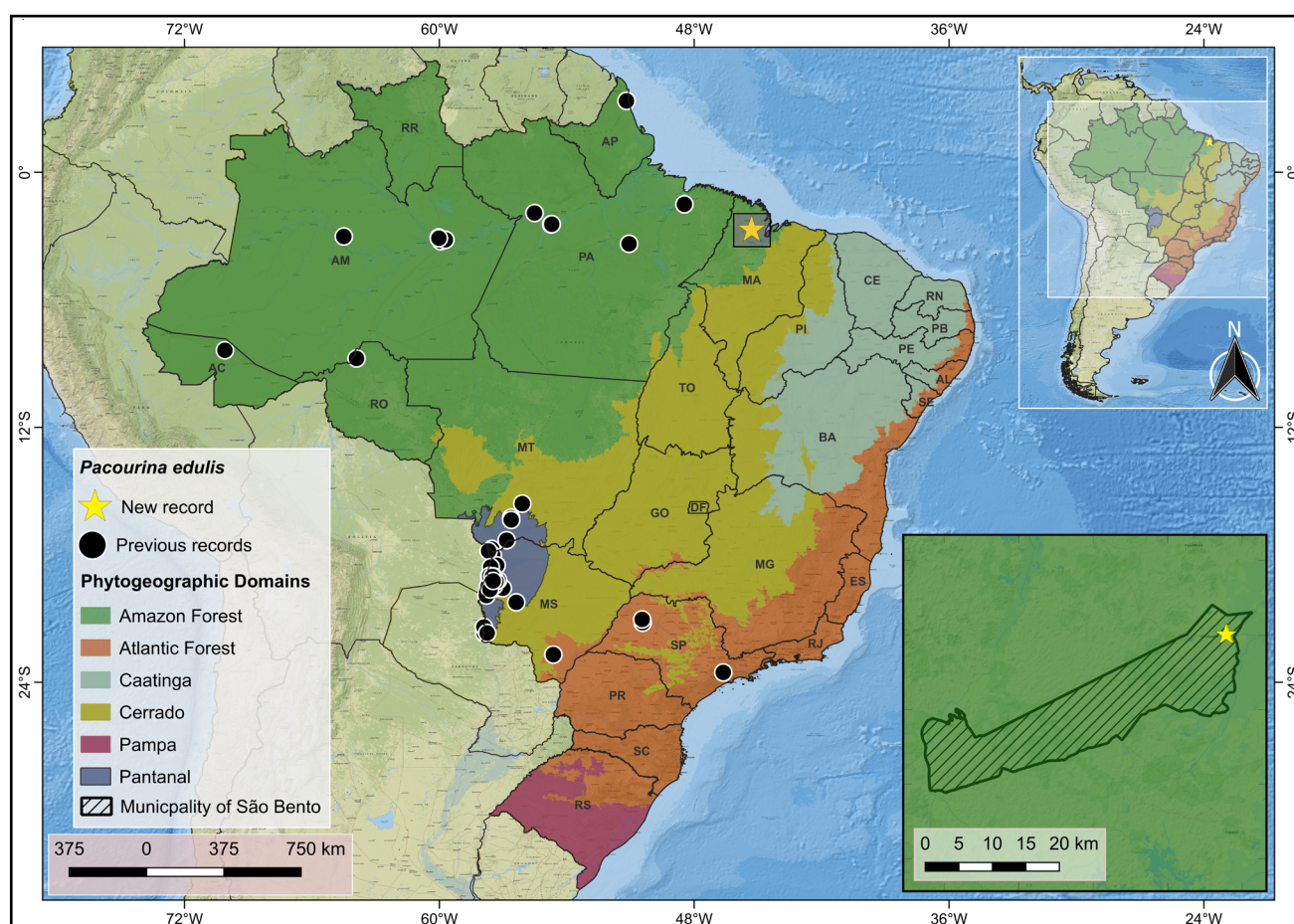


Figure 4. Geographic distribution of *Pacourina edulis* in Brazil. Black circles indicate previously known records, and the yellow star represents a new record in the municipality of São Bento, Maranhão state, Brazil. Map preparation: Mateus Pestana.

Bento, Barbieri and Pinto (1999) conducted one of the first surveys of aquatic macrophytes in Maranhão. Although species composition was not the main focus of that study, *Pacourina edulis* was not recorded, despite apparently being common in the area. This absence may reflect the methodology used, which excluded subshrub species. Another contributing factor may be the limited sampling effort during the transition flood–dry seasons, the period when *P. edulis* reaches its flowering peak (CRIA 2025).

Floristic surveys have also advanced in the state (Silva and Fontes 2018; Arouche et al. 2021; Pestana et al. 2024b; Alves et al. 2024), as a result of more recent and systematic efforts in flooded environments of both the Amazon Forest and Cerrado domains. However, further investigation into the floristic composition of these areas remains necessary, as the Maranhão Amazon has demonstrated high species richness (e.g. Amorim et al. 2023; Penha et al. 2025; Anjos et al. 2025), while several areas remain poorly explored (Anjos et al. 2025). This pattern is supported by herbarium records in speciesLink, which show dozens of *Pacourina edulis* specimens collected historically in Pará, but none previously recorded in Maranhão, despite their geographic proximity. This absence likely reflects a long-standing sampling gap in flooded and transitional environments rather than a true distributional break. The approximately 400–500 km distance between the new record in São Bento and prior occurrences in Pará supports the idea of a broader, continuous distribution that had remained undocumented due to regional sampling gaps. Thus, this new record highlights the need for continuous and year-round floristic surveys to improve understanding of the plant diversity in the Maranhão Amazon.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: ECSF, MCAP, RVCS. Data curation: ECSF, RVCS. Formal analysis: ECSF, MCAP, RVCS. Funding acquisition: RVCS. Investigation: ECSF, MCAP, NPFA, CSBV, WPN, JCAP, RVCS. Methodology: MCAP, RVCS. Resources: RVCS. Supervision: MCAP, RVCS. Visualization: ECSF, MCAP, RVCS. Project administration: RVCS. Writing – original draft: ECSF, MCAP, NPFA, RVCS. Writing – review and editing: ECSF, MCAP, NPFA, CSBV, WPN, JCAP, RVCS.

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Data availability

All data that support the findings of this study are available in the main text.

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