



Enhancing our understanding of Euphorbiaceae in the Brazilian Amazon: a comprehensive update on the geographic distribution of eight species

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- Brazilian flora
- floristic studies
- phytogeography
- taxonomy

Palavras-chave:

- flora brasileira
- estudo florístico
- fitogeografia
- taxonomia

Abstract

While reviewing botanical collections from the state of Pará as part of a study of the family Euphorbiaceae, we expanded the distribution of eight species of the family in Brazil. Four species are recorded for the first time for the Brazilian Amazon (*Dalechampia stipulacea*, *Euphorbia adenoptera*, *Mabea glaziovii*, and *Microstachys glandulosa*) and four species are recorded for the first time for Pará state (*Euphorbia potentilloides*, *Microstachys hispida*, *Pleradenophora membranifolia*, and *Plukenetia supraglandulosa*). In addition to the new records for Pará, we also recorded *Dalechampia stipulacea* for the first time for the states of Mato Grosso and Roraima and *Pleradenophora membranifolia* for the first time for Tocantins state. Here, we provide a brief description of diagnostic morphological characters for each taxon. Field photographs and data on the geographic distribution and habitat of the species are also provided. The new records highlight the importance of floristic and taxonomic studies and demonstrate the lack of studies on Euphorbiaceae in the Amazon region.

Resumo

Durante a revisão das coleções botânicas do estado do Pará, no âmbito do estudo da família Euphorbiaceae, ampliamos a distribuição conhecida de oito espécies da família na flora brasileira. Quatro espécies são registradas pela primeira vez para a Amazônia brasileira (*Dalechampia stipulacea*, *Euphorbia adenoptera*, *Mabea glaziovii* e *Microstachys glandulosa*) e novos registros para quatro espécies são indicados para o estado do Pará (*Euphorbia potentilloides*, *Microstachys hispida*, *Pleradenophora membranifolia* e *Plukenetia supraglandulosa*). Além do novo registro para o Pará, também registramos pela primeira vez *Dalechampia stipulacea* para os estados de Mato Grosso e Roraima e *Pleradenophora membranifolia* para o estado de Tocantins. Apresentamos uma breve descrição com caracteres morfológicos diagnósticos para o reconhecimento dos táxons. Fotografias em campo, dados sobre a distribuição geográfica e hábitat das espécies também são fornecidos. Os novos registros evidenciam a importância de estudos florísticos e taxonômicos, além de demonstrar a carência de estudos sobre Euphorbiaceae na região amazônica.

Original Papers

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Introduction

Euphorbiaceae Juss. is one of the richest plant families, which comprises approximately 6,300 species in 245 genera (Govaerts *et al.* 2000; Webster 2014). It is most diverse in tropical and subtropical regions, especially on the American and African continents (Webster 1994, 2014). It is also one of the most diverse angiosperm families in Amazonia where there are 270 species, of which 176 occur in the state of Pará (Flora & Funga do Brasil 2025, continuously updated). Among these, there are some economically important species, such as *Hevea brasiliensis* (Willd. ex A. Juss.) Müll. Arg. (*seringueira*) and *Manihot esculenta* Crantz (*mandioca*) (Orlandini & Lima 2014; Silva *et al.* 2024).

Some taxonomic studies, reviews and floras with Amazonian Euphorbiaceae have been conducted since the 1980s (Secco 1985, 1987; Secco *et al.* 2012; Secco & Webster 1990; Bigio & Secco 2012; Mendes *et al.* 2021), including studies about Pará state (Souza & Secco 2009; Costa *et al.* 2018). The high diversity of the family, the large areas that Amazonia occupies, and the low density of collections make further studies necessary. Studies of herbarium collections have proven to be an excellent tool for understanding the plant diversity of certain regions and this allows the discovery of new species and new records (Nualart *et al.* 2017).

This study underscores the critical role of field collections and the revision of herbarium specimens for enhancing our understanding of plant biodiversity. Based on a study of Euphorbiaceae collections from the state of Pará, here we provide four new records of Euphorbiaceae for the Brazilian Amazon region, four new records for Pará State, one new record for the states of Mato Grosso and Roraima, and one new record for Tocantins state. Descriptions of diagnostic characters, photographs in the field, scientific illustrations, and geographic distribution maps with the new occurrences are provided for the species.

Material and Methods

Data origin and terminology

Specimens deposited in the BHCB, CEN, FLOR, HCJS, HUTO, IAN, K, MFS, MG, MICH, NY, PEUFR, RON, SP, and UB herbaria were reviewed (acronyms according to Thiers 2024, continuously updated). In addition to these samples, specimens collected in a floristic inventory in several municipalities of the state of Pará from research projects of the company Vale Amazônia were studied. Vouchers of these new records, with duplicates to be distributed, were incorporated into the HCJS and MG herbaria. Many of the new records occur on ferruginous soil, which is locally called *canga*.

Identification

The specimens were identified based on specific literature, analyzing protologues, and nomenclatural types available in online databases, such as JSTOR (<<https://plants.jstor.org/>>). After confirmation of the identifications, a diagnostic description was made for each species based on the terminology in Webster (2014). The descriptions were based on the herbarium specimens and plants in their natural habitat. To confirm the occurrence of species in others states and regions, we used the Flora e Funga do Brasil 2025 (continuously updated). The geographic distribution of new records and habitat information were obtained from labels of herbarium specimens, field observations, and virtual databases, such as SpeciesLink (<<https://specieslink.net/search/>>) and ReFlora (<<https://floradobrasil.jbrj.gov.br/reflora/herbarioVirtual>>). The previously known distributions were based on Flora e Funga do Brasil 2025 (continuously updated).

Results

Based on our analysis of herbarium specimens and field collections, we recorded four new occurrences of Euphorbiaceae for the Amazon phytogeographic domain [*Dalechampia stipulacea* Müll. Arg. (1865: 221) (Fig. 1a), *Euphorbia adenoptera* Bertol. (1844: 20) (Fig. 1b), *Mabea glaziovii* Pax & K. Hoffm. (1912: 37) (Fig. 2a-d), and *Microstachys glandulosa* (Mart. & Zucc.) Esser & M.J. Silva (2011: 19) (Fig. 1c)], and these four species are also reported for the first time for the state of Pará. Additionally, we documented four new records for the state of Pará, which had been previously recorded in other regions of the Amazon [*Euphorbia potentilloides* Boiss (1860: 3) (Fig. 1d), *Microstachys hispida* (Mart.) F. Dietr. (1836: 556) (Fig. 1e), *Pleradenophora membranifolia* (Müll. Arg.) Esser & A.L. Melo (2013: 35) (Fig. 1f), and *Plukenetia supraglandulosa* L.J. Gillespie (1993: 589) (Fig. 1g)]. We highlight that *Dalechampia stipulacea* is also a new record for the states of Mato Grosso and Roraima and *Pleradenophora membranifolia* is also a new record for Tocantins state.

New records for the Brazilian Amazon

Dalechampia stipulacea Müll. Arg., Linnaea 34: 221. 1875.

Fig. 1a

Liana, leaves 3-lobed, glandular trichomes distributed on the vegetative and reproductive structures, mainly on the leaf margins, stipules, and involucre bracts. The presence of glandular trichomes distinguishes it from other *Dalechampia* species with simple, 3-lobed leaves.

New records: BRAZIL. MATO GROSSO: Carlinda, MT-208, acesso à Balsa Indeco, 09°59'33"S, 55°45'11"W, 280 m.s.l., 3.IV.2012, fl., CRA Soares *et al.* 7507 (SP). PARÁ:

Canaã dos Carajás, segundo aceiro à esquerda no início da Pilha de Estéril S11, 06°28'16.031"S, 50°19'49.992"W, 295 m.s.l., 13.XII.2012, fl., IMC Rodrigues *et al.* 606 (BHCb, HCJS). Palestina do Pará, Fazenda Andorinha sede 2, margem esquerda do Rio Gameleira, 06°7'17"S, 48°25'33"W, 114 m.s.l., 17.IV.2004, fl., G.Pereira-Silva *et al.* 8708 (CEN). RORAIMA: Mucajá, Cachoeira do Evandro, 02°23'33"S, 61°21'36"W, 119 m.s.l., 13.XII.2024, fl., J Paula-Souza *et al.* 14169 (FLOR). (Fig. 3a).

This species is distributed in South America and has been recorded in Argentina, Brazil, Colombia, Paraguay, Peru, and Venezuela (Webster & Armbruster 1991). In Brazil, it occurs in the Central-West (Mato Grosso do Sul state), Northeast (states of Bahia, Maranhão, Pernambuco, and Piauí), Southeast (states of Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo), and South (states of Paraná, Rio Grande do Sul, and Santa Catarina) regions (Webster & Armbruster 1991; Mendes *et al.* 2022). In this work, based on four specimens (Pereira-Silva *et al.* 8708, Paula-Souza *et al.* 14169, Rodrigues *et al.* 606, and Soares *et al.* 7507), we recorded *D. stipulacea* for the first time for the Brazilian Amazon (Fig. 3a), as well as for the states

of Mato Grosso, Pará, and Roraima (Fig. 3a). The species grows in forest environments, mainly on the edge or in clearings.

Six years ago, Mendes *et al.* (2019) recorded a new occurrence of *D. brownsbergensis* G.L.Webster & Armbruster (1982: 484) for Serra de Carajás, Pará. This species is morphologically similar to *D. stipulacea* because both have simple, 3-lobed leaves; however, *D. stipulacea* has glandular trichomes on the vegetative and reproductive structures (*v* absent in *D. brownsbergensis*), glandular, lacinate parastipules (*v* absent), and yellowish, scaly resin glands (*v* vestigial, non-secretory, dark, punctiform glands).

Euphorbia adenoptera Bertol., Misc. Bot. 3: 20. 1844.

Fig. 1b

Prostrate herb with vinous to greenish branches, pubescent; cyathia zygomorphic, solitary or twinned, axillary, with 4 well-developed appendages that are unequal in size (2 larger and 2 smaller), reniform, glabrous, and pinkish to reddish; ovary and fruit covered with trichomes.

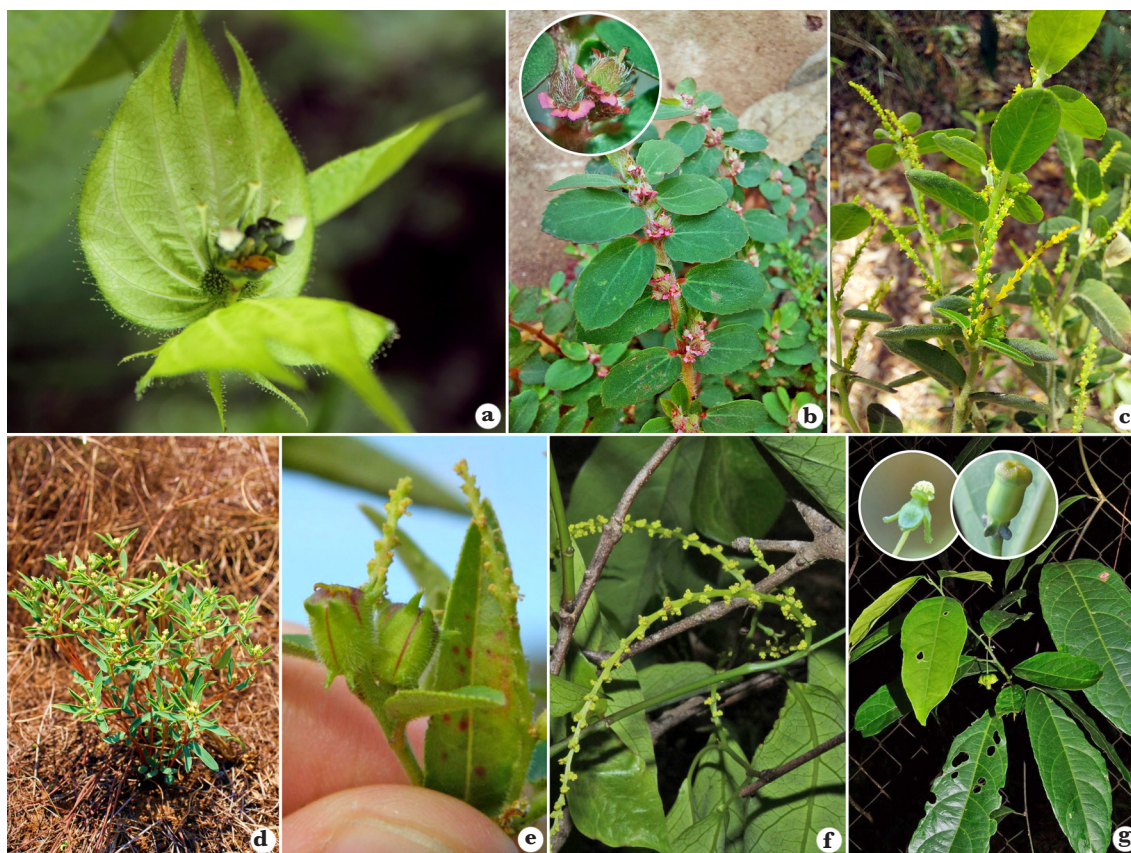


Figure 1 – a-g. Species recorded for the first time for the Brazilian Amazon and the state of Pará – a. *Dalechampia stipulacea*; b. *Euphorbia adenoptera*; c. *Microstachys glandulosa*; d. *Euphorbia potentilloides*; e. *Microstachys hispida*; f. *Pleradenophora membranifolia*; g. *Plukenetia supraglandulosa*. Photos: a, f, g by Tyski; b, c by Mendes; d by Amorim; e by Pscheidt.

New records: BRAZIL. PARÁ: Belém, Museu Paraense Emílio Goeldi, Campus de Pesquisa, 01°25'05"S, 48°26'40"W, 24 m.s.l., 8.VII.2022, fl. and fr., JCR Mendes & RS Secco 290 (PEUFR, MG). Parauapebas, entrada do Bioparque Vale Amazônia, 06°03'53"S, 50°03'32"W, 663 m.s.l., 4.IV.2024, fl. and fr., AS Chagas & JCR Mendes 666 (HCJS). Fig. 3b.

This is a widely distributed species that occurs in Mexico, Central America, the Caribbean, and South America (Silva *et al.* 2014). In Brazil, it occurs in the North (Tocantins state), Northeast (states of Bahia, Maranhão, Pernambuco, and Piauí), Central-West (Distrito Federal and the states Goiás, Mato Grosso, and Mato Grosso do Sul), and Southeast (states of Espírito Santo, Rio de Janeiro, and São Paulo) regions. There are records from the Caatinga, Cerrado and Atlantic Forest phytogeographic domains, mainly in anthropic areas (Silva *et al.* 2024). In this study, this species is reported for the first time for the Brazilian Amazon, expanding its occurrence to the state of Pará (Fig. 3b). It is a ruderal species, so it could possibly occur in other states in the North Region of Brazil.

Euphorbia adenoptera belongs to section *Anisophyllum* where all species are prostrate, puberulent or pubescent herbs that occur in ruderal environments. *Euphorbia adenoptera* is similar to *E. prostrata* Aiton (1789: 139) but differs because the ovary and fruits are completely covered with trichomes (*v* ovary and fruits with trichomes only on the back of each carpel of *E. prostrata*). *Euphorbia adenoptera* is also similar to *E. thymifolia* L. (1753: 454) because of the prostrate habit and pubescent cyathium involucre and ovary, but it differs by the zygomorphic cyathia with well-developed appendages that are unequal in size (2 larger and 2 smaller) and fruit that does not break the involucre when it ripens (*v* actinomorphic cyathia, absent or small appendages, and fruit breaking the involucre).

Mabea glaziovii Pax & K.Hoffm., Pflanzenr. IV, 147 (Heft 52): 37. 1912. Fig. 2a-d

Tree; nectaries present at the base of the stipules; leaf blades oblong to elliptical, apex

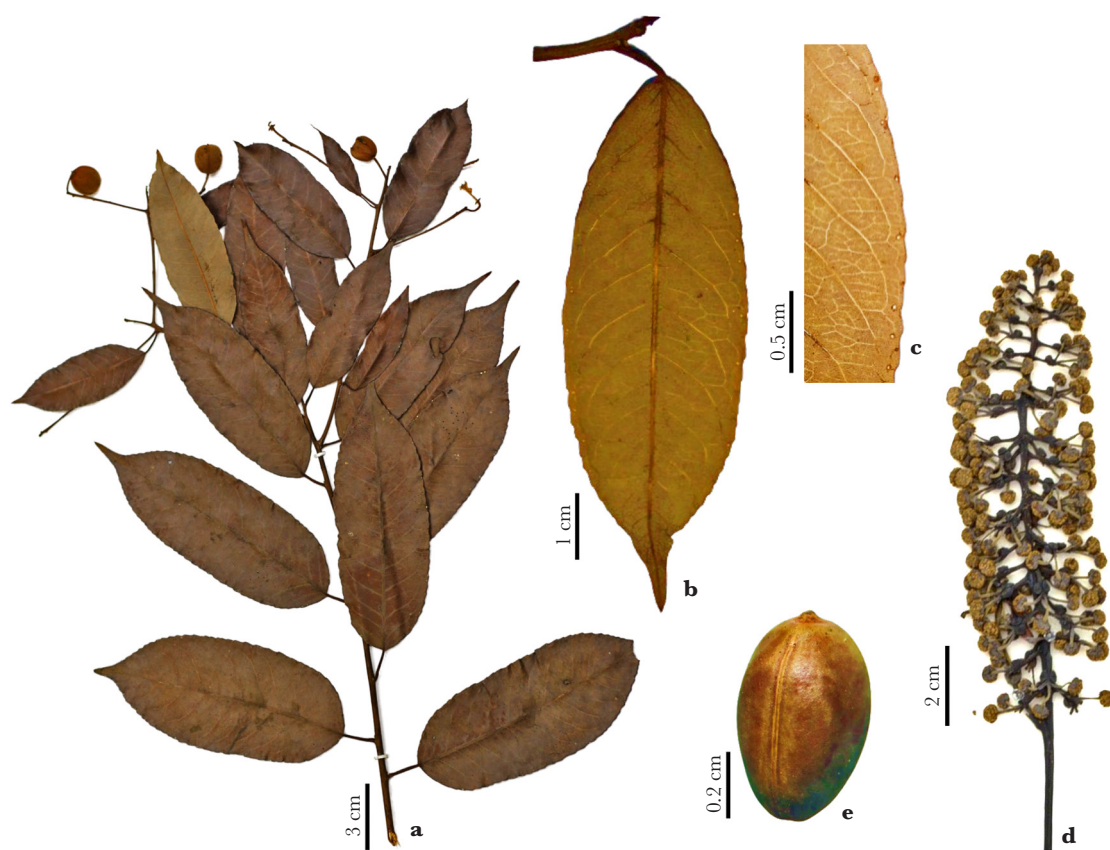


Figure 2 – a-e. *Mabea glaziovii* based on a specimen collected in the state of Pará – a. branch with fruit; b. abaxial surface of leaf; c. detail of the abaxial surface of the blade, showing the submarginal glands; d. staminate inflorescence; e. seed. (a. DF Silva 222 - HCJS).

acuminate to cuspidate, glands distributed on the leaf blade; inflorescences 7–9 cm long; sepals of pistillate flowers smaller than the ovary, without glands; seeds depressed-globose, with inconspicuous caruncle.

New records: BRAZIL. PARÁ: Marabá, Rio Itacaiunas, 06°31'52"S, 50°25'12"W, 254 m.s.l., 20.XII.2007, fl. and fr., DF Silva 222 (HCJS).

This species is endemic to Brazil and has records from the Northeast (states of Bahia and Sergipe) and Southeast (Minas Gerais state)

regions in areas with the Caatinga and Atlantic Forest phytogeographic domains (Silva *et al.* 2023). In this study, we report the first record for the Amazon phytogeographic domain and for Pará state (Fig. 3c). The species was recorded in ombrophilous forest (more specifically in riparian forest) on the banks of the Itacaiúnas River, in riparian forest.

In the state of Pará, *Mabea glaziovii* is similar to *M. pohliana* (Benth.) Müll.Arg. (1866: 1152), which occurs in the same forest areas.

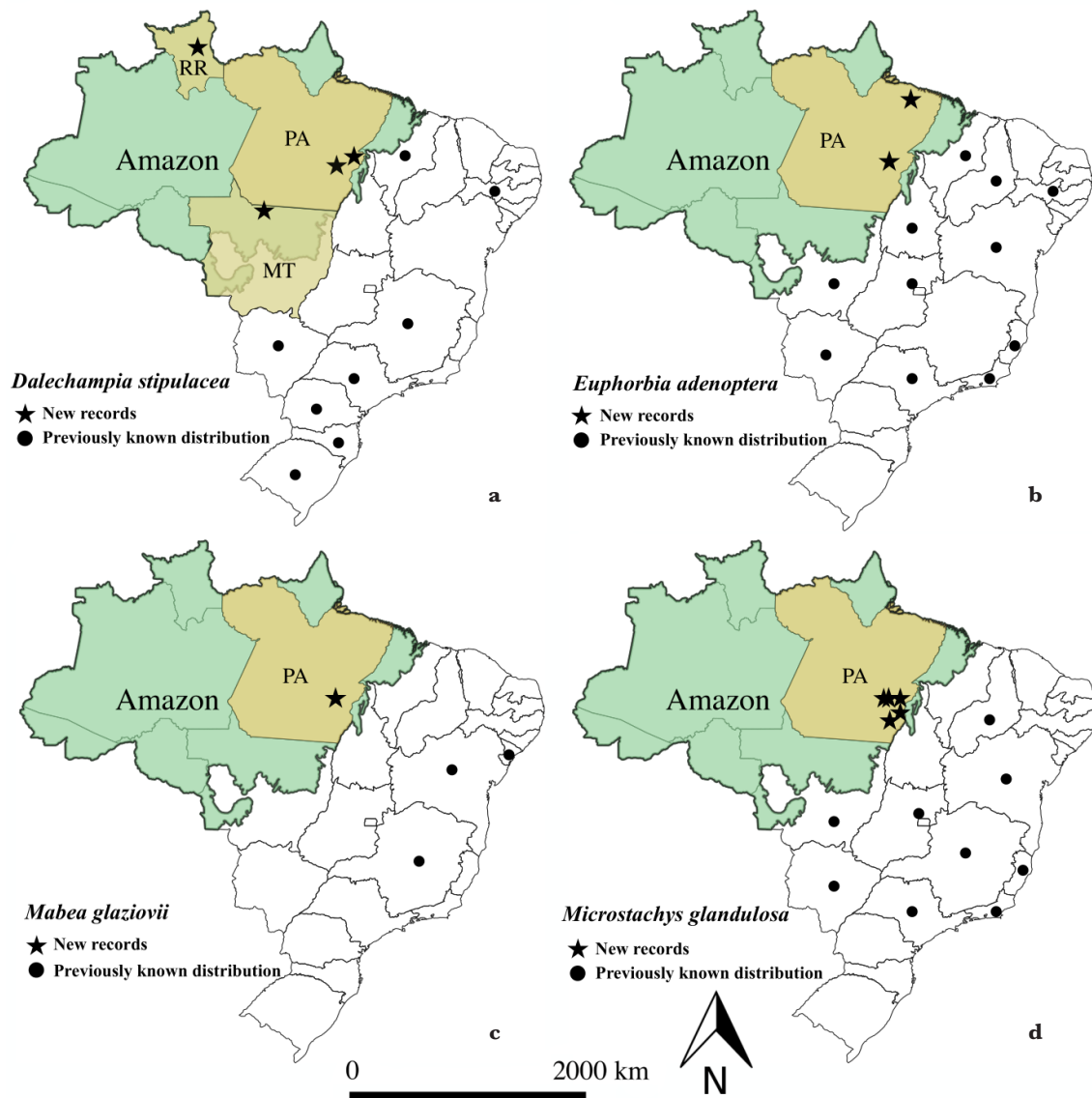


Figure 3 – a-d. Distribution map of Euphorbiaceae species with new records for the Brazilian Amazon – a. *Dalechampia stipulacea*; b. *Euphorbia adenoptera*; c. *Mabea glaziovii*; d. *Microstachys glandulosa*. MT = Mato Grosso; PA = Pará; RR = Roraima. Black star represents the new occurrences, and black circle represents the previously known distribution of the species in Brazil. Area in green represents the Brazilian Amazon. Area in yellow represents the first records for the respective states.

They are similar due to the oblong to elliptical leaves and compact inflorescence, but differ by the branches, petioles and leaf blades that are glabrous on both sides in *M. glaziovii* (*v* pubescent in *M. pohliana*), leaf blades that have serrate and flat margins (*v* irregularly denticulate and revolute) and brochidodromous secondary veins (*v*. eucamptodromous), inflorescence that is glabrous (*v* pubescent) with 2–4 pistillate flowers at the base (*v* 1–2), staminate flowers with 10–30 stamens (*v* 3–4), and depressed-globose seeds with an inconspicuous caruncle (*v* globose, with conspicuous caruncle).

Microstachys glandulosa (Mart. & Zucc.) Esser & M.J.Silva, Phytotaxa 32: 18–26. 2011. Fig. 1c

Shrub, erect, with a xylopodium; branches pubescent; leaf blades ovate to elliptical, margin with distinct crateriform glands on the abaxial surface, the glands situated in small lateral lobes giving the leaves a toothed appearance, this more evident in young leaves; fruit globose, glabrous to pubescent, with numerous appendages.

New records: BRAZIL. PARÁ: Canaã dos Carajás, 06°28′09.9″S, 50°02′40.5″W, 217 m.s.l., 3.II.2011, fl. and fr., *L Tyski* 053 (HCJS). Conceição do Araguaia, 07°43′35.20″S, 49°21′53.80″W, 228 m.s.l., 29.III.2022, fl. and fr., *A Cardoso et al.* 4582 (HCJS). Floresta do Araguaia, 07°60′32.85″S, 49°57′38.8″W, 183 m.s.l., 24.I.2023, fl. and fr., *L Tyski* 1490 (HCJS). Parauapebas, S. da Bocaina, 06°17′3″S, 49°55′2″W, 568 m.s.l., 20.XII.2010, fl. and fr., *NFO Mota et al.* 2020 (HCJS). Xinguara, 06°55′35.8″S, 49°17′44.75″W, 222 m.s.l., 23.III.2022, fl. and fr., *A Cardoso et al.* 4351 (HCJS).

This species is endemic to Brazil and occurs in the Northeast (states of Bahia and Piauí), Central-West (Distrito Federal and the states of Goiás, Mato Grosso, and Mato Grosso do Sul), and Southeast (states of Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo) regions (Cordeiro *et al.* 2024). It occurs in the Atlantic Forest and Cerrado phytogeographic domains (Cordeiro *et al.* 2024). In this study, we report the first record for the Amazon phytogeographic domain in Pará state (Fig. 3d). The occurrences were recorded predominantly in ferruginous rocky areas, in different geoenvironmental areas, such as open *canga*, nodular *canga* formations, grasslands and marshy fields, in transition areas between *canga* and forest, and near a river.

Microstachys glandulosa is similar to *M. hispida* due to its habit. In Pará, both grow sympatrically, mainly on ferruginous soil (locally called *canga*). *Microstachys glandulosa* is distinguished by the presence of a xylopodium (*v* absent in *M. hispida*), pubescent indumentum on the vegetative and reproductive structures (*v* hispid), and numerous appendages per fruit mericarp (*v* 2 on the apex and base).

New records for Pará State, previously recorded for the Brazilian Amazon

Euphorbia potentilloides Boiss., Cent. Euphorb.: 3. 1860. Fig. 1d

Erect herb with vinaceous branches, opposite phyllotaxy, and linear-lanceolate, oval or oblong leaf blade, with an acute, cuspidate or apiculate apex in the same population and slightly asymmetrical base; cyathia organized in terminal pleiochasia, with 3–4 lateral axes with 6(–7) erect glands; seeds with a smooth surface.

New records: BRAZIL. PARÁ: Conceição do Araguaia, 07°58′58.24″S, 49°27′17.2″W, 16.IX.2021, fl. and fr., *A. Cardoso et al.* 3958 (HCJS); 08°32′32.15″S, 49°55′16.60″W, 18.IX.2021, fl. and fr., *LFF Seabra et al.* 72 (HCJS). Fig. 4a

This species is restricted to South America and occurs in Argentina, Bolivia, Brazil, Paraguay, and Uruguay (Simmons & Hayden 1997). In Brazil, it has been recorded in the North (states of Roraima and Tocantins), Northeast (states of Bahia and Maranhão), Central-West (Distrito Federal and states of Goiás, Mato Grosso, and Mato Grosso do Sul), Southeast (states of Minas Gerais and São Paulo) and South (states of Paraná and Rio Grande do Sul) regions, in all Brazilian phytogeographic domains (Silva *et al.* 2024). Here we report the first record for Pará state (Fig. 4a), where the species grows in ferruginous soil and a grassy field environment.

Among the *Euphorbia* species that occur in Pará, *Euphorbia potentilloides* is morphologically most similar to *E. heterophylla* L. (1753: 453), which are both erect herbs with vinous or green stems. *Euphorbia potentilloides* differs mainly by the cyathium with 6(–7) glands and opposite phyllotaxy (*v* 1 gland and alternate phyllotaxy).

Microstachys hispida (Mart. & Zucc.) F.Dietr., Nachtr. Vollst. Lex. Gärtn. 5: 556. 1836. Fig. 1e

Erect shrub, xylopodium absent, with hispid indumentum on the branches, leaves, stipules, ovary, and fruit; leaf blade elliptical to lanceolate, with acute to acuminate apex and discoid submarginal glands; fruit globose, with 2 appendages at the apex and 2 at the base of each mericarp.

New records: BRAZIL. PARÁ: Conceição do Araguaia, 07°55′32.63″S, 49°22′32.16″W, 227 m.s.l., 5.XII.2021, fl., *A Cardoso et al.* 4143 (HCJS); Canga 5, área 2, 11.III.2023, fl. and fr., *CVO Barbosa et al.* 216 (MFS); Maracanã, Ca 73 airline km NE of Castanhal, 00°52′S, 47°35′W, 50 m.s.l., 6.IV.1980, fl. and fr., *G. Davidse* 17952 (K, MICH). Floresta do Araguaia, 07°61′02.75″S, 49°58′11.3″W, 24.I.2023, fr., *L Tyski* 1458 (HCJS). Fig. 4b.

This species is widely distributed in South America, mainly in the Chaco province of Argentina, Bolivia, Brazil, and Paraguay. In Brazil, it occurs in the Northeast (states of Bahia and Pernambuco), Central-West (Distrito Federal and states of Goiás,

Mato Grosso, and Mato Grosso do Sul), Southeast (states of Minas Gerais and São Paulo), and South (states of Paraná, Rio Grande do Sul, and Santa Catarina) regions. It has been recorded in the Amazon, Atlantic Forest, Caatinga, Cerrado, and Pampa phytogeographic domains (Silva *et al.* 2024). Here we report the first record of it for the state of Pará (Fig. 4b), where it occurs on the edge of *canga* and in grassy fields on sandy soil.

This species is similar to *Microstachys glandulosa*; see the morphological differences in the *Microstachys glandulosa* comments.

Pleradenophora membranifolia (Müll.Arg.) Esser & A.L.Melo, Phytotaxa 81(1): 35. 2013. Fig. 1f

Shrub, glabrous; leaf blade elliptical to obovate, membranous, with obtuse to cuneate base and 2 conspicuous maculate glands on the abaxial surface; inflorescence axillary or terminal, with 2–5 flowers in each staminate cymule and 1–2 flowers in each pistillate cymule; carpophore 3-winged.

New records: BRAZIL. PARÁ: Canaã dos Carajás, 31.VII.2014, fl. and fr., L Tyski 487 (HCJS); acesso à mina do sossego, 06°26'41"S, 50°02'43"W, 225 m.s.l., 15.IV.2009, fr., DF Silva & L Tyski 483 (HCJS). São Geraldo do

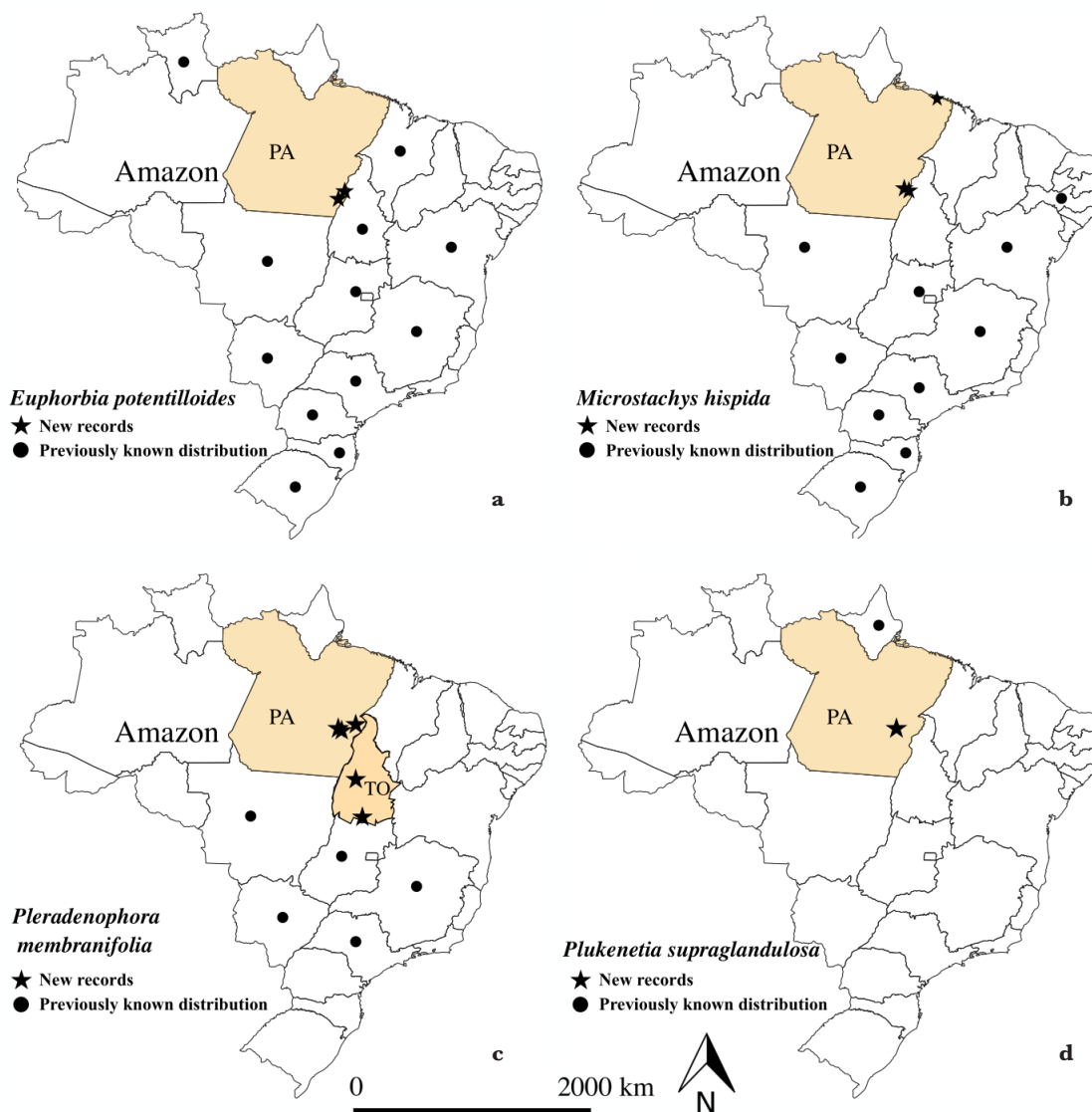


Figure 4 – a-d. Distribution map of Euphorbiaceae species with new records for Pará state – a. *Euphorbia potentilloides*; b. *Microstachys hispida*; c. *Pleradenophora membranifolia*; d. *Plukenetia supraglandulosa*. PA = Pará; TO = Tocantins. Black star represents the new occurrences, and black circle represents the previously known distribution of the species in Brazil.

Araguaia, Fazenda Andorinhas, 06°13'14"S, 48°25'55"W, 130 m.s.l., 21.IV.2004, fr., *G Pereira-Silva et al.* 8880 (CEN, RON). TOCANTINS: Paraíso do Tocantins, 10°14'13"S, 48°57'17"W, 301 m.s.l., 11.IX.1963, fl., *G Eiten & LT Eiten* 5502 (NY, PEUFR, UB). Palmeirópolis, 13°02'20"S, 48°26'24"W, 656 m.s.l., 16.X.2008, fl., *RF Haidar et al.* 991 (HUTO). Fig. 4c.

The species is found in South America (Bolivia, Brazil, and Peru) and Central America (Panama) (Carrion *et al.* 2024). In Brazil, it has been recorded in the Central-West (states of Goiás, Mato Grosso do Sul, and Mato Grosso) and Southeast (states of Minas Gerais and São Paulo) regions, and it occurs in the Amazon and Cerrado phytogeographic domains (Esser 2012; Melo *et al.* 2013; Athiê-Souza 2024; Carrion *et al.* 2024). In this study, we report the first record of this species for the states of Pará and Tocantins (Fig. 4c). The species occurs in anthropized areas at the initial regeneration stage and in gallery forest.

Pleradenophora membranifolia is the single Brazilian species segregated from *Sebastiania* Spreng. It shares many-flowered staminate cymules with short-pedicellate flowers and fused sepals with *Sapium* Jacq. and *Stillingia* Garden ex L., as well as the presence of 3–(5) stamens per flower with *Gymnanthes* Sw. and *Sebastiania*. However, it is distinguished by its basal leaf glands, which are in well-defined basal auricles of the leaf blade. Additionally, the staminate cymules, comprising more than five flowers, set this taxon apart and support its placement in *Pleradenophora*, distinguishing it from all other genera within the tribe Hippomaneae. *Pleradenophora membranifolia* is one of five species of the genus, which is distributed from North America to South America (Esser 2012; Melo *et al.* 2013). *Pleradenophora membranifolia* is the sole species of the genus recorded in Brazil, and in the state of Pará, it is locally known as *figueirinha*.

Plukenetia supraglandulosa L.J.Gillespie, Syst. Bot. 18 (4): 598. 1993. Fig. 1g

Liana with slender branches, puberulent; leaf blade elliptic to ovate-elliptic, base cuneate to obtuse, stipels absent, glands on both surfaces, arranged in 2–4 rarely 6 pairs on each side of the central vein, penninerved; inflorescence racemose, staminate flower puberulous, stamens dimorphic, 4 with filaments larger than the sepals and 6–12 sessile; stylar column cylindrical; capsules 4-lobed. **New records:** BRAZIL. PARÁ: Parauapebas, Serra de Carajás, 10.X.2008, fl. and fr., 06°16'14"S, 50°18'30"W, *LVC Silva et al.* 703 (HCJS); 25.IX.1989, fr., *JP Silva* 574 (HCJS); 18.VII.1990, fr., *NA Rosa & MFF da Silva* 5291 (HCJS). Fig. 4d.

This species occurs in Guyana, French Guiana, and Brazil. In Brazil, it has been recorded in the state of Amapá in the North Region

(Gillespie 1993; Cardinal-McTeague & Gillespie 2020). In this work, we report the first record for the state of Pará (Fig. 4d) in secondary vegetation close to a copper deposit.

Among the species of the genus found in the state of Pará, *Plukenetia supraglandulosa* is similar to *P. brachybotrya* Müll.Arg. (1865: 158) because of the leaf blades with pinnate venation, 1 primary vein, and rounded to attenuate base, and stipels absent adaxially at petiole apex. It differs by the presence of laminar glands on the adaxial surface in pairs of 2–4 or rarely 6 (*v* 1 pair), 4 dimorphic stamens (*v* 30–50 polymorphic stamens), 4-lobed staminate nectaries (*v* absent), and cylindrical to robust stylar column (*v* globose).

Discussion

The North Region of Brazil is known for its lush forests, high diversity, and large areas. Although this region accounts for 45% of Brazil, it ranks fourth in the number of herbarium samples and has the lowest density of records per square kilometer (0.2) (Gasper *et al.* 2020; Hopkins 2019). According to Gasper *et al.* (2020), the main reasons for this are the scarcity of taxonomists working in the region and the vast geographical area, which hinders access to sampling sites. The low density reflects less knowledge about the real botanical diversity in the region. This study highlights the importance of floristic studies and reviewing herbarium collections, especially in regions where there has been a low collection effort. These new records for the Brazilian Amazon and the state of Pará help fill the knowledge gap about the flora of the region, as highlighted in previous studies (Hopkins 2019). Often, simply increasing the collection effort does not reveal the true diversity, since understanding the diversity also requires taxonomists to study the specimens in herbarium collections.

Our review of Euphorbiaceae based on collections from the Amazon region revealed several new records and increases the known diversity of the family for the Brazilian Amazon and the state of Pará. This reinforces that the diversity of plants in the Amazon is higher than previously known and much of this richness may already be deposited in herbaria.

Many of the new records were documented in floristic surveys, such as that by Vale in Parauapebas, Pará. It is noteworthy that most of the specimens corresponding to the new records were collected within the past 16 years (Fig. 5) by different Vale projects. Even after an extensive study of Euphorbiaceae from the Cangas da Serra dos Carajás (Costa *et al.* 2018), new information about the family was recorded for the region.

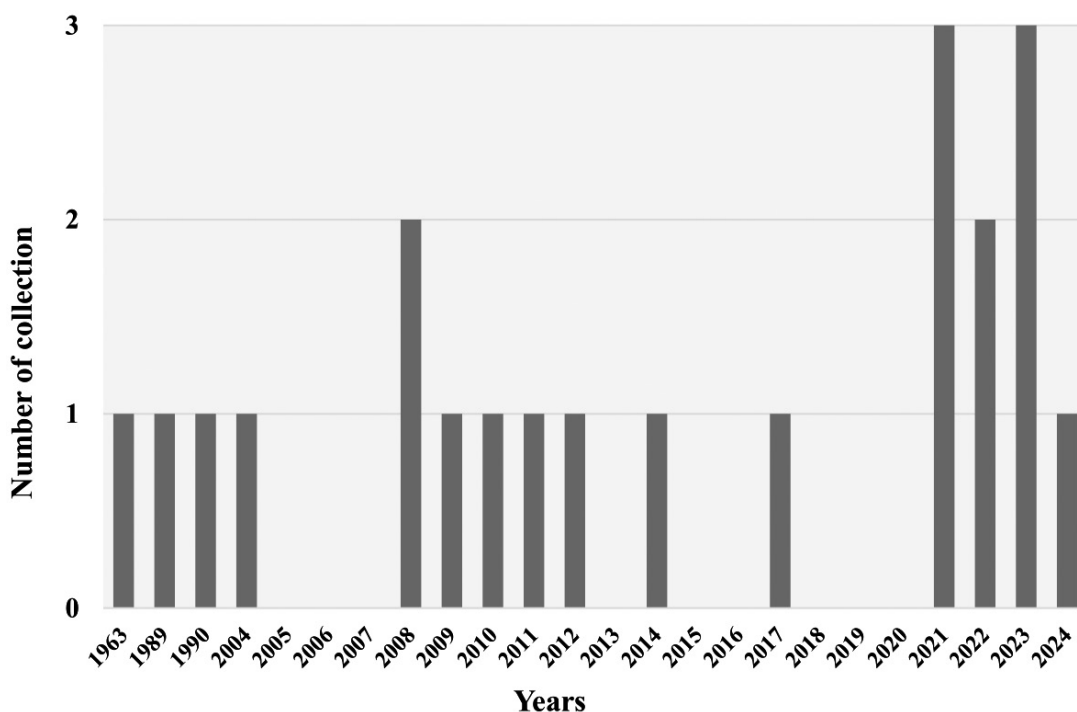


Figure 5 – Overview of the specimen collection period for the new records, documented in this study.

These new records are important because they improve our knowledge about the distribution of taxa and provide geographic data relevant to understanding the conservation status of species. New occurrence records that expand the distribution of some species have made it possible to review the threat level and reveal a less worrying scenario in some cases.

Külkamp *et al.* (2021) studied specimens of *Caperonia* A.St.-Hil. from the Amazon region and revealed a new geographic scenario for *Caperonia zaponzeta* Mansf. (1925: 260), which was previously known only from Peru. Despite being considered a basic science by many scientists, this is yet another example of the importance of taxonomy.

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Data availability statement

In accordance with Open Science communication practices, the authors inform that there is no data sharing of this manuscript.

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