Heringeriana
Jardim Botânico de Brasília
https://revistas.jardimbotanicodf.org/index.php/heringeriana
ISSN 2359-165X

Original Article

Updates on the diversity of *Ipomoea* L. (Convolvulaceae) in the Serra dos Carajás beyond the *cangas*

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Received 12 June 2026 | **Accepted** 20 July 2026 | **Published** 12 September 2026

How to cite: Pastore, M., Paixão, C. P., Cardoso, A. L. de R., Nunes, C. de S., Tyski, L., Simão-Bianchini, R. & Watanabe, M. T. C. (2026). Updates on the diversity of *Ipomoea* L. (Convolvulaceae) in the Serra dos Carajás beyond the cangas. Heringeriana, 20(1b), e918119. doi.org/10.70782/heringeriana.v20i1b.918119

Handling Editor: Dr. André Luiz da Costa Moreira

Abstract: This study provides an update on the *Ipomoea* diversity in the Serra dos Carajás, eastern Amazonia, expanding knowledge of the genus across forest habitats, disturbed areas and rock outcrops. Twenty-eight species of *Ipomoea* were recorded in the study area, including two new records for the state of Pará (*I. marcellia* and *I. peruviana*), as well as a new record of *I. cavalcantei* occurring on sandstone outcrops in the Carajás National Forest. Regarding vegetation types, 10 native species occur on rock outcrops (10 on *canga*, three on sandstone, one on granite), seven along forest margins, 11 in disturbed vegetation and two are cultivated. Among the species associated with disturbed vegetation, six were recorded invading *canga* vegetation. A checklist, examined specimens, an identification key, photographs, maps of distribution, and a discussion of the diversity, diagnostic morphology and phenology of the recorded species are provided.

Keywords: checklist of plants, Eastern Amazonia, Ipomoeeae, rock outcrops, morning glories.

Resumo: (Atualizações sobre a diversidade de *Ipomoea* L. (Convolvulaceae) na Serra dos Carajás para além das cangas). Este estudo apresenta uma atualização da diversidade de *Ipomoea* na Serra dos Carajás, Amazônia Oriental, ampliando o conhecimento sobre o gênero em habitats florestais, áreas antropizadas e afloramentos rochosos. Vinte e oito espécies de *Ipomoea* foram registradas na área de estudo, incluindo dois novos registros para o estado do Pará (*I. marcellia* e *I. peruviana*), bem como um novo registro de *I. cavalcantei* em afloramentos de arenito da Floresta Nacional de Carajás. Em relação aos tipos de vegetação, 10 espécies ocorrem em afloramentos rochosos (10 em canga, três em arenito, uma em granito), sete em bordas de floresta, 11 em vegetação antropizada e duas são cultivadas. Entre as espécies associadas a vegetação perturbada, seis foram registradas invadindo a vegetação sobre a canga. Uma lista, materiais examinados, chave de identificação, fotografias, mapas de distribuição e discussão sobre a diversidade, morfologia diagnóstica e fenologia das espécies registradas são fornecidos.

Palavras-chave: afloramentos rochosos, Amazônia Oriental, glória-da-manhã, Ipomoeeae, lista de plantas.

Introduction

Ten years ago, a monograph of Convolvulaceae from the *cangas* of Serra dos Carajás provided a taxonomic treatment of 17 species distributed across eight genera, including nine species of *Ipomoea* Linnaeus (1753: 159), the most diverse genus recorded in the area and in Convolvulaceae (Simão-Bianchini et al., 2016). The Flora of Serra dos Carajás was a major project and remains the only comprehensive flora ever prepared for the Brazilian Amazon. It published taxonomic treatments for spermatophytes, monilophytes, lycophytes, and bryophytes, documenting a total of 1,094 species through the collaboration of 145 taxonomists (Viana et al., 2016; Mota et al., 2018; Oliveira-da-Silva & Ilkiu-Borges, 2018; Salino et al., 2018).

The Serra dos Carajás is a mountainous complex within the Carajás Mineral Province, characterized by remarkable mineral and biological diversity and located in the southeastern portion of Pará State, eastern Amazonia, Brazil (Santos, 1986; M. F. F. Silva et al., 1996; Souza-Filho et al., 2019). Most of the Carajás Mineral Province was originally covered by forest vegetation (Souza-Filho et al., 2019). The region also encompasses a distinctive savanna vegetation associated with ironstone outcrops, known locally as *campo rupestre sobre cangas* or *cangas* occurring on top of plateaus at elevations ranging from 600 to 760 m, as well as granite and sandstone outcrops (Souza-Filho et al., 2019; Giulietti et al., 2019; Barbosa-Silva et al., 2022). Despite increasing knowledge of the floristic composition of the *cangas*, the diversity of plant species in other habitats of the region remains poorly known (Viana et al., 2016; Mota et al., 2018).

The *cangas* of Serra dos Carajás comprises a complex vegetation mosaic, with gradual transitions among distinct phytophysiognomies. This heterogeneous landscape includes plant species restricted to a single phytophysiognomy and others that occurs across multiple habitats (Mota et al., 2015; Zappi et al., 2017). These phytophysiognomies can be categorized into shrubby *canga* (*canga arbustiva*), duricrust *canga* (*canga couraçada* or *lajedo*), nodular *canga* (*canga nodular* or *campo graminoso*), flooded *canga* (*canga inundada* or *campos brejosos*) and small copses (*capões de mata*) (Mota et al., 2015; Zappi et al., 2017). *Canga* vegetation is strongly shaped by seasonality: during the rainy season (November–June) the vegetation is predominantly green and frequently waterlogged, whereas during the dry season (July–October) most herbaceous species disappear and many shrub and tree species become deciduous (Mota et al., 2015; Zappi et al., 2017; Costa et al., 2023).

Amazonian forests are commonly classified into non-flooded forests (*terra firme*), seasonally flooded forests (*igapó* and *várzea*) and white-sand vegetation (*campinarana*) (Prance, 1979; Junk et al., 2011). In Brazil in the Serra dos Carajás, forests can also be categorized as dense ombrophilous, open ombrophilous, semideciduous, and deciduous forests (Zappi et al., 2017; Zappi, 2020). Furthermore, research has demonstrated that Amazonian forests are far more complex than these broad categories suggest, encompassing distinct biogeographic patterns and floristic assemblages across the region (ter Steege et al., 2015; Cardoso et al., 2017; Tuomisto et al., 2019).

Ipomoea has become one of the focal plant groups among the plants of the Serra dos Carajás, with several studies already published or currently underway, as well as conservation initiatives for original biodiversity (Babiychuk et al., 2017; Babiychuk et al., 2019; Lanes et al., 2018; Laux et al., 2022; J. C. R. Silva et al., 2024; Valentin-Silva et al., 2025; Zupo et al., 2026). This attention is due to the remarkable *Ipomoea cavalcantei* D.F. Austin (1981: 292–293), popularly known as the "carajás flower" (*flor-de-carajás*), an endangered species endemic to the *cangas* of the Serra dos Carajás (Ministério do Meio Ambiente, 2022). Along with *I. carajasensis* D.F.Austin (1981: 291–292) and *I. marabaensis* D.F.Austin & Secco (1988: 188), these species stand out prominently across the landscape during the flowering period (Simão-Bianchini et al., 2016; Costa et al., 2023). This visibility is consistent with the remarkable diversity of *Ipomoea*, the largest genus of Convolvulaceae, comprising approximately 650–900 species worldwide and showing its highest diversity in tropical regions (Wood et al., 2020; Eserman et al., 2014; Simões et al., 2022).

This study provides an update on *Ipomoea* diversity in the Serra dos Carajás, where the genus constitutes a prominent component of this unique Amazonian ecosystem. By documenting its distribution across diverse vegetation types, including forest habitats, disturbed areas and rock outcrops, the study presents a foundation for accurate species identification and informs conservation and restoration initiatives in the region.

Material and Methods

The study area comprises the Serra dos Carajás (Figure 1), which is predominantly covered by forest vegetation and includes smaller isolated areas of savanna vegetation associated with rocky outcrops (Figure 2). The area has been divided into five main mountain ranges according to the plateaus formed by the *cangas*: Serra Norte (plateaus N1–N9) in the municipality of Parauapebas, Serra Sul (plateaus S1–S45) in the municipality of Canaã dos Carajás, Serra Leste (plateaus SL1–SL3) in the municipality of Curionópolis, Serra de São Félix, also known as Serra de Campos (plateaus SF1–SF3) in the municipality of São Félix do Xingu (Viana et al., 2016; Souza-Filho et al., 2019), and Serra Arqueada in the municipalities of São Félix do Xingu and Ourilândia do Norte (Fonseca-da-Silva et al., 2020). Additionally, the region includes sandstone and granite outcrops (Figure 2), as well as disturbed areas associated with mining, agriculture, pasture and urbanization (Viana et al., 2016; Souza-Filho et al., 2019). Our study encompasses all mountain ranges of the Serra dos Carajás for which *Ipomoea* specimens are deposited in herbaria. These include Serra Norte (N1–N8) and Serra Sul (S11) within the Carajás National Forest (FLONA de Carajás); Serra da Bocaina (S29–S40) and Serra do Tarzan (S18-S28) within the Campos Ferruginosos National Park (PNCF); and areas outside protected areas, including Cristalino (S43–S45), Serra Leste (SL1–SL3), Serra de São Félix (SF1–SF3) and Serra Arqueada (Souza-Filho et al., 2019; Fonseca-da-Silva et al., 2020). For this study, only specimens of *Ipomoea* recorded from the mountains and foothills of the Serra dos Carajás Complex were considered.

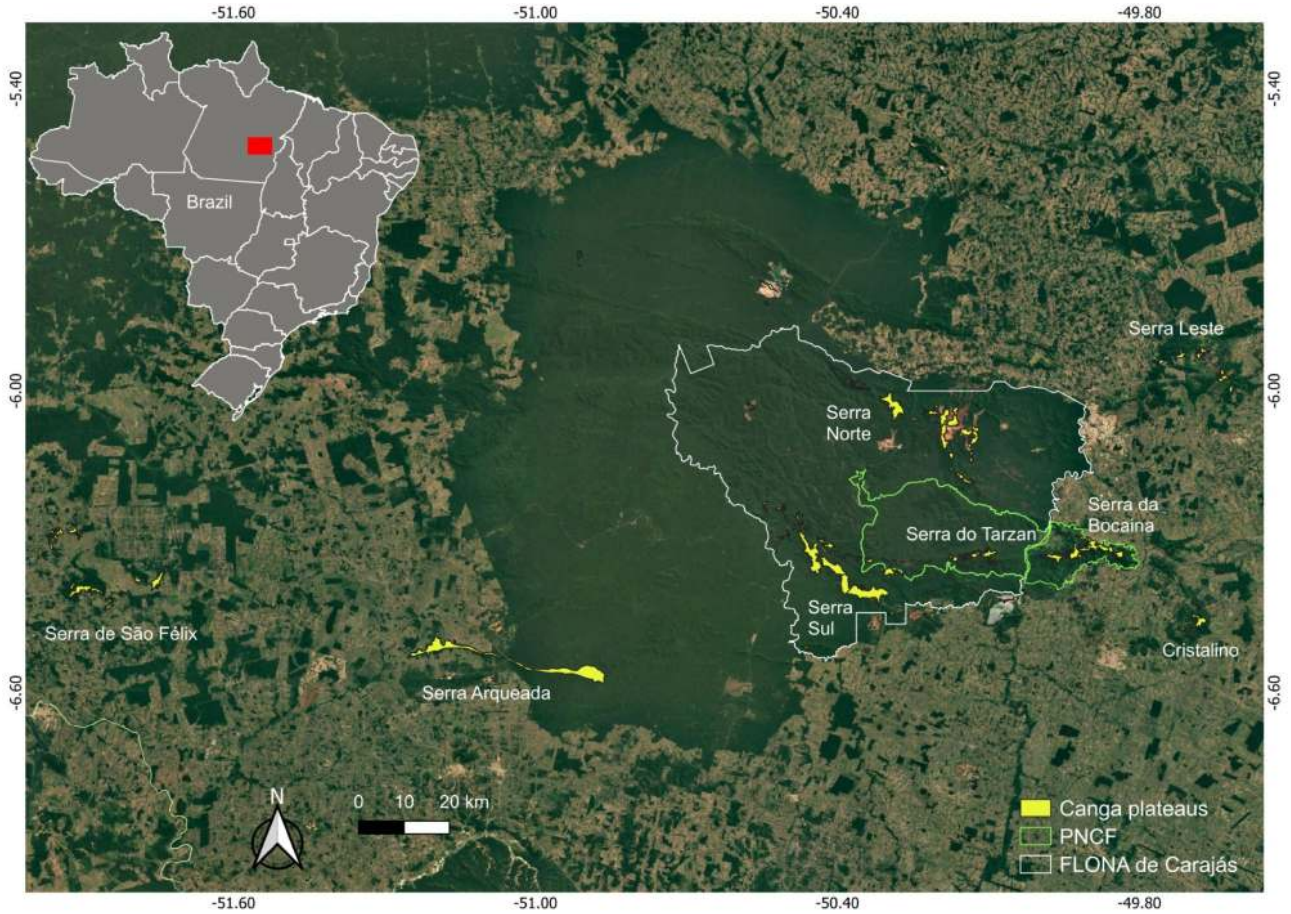


Figure 1: Map of Carajás Mineral Province, discriminated by *canga* plateaus.

This study is based on field collections and observations conducted since 2016, as well as on specimens deposited in the herbaria BHCB, HCJS, IAN, MG, and SP (acronyms follow *Index Herbariorum*, 2026). For species identification and comparison with taxa from other regions, protologues, type specimens, and additional specimens available through the online platforms SpeciesLink, Reflora, and JSTOR Global Plants were also consulted. Specimens were examined in the herbaria and in the laboratories of the Museu Paraense Emílio Goeldi and Instituto Tecnológico Vale using a stereomicroscope. General botanical terminology follows Harris and Harris (1994) and Beentje (2010). A checklist, examined specimens, an identification key, field photographs, distribution maps and a discussion of the diversity, diagnostic morphology, and phenology of the recorded species are provided. The distribution map was prepared using QGIS version 3.24.2 (QGIS Development Team, 2022).

Results

Twenty-eight (28) species of *Ipomoea* are recorded from the Serra dos Carajás, encompassing records throughout the mountainous complex of the Carajás Mineral Province across different vegetation types. This result includes two new records for the state of Pará, *I. marcellia* Meisner (1869: 257) and *I. peruviana* O'Donell (1948: 4), and a putative new species currently under genomic investigation (*Ipomoea* sp.). In addition, *I. cavalcantei* is newly recorded from sandstone outcrops near N1 plateau (Figure 2). Regarding vegetation types, 10 native species occur on rock outcrops (10 on *canga*, three on sandstone, one on granite), seven along forest margins, and 11 in disturbed vegetation (Appendix). Additionally, two species are cultivated, *I. batatas* (Linnaeus 1753: 154) Lamarck (1791: 465), widely known as sweet potato, and *I. carnea* subsp. *fistulosa* (Mart. ex Choisy 1845: 349) D.F. Austin (1977: 237), known as wild cotton.

The most frequently collected species in the *cangas* are *I. carajasensis* (N1-N8, S11, ST), *I. cavalcantei* (N1-N5), and *I. marabaensis* (N6-N8, S11, SB, ST, C, L, SF), which are found in shrubby, duricrust, and nodular *canga*. *Ipomoea procumbens* Mart. ex Choisy (1845: 351) also occurs in the duricrust *canga* and nodular *canga*, found in the region only in the Serra Sul (S11). The remaining species associated with *cangas* occur in a transition zone with the forest [*I. asplundii* O'Donell (1952: 211) (N3, N6, N7, ST, SA), *I. decora* Meisner (1869: 272) (N4, S11, ST, SF, SL), *I. goyazensis* Gardner (1842: 479) (N5, S11, ST), and *I. reticulata* O'Donell (1953: 389) (N5, S11, forest edge)]. Moreover, *I. minutiflora* (M.Martens & Galeotti 1845: 262) House (1909: 1971) is probably the rarest species in the studied area, having been collected only three times on the *canga* (S11, SB, C). Among the species found in disturbed areas, six have also been recorded invading native vegetation on *cangas* [*I. bahiensis* Willd. ex Roemer & Schultes (1919: 789) (Cristalino), *I. hederifolia* Linnaeus (1759: 925). (N5), *I. ramosissima* (Poiret 1804: 562) Choisy (1845: 377) (N4, N5, L), *I.*

setifera Poiret (1804: 17) (S11D), *I. nil* (Linnaeus 1762: 219) Roth (1797: 36) (N4, N5), and *I. triloba* Linnaeus (1753: 161) (N3, N5)].

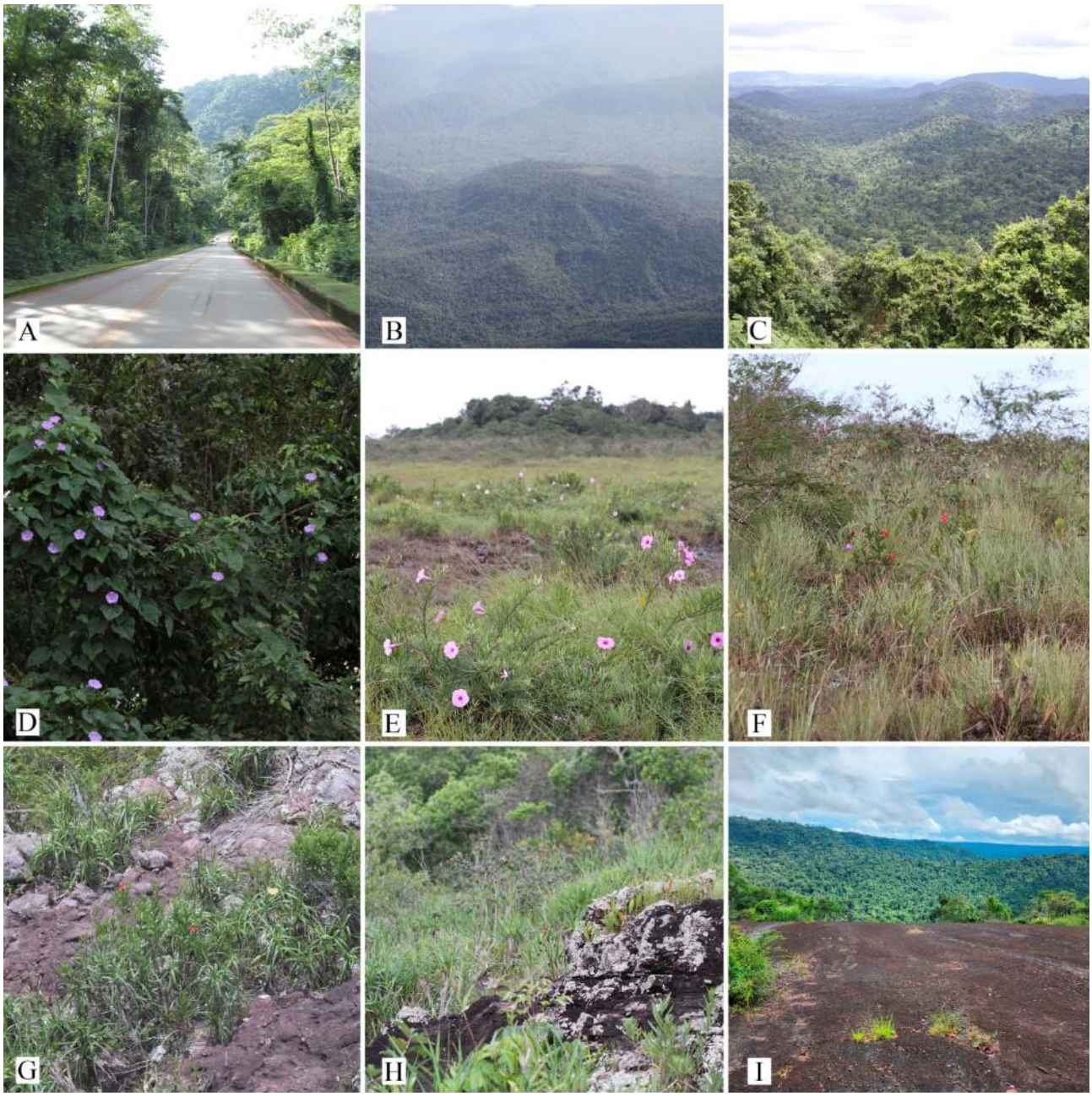


Figure 2: Landscapes and habitats in the Serra dos Carajás, Pará, Brazil. A. Access road to the Floresta Nacional de Carajás. B. General view of *canga* plateaus surrounded by forests. C. General view of forest vegetation. D. *Ipomoea peruviana* in forest vegetation. E. *Ipomoea marabaensis* in nodular and duricrust *cangas*. F. *Ipomoea cavalcantei* in shrubby *canga*. G–H. *Ipomoea cavalcantei* in sandstone outcrops. I. Granite outcrops surrounded by forest. Photos by André Cardoso (A–F, H). Lourival Tyski (G, I).

Key to the species of *Ipomea* in the Serra dos Carajás

1. Leaves pinnatisect or 7–9-lobate
   2. Leaves pinnatisect; corolla hypocrateriform, red; stamens exserted ..... ***I. quamoclit***
   2. Leaves 7–9-lobate; corolla infundibuliform to campanulate, pink; stamens inserted ..... ***Ipomoea sp.***
1. Leaves entire to 3-lobate
   3. Leaves oblong, obovate to elliptical, base cuneate, attenuate to rounded
      4. Climbers herbaceous; leaves glabrous; sepals glabrous ..... ***I. procumbens***
      4. Climbers wood (lianas) or shrub; leaves sericeous on abaxial surface; sepals sericeous
         5. Corolla hypocrateriform, red, rare white; stamens exserted ..... ***I. cavalcantei***

5. Corolla infundibuliform to campanulate, pink, rare white; stamens inserted ..... ***I. marabaensis***

3. Leaves ovate, lanceolate, sagittate, suborbiculate, or reniform, base cordate or sagittate

6. Shrub erect; leaves lanceolate ..... ***I. carnea sub. fistulosa***

6. Twining climbers or decumbent herbs; leaves ovate, suborbiculate, or reniform

7. Corolla hypocrateriform, sepals rostrate to aristate

8. Leaves usually entire; flowers open at night, corolla white, tube 7–12 cm long ..... ***I. alba***

8. Leaves usually 3-lobate; flowers open at morning, corolla red, tube 3–4 cm long ..... ***I. hederifolia***

7. Corolla infundibuliform to campanulate; sepals lacking rostrum

9. Flowers small, corolla 0.8–2.5 cm long

10. Corolla 0.5–0.8 cm long, yellow ..... ***I. minutiflora***

10. Corolla 1–2.5 cm long, pink

11. Sepals glabrescent, ciliate, apex acuminate ..... ***I. triloba***

11. Sepals glabrous, apex rounded to obtuse

12. Capsule ovoid ..... ***I. cynanchifolia***

12. Capsule depressed-subglobose ..... ***I. ramosissima***

9. Flowers medium to large, corolla 4–12 cm long

13. Sepals with prominent structures

14. Sepal with conspicuous angles near the apex; seeds lanate on margins ..... ***I. bahiensis***

14. Sepals with winged veins; seeds pubescent ..... ***I. setifera***

13. Sepals smooth, rugoses or with slightly prominent veins

15. Sepals with acuminate or acute apex

16. Sepals acute, glabrous; corolla 10–12 cm long ..... ***I. peruviana***

16. Sepals acuminate, hirsute, sericeous, pubescent to glabrescent; corolla 4–6 cm long

17. Plants generally decumbent herbs, rarely twining climbers; sepals glabrescent, ciliate; corolla uniformly pink ..... ***I. batatas***

17. Plants always twining climbers; sepals hirsute or sericeous to pubescent; corolla with the tube and lobes distinctly different in color

18. Corolla blue with white tube; sepals long-acuminate, apex 20–30 mm long, hirsute ..... ***I. nil***

18. Corolla purple with pink tube; sepals acuminate, apex up to 15 mm long, sericeous to pubescent ..... ***I. indica***

15. Sepals with rounded to obtuse apex

19. Corolla white or yellowish

20. Peduncles 30–40 cm long; sepals pubescent; corolla yellowish; midpetaline bands sericeous ..... ***I. marcellia***

20. Peduncles 2–5 cm long; sepals glabrous; corolla white, midpetaline bands glabrous ..... ***I. reticulata***

19. Corolla pink to purple

21. Sepals flat, cartaceous to membranaceous

22. Decumbent herbs; leaves suborbiculate to reniform; outer sepals rugose .. ***I. asarifolia***

22. Twining climbers, leaves ovate or sagittate, sepals smooth

23. Leaves narrowly sagittate; sepal with slightly prominent veins ..... ***I. carajasensis***

23. Leaves ovate or widely sagittate; sepals with flat veins

24. Corolla deep pink; sepals subequal, pink; seeds glabrous ..... ***I. philomega***

24. Corolla pink; sepals unequal, the outer shorter than inner, green; seeds lanate ..... ***I. squamosa***

21. Sepals convex, coriaceous

25. Leaves sericeous, abaxial surface whitish to silvery ..... ***I. asplundii***

25. Leaves pubescent or glabrous, abaxial surface green

26. Inflorescence in thyrse, peduncles 4–10 cm long; corolla pink ..... ***I. batatoides***

26. Inflorescence corymbiform, peduncles 0.5–1 cm long; corolla purple with white tube
    27. Stem and leaves hirsute to pubescent ..... ***I. decora***
    27. Stem and leaves glabrous ..... ***I. goyazensis***

Ipomoea alba L., Sp. Pl. 1: 161 (1753). Figure 3 A–B.
Specimens examined: BRAZIL. Pará: Marabá, Serra dos Carajás, borda de floresta, 21 May 1982, *Sperling, C.R. et al. 5782* (ARIZ, INPA, MG, NY). Parauapebas, Serra dos Carajás área antropizada, 5°59'08"S, 50°08'41"W, 2024, Cruz, *R.P. 399* (HCJS); October 1989, *Silva J.P. 590* (IAN, HCJS); 29 May 2009, *Silva, D.F. 486* (HCJS); borda de floresta, 12 April 1989, *Bastos, J.A.A. 166* (IAN, HCJS).

Ipomoea asarifolia (Desr.) Roem. & Schult., Syst. Veg., ed. 15[bis]. 4: 251 (1919). Figure 3 C–E.
Specimens examined: BRAZIL. Pará: Parauapebas, Serra dos Carajás, área antropizada, 6°02'52"S, 50°07'19"W, 24 July 2024, *Cruz, R.P. 321* (HCJS); 6°02'52"S, 50°07'19"W, 24 July 2024, *Cruz, R.P. 322* (HCJS); 25 April 1989, *Silva, J.P. 456* (HCJS).

Ipomoea asplundii O'Donell, Arq. Mus. Paranaense 9: 211, tab. 4 (1952). Figure 3 F–G, Figure 4.
Specimens examined: BRAZIL. Pará: Parauapebas [Marabá], Serra dos Carajás, Serra Norte, N3, 13 March 1985, *Secco, R.S. & Barth, O.M. 442* (MG). Canaã dos Carajás, Serra do Tarzan, 6°19'56" S, 50°8'40" W, 16 December 2007, *Mota, N.F.O. et al. 1212* (BHCB, MG). Ourilândia do Norte, Serra Arqueada, 6°31'24" S, 51°12'49" W, 23 April 2017, *Silva, T. et al. 96* (MG). Parauapebas, Serra Norte, N3, 6°02'39"S, 5°01'16"W, 23 February 2023, *Alves, D. 953* (HCJS); N3, 6°2'35" S, 50°12'34" W, 27 January 2013, *Arruda, A.J. et al. 1378* (BHCB, HCJS); N3, 6°2'35" S, 50°12'34" W, 27 January 2013, *Arruda, A.J. et al. 1379* (BHCB); N3, 6°02'45"S, 50°12'32"W, 14 March 2025, *Costa, J.B.R. 19* (HCJSN3, 6°02'47"S, 50°12'21"W, 15 February 2024, *Silva, D.F 1484* (HCJS); N6, 6°7'39" S, 50°10'41" W, 26 January 2013, *Arruda, A.J. et al. 1351* (BHCB, MG, HCJS); N7, 6°9'26" S, 50°10'21" W, 26 January 2013, *Arruda, A.J. et al. 1367* (BHCB, MG, HCJS); N7, 6°9'13" S, 50°10'21" W, 25 March 2012, *Meyer, P.B. et al. 1226* (BHCB); N7, 6°02'37"S, 50°12'30"W, 5 March 2016, *Silva, D.F. 1098* (HCJS); N7, 6°09'14.00" S, 50°10'21.22" W, 3 January 2011, *Tyski, L. 21* (HCJS); N7, 6°9'29" S, 50°10'14" W, 24 February 2016, *Harley, R.M. et al. 57379* (MG); N7, 6°9'29" S, 50°10'10" W, 17 January 2017, *Vasconcelos, L.V. et al. 1102* (MG, HCJS).

Ipomoea bahiensis Willd. ex Roem. & Schult., Syst. Veg., ed. 15 bis [Roemer & Schultes] 4: 789 (1919). Figure 5 A–C.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, área antropizada, Mina do Sossego, 6°27'45"S, 50°05'20"W, 3 July 2024, *Pastore, M. et al. 1712* (MG); Cristalino, 6°31'47"S, 49°41'06"W, April 2024, *Pinheiro, M.S. 36* (HCJS).

Ipomoea batatas (L.) Lam., Tabl. Encycl. 1: 465 (1793).
Specimens examined: BRAZIL. Pará: Parauapebas, acesso sul/Núcleo, 23 February 1987, *Araújo, C.M. 16* (IAN, HCSJ).

Ipomoea batatoides Choisy, Mém. Soc. Phys. Genève 8(1): 58 (1838). Figure 5 D–E, Figure 6.
Specimens examined: BRAZIL. Pará: [Marabá], Serra dos Carajás borda de floresta, 21 March 1984, *Silva, A.S.L. et al. 1950* (INPA, MG, MO, NY, UFMT); 1 April 1977, *Silva, M.G. da & Bahia, R.P. 2977* (MG, NY). Parauapebas, borda de floresta, 5°58'37"S, 50°19'05"W, 14 February 2020, *Barbosa-Silva, R.G. et al. 1390* (BHCB, MG); 5°57'22" S, 50°08'05"W, 18 March 2019, *Pastore, M. et al. 811* (MG, HCJS); 6º03'55.04" S, 50°03'34.07"W, 1 March 2011, *Tyski, L. 94* (HCJS).

Ipomoea carajasensis D.F.Austin, Acta Amazonica 11(2): 291 (-292), fig (1981). Figure 5 F–I, Figure 7.
Specimens examined: BRAZIL. Pará: [Marabá], Serra dos Carajás, 21 May 1969, *Cavalcante, P.B. 2115* (MG); 2 April 1977, *Silva, M.G. da & R.P. Bahia 3003* (ARIZ, MG, NY); 12 May 1982, *Sperling, C.R. et al. 5610* (ARIZ, K, MG, NY). Parauapebas [Marabá], Serra Norte, N1, 19 May 1987, *Bastos, M.N.C. & Rosa, N.A. 477* (MG); N1, 31 May 1996, *Lima, M.P.M. 36* (RB); N4, 14 March 1984, *Silva, A.S.L. 1798* (RB); N5, 12 May 1982, *Secco, R.S. et al. 132* (MG). Canaã dos Carajás, Serra do Tarzan, 6°19'24"S, 50°06'16"W, 26 June 2025, *Pastore, M. et al. 1856* (MG); 6°19'29" S, 50°62'10" W, 21 May 2016, *Vasconcelos, L.V. & Jaffé, R. 845* (MG); Serra Sul, 6°22'17" S, 50°23'4" W, 22 March 2015, *Lobato, L.C.B. et al. 4389* (MG, SP, HCJS); 6°19'43" S, 50°7'57" W, 6 June 2016, *Silva, C.A.S. da et al. 563* (MG); 10 June 2010, *Silva, D.F. 671* (HCJS); Serra Sul, S11A, 6°21'9" S, 50°26'54" W, 20 April 2015, *Carreira, L.M.M. et al. 3442* (MG, HCJS); S11A, 6°21'9" S, 50°26'54" W, 20 April 2015, *Carreira, L.M.M. et al. 3446* (MG, HCJS); S11B, 6°21'20" S, 50°23'27" W, 4 May 2016, *Vasconcelos, L.V. et al. 777* (MG, HCJS); S11B, 6°20'39" S, 50°24'38" W, 22 May 2016, *Vasconcelos, L.V. & Jaffé, R. 871* (MG, HCJS); S11C, 6°23'58" S, 50°22'31" W, 16 April 2015, *Carreira, L.M.M. et al. 3387* (MG, HCJS); S11C, 6°22'32" S, 50°22'58" W, 22 March 2012, *Meyer, P.B. et al. 1154* (BHCB); S11C, 6°22'40" S, 50°23'3" W, 20 May 2016, *Vasconcelos, L.V. & Jaffé, R. 834* (MG, HCJS); S11D, 30 March 2015, *Cardoso, A. et al. 2007* (MG); S11D, 6°24'20.87" S, 50°20'55.34" W, 19 April 2023, *Dias A. S. 46* (HCJS); S11D, 6°23'39"S, 50°21'20"W, 17 April 2025, *Pastore, M. et al. 1737* (MG); S11D, 22 June 2013, *Santos, R.S. & Rocha, A.E.S. 18* (MG); S11D, 6°24'0" S, 50°18'56" W, 20 May 2014, *Santos, R.S. et al. 199* (MG); S11D, 6°23'23"S, 50°22'46"W, 24 February 2022, *Seabra, L.F.F. et al. 112* (HCJS); S11D, 6°23'54" S, 50°22'13" W, 17 March 2009, *Viana, P.L. et al. 4089*

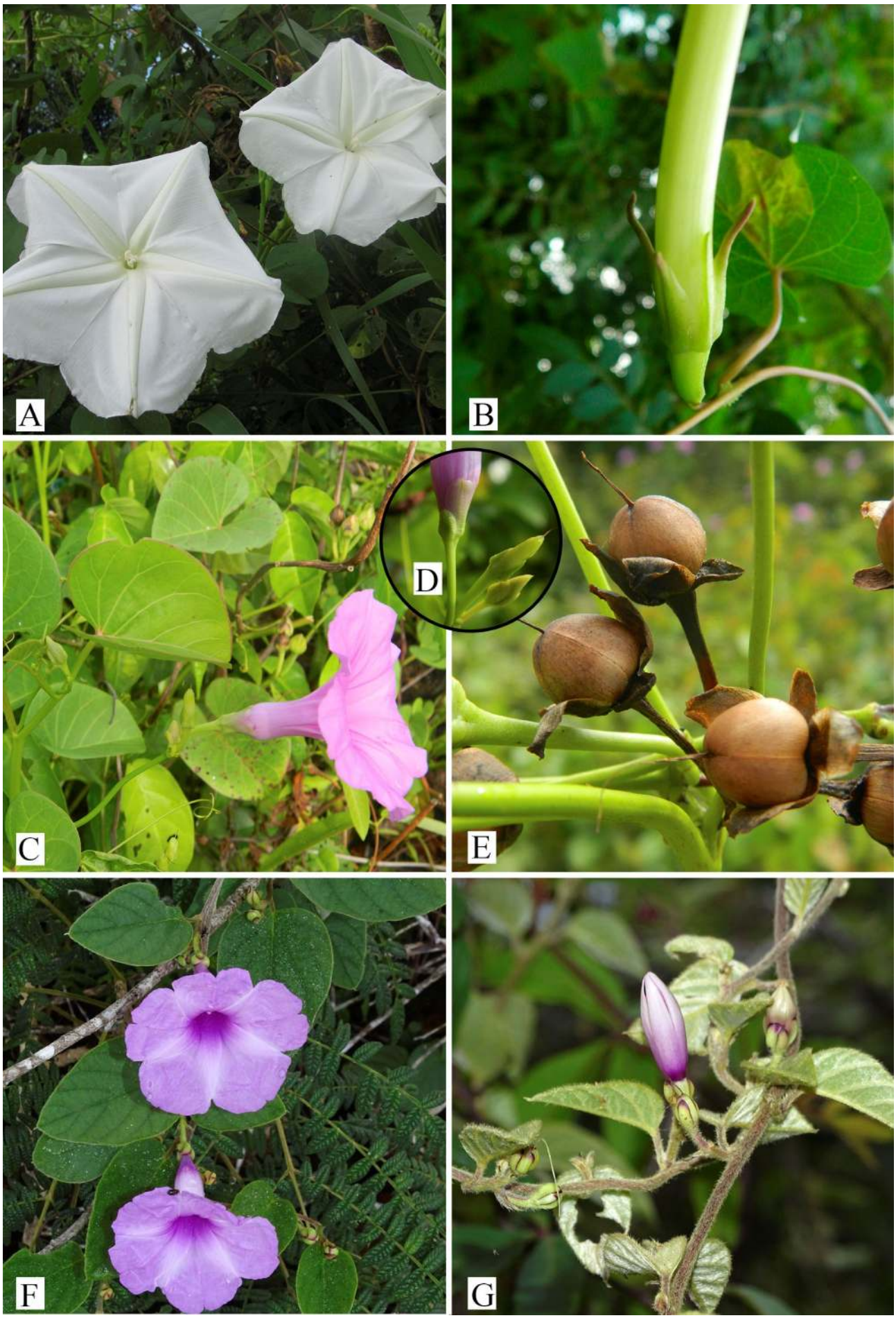


Figure 3: A–B. *Ipomoea alba*: A. flower, lateral view; B. sepal detail. C–E. *Ipomoea asarifolia*: C. flowering branch; D sepal detail; E. fruits. F–G *Ipomoea asplundii*: F. flowering branch, leaves showing the adaxial surface; G. buds, and leaves showing the abaxial surface. Photos by Mayara Pastore (A–E); Lourival Tyski (F, G).

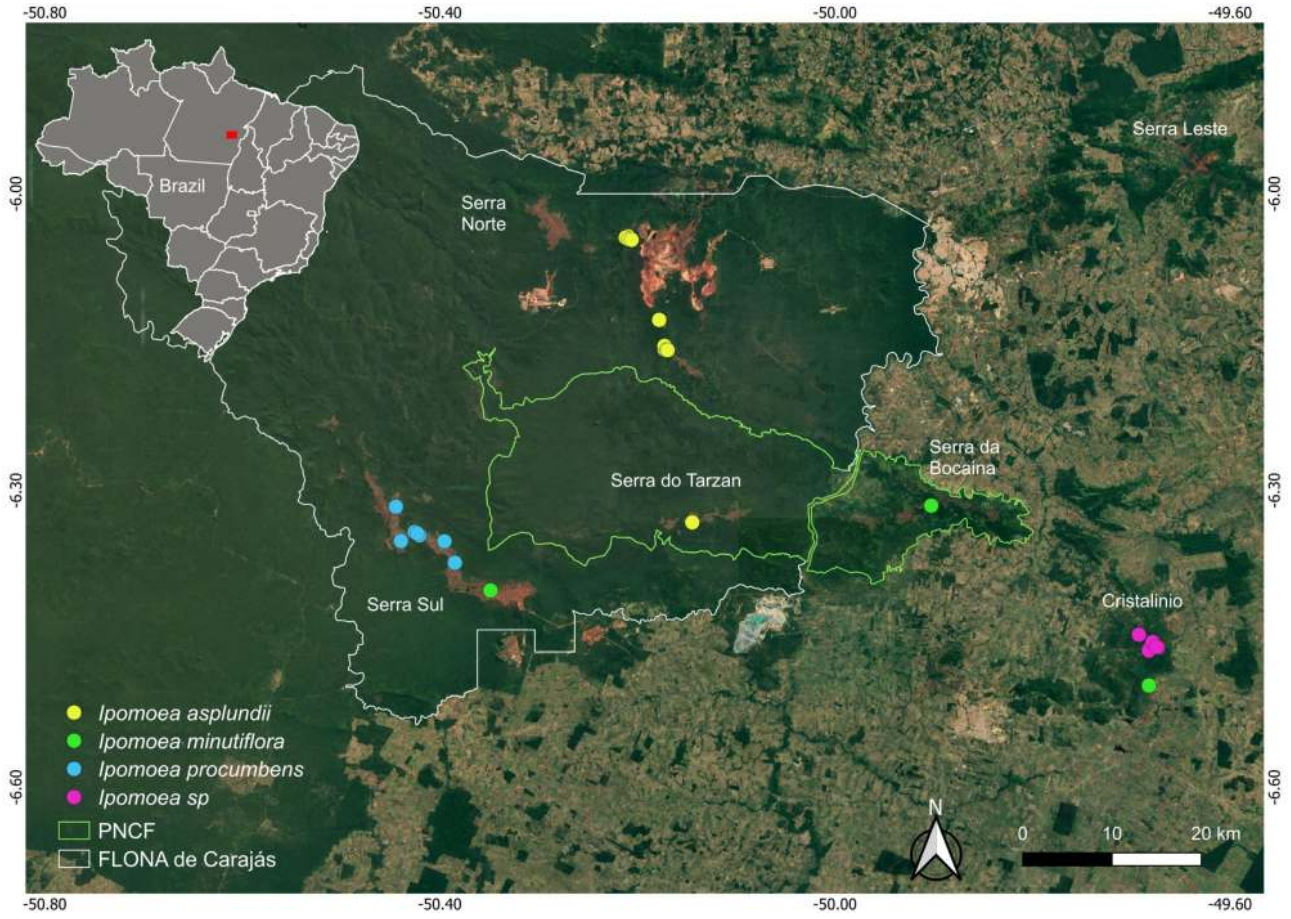


Figure 4: Distribution map of *Ipomoea asplundii, Ipomoea minutiflora, Ipomoea procumbens* and *Ipomoea* sp. in Serra dos Carajás.

(BHCB). Parauapebas, Serra Norte, 20 August 1973, *Pires, J.M. et al. 13196* (IAN); N1, 6°02'25"S, 50°05'20"W, April 2018, *Machado, G.C. & Pena, F.S.R. 100* (HCJS); N1, 6°1'52" S, 50°17'25" W, 26 March 2012, *Meyer, P.B. et al. 1231* (BHCB); N1, 6°2'10" S, 50°17'6" W, 8 May 2016, *Pastore, M. et al. 343* (MG); N1, 6°02'40"S, 50°16'06"W, 29 June 2024, *Pastore, M. et al. 1694* (MG); N1, 6°00'22"S, 50°17'49"W, 30 June 2024, *Pastore, M. et al. 1697* (MG); N1, 6°01'53"S, 50°17'27"W, 30 June 2024, *Pastore, M. et al. 1702* (MG); N1, 8 June 1989, *Rosa, N.A. & Nascimento, F.C. do 5139* (MG); N1, 15 April 1987, *Staudohar, G.S. 21* (HCJS); N1, 6°2'35" S, 50°16'57" W, 26 March 2015, *Viana, P.L. et al. 5595* (MG); N2, 6°3'27" S, 50°14'41" W, 19 April 2012, *Arruda, A.J. et al. 947* (BHCB); N2, 6°03'31"S, 50°15'05"W, 29 June 2024, *Pastore, M. et al. 1696* (MG); N2, 6°3'31" S, 50°14'46" W, 19 February 2017, *Vasconcelos, L.V. et al. 1110* (MG); N3, 6°02'45"S, 50°12'53"W, 5 May 2025, *Costa, J.B.R. 64* (HCJS); N3, 6°02'41"S, 50°12'57"W, 5 May 2025, *Costa, J.B.R. 74* (HCJS); N3, 6°02'40"S, 50°12'27"W, 5 May 2025, *Costa, J.B.R. 102* (HCJS); N3, 6°2'38" S, 50°12'31" W, 24 March 2016, *Falcão, B.F. et al. 200* (MG); N3, 6°4'45" S, 50°21'26" W, 22 June 2016, *Giulietti, A.M. et al. 2583* (MG); N3, 16 May 2017, *Lobato, L.C.B. et al. 4610* (MG); N3, 6°2'30" S, 50°12'28" W, 27 March 2012, *Meyer, P.B. et al. 1246* (BHCB); N3, 6°02'36"S, 50°12'35"W, 12 June 2025, *Moura, I.B. 35* (HCJS); N3, 6°02'47"S, 50°12'56"W, 18 July 2025, *Moura, I.B. 48* (HCJS); N3, 6°3'69" S, 50°12'37" W, 22 June 2015, *Trindade, J.R. et al. 233* (MG, SP); N3, 6°2'32" S, 50°12'22" W, 14 June 2017, *Wardil, M.V. et al. 256* (MG); N3, 15 June 2017, *Wardil, M.V. et al. 265* (MG); N4, 6°6'13" S, 50°10'54" W, 18 May 2016, *Falcão, B.F. et al. 474* (MG); N4, 6°6'50" S, 50°11'6" W, 18 May 2016, *Falcão, B.F. et al. 502* (MG); N4, 6°5'37" S, 50°11'41" W, 21 May 2016, *Falcão, B.F. et al. 530* (MG); N4, 20 July 2017, *Lima, A.M.* (HCJS); N4, 6°6'11" S, 50°11'21" W, 24 July 2012, *Lima, H.C. de & Silva, D.F. 7508* (MG, RB); N4, 11 March 2010, *Lobato, L.C.B. et al. 3838* (MG); N4, 6°02'44"S, 50°13'09"W, 25 July 2018, *Lopes, M.M. 57* (HCJS); N4, 6°06'13"S, 50°11'01"W, 2 July 2024, *Pastore, M. et al. 1705* (MG); N5, 6°11'35" S, 50°14'24" W, 23 June 2016, *Giulietti, A.M. et al. 2594* (MG); N5, 6°55'43"S, 50°06'07"W, 3 May 2019, *Miranda, D.H.L. 113* (HCJS); N5, 6°6'5" S, 50°7'42" W, 27 April 2015, *Mota, N.F.O. et al. 2915* (MG); N5, 6°5'17" S, 50°8'22" W, 27 May 2017, *Rodrigues, T.M. & Marino, F.S. 35* (MG); N6, 6°07'48.4"S, 50°10'37.6" W, 4 April 2022, *A.R. Brito et al. 679* (HCJS); N6, 6°07'46"S, 50°10'39"W, 1 July 2024, *Pastore, M. et al. 1704* (MG); N7, 6°9'13" S, 50°10'21" W, 25 March 2012, *Arruda, A.J. et al. 858* (BHCB, MG, HCJS); N7, 6°9'20" S, 50°10'20" W, 18 May 2016, *Falcão, B.F. et al. 475* (MG); N7, 6°09'18"S, 50°10'18"W, 2 July 2024, *Pastore, M. et al. 1706* (MG); N7, 6°92'85" S, 50°10'20" W, 17 May 2016, *Vasconcelos, L.V. et al. 825* (MG); N7, 6°33'25" S, 50°10'14.2" W, 12 June 2016, *Vasconcelos, L.V. et al. 881* (MG); N8, 6°11'02"S, 50°08'12"W, 2 July 2024, *Pastore, M. et al. 1709* (MG); N8, 6°11'09"S, 50°07'58"W, 2

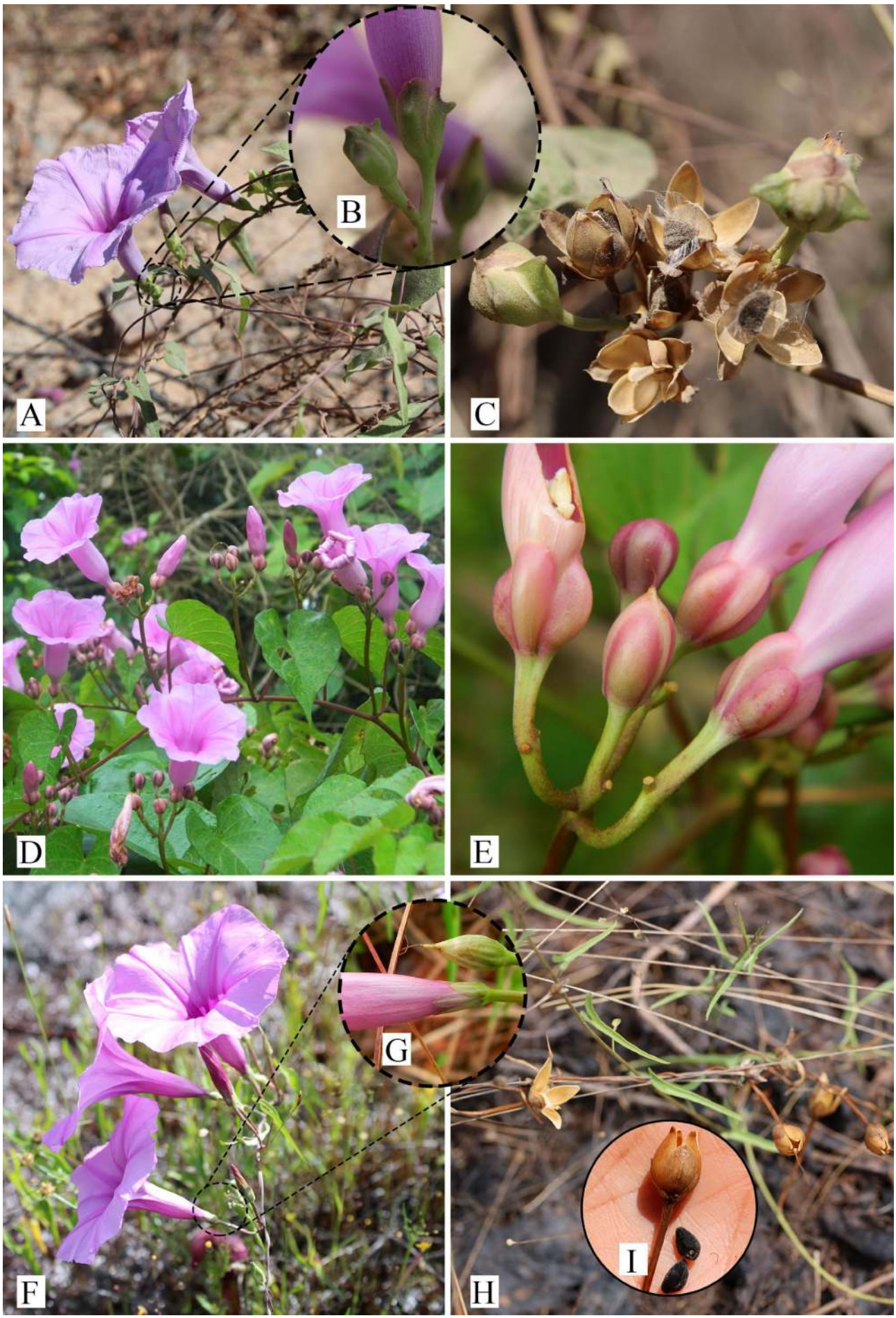


Figure 5: A–C. *Ipomoea bahiensis*: A. flowering branch; B. sepal detail; C. fruits and seeds. D–E. *Ipomoea batatoides*: D. flowering branch; E. sepal detail. F–H. *Ipomoea carajasensis*: F. flowers; G. sepal detail; H. fruiting branch; F. fruit and seeds. Photos by Mayara Pastore (A–I).

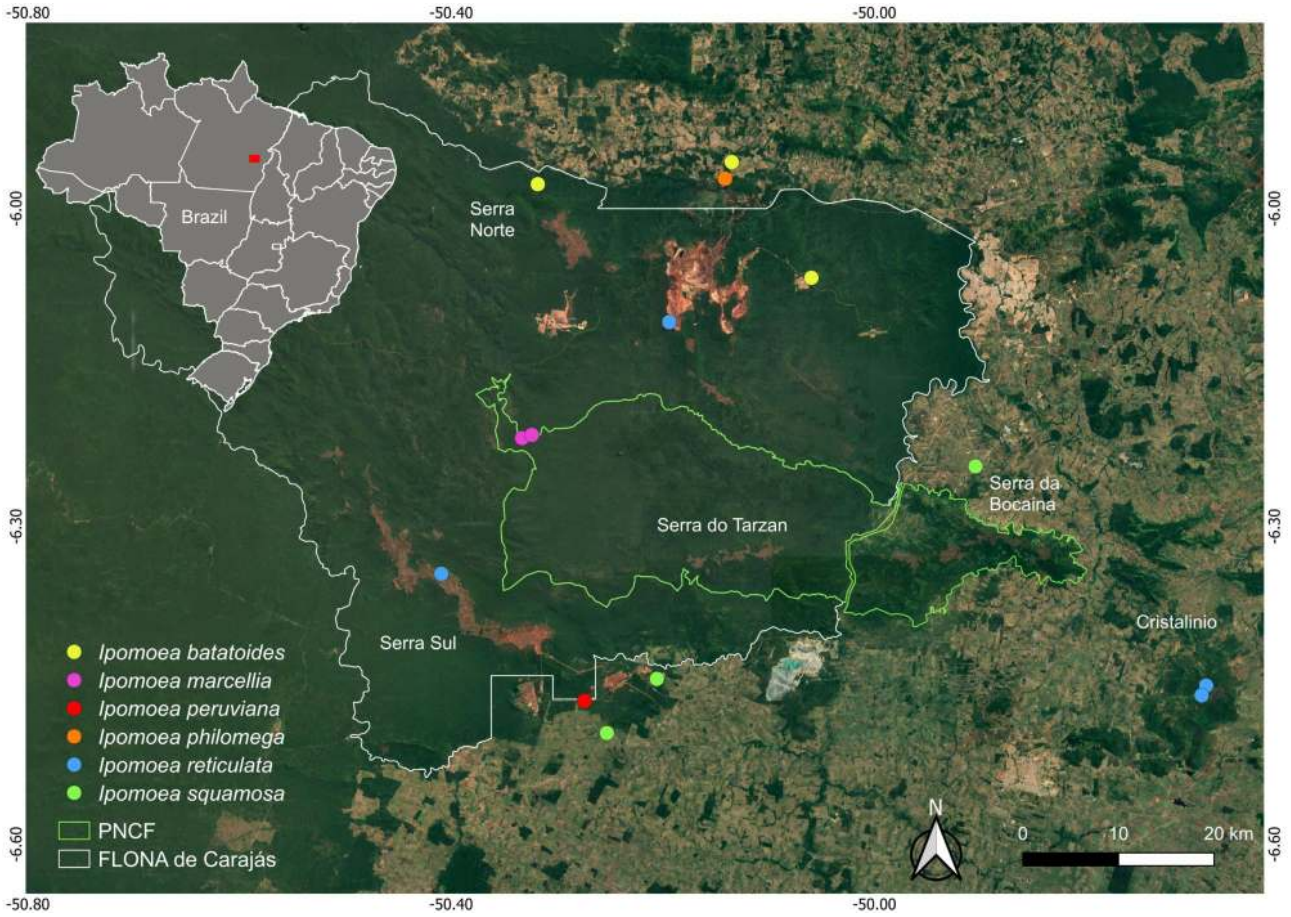


Figure 6: Distribution map of *Ipomoea batatoides, Ipomoea marcellia, Ipomoea peruviana, Ipomoea philomega, Ipomoea reticulata* and *Ipomoea squamosa* in Serra dos Carajás.

July 2024, *Pastore, M. et al. 1710* (MG); N8, 6°09'54"S, 50°09'46"W, 2 July 2024, *Pastore, M. et al. 1711* (MG).

Ipomoea carnea* subsp. *fistulosa (Mart. ex Choisy) D.F.Austin, Taxon 26(2-3): 237 (1977). Figure 8 A–C.
Specimens examined: BRAZIL. Pará: Parauapebas, Serra dos carajás, Estrada do Pará, Mata da Serraria km 3, 1 July 1976, *Ribeiro, B.G.S. 1431* (IAN).

Ipomoea cavalcantei D.F.Austin, Acta Amazonica 11(2): 292 (-293), fig (1981). Figure 9 D–F, Figure 10.
Specimens examined: BRAZIL. Pará: Marabá, Serra dos Carajás, 22 May 1969, *Cavalcante, P.B. 2086* (MG); 25 March 1977, *Silva, M.G. da & R.P. Bahia 2911* (NY). Parauapebas, arenito, 6°03'34"S, 50°20'38"W, 27 January 2026, *Tyski, L. et al. 2034* (HCJS); arenito, 6°03'33"S, 50°20'40"W, 27 January 2026, *Tyski, L. et al. 2057* (HCJS); arenito, 6°03'34"S, 50°20'38"W, 27 January 2026, *Tyski, L. et al. 2058* (HCJS); arenito, 6°03'34"S, 50°20'39"W, 27 January 2026, *Tyski, L. et al. 2059* (HCJS); arenito, 6°03'35"S, 50°20'39"W, 27 January 2026, *Tyski, L. et al. 2060* (HCJS); arenito, 6°03'35"S, 50°20'42"W, 10 April 2026, *Tyski, L. et al. 2167* (HCJS); arenito, 6°03'35"S, 50°20'41"W, 10 April 2026, *Tyski, L. et al. 2168* (HCJS); arenito, 6°03'35"S, 50°20'41"W, 10 April 2026, *Tyski, L. et al. 2169* (HCJS); arenito, 6°03'36"S, 50°20'40"W, 10 April 2026, *Tyski, L. 2170* (HCJS); arenito, 6°03'36"S, 50°20'41"W, 10 April 2026, *Tyski, L. et al. 2171* (HCJS); arenito, 6°03'36"S, 50°20'40"W, 10 April 2026, *Tyski, L. et al. 2172* (HCJS); arenito, 6°03'35"S, 50°20'39"W, 10 April 2026, *Tyski, L. et al. 2173* (HCJS); arenito, 6°03'35"S, 50°20'38"W, 10 April 2026, *Tyski, L. et al. 2174* (HCJS); arenito, 6°03'34"S, 50°20'38"W, 10 April 2026, *Tyski, L. et al. 2175* (HCJS); arenito, 6°03'34"S, 50°20'38"W, 10 April 2026, *Tyski, L. et al. 2176* (HCJS); arenito, 6°03'34"S, 50°20'38"W, 10 April 2026, *Tyski, L. 2177* (HCJS); arenito, 6°03'34"S, 50°20'40"W, 10 April 2026, *Tyski, L. et al. 2178* (HCJS); arenito, 6°03'33"S, 50°20'42"W, 10 April 2026, *Tyski, L. et al. 2179* (HCJS); arenito, 6°03'33"S, 50°20'42"W, 10 April 2026, *Tyski, L. et al. 2180* (HCJS); arenito, 6°03'33"S, 50°20'42"W, 10 April 2026, *Tyski, L. et al. 2181* (HCJS); arenito, 6°03'31"S, 50°20'42"W, 10 April 2026, *Tyski, L. et al. 2182* (HCJS); cultivada, 8 May 1987, *Silva, J.P. 9* (HCJS); Serra Norte, 13 May 2017, *Lobato, L.C.B. et al. 4577* (MG); 13 March 2001, *Martins-da-Silva, R.V.C. 47* (IAN); Serra Norte, 6°1'4" S, 50°17'33" W, 22 April 2016, *Reis, A.S. et al. 107* (MG); 27 September 1989, *Silva, J.P. 583* (IAN, HCSJ); Serra norte, N1, 6°02'15"S, 50°16'26"W, 27 June 2023, *Alves, D. 2027* (HCJS); N1, 6°01'41"S, 50°16'37"W, 27 June 2023, *Alves, D. 2032* (HCJS); N1, 5°59'28" S, 50°19'24" W, 29 January 2013, *Arruda, A.J. et al. 1432* (BHCB, HCJS); N1, 5°59'26" S, 50°19'22" W, 29 January 2013, *Arruda, A.J. et al. 1434* (BHCB); N1, 18 April 1970, *Cavalcante, P.B. & Silva, M.G. da 2651* (MG); N1, 5°55" S, 50°26'" W, 5 December 1981, *Daly, D.C. et al. 1742* (MG); N1, 6°1'57" S, 50°17'24" W, 22 March 2016, *Falcão, B.F. et al. 180* (MG); N1, 6°0'26" S, 50°18'1" W, 22 March 2016, *Falcão, B.F. et al. 181* (MG); N1, 6°1'20" S, 50°18'2" W, 22 March 2016, *Falcão, B.F. et al. 182*

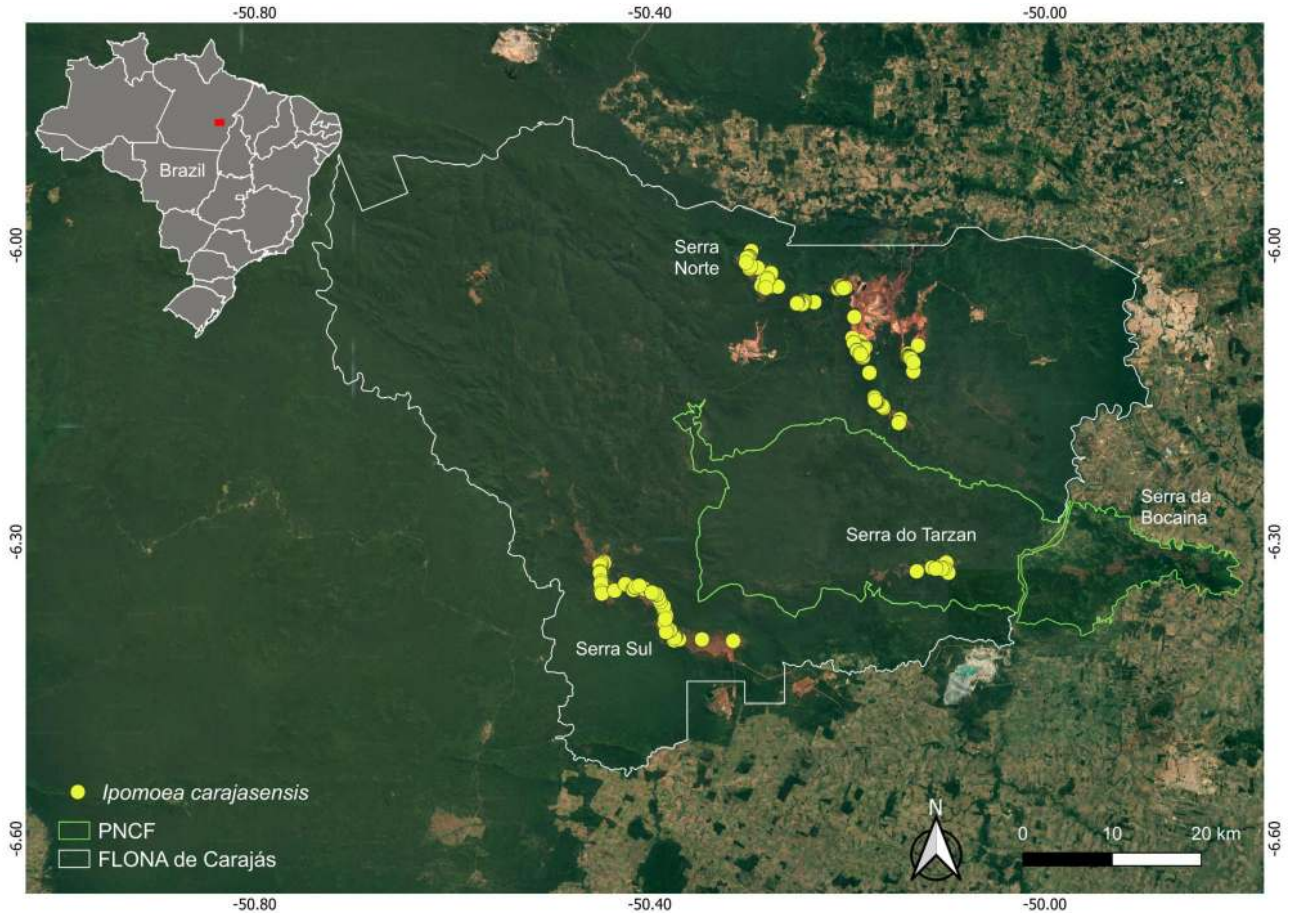


Figure 7: Distribution map of *Ipomoea carajasensis* in Serra dos Carajás.

(MG); N1, 6°2'80" S, 50°16'26" W, 11 March 2009, *Giorni, V.T. et al. 85* (BHCB); N1, 6°11'43" S, 50°13'58" W, 23 June 2016, *Giulietti, A.M. et al. 2600* (MG); N1, 6°2'40" S, 50°17'4" W, 24 March 2016, *Harley, R.M. et al. 57471* (MG, HCJS); N1, 6°2'11" S, 50°17'70" W, 10 February 2011, *Lima, H.C. de & Silva, D.F. 7099* (MG); N1, 6°0'59" S, 50°17'58" W, 2 May 2015, *Lima, H.C. de et al. 7984* (MG); N1, 17 December 2008, *Lima, H.C. de 7022* (RB); N1, 6°02'30"S, 50°16'14"W, 22 May 2018, *Melo, R.S. et al. 261* (UB, UFRR); N1, 6°1'52" S, 50°17'25" W, 26 March 2012, *Meyer, P.B. et al. 1236* (BHCB); N1, 6°01'09"S, 50°17'56"W, 13 June 2016, *Pastore, M. et al. 367* (MG); N1, 06°01'26" S, 50°17'53" W, 13 June 2016, *Pastore, M. et al. 368* (MG); N1, 6°1'28" S, 50°17'22" W 23 March 2015, *Rocha, A.E.S. & Costa-Neto, S.V. 1789* (MG); N1, 6°1'13.9" S, 50°17'51" W, 12 January 2017, *Rodrigues, I.M.C. et al. 101* (MG); N1, 6°18'00" S, 50°16'59" W, 7 December 2013, *Santos, R.S. et al. 168* (MG); N1, 6°2'32" S, 50°16'51" W, 15 January 2017, *Vasconcelos, L.V. et al. 1099* (MG); N1, 6°1'52" S, 50°17'23" W, 12 March 2009, *Viana, P.L. et al. 4032* (BHCB, HCJS); N1, 6°2'30" S, 50°16'14" W, 26 March 2015, *Viana, P.L. et al. 5581* (MG); N2, 6°03'11"S, 50°15'17"W, 11 May 2023, *Alves, D. 2419* (HCJS); N2, 6°3'25" S, 50°14'48" W, 19 April 2012, *Arruda, A.J. et al. 955* (BHCB); N2, 6°3'22" S, 50°15'15" W, 23 February 2016, *Harley, R.M. et al. 57354* (MG); N2, 6°3'22" S, 50°15'15" W, 23 February 2016, *Harley, R.M. et al. 57362* (MG); N2, 6°1'19" S, 50°18'3" W, 23 February 2016, *Harley, R.M. et al. 57365* (MG); N2, 15 April 2010, *Lobato, L.C.B. et al. 3895* (MG); N2, 27 January 2018, *Machado, G.C. & Pena, F.S.R. 9* (HCJS); N2, 6°20'51"S, 50°26'04"W, April 2018, *Machado, G.C. & Pena, F.S.R. 98* (HCJS); N2, 6°03'27.59" S, 50°14'39.52" W, 5 June 2019, *Rodrigues, M. 1* (HCJS); N2, 6°32'00" S, 50°15'15" W, 6 May 2016, *Vasconcelos, L.V. et al. 793* (MG, HCJS); N2, 6°32'7" S, 50°15'15" W, 11 June 2016, *Vasconcelos, L.V. et al. 874* (MG, HCJS); N2, 6°3'21" S, 50°15'13" W, 26 March 2015, *Viana, P.L. et al. 5631* (MG, HCJS); N3, 6°02'17"S, 50°12'52"W, 28 June 2023, *Alves, D. 2043* (HCJS); N3, 6°2'30" S, 50°12'28" W, 27 March 2012, *Arruda, A.J. et al. 903* (BHCB, HCJS); N3, 6°2'35" S, 50°12'34" W, 27 January 2013, *Arruda, A.J. et al. 1375* (BHCB); N3, 6°2'35" S, 50°12'34" W, 27 January 2013, *Arruda, A.J. et al. 1376* (BHCB); N3, 6°2'35" S, 50°12'34" W, 27 January 2013, *Arruda, A.J. et al. 1377* (BHCB); N3, 6°2'35" S, 50°12'34" W, 27 January 2013, *Arruda, A.J. et al. 1380* (BHCB); N3, 6°2'34" S, 50°13'70" W, 27 January 2013, *Arruda, A.J. et al. 1385* (BHCB); N3, 6°02'44"S, 50°12'42"W, 7 March 2025, *Costa, J.B.R. 25* (HCJS); N3, 6°02'40"S, 50°12'38"W, 10 March 2025, *Costa, J.B.R. 48* (HCJS); N3, 6°02'27"S, 50°12'42"W, 14 March 2025, *Costa, J.B.R. 55* (HCJS); N3, 6°02'45"S, 50°12'53"W, 5 May 2025, *Costa, J.B.R. 61* (HCJS); N3, 6°02'42"S, 50°12'52"W, 7 May 2025, *Costa, J.B.R. 63* (HCJS); N3, 6°02'41"S, 50°12'25"W, 29 May 2025, *Costa, J.B.R. 79* (HCJS); N3, 6°2'28" S, 50°12'37" W, 12 December 2015, *Falcão, B.F. et al. 48* (MG); N3, 6°4'42" S, 50°21'23" W, 22 June 2016, *Giulietti, A.M. et al. 2585* (MG); N3, 6°2'34" S, 50°12'33" W, 27 April 2015, *Mota, N.F.O. et al. 2951* (MG); N3, 6°02'46"S, 50°12'15"W, 16 June 2025, *Moura, I.B. 40*

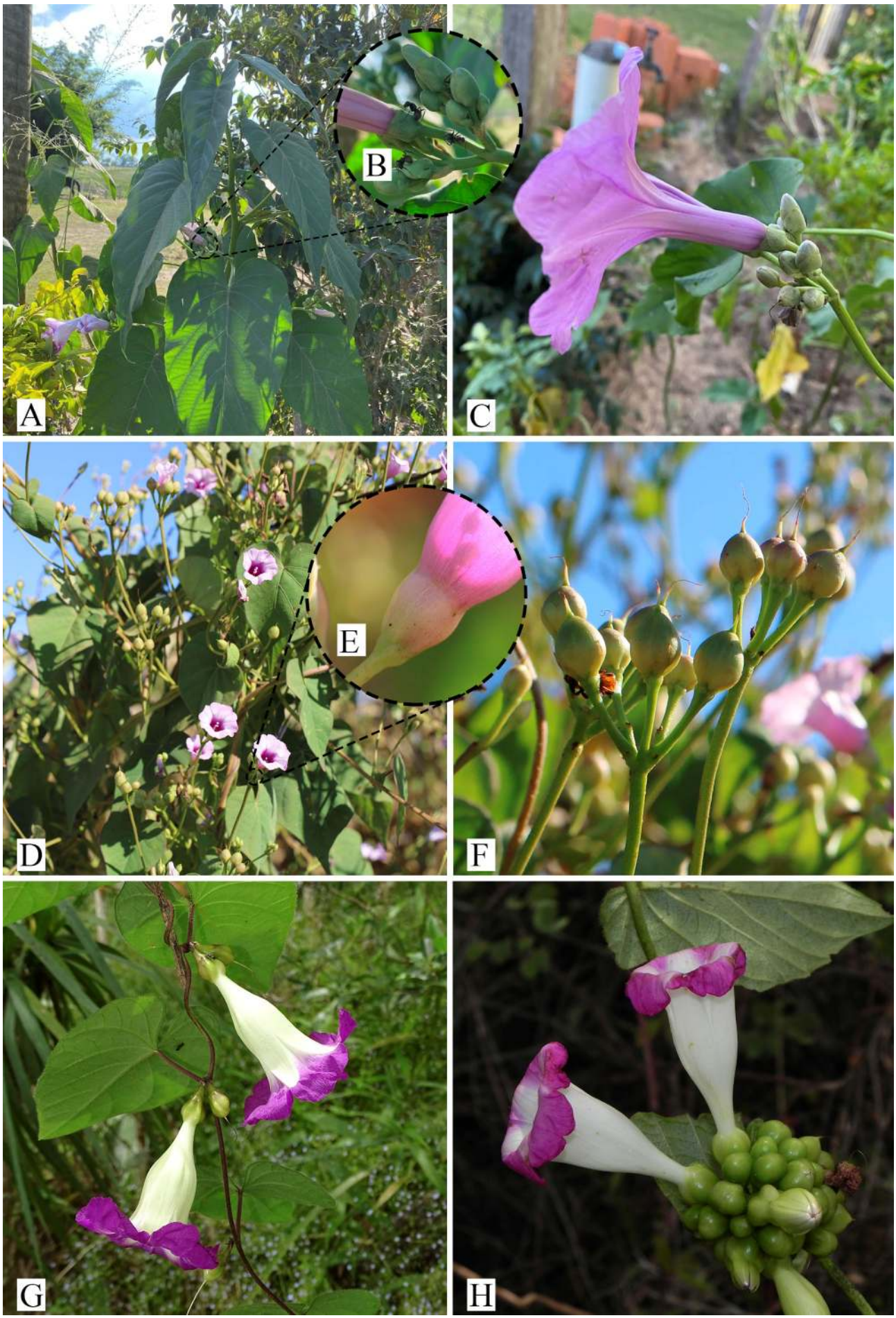


Figure 8: A–C. *Ipomoea carnea* subsp. *fistulosa*: A. habit; B. sepal detail; C. flower, lateral view. D–F. *Ipomoea cynanchifolia*: D. flowering branch; E. sepal detail; F. immature fruits. G–H. *Ipomoea decora*: G. flowering branch; H. Inflorescence. Photos by César Paixão (A–C); Mayara Pastore (D–F); Lourival Tyski (G, H).

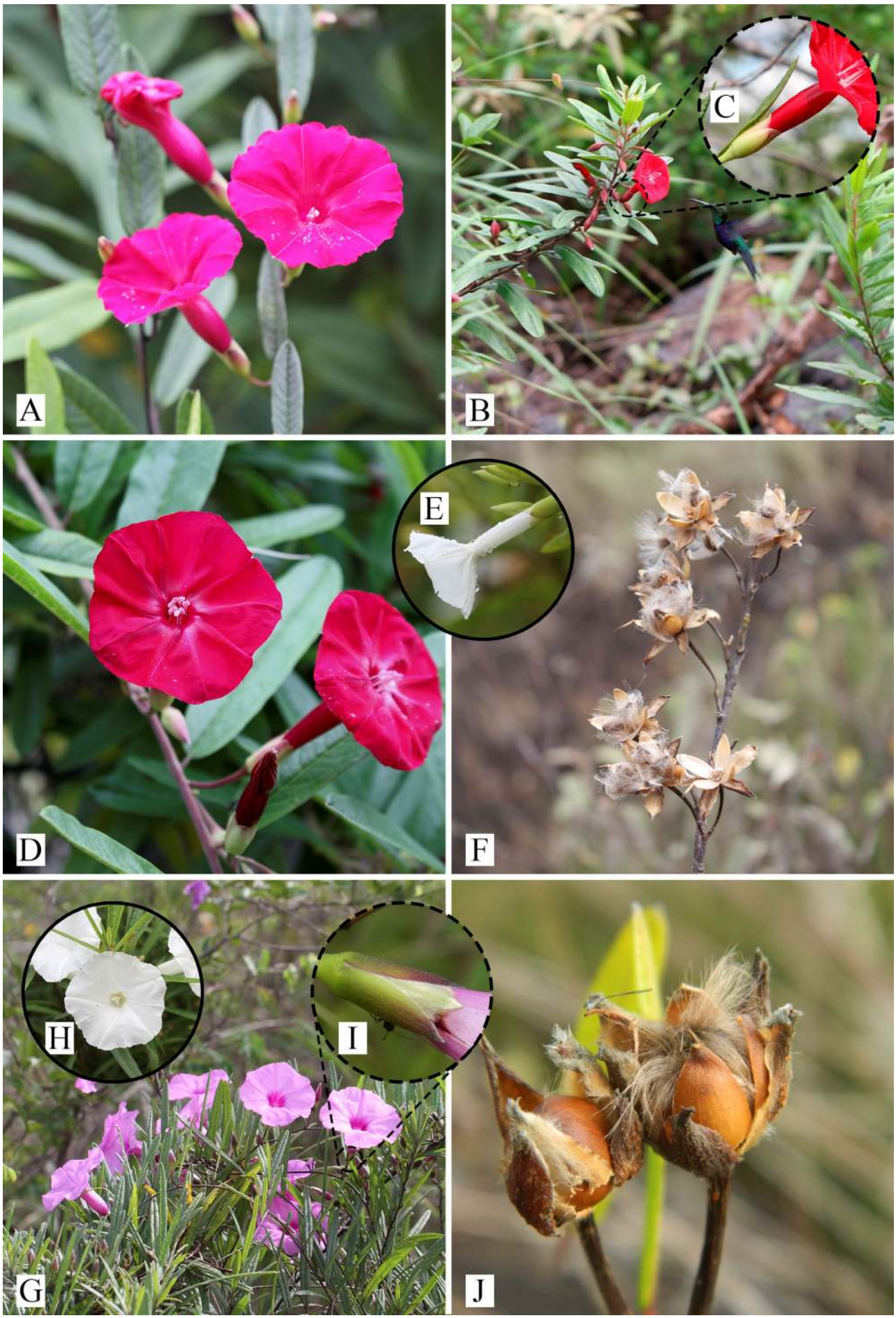


Figure 9: A. *Ipomoea cavalcantei* × *marabaensis*: flowering branch. B–F. *Ipomoea cavalcantei*: B. flowering branch; C. flower, lateral view; D. flowering branch; E. flower with an unusual white corolla; F. fruits and seeds. G–J. *Ipomoea marabaensis*: G. flowering branch; H. flower with an unusual white corolla; I. sepal detail; J. fruits and seed. Photos by André Cardoso (A–H).

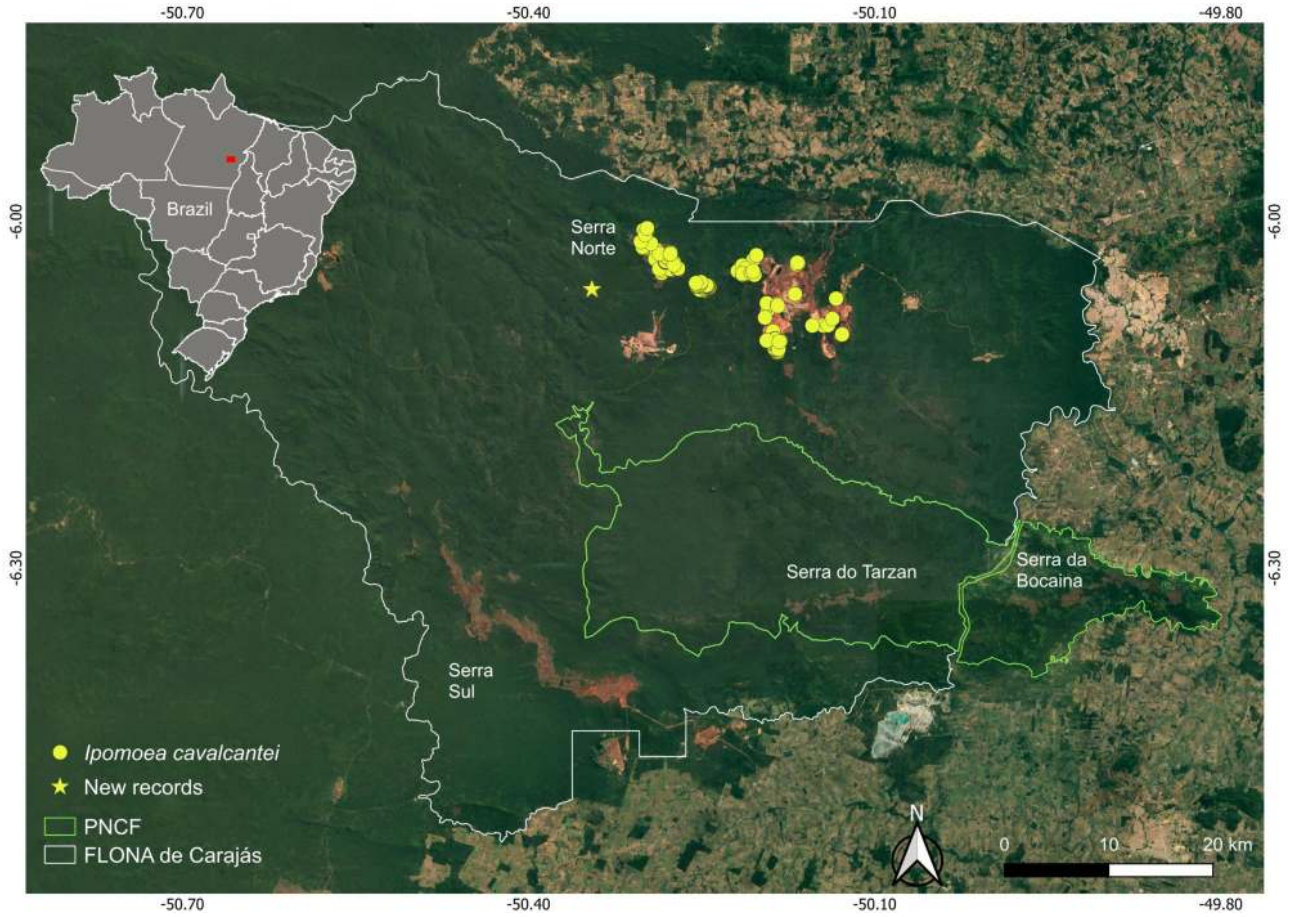


Figure 10: Distribution map of *Ipomoea cavalcantei*.

(HCJS); N3, 6°02’35"S, 50°12’19"W, 5 June 2026, *Moura, I.B. 41* (HCJS); N3, 6°01’45"S, 50°12’08"W, 6 June 2017, *Pastore, M. et al. 729* (MG); N3, 6°1’45" S, 50°12’8" W, 6 June 2017, *Pastore, M. et al. 729* (MG); N3, 6°03’54"S, 50°03’34"W, 4 March 2011, *Tyski, L. 95* (HCJS); N4, 6°6’34" S, 50°10’59" W, 24 March 2012, *Arruda, A.J. et al. 829* (BHCB); N4, 6°6’34" S, 50°10’59" W, 24 March 2012, *Arruda, A.J. et al. 831* (BHCB, HCJS); N4, 6°6’34" S, 50°10’59" W, 24 March 2012, *Arruda, A.J. et al. 832* (BHCB, HCJS); N4, 6°5’42" S, 50°11’17" W, 26 January 2013, *Arruda, A.J. et al. 1349* (BHCB, HCJS); N4, 6°6’37" S, 50°11’13" W, 26 January 2013, *Arruda, A.J. et al. 1361* (BHCB); N4, 6°6’39" S, 50°11’20" W, 26 January 2013, *Arruda, A.J. et al. 1362* (BHCB); N4, 6°6’37" S, 50°11’13" W, 29 January 2013, *Arruda, A.J. et al. 1442* (BHCB); N4, 6°6’37" S, 50°11’13" W, 29 January 2013, *Arruda, A.J. et al. 1443* (BHCB); N4, 6°5’24" S, 50°8’84" W, 3 April 2007, *Carreira, L.M.M. et al. 2723* (MG); N4, 6°5’24" S, 50°8’84" W, 3 April 2007, *Carreira, L.M.M. et al. 2729* (MG); N4, 6°04’59"S, 50°11’42"W, 15 March 2023, *Chagas, A.S. 293* (HCJS); N4, 6°06’11"S, 50°11’37"W, 12 April 2023, *Chagas, A.S. 308* (HCJS); N4, 6°04’18"S, 50°11’03"W, 30 May 2022, *Cruz, R.P. & Alves, J.N. 94* (HCJS); N4, 6°6’6" S, 50°11’13" W, 26 March 2016, *Falcão, B.F. et al. 234* (MG); N4, 6°6’13" S, 50°10’54" W, 18 May 2016, *Falcão, B.F. et al. 482* (MG); N4, 6°6’5" S, 50°11’11" W, 24 February 2016, *Harley, R.M. et al. 57391* (MG); N4, 6°6’8" S, 50°11’13" W, 26 March 2016, *Harley, R.M. et al. 57491* (MG); N4, 6°6’8" S, 50°11’13" W, 26 March 2016, *Harley, R.M. et al. 57492* (MG); N4, 6°6’5" S, 50°11’11" W, 17 May 2016, *Hiura, A.L. et al. 52* (MG, HCJS); N4, 6°06’37"S, 50°10’59"W, 30 January 2025, *Lima, J.A. 0* (HCJS); N4, 13 January 2010, *Lobato, L.C.B. et al. 3812* (MG); N4, 8 March 2010, *Lobato, L.C.B. et al. 3837* (MG); N4, 6°4’24" S, 50°11’29" W, 19 March 2017, *Lobato, L.C.B. et al. 4566* (MG); N4, 6°21’20"S, 50°23’27"W, 14 March 2019, *Lopes, M.M. 106* (HCJS); N4, 9 April 2018, *Morais, V.F.S.* (HCJS); N4, 6°04’23"S, 50°11’02"W, 28 May 2025, *Neves, E.S.* 3 (HCJS); N4, 6°4’17" S, 50°9’49" W, 1 June 2017, *Rodrigues, T.M. et al. 36* (MG); N4, 29 March 2009, *Silva, D.F. 466* (HCJS); N4, 27 March 2008, *Silva, J.S. 1* (HCJS); N4, 6°24’15"S, 51°55’19"W, 6 February 2020, *Sousa, M.S 48* (HCJS); N4, 6°09’40"S, 50°09’54"W, 16 March 2020, *Sousa, M.S 59* (HCJS); N4, 6°6’33" S, 50°11’13" W, 23 March 2017, *Vasconcelos, L.V. et al. 1121* (MG); N5, 6°5’24" S, 50°9’14" W, 4 April 2007, *Carreira, L.M.M. et al. 2792* (MG); N5, 27 February 2013, *Chaves, P.P. et al. 19* (MG); N5, 6°21’23"S, 50°23’26"W, 27 May 2017, *F. Santos et al. 606* (HCJS); N5, 6°5’23" S, 50°8’25" W, 25 March 2016, *Falcão, B.F. et al. 211* (MG); N5, 6°7’5" S, 50°19’35" W, 22 June 2016, *Giulietti, A.M. et al. 2587* (MG); N5, 6°03’10"S, 50°10’23"W, 20 April 1989, *J.P. Silva 463* (HCJS); N5, 6°24’25"S, 50°14’57"W, 7 April 2016, *Silva, L.V.C. 1439* (HCJS); N5, 6°04’00"S, 50°07’59"W, 12 May 1982, *Sperling, C.R. et al. 5584* (MG, IAN); N6, 6°6’43" S, 50°11’2" W, 24 February 2016, *Harley, R.M. et al. 57388* (MG); Parauapebas [Marabá], N1, 19 May 1987, *Bastos, M.N.C. & Rosa, N.A.*

478 (MG); N1, 23 January 1983, *Rosa, N.A. et al. 4480* (MG); N1, 21 April 1985, *Rosa, N.A. & Silva, M.F.F. da 4696* (MG); N4, 19 April 1905, *Rosa, N.A. et al. 4674* (MG); N4, 12 January 1985, *Rosário, C.S. et al. 685* (MG); N4, 14 March 1984, *Silva, A.S.L. et al. 1764* (MG); N5, 19 January 1985, *Nascimento, O.C. & Bahia, R.P. 934* (MG); N5, 12 May 1982, *Secco, R.S. et al. 120* (MG); N5, 22 April 1986, *Secco, R.S. & Bahia, R.P. 731* (MG); N4, 9 February 2018, *Lima, A.M.* (HCJS); N4, 16 October 2017, *Lima, A.M.* (HCJS); N4, 19 June 2017, *Lima, A.M.* (HCJS); N4, 6°02'32"S, 50°13'08"W, 25 July 2018, *Lopes, M.M. 61* (HCJS); N4, 6°43'39"S, 50°30'10"W, 23 May 2017, *Monteiro, L.M 23* (HCJS); N4, 6°43'39"S, 50°30'10"W, 23 May 2017, *Monteiro, L.M 27* (HCJS); N4, 6°06'14"S, 50°10'57"W, 9 September 2025, *Navarro, P.S. et al. 144* (HCJS); N5, 6°05'03"S, 50°08'12"W, 8 April 2025, *Brito, A.K. et al. 119* (HCJS); N5, 6°43'39"S, 50°30'10"W, 18 April 2017, *Monteiro, L.M 10* (HCJS).

Ipomoea cynanchifolia Meisn., Fl. Bras. 7: 274 (1869). Figure 8 D–F.

Specimens examined: BRAZIL. Pará: Parauapebas [Marabá], Serra Norte, 19 March 1984, *Silva, A.S.L. 1895* (MO, NY).

Ipomoea decora Meisn., Fl. Bras. 7: 272 (1869). Figure 8 G–H, Figure 11.

Specimens examined: BRAZIL. Pará: [Marabá], Serra dos Carajás, borda de floresta, 15 July 1987, *Marinho, L.R. 1388* (IAN). Parauapebas [Marabá], N4, 14 March 1984, *Silva, A.S.L. et al. 1786* (MG). Canaã dos Carajás, borda de floresta, 6°19'15.4" S, 50°26'58.6" W, 11 June 2010, *Tyski, L. & Silva, D.F. 697* (HCJS); Serra Sul, 6°19'43" S, 50°7'57" W, 20 May 2016, *Silva, C.A.S. da et al. 529* (MG); S11, 6°22'17" S, 50°23'4" W, 23 March 2015, *Lobato, L.C.B. et al. 4406* (MG, HCJS); S11B, 6°22'72" S, 50°22'79" W, 16 February 2010, *Costa, L.V. et al. 773* (BHCB, INPA, MG, HCJS); S11D, 6°23'10" S, 50°23'80" W, 15 March 2009, *Giorni, V.T. et al. 165* (BHCB, HCJS); S11D, 6°24'17.02"S, 50°19'59.90" W, 17 March 2011, *Tyski, L. 125* (HCJS); Curionópolis, Serra Leste, 5°57'55"S, 49°38'09"W, 14 March 2022, *Chagas, A.S. 238* (HCJS). Parauapebas, arenito, 6°07'55"S, 50°27'18"W, 6 March 2025, *Tyski, L. et al. 1956* (HCJS); borda de floresta, 6°09'12"S, 50°26'22"W, 29 April 2025, *Seabra, L.F.F. et al. 301* (HCJS); borda de floresta, 15 November 1989, *Silva J.P. 339* (IAN, HCSJ); borda de floresta, 6°11'06.5" S, 50°20'91.9" W, 9 June 2010, *Silva, D.F. 641* (HCJS); N3, 6°02'48"S, 50°12'55"W, 18 March 2026, *Costa, J.B.R. 154* (HCJS); N4, 6°04'26"S, 50°10'59"W, 8 April 2024, *Cruz, R.P. 290* (HCJS); N4, 6°06'36"S, 50°11'00"W, 27 February 2025, *Lima, J.A. 101* (HCJS); N4, 14 March 1990, *Rocha, J.B.P. 744* (HCJS, IAN).

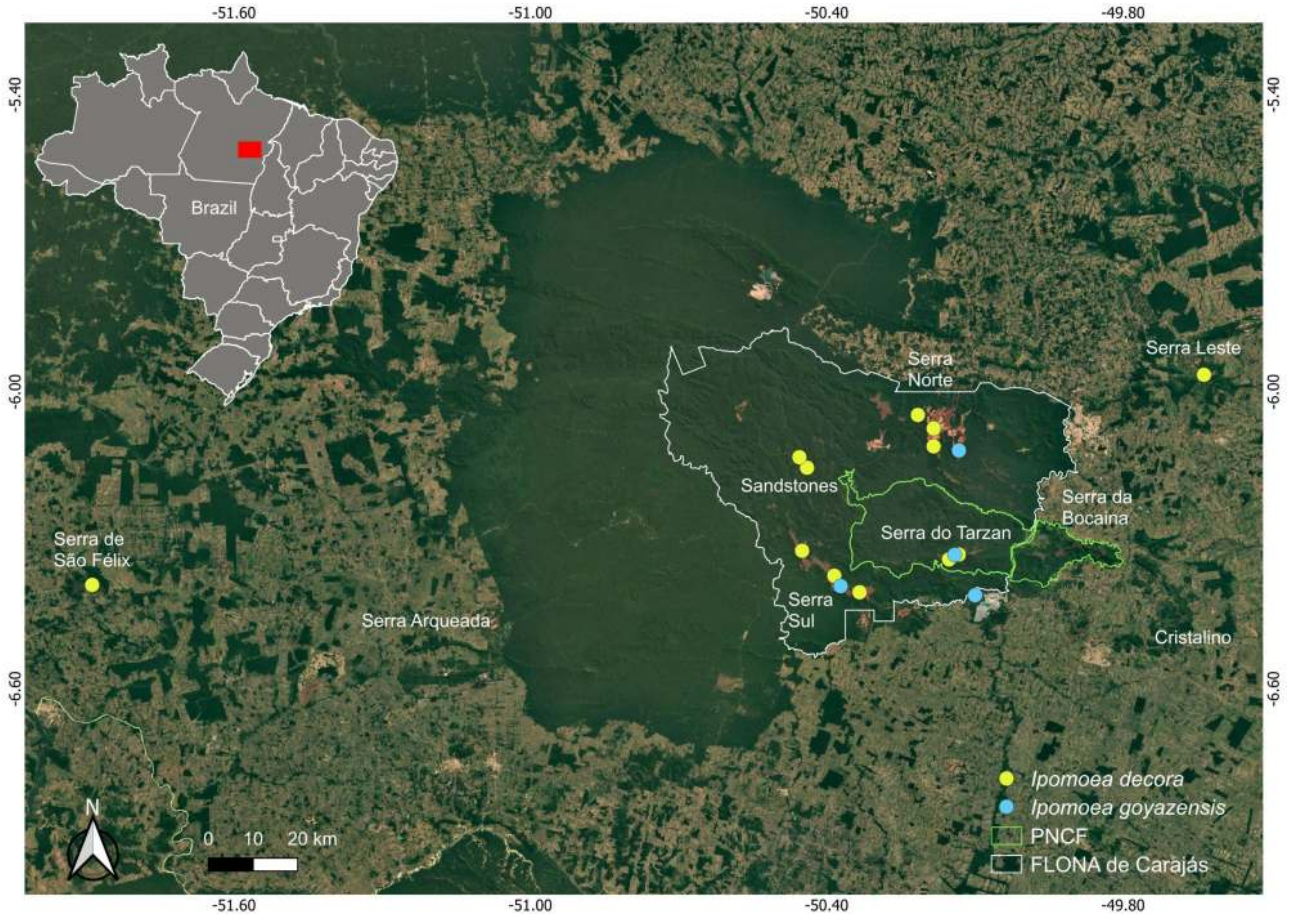


Figure 11: Distribution map of *Ipomoea decora* and *Ipomoea goyazensis* in Serra dos Carajás.

Ipomoea goyazensis Gardner, Icon. Pl. 5: t. 479 (1842). Figure 11.
Specimens examined: BRAZIL. Pará: Parauapebas [Marabá], Serra dos Carajás, Serra Norte, N5, 14 May 1982, *Secco, R.S. et al. 201* (MG). Canaã dos Carajás, borda de floresta, 6°11'90" S, 50°20'58" W, 22 March 2012, *Meyer, P.B. et al. 1153* (BHCB); borda de floresta, 6°24'39" S, 50°5'57" W, 8 August 2010, *Silva, L.V.C. et al. 1045* (BHCB); Serra do Tarzan, 6°19'45" S, 50°8'26" W, 14 March 2009, *Viana, P.L. et al. 4048* (BHCB, IAN, MG); Serra Sul, S11D, 6°23'32" S, 50°22'18" W, 20 March 2012, *Arruda, A.J. et al. 710* (BHCB); Serra Sul, S11D, 6°13'1" S, 50°21'25" W, 29 April 2015, *Mota, N.F.O. et al. 2982* (MG). [Marabá], borda de floresta, 1 May 1985, *Rosa, N.A. & Silva, M.F.F. da 4750* (MG); 7 November 2003, *Coelho, Q.S. 49* (HCJS). 23 February 1990, *Rocha, J.B.P. & Silva, J.P. 724* (IAN, HCSJ); 2 March 1989, *Silva, J.P. 367* (HCJS); 25 April 1990, *Yoshiura, L.S. & Silva, J.P. 770* (IAN, HCSJ); N5, 6°4" S, 50°10' W, 15 May 1982, *Sperling, C.R. et al. 5680* (MG).

Ipomoea hederifolia L., Syst. Nat., ed. 10. 2: 925 (1759). Figure 12 A–B.
Specimens examined: BRAZIL. Pará: Parauapebas, Serra dos Carajás, área antropizada, 5°52'10"S, 50°28'53"W, 9 December 2023, *Alves, D. et al. 2408* (HCJS); 6°02'58.50" S, 50.09'16.70" W, 9 December 2023, *Chagas, A.S. 149* (HCJS); 6°03'12"S, 50°08'40"W, 27 June 2022, *Cruz, R.P. 114* (HCJS); N4, 6°06'40"S, 50°11'00"W, 30 January 2025, *Lima, J.A. 111* (HCJS); N5, 17 June 2009, *Silva, D.F. 554* (HCJS).

Ipomoea indica (Burm.f.) Merr., Interpr. Herb. Amboin. 445 (1917). Figure 12 C–D.
Specimen examined: BRAZIL. Pará: Parauapebas, Serra dos Carajás, lixeira, próximo a serraria da N5, 7 November 1988, *Silva J.P. 220* (HCJS, IAN).

Ipomoea marabaensis D.F.Austin & Secco, Bol. Mus. Paraense Emilio Goeldi, N.S., Bot. 4: 188, fig (1988). Figure 9 G–J, Figure 13.
Specimens examined: BRAZIL. Pará: [Marabá], Serra dos Carajás, 16 April 1986, *Secco, R.S. & Silva, M.F.F. 708* (MG). Parauapebas [Marabá], N4, 25 January 1985, *Nascimento, O.C. & Bahia, R.P. 956* (MG); N4, 19 April 1985, *Rosa, N.A. et al. 4675* (MG); Parauapebas, Serra Norte, N4, 19 April 1985, *Rosa, N.A. & Bahia, R.P. 4675* (MG); N4, 14 March 1984, *Silva, A.S.L. et al. 1773* (MG); N5, 22 April 1986, *Secco, R.S. & Bahia, R.P. 730* (MG). Canaã dos Carajás, arenito, 6°27'52" S, 50°5'22" W, 21 May 2016, *Falcão, B.F. et al. 531* (MG); Cristalino, 6°27'16" S, 49°40'31" W, 23 May 2016, *Falcão, B.F. et al. 551* (MG); Cristalino, 6°27'19" S, 49°40'32" W, 24 May 2016, *Falcão, B.F. et al. 570* (MG); Cristalino, 6°31'46"S, 49°41'03"W, 21 June 2024, *Fonseca-da-Silva, T.L. 564* (HCJS); Cristalino, 6°28'22"S, 49°42'01"W, 24 June 2024, *Fonseca-da-Silva, T.L. 648* (HCJS); Cristalino, 6°31'46"S, 49°41'03"W, 21 June 2024, *Fonseca-da-Silva, T.L. 677* (HCJS); Cristalino, 6°28'20"S, 49°41'57"W, 0 April 2024, *Vidal, C.V. 34* (HCJS); Serra da Bocaina, 6°19'55.30" S, 49°56'13.10" W, 8 April 2022, *Alves, D. et al. 231* (HCJS); Serra da Bocaina, 6°19'51" S, 49°56'20" W, 12 March 2012, *Arruda, A.J. et al. 707* (BHCB); Serra da Bocaina, 6°18'46" S, 49°52'59" W, 28 January 2013, *Arruda, A.J. et al. 1389* (BHCB); Serra da Bocaina, 6°18'54" S, 49°16'31" W, 14 April 2016, *Falcão, B.F. et al. 356* (MG); Serra da Bocaina, 6°18'11" S, 49°53'57" W, 16 April 2016, *Falcão, B.F. et al. 380* (MG); Serra da Bocaina, 6°34'20" S, 50°36'13" W, 21 June 2016, *Giulietti, A.M. et al. 2579* (MG); Serra da Bocaina, 6°18'41" S, 49°52'11" W, 25 September 2012, *Lima, H.C. de & Silva, D.F. 7565* (MG); Serra da Bocaina, 6°19'49" S, 49°58'32" W, 16 June 2016, *Pastore, M. et al. 395* (MG); Serra da Bocaina, 6°18'39" S, 49°52'29" W, 5 April 2017, *Pastore, M. et al. 595* (MG); Serra do Tarzan, 6°19'45" S, 50°5'53" W, 13 February 2016, *Falcão, B.F. et al. 94* (MG); Serra do Tarzan, 6°20'15" S, 50°10'0" W, 14 March 2009, *Giorni, V.T. et al. 144* (BHCB,HCJS); Serra do Tarzan, 6°10'27" S, 50°10'27" W, 21 May 2016, *Vasconcelos, L.V. & Jaffé, R. 836* (MG, HCJS); Serra do Tarzan, 6°27'51" S, 50°52'20" W, 21 May 2016, *Vasconcelos, L.V. & Jaffé, R. 850* (MG); Serra do Tarzan, 6°19'35" S, 50°6'19" W, 26 March 2015, *Viana, P.L. et al. 5642* (MG); Serra Sul, S11A, 6°20'51" S, 50°26'4" W, 5 April 2016, *Carreira, L.M.M. et al. 3539* (MG); Serra Sul, 6°22'17" S, 50°23'4" W, 23 March 2015, *Lobato, L.C.B. et al. 4421* (MG); Serra Sul, 6°19'43" S, 50°7'57" W, 20 May 2016, *Silva, C.A.S. da et al. 534* (MG); Serra Sul, 6°23'50"S, 50°20'58"W, 9 February 2024, *Varotto, R.J.H. 671* (HCJS); S11A, 6°18'38" S, 50°27'19" W, 29 June 2010, *Arruda, A.J. et al. 291* (BHCB); S11A, 6°21'11" S, 50°25'30" W, 13 February 2010, *Costa, F.M. et al. 100* (BHCB, HCJS); S11A, 6°20'0" S, 50°27'90" W, 21 March 2012, *Meyer, P.B. et al. 1134* (BHCB); S11A, 6°20'58" S, 50°26'56" W, 22 May 2016, *Vasconcelos, L.V. & Jaffé, R. 868* (MG, HCJS); S11A, 6°20'0" S, 50°27'90" W, 21 March 2012, *Viana, P.L. et al. 5244* (BHCB); S11B, 6°20'46" S, 50°24'18" W, 21 January 2016, *Falcão, B.F. et al. 86* (MG); S11B, 6°20'18" S, 50°25'90" W, 19 May 2010, *Pivari, M.O. et al. 1533* (BHCB); S11B, 6°21'9" S, 50°23'40" W, 13 January 2017, *Vasconcelos, L.V. et al. 1079* (MG, HCJS); S11C, 6°24'10" S, 50°23'18" W, 18 March 2009, *Giorni, V.T. et al. 207* (BHCB); S11C, 6°23'6" S, 50°23'3" W, 23 March 2016, *Harley, R.M. et al. 57434* (MG, HCJS); S11C, 6°20'46" S, 50°24'54" W, 23 March 2016, *Harley, R.M. et al. 57447* (MG, HCJS); S11C, 6°22'29" S, 50°22'51" W, 8 December 2007, *Mota, N.F.O. et al. 1108* (BHCB); S11D, 6°6'23" S, 50°19'0" W, 22 July 2012, *Arruda, A.J. et al. 1208* (BHCB); S11D, 30 March 2015, *Cardoso, A. et al. 2008* (MG); S11D, 6°23'44" S, 50°22'17" W, 11 April 2015, *Carreira, L.M.M. et al. 3337* (MG, HCJS); S11D, 23 March 2016, *Harley, R.M. et al. 57462* (MG, HCJS); S11D, 6°23'40"S, 50°21'19"W, 17 April 2025, *Pastore, M. et al. 1738* (MG); S11D, 6°24'0" S, 50°18'56" W, 20 May 2014, *Santos, R.S. et al. 198* (MG); S11D, 6°23'23"S, 50°22'46"W, 24 February 2022, *Seabra, L.F.F. et al. 116* (HCJS); S11D, 6°23'23"S, 50°22'46"W, 24 February 2022, *Seabra, L.F.F. et al. 117* (HCJS); S11D, 6°23'54" S, 50°22'12" W, 17 March 2009, *Viana, P.L. et al. 4096* (BHCB); S16, 6°26'27" S, 50°17'35" W, 25 May 2016, *Falcão, B.F. et al. 593* (MG). Curionópolis, Cristalino, 6°27'42.4" S, 49°40'55.9" W, 6 April 2017, *Harley, R.M. et al. 58132* (MG); Curionópolis, Cristalino,

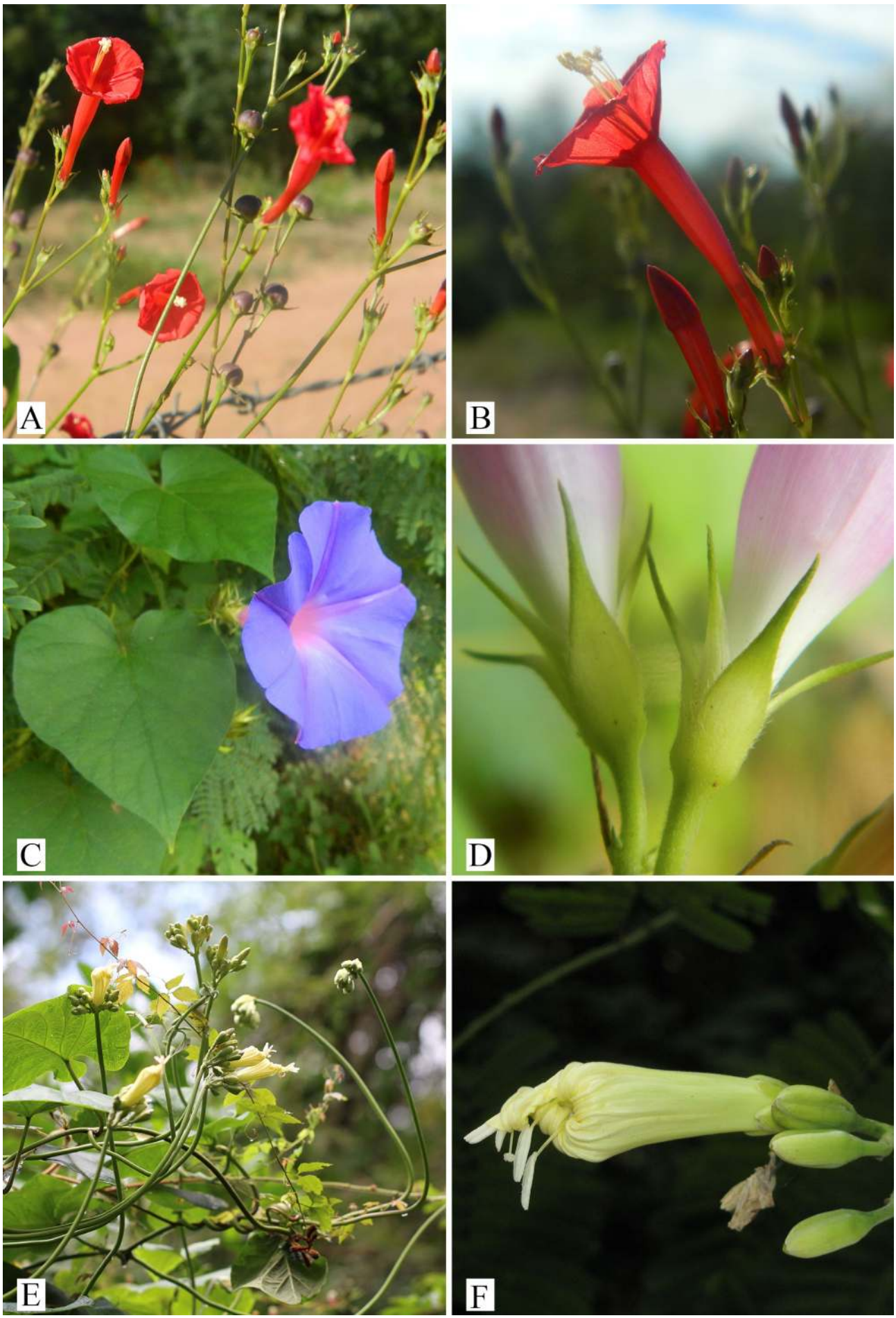


Figure 12: A–B. *Ipomoea hederifolia*: A. flowers and immature fruits; B. flower, lateral view. C–D. *Ipomoea indica*: C. flowering branch; D. sepal detail. E–F. *Ipomoea marcellia*: E. flowering branch; F. wilting flower. Photos by Mayara Pastore (A–D); André Cardoso (E–F).

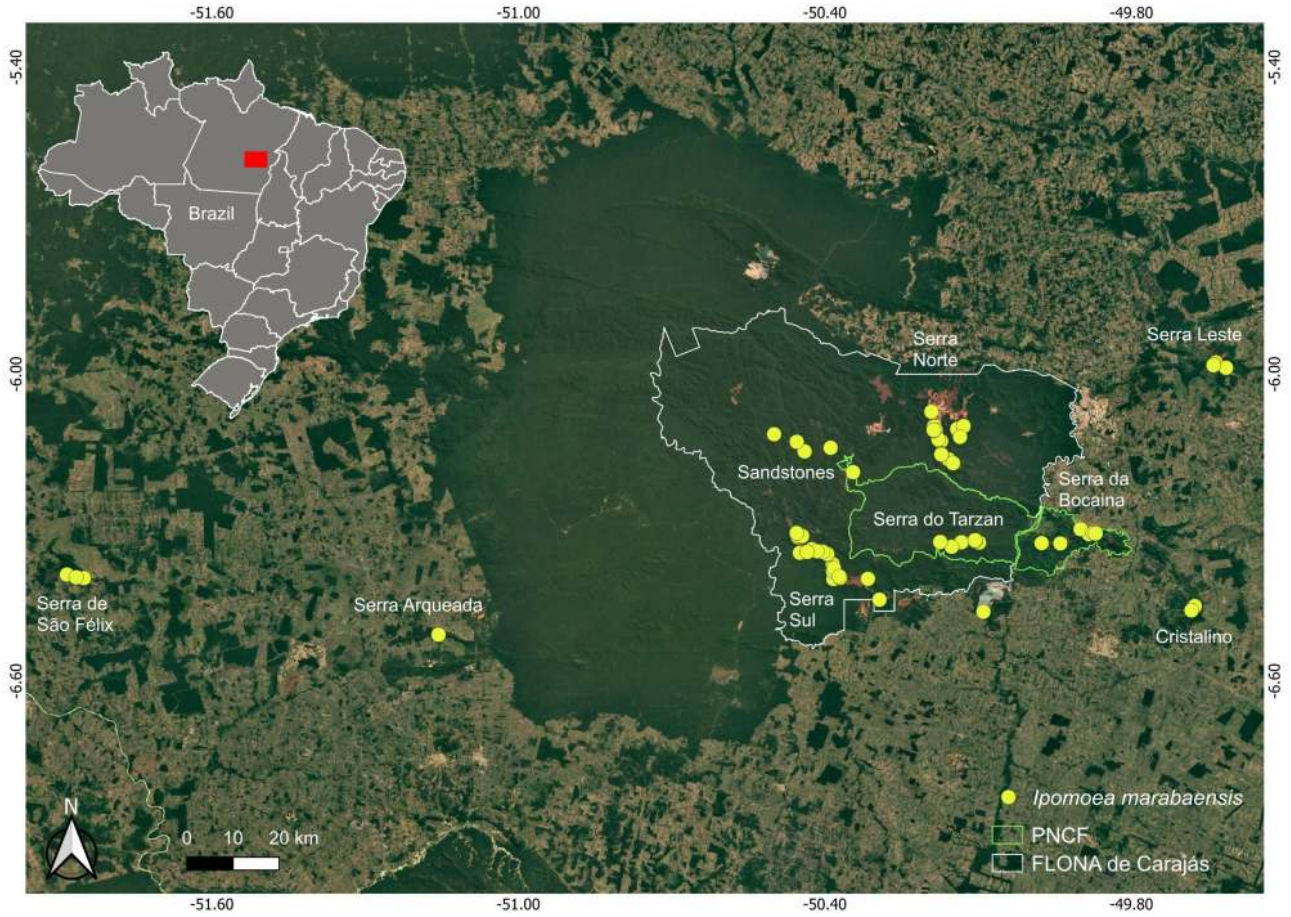


Figure 13: Distribution map of *Ipomoea marabaensis* in Serra dos Carajás.

6°28’23.13" S, 49°42’22.03" W, 26 May 2019, *Pastore, M. et al. 869* (MG); Cristalino, 6°27’12" S, 49°40’32" W, 4 May 2016, *Viana, P.L. et al. 6234* (MG); Serra Leste, 6°02’36"S, 50°12’09"W, 13 February 2020, *Chagas, A.S. 33* (HCJS); Serra Leste, 5°57’56"S, 49°38’05"W, 10 March 2022, *Chagas, A.S. 231* (HCJS); Serra Leste, 6°06’46"S, 50°08’20"W, 24 January 2018, *F. Santos 436* (HCJS); Serra Leste, 6°22’31"S, 50°21’16"W, 7 July 2016, *F. Santos 437* (HCJS); Serra Leste, 5°58’50" S, 49°38’16" W, 19 May 2016, *Hiura, A.L. & Jaffé, R. 91* (MG); Serra Leste, 6°09’26"S, 50°10’19"W, 7 March 2019, *Miranda, D.H.L 92* (HCJS); Serra Leste, 6°02’19"S, 50°17’32"W, 9 March 2018, *Muroi, J.H.S 4* (HCJS); Serra Leste, 6°02’19"S, 50°17’32"W, 9 March 2018, *Muroi, J.H.S 5* (HCJS); Serra Leste, 5°58’36" S, 49°38’5" W, 13 July 2016, *Pastore, M. et al. 491* (MG); Serra Leste, 6°43’39"S, 50°30’10"W, 12 April 2017, *Pinho, C.F 1* (HCJS); Serra Leste, 6°19’06"S, 50°27’09"W, 12 April 2017, *Pinho, C.F 14* (HCJS); Serra Leste, 5°59’15" S, 49°36’52" W, 23 March 2017, *Vasconcelos, L.V. et al. 1125* (MG); Serra Leste, 5°58’57" S, 49°38’21" W, 23 March 2017, *Vasconcelos, L.V. et al. 1150* (MG). Ourilândia do Norte, Serra Arqueada, 6°30’33.40" S, 50°09’23.20" W, 24 March 2022, *A.R. Brito et al. 620* (HCJS); Serra Arqueada, 6°03’50"S, 50°22’23"W, 2 May 2017, *F. Santos 433* (HCJS); Serra Arqueada, 6°30’33.3" S, 51°9’22.9" W, 11 April 2017, *Harley, R.M. et al. 58166* (MG); Serra Arqueada, 6°30’33" S, 51°9’23" W, 3 May 2016, *Viana, P.L. et al. 6188* (MG); Serra Arqueada, 6°30’33" S, 51°9’23" W, 3 May 2016, *Viana, P.L. et al. 6210* (MG, HCJS). Parauapebas, arenito, °611’28.67" S, 50°20’40.86" W, 27 March 2024, *Bona, L.F. et al. 77* (HCJS); arenito, 6°09’04"S, 50°26’23"W, 12 March 2025, *Brito, A.K. et al. 81* (HCJS); arenito, 6°07’02"S, 50°29’57"W, 14 April 2025, *Brito, A.K. et al. 157* (HCJS); arenito, 6°11’29"S, 50°20’41"W, 29 May 2025, *Brito, A.K. et al. 183* (HCJS); arenito, 6°08’38"S, 50°23’19"W, 15 April 2025, *Navarro, P.S. et al. 35* (HCJS); arenito, 6°11’25.25" S, 50°20’41.12" W, 14 April 2023, *Seabra, L.F.F. 225* (HCJS); arenito, 6°07’56"S, 50°27’18"W, 6 March 2025, *Tyski, L. et al. 1950* (HCJS); Serra Norte, 6°00’09"S, 49°47’55"W, 20 May 2024, *Ramos, R.S. 300* (HCJS); Serra Norte, N4, 6°6’34" S, 50°10’59" W, 24 March 2012, *Arruda, A.J. et al. 830* (BHCB, HCJS); N4, 6°6’37" S, 50°11’13" W, 26 January 2013, *Arruda, A.J. et al. 1360* (BHCB, HCJS); N4, 6°6’37" S, 50°11’13" W, 29 January 2013, *Arruda, A.J. et al. 1441* (BHCB); N4, 6°05’38"S, 50°11’47"W, 29 March 2023, *Cruz, R.P. 175* (HCJS); N4, 6°6’8" S, 50°11’13" W, 26 March 2016, *Harley, R.M. et al. 57493* (MG); N4, 13 January 2010, *Lobato, L.C.B. et al. 3813* (MG); N4, 6°4’24" S, 50°11’29" W, 19 March 2017, *Lobato, L.C.B. et al. 4565* (MG); N4, 8 April 2026, *Pastore, M. et al. 1432* (HCJS); N4, 17 February 1987, *Staudohar, G.S. 10* (HCJS); N4, 6°6’33" S, 50°11’13" W, 22 March 2017, *Vasconcelos, L.V. et al. 1120* (MG); N5, 6°06’40"S, 50°08’09"W, 6 April 2023, *Chagas, A.S. 316* (HCJS); N5, 27 February 2013, *Chaves, P.P. et al. 7* (MG); N5, 6°06’33"S, 50°08’12"W, 16 September 2022, *Cruz, R.P. 142* (HCJS);

N5, 6°06'26"S, 50°08'15"W, 18 March 2024, *Cruz, R.P. 272* (HCJS); N5, 6°6'35" S, 50°8'11" W, 21 February 2016, *Falcão, B.F. et al. 135* (MG); N5, 6°6'52" S, 50°8'9" W, 25 March 2016, *Falcão, B.F. et al. 212* (MG); N5, 6°6'52" S, 50°8'9" W, 25 March 2016, *Falcão, B.F. et al. 213* (MG); N5, 6°6'25" S, 50°8'27" W, 25 March 2016, *Falcão, B.F. et al. 214* (MG); N5, 6°7'21" S, 50°8'7" W, 21 April 2016, *Gil, A. et al. 577* (MG); N5, 6°11'0" S, 50°14'26" W, 23 June 2016, *Giulietti, A.M. et al. 2593* (MG); N5, 6°11'43" S, 50°13'58" W, 23 June 2016, *Giulietti, A.M. et al. 2599* (MG); N5, 6°23'58"S, 50°22'31"W, 18 January 2019, *Lopes, M.M. 88* (HCJS); N5, 6°6'5" S, 50°7'42" W, 27 April 2015, *Mota, N.F.O. et al. 2923* (MG); N5, 6°6'5" S, 50°7'42" W, 27 April 2015, *Mota, N.F.O. et al. 2961* (MG, HCJS); N5, 7 April 2016, *Silva, L.V.C. et al. 1435* (HCJS); N6, 6°7'50" S, 50°10'27" W, 25 March 2012, *Arruda, A.J. et al. 847* (BHCB); N6, 6°7'38" S, 50°10'40" W, 26 January 2013, *Arruda, A.J. et al. 1357* (BHCB); N6, 6°7'38" S, 50°10'40" W, 26 January 2013, *Arruda, A.J. et al. 1358* (BHCB); N6, 6°7'38" S, 50°10'40" W, 26 January 2013, *Arruda, A.J. et al. 1359* (BHCB); N6, 6°7'48" S, 50°10'36" W, 26 March 2016, *Falcão, B.F. et al. 237* (MG); N6, 6°7'48" S, 50°10'36" W, 26 March 2016, *Falcão, B.F. et al. 238* (MG); N6, 6°7'48" S, 50°10'36" W, 26 March 2016, *Falcão, B.F. et al. 239* (MG); N6, 6°7'47" S, 50°10'35" W, 26 March 2016, *Harley, R.M. et al. 57503* (MG, HCJS); N6, 5 March 2010, *Lobato, L.C.B. et al. 3836* (MG); N6, 6°7'50" S, 50°10'27" W, 25 March 2012, *Meyer, P.B. et al. 1208* (BHCB); N7, 6°9'25" S, 50°10'19" W, 26 January 2013, *Arruda, A.J. et al. 1363* (BHCB); N7, 6°9'25" S, 50°10'19" W, 26 January 2013, *Arruda, A.J. et al. 1366* (BHCB, HCJS); N7, 6°9'19" S, 50°10'19" W, 18 May 2016, *Falcão, B.F. et al. 476* (MG); N7, 6°9'29" S, 50°10'14" W, 24 February 2016, *Harley, R.M. et al. 57377* (MG); N7, 6°92'85" S, 50°10'20" W, 17 May 2016, *Vasconcelos, L.V. et al. 826* (MG, HCJS); N8, 6°11'02"S, 50°08'12"W, 27 April 2023, *Alves, D. 1975* (HCJS); N8, 6°10'26" S, 50°8'56" W, 26 January 2013, *Arruda, A.J. et al. 1364* (BHCB); N8, 6°10'26" S, 50°8'56" W, 26 January 2013, *Arruda, A.J. et al. 1365* (BHCB, HCJS); N8, 6°10'13" S, 50°9'14" W, 27 March 2015, *Cardoso, A. et al. 1942* (MG, HCJS); N8, 6°9'59" S, 50°9'28" W, 21 May 2016, *Falcão, B.F. et al. 543* (MG); N8, 6°10'1" S, 50°9'29" W, 18 March 2015, *Lobato, L.C.B. et al. 4356* (MG); N7, 6°09'28"S, 50°10'19"W, 17 May 2016, *Vasconcelos, L.V. et al. 692* (MG). São Félix do Xingu, Serra de São Félix, 6°23'43"S, 50°22'23"W, 26 April 2017, *F. Santos et al. 434* (HCJS); Serra de São Félix, 6°03'28"S, 50°15'09"W, 29 June 2016, *F. Santos 435* (HCJS); São Félix do Xingu, 6°23'30" S, 51°53'2" W, 29 June 2016, *Falcão, B.F. et al. 618* (MG); 6°23'55" S, 51°51'3" W, 1 May 2016, *Viana, P.L. et al. 6108* (MG, HCJS), 6°23'55" S, 51°51'3" W, 1 May 2016, *Viana, P.L. et al. 6110* (MG).

Ipomoea marcellia Meisn., Fl. Bras. 7: 257 (1869). Figure 12 E–F, Figure 6.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Estrada Núcleo - Serra Sul, borda de floresta, 27 April 2010, *Gontijo, F.D. et al. 178* (HCJS); 6°13'00" S, 50°19'58.4" W, 6 September 2010, *Silva, D.F. 646* (HCJS); 6°13'00" S, 50°19'58.4" W, 11 April 2011, *Tyski, L. 171* (HCJS); 6°12'49" S, 50°19'25" W, 22 March 2012, *Arruda, A.J. et al. 767* (BHCB, HCJS); 6°12'49" S, 50°19'25" W, 24 April 2012, *Arruda, A.J. et al. 1072* (BHCB, HCJS).

Ipomoea minutiflora (M.Martens & Galeotti) House, Muhlenbergia 5(no. 5): 71 (1909). Figure 4, Figure 14 A–C.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, Cristalino, 6°29'50"S, 49°40'55"W, 29 April 2024, *Vidal, C.V. 35* (HCJS); Serra da Bocaina, 6°18'55"S, 49°54'09"W, 18 December 2010, *Mota, N.F.O. et al. 1971* (BHCB, HCJS); Serra Sul, S11D, 6°30'17" S, 50°22'20" W, 30 April 2010, *Gontijo, F.D. et al. 183* (BHCB, RB).

Ipomoea nil (L.) Roth, Catal. Bot. 1: 36 (1797). Figure 14 D–E.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, área antropizada, 6°03'41"S, 50°03'43"W, 29 July 2020, *Tyski, L. & Cardoso, A. 588* (HCJS). Parauapebas, Serra Norte, N4, 6°04'59"S, 50°10'31"W, 4 June 2025, *Neves, E.S. 6* (HCJS); N5, 6°04'04"S, 50°07'51"W, 10 January 2023, *Chagas, A.S. 282* (HCJS); N5, 6°04'43"S, 50°08'52"W, 27 February 2025, *Costa, J.B.R. 11* (HCJS).

Ipomoea peruviana O'Donell, Bol. Soc. Peruana Bot. tab. 1: 4 (1948). Figure 6, Figure 14 F–H.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, borda de floresta, 6°27'52.93" S, 50°16'26.30"W, 17 June 202, *Tyski, L. & Cardoso, A. 585* (HCJS); Parauapebas, borda de floresta, 6°07'40"S, 49°52'05"W, 7 December 2018, *Silva, D.F. 853* (HCJS).

Ipomoea philomega (Vell.) House, Ann. New York Acad. Sci. 18: 246 (1908). Figure 6, Figure 15 A–C.
Specimens examined: BRAZIL. Pará: [Marabá], Serra dos Carajás, borda de floresta, 7 November 1983, *Rosa, N.A. et al. 4539* (MG). Parauapebas, borda de floresta, 5°58'18.17" S, 50°08'28.28" W, 17 March 2019, *Pastore, M. et al. 810* (MG).

Ipomoea procumbens Mart. ex Choisy, Prodr. 9: 351 (1845). Figure 4, Figure 15 D–E.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, Serra Sul, S11A, 6°18'59" S, 50°26'40" W, 26 May 2016, *Falcão, B.F. et al. 612* (MG); S11B, 6°21'5" S, 50°23'43" W, 31 March 2016, *Falcão, B.F. et al. 316* (MG); S11B, 6°20'31" S, 50°25'32" W, 31 March 2016, *Falcão, B.F. et al. 317* (MG); S11A, 6°20'43"S, 50°25'15"W, 5 February 2026, *Pastore, M. et al. 1896* (MG); S11A, 6°20'36" S, 50°25'23" W, 14 January 2017, *Vasconcelos, L.V. et al. 1088* (MG, HCJS); S11B, 6°22'23" S, 50°23'5" W, 14 February 2017, *Zappi, D.C. et al. 3510* (MG); S11A, 6°21'4" S, 50°26'22" W, 4 April 2016, *Carreira, L.M.M. et al. 3527* (MG, HCJS).

Ipomoea quamoclit L., Sp. Pl. 1: 159 (-160) (1753). Figure 15 F–G.
Specimens examined: BRAZIL. Pará: Parauapebas,

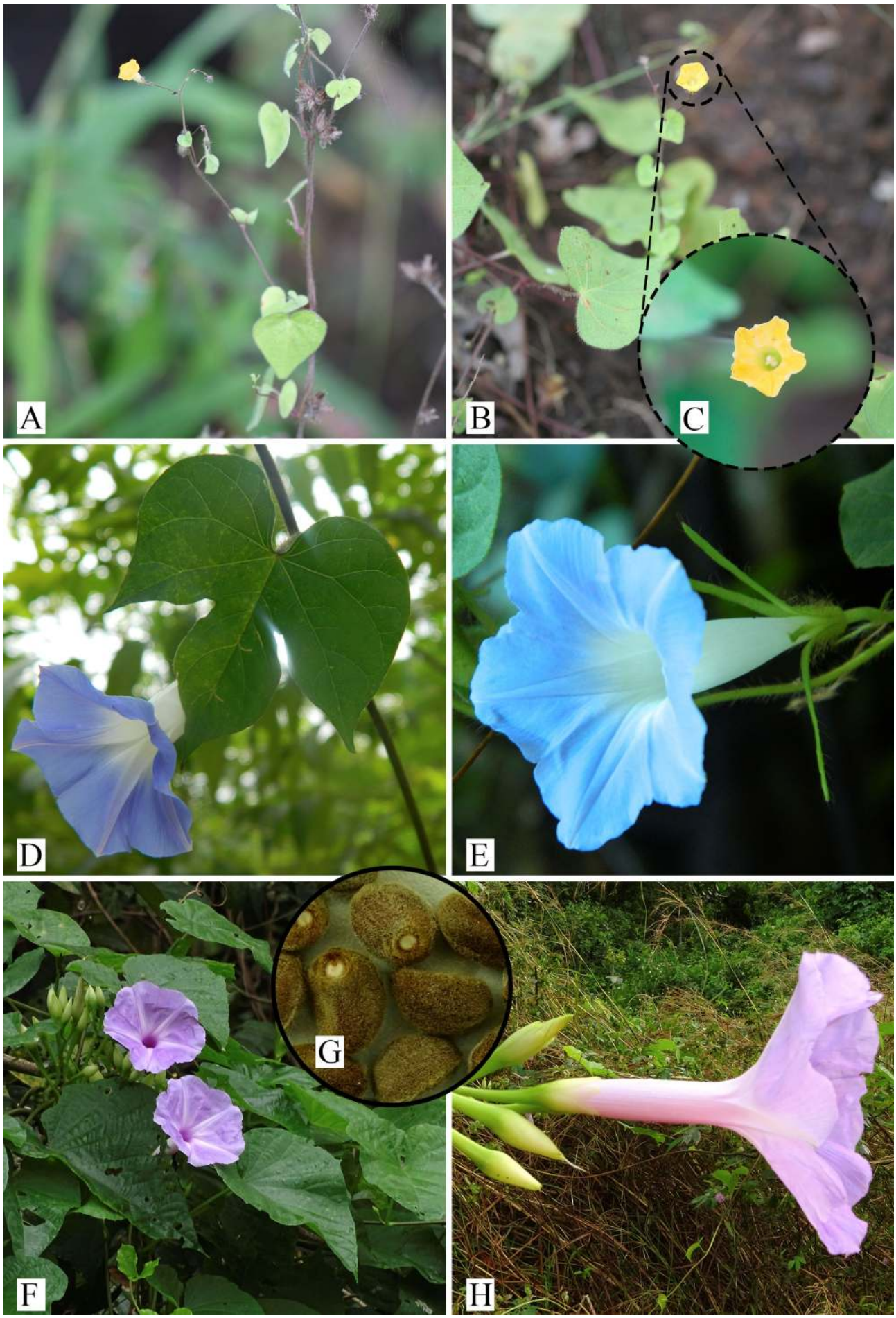


Figure 14: A–C. *Ipomoea minutiflora*: A. flowering branch; B. flowering branch; C. flower, frontal view. D–E. *Ipomoea nil*: D. flowering branch; E. flower, lateral view. G–H. *Ipomoea peruviana*: F. flowering branch; G. seeds; H. flower, lateral view. Photos by André Cardoso (A–C); Mayara Pastore (D, E); Lourival Tyski (F, G).

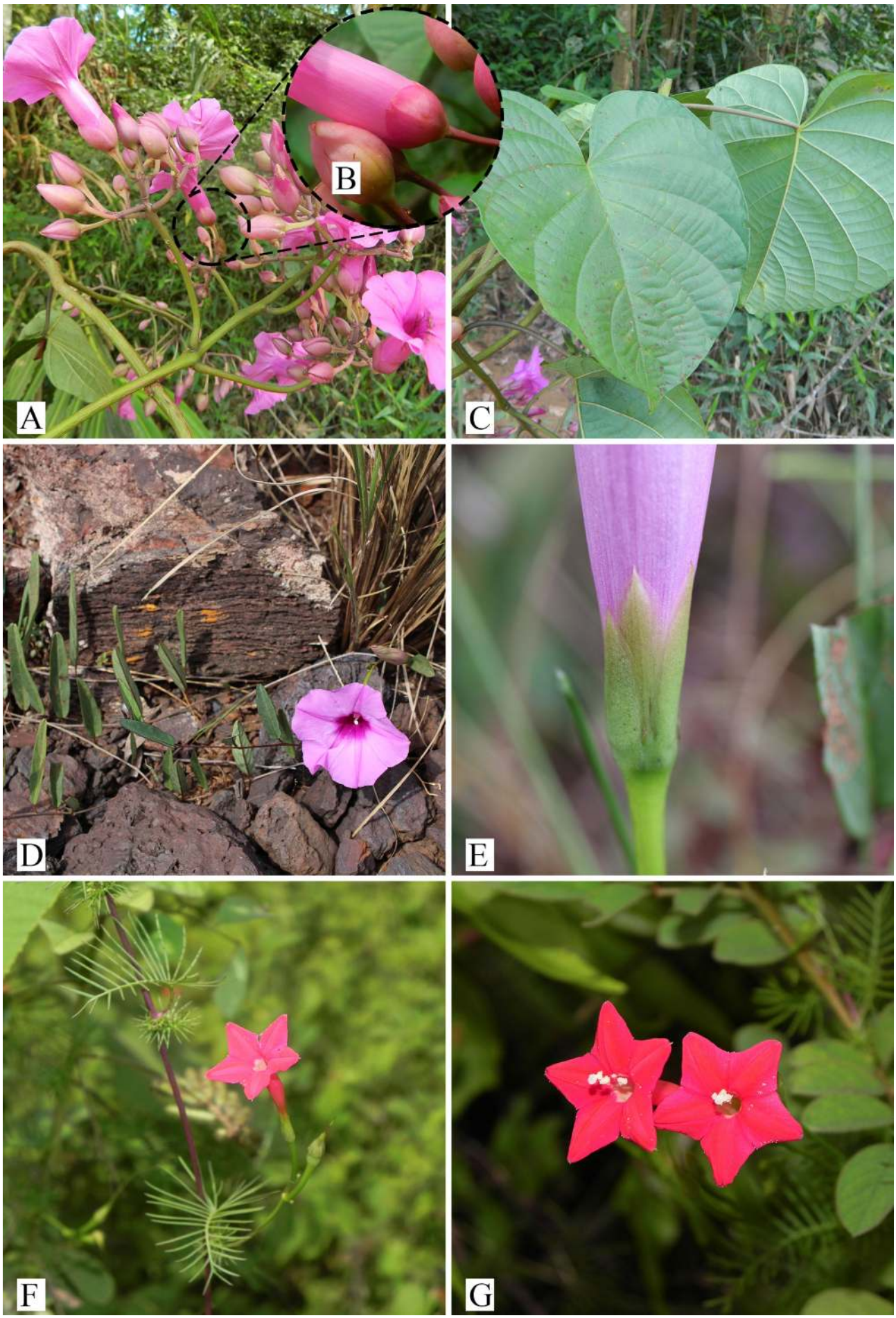


Figure 15: A–C. *Ipomoea philomega*: A. inflorescence; B. sepal detail; C. leaves. D–E. *Ipomoea procumbens*: D. flowering branch; E. sepal detail. F–G. *Ipomoea quamoclit*: F. flowering branch; G. flowers, frontal view. Photos by Mayara Pastore (A–E); Lourival Tyski (F–H).

Serra dos Carajás, aterro sanitário, próximo a barragem estéril sul, 11 April 1989, *Silva, J.P. 422* (HCJS).

Ipomoea ramosissima (Poir.) Choisy, Prodr. 9: 377 (1845). Figure 16 A–B.
Specimens examined: BRAZIL. Pará: [Marabá], Serra dos Carajás, Estrada do Estéril Sul, as proximidades da barragem, 6 February 1985, *Nascimento, O.C. & Bahia, R.P. 1182* (MG). área antropizada, 19 October 1989, *Silva, J.P. 604* (HCJS); N4, 19 March 1984, *Silva, A.S.L. et al. 1894* (MG); N4, 19 March 1984, *Silva, A.S.L. et al. 1895* (MG). Canaã dos Carajás, área antropizada, 6°26'33.19" S, 50°02'03.96" W, 1 September 2010, *Tyski, L. 724* (HCJS); 8 August 2010, *Costa, L.V. et al. 1045* (HCJS, BHCB). Curionópolis, Serra Leste, 16 March 2020, *Chagas, A.S. 47* (HCJS). Parauapebas, área antropizada, 6°03'10"S, 50°10'23"W, 25 April 1990, *L.S. Yoshiura & Silva. J.P. 770* (HCJS); 6°04'10"S, 50°03'41"W, 25 July 2013, *Silva, D.F. 841* (HCJS).

Ipomoea reticulata O'Donell, Lilloa 26: 389, tab. 15 (1953). Figure 6, Figure 16 C–D.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, borda de floresta, 6°27'01"S, 49°41'11"W, 22 April 2024, *Vidal, C.V. 37* (HCJS); Serra Sul, S11B, 21 May 2019, *Pastore, M. 847* (MG). Curionópolis, borda de floresta, 26 May 2019, *Pastore, M. 859* (MG). Parauapebas, área antropizada, 6°06'26"S, 50°11'38"W, 8 May 2025, *Oliveira, C.S. 185* (HCJS); borda de floresta, 26 May 2019, *Yoshiura, L.S. & Silva, J.P. 770* (HCJS).

Ipomoea setifera Poir., Encycl. [J. Lamarck & al.] 6(1): 17 (1804). Figure 16 E–G.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, Serra Sul, S11D, 6°23'23" S, 50°21'36" W, 8 June 2017, *Zappi, D.C. et al. 3561* (MG). Parauapebas, área antropizada, 28 June 1989, *Silva, J.P. 514* (IAN, HCSJ).

Ipomoea squamosa Choisy, Prodr. 9: 376 (1845). Figure 6, Figure 17 A–C.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, borda de floresta, 6°14'36"S, 49°54'16"W, 23 July 2024, *Pastore, M. et al. 1733* (MG); 6°26'38"S, 50°12'20"W, 9 August 2016, *Vasconcelos, L.V. et al. 899* (MG, HCJS); 6°29'42"S, 50°15'10"W, 06 August 2020, *Tyski, L. 591* et al. (HCJS); 6°29'42"S, 50°15'10"W, 06 August 2020, *Tyski, L. et al. 592* (HCJS). Parauapebas, borda de floresta, 13 July 1990, *Rosa, N.A. 5271* (MG, HCJS).

Ipomoea triloba L., Sp. Pl. 1: 161 (1753). Figure 17 D–F.
Specimens examined: BRAZIL. Pará: Parauapebas, Serra dos Carajás, área antropizada, 17 June 2009, *Silva, D.F. 555* (HCJS); Serra Norte, N3, 6°02'46"S, 50°12'22"W, 26 March 2025, *Costa, J.B.R. 29* (HCJS); N4, 6°04'02"S, 50°09'38"W, 13 March 2024, *Cruz, R.P. 270* (HCJS); N5, 6°04'40"S, 50°08'52"W, 25 October 2024, *Cruz, R.P. 349* (HCJS).

Ipomoea cavalcantei* x *marabaensis
Specimens examined: BRAZIL. Pará: Parauapebas, Serra dos Carajás, Serra Norte, N4, 6°6'31" S, 50°11'12" W, 23 April 2012, *Arruda, A.J. et al. 1065* (BHCB, HCJS); Mina de Ferro PDE Oeste, 6°03'14.83"S, 50°10'42.35"W, 04 May 2023, *Cruz, R.P. 201* (HCJS); N4, 6°6'6" S, 50°11'13" W, 26 March 2016, *Falcão, B.F. et al. 235* (MG); N4, 6°6'35" S, 50°11'1" W, 26 March 2016, *Falcão, B.F. et al. 236* (MG); N4, 6°4'24" S, 50°11'29" W, 19 March 2017, *Lobato, L.C.B. et al. 4567* (MG); N4, 6°4'36" S, 50°11'35" W, 19 March 2017, *Lobato, L.C.B. et al. 4568* (MG); N4, 6°06'08"S, 50°11'09"W, 8 April 2016, *Silva, L.V.C. 1434* (HCJS); N5, 6°01'44"S, 50°12'07"W, 7 April 2016, *Silva, L.V.C. 1436* (HCJS).

***Ipomoea* sp.** Figure 4.
Specimens examined: BRAZIL. Pará: Canaã dos Carajás, Serra dos Carajás, Cristalino, Serra do Rabo, 6°27'27" S, 49°40'49" W, 24 May 2016, *Falcão, B.F. et al. 569* (MG); 6°27'42"S, 49°40'56"W, 6 April 2017, *Harley, R.M. et al. 58149* (MG); 6°27'12"S, 49°40'42"W, *Pinheiro, M.S. 33* (HCJS); Cristalino, 6°27'31"S, 49°40'23"W, *Varotto, R.J.H. 607* (HCJS); 6°27'29"S, 49°40'28"W, *Varotto, R.J.H. 613* (HCJS); 6°26'45"S, 49°41'32"W, *Vidal, C.V. 32* (HCJS).

Doubtful specimen:

Specimens examined: BRAZIL. Pará: Parauapebas [Marabá], Serra dos Carajás. AMZA camp 3- Alfa., disturbed forest and roadside from camp to water statin, high presence of babassu palm, 10 June 1982, *Sperling, C.R.; Silva, M.G.; Condon, M.; Rosario, C.S.; Lima, R.P.; Santos, J.C. 6050* (K, MG, NY, US).

The specimen deposited at K was identified by Rosângela Simão-Bianchini as *Ipomoea paludosa* (L.) G.Mey., whereas the specimen at NY was identified by John Wood as *Ipomoea* cf. *longirostra* J.R.I.Wood & Scotland. *Ipomoea pandurata* is a species native to the southeastern United States with records of introduction in Italy and Australia. It is characterized by its ovate-deltoid leaves, dichasial inflorescences, outer sepals smaller than the inner ones and with rounded apices, and hairy seeds (Wood et al., 2020). More recently, *I. longirostra* was described based on a single specimen from Minas Gerais and was compared with *Ipomoea procumbens* (Wood et al., 2017). This specimen was collected in a disturbed roadside habitat near AMZA Camp 3-Alfa at the Salobo copper mine and may represent an introduced species in the area.

Discussion

New Insights into Species Diversity

Our results update knowledge of diversity in *Ipomoea* in the Serra dos Carajás by documenting species beyond the *cangas*, including edge forest, disturbed areas, and other rock outcrops. In addition to the records reported by Simão-Bianchini et al. (2016), the new findings of our study include the recording of *I. marcellia*, *I. peruviana* and *I. philomega* (Vellozo 1829: 63) House (1908: 246) in forest; *I. bahiensis, I. nil* and *I. triloba* in *canga*; *I. cavalcantei, I. decora* and *I. marabaensis* in sandstone outcrops; *I. marabaensis* in granite; and *I. asarifolia*

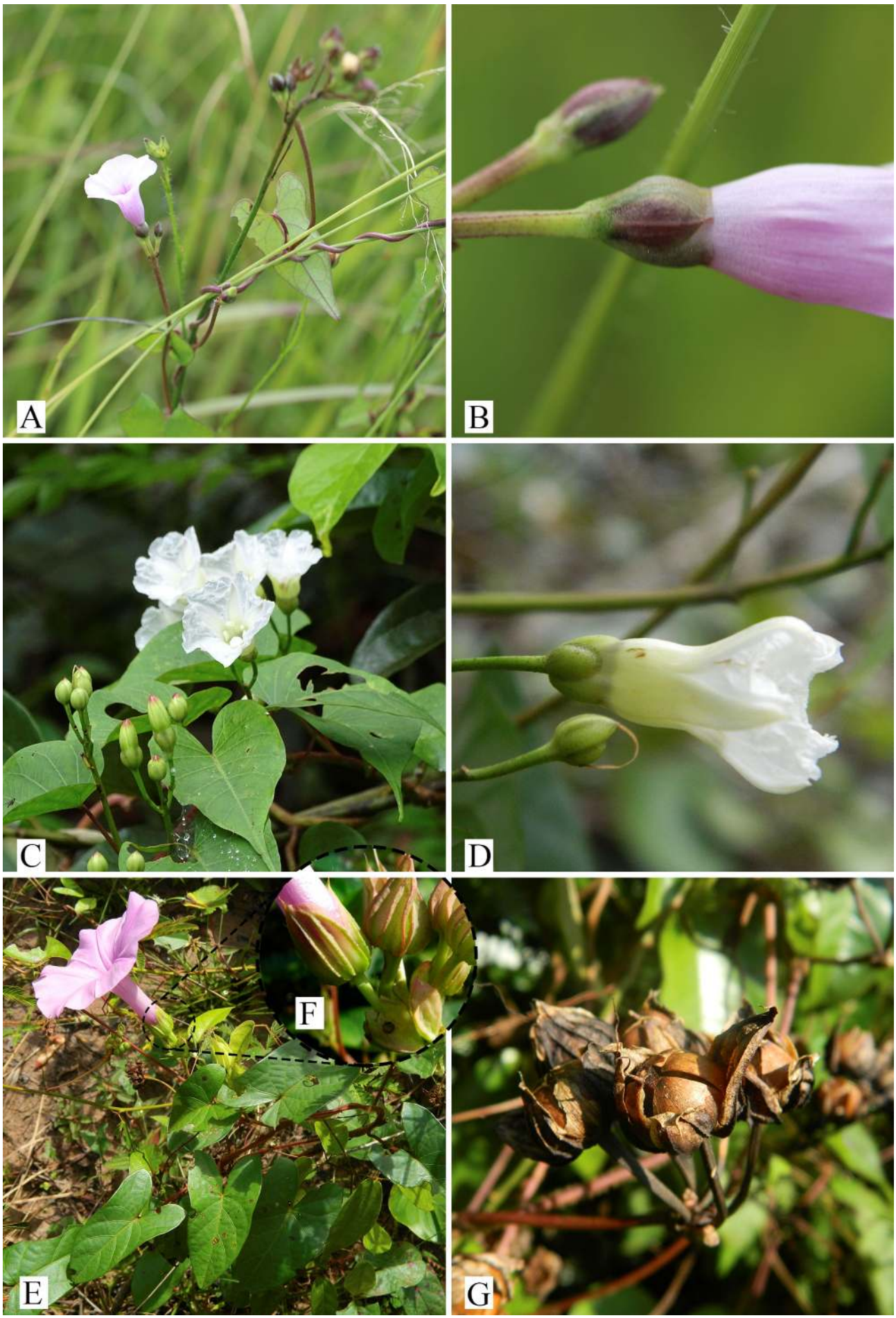


Figure 16: A–B. *Ipomoea ramosissima*: A. flowering branch; B. sepal detail. C–D. *Ipomoea reticulata*: C. flowering branch; D. flower, lateral view. E–G. *Ipomoea setifera*: E. flowering branch; F. sepal detail; G. fruits. Photos by Mayara Pastore (A–B, D–G); Lourival Tyski (C).

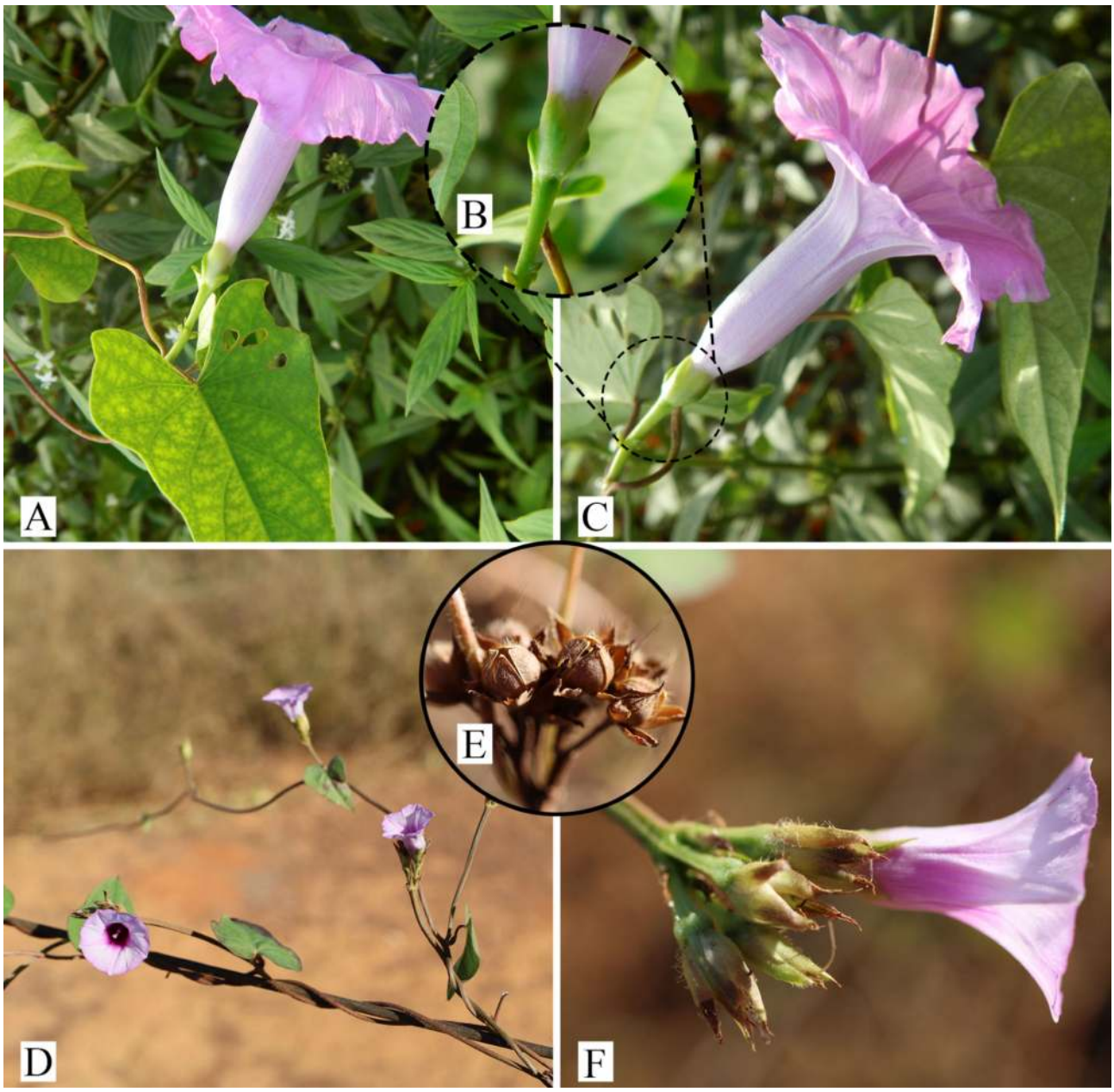


Figure 17: A–C. *Ipomoea squamosa*: A. flowering branch; B. sepal detail; C. flower, lateral view. D–F. *Ipomoea triloba* D. flowering branch; E. fruits; F. sepal detail. Photos by Mayara Pastore (A–F).

(Desruisseaux 1792: 553) Roemer & Schultes (1919: 251), *I. bahiensis, I cynanchifolia* Meisner (1869: 274), *I. nil* and *I. triloba* in disturbed vegetation.

Among the new records of our study, *I. marcellia* is a Brazilian endemic species previously known only from the Caatinga biome (Simão-Bianchini et al., 2026; Wood et al., 2020), and its occurrence in the Serra dos Carajás represents the first record in the Amazonia. Further investigation of these disjunct populations is needed to improve species delimitation and to better understand their taxonomic relationships. *Ipomoea peruviana* is an Amazonian endemic species, previously known only in western Amazonia, including Bolivia, Peru, and Brazil (Acre) (Wood et al., 2020; POWO, 2026). It is recorded here for the first time in eastern Amazonia and in the state of Pará. *Ipomoea asarifolia* and *I. triloba* are pantropical species, *I. nil* is widely distributed in the Americas, *I. bahiensis* and *I. cynanchifolia* are native to tropical America (POWO, 2026). These species are well adapted to disturbed habitats and have the potential to spread into native vegetation on rock outcrops (Lorenzi, 2014; Wood et al., 2020; POWO, 2026; Simão-Bianchini et al., 2026).

Diversity of *Cangas*

The three most frequent recorded on *cangas* also have the most restricted distributions in the World, particularly *I. cavalcantei*, an endangered and endemic species to the *cangas* of Serra Norte (N1, N2, N3, N4, N5) in the Serra dos Carajás (Simão-Bianchini et al., 2026; Giulietti et al., 2019), in addition to the new records in the sandstone. *Ipomoea marabaensis* is endemic to rock outcrops in southeastern Pará and Tocantins states, occurring in almost all plateaus in FLONA of Carajás and PNCF, except in N1, N2, and N3 (Simão-Bianchini et al., 2016; Giulietti et al., 2019). These two species are sister lineages

that occur in sympatry only on the N4 and N5 plateaus, where possible hybrid individuals between the two species have been documented (Babiychuk et al., 2017; Babiychuk et al., 2019; Laux et al., 2022). While *I. carajasensis* is known to occur in Pará, Tocantins, Maranhão and Piauí states, it belongs to a species complex with *I. maurandioides*, which warrants further investigation (Simão-Bianchini et al., 2016; Wood et al., 2020).

Another species occurring in the open vegetation physiognomies of the *cangas* is *I. procumbens*, which has intriguingly been recorded in Serra dos Carajás only from S11A and S11C. *Ipomoea procumbens* is native to savanna vegetation in Brazil, Bolivia and Paraguay (Simão-Bianchini, 1998; Wood et al., 2020). The species associated with the ecotone between *cangas* and low forest, *I. asplundii, I. decora* and *I. goyazensis* are endemic to Brazil and occur in savanna habitats across several regions of the country, particularly in the Central Brazilian Plateau (Simão-Bianchini et al., 2026). In contrast, *I. reticulata* is generally found along forest margins in Serra dos Carajás, although it has also been recorded in transition zones between *cangas* and low forest, as well in forest margins. *Ipomoea reticulata* is distributed throughout Central and South America, occurring in Brazil in the North and Central-West regions (POWO, 2026; Simão-Bianchini et al., 2026). *Ipomoea minutiflora* occurs in Mexico to northern Brazil and appears to be rare throughout its distribution (Austin & Huáman, 1996; Simão-Bianchini et al., 2016; POWO, 2026).

Although *Ipomoea rubens* Choisy (1834: 463–464) was reported from the *cangas* in Serra de São Félix (Andrino et al., 2020), examination of the voucher specimen data (*M. Pastore et al. 959*) indicates that the specimen was collected outside the *canga*, in riparian forest along the Xingu River at approximately 60 m elevation. This record therefore reinforces the species' affinity with riverine environments rather than *cangas*.

Diversity of Granite and Sandstone Outcrops

The granite and sandstone outcrops of the Serra dos Carajás are likely smaller and more fragmented within the surrounding forests than the *cangas*, remaining poorly known and difficult to access. Following the publication of the Flora of the *Cangas* of Carajás, the vegetation on granite outcrops was sampled and documented in an area known as Pedra da Harpia, located within both the FLONA of Carajás and the PNCF (Barbosa-Silva et al., 2022). This granite outcrop reaches approximately 600 m in elevation and is surrounded by forests, forming part of an inselberg complex, which comprises isolated refugia scattered across different ecoregions worldwide (Barbosa-Silva et al., 2022). However, no species of *Ipomoea* have so far been recorded at Pedra da Harpia (Barbosa-Silva et al., 2022). To date, only *I. marabaensis* has been found on a granite outcrop in the vicinity of Pedra da Harpia.

In 2025, Lourival Tyski and collaborators recorded some populations of *I. marabaensis* and one population of *I. decora* on sandstone outcrops within the FLONA of Carajás, between 560 and 690 m elevation. These sites are located approximately 20 km from the *canga* plateaus of Serra Norte and about 15 km from Pedra da Harpia. More recently, Tyski and collaborators accessed isolated sandstone areas at approximately 650 m elevation, located about 6 km from the N1 plateau, where they found populations of *I. cavalcantei*. These represent the first records of *I. cavalcantei* outside *canga* vegetation and constitute an important contribution to the conservation of the species by expanding its known geographic distribution. As a highly restricted endemic, *I. cavalcantei* depends on the conservation of its natural habitats (Giulietti et al., 2019). These sandstone outcrops were accessed by helicopter during expeditions conducted in 2026, highlighting both the logistical challenges involved and the potential for additional botanical discoveries in these remote habitats.

Diversity of Forests

Most *Ipomoea* species occur in savanna vegetation across different tropical and subtropical biomes around the world (Simão-Bianchini, 1998; Wood et al., 2020). However, the genus is highly diverse and includes representatives in Brazilian forests across the Amazon, Atlantic Forest, Caatinga and Cerrado biomes, where species typically occur along forest margins and in canopy gaps (Simão-Bianchini et al., 2026). Forested areas in the Serra dos Carajás are extensive and represent the predominant vegetation type, yet they remain poorly sampled botanically (Viana et al., 2016; Mota et al., 2018; Giulietti et al., 2019).

Among the seven species recorded in this vegetation type, *I. batatoides* Choisy (1838: 58), *I. philomega, I. reticulata* and *I. squamosa* Choisy (1845: 376) are widely distributed throughout tropical America, from southern Mexico to Brazil and Bolivia. *Ipomoea alba* Linnaeus (1753: 161). is a pantropical species that is also associated with disturbed vegetation. Whereas *I. marcellia* and *I. peruviana* have more restricted distributions, as discussed above (Wood et al., 2020; POWO, 2026). Furthermore, *I. marcellia* appears to occur in a distinct vegetation type, along the forest margins transitioning into sandstone outcrops, near the road connecting Serra Norte and Serra Sul into FLONA of Carajás. Due to limited botanical sampling in the forested areas of the Serra dos Carajás, it is currently not possible to accurately determine the distribution of *Ipomoea* species across the different forest phytophysiognomies.

Diversity of Disturbed Vegetation

Regarding ruderal species, monitoring and management measures are necessary to prevent their expansion into native vegetation on rock outcrops, where they may become established and negatively affect the native ecosystem (Giulietti et al., 2018). These *Ipomoea* species generally have broad geographic distributions across the Americas or throughout tropical regions worldwide, except for *I. bahiensis* and *I. cynanchifolia*, which are restricted to Bolivia and Brazil. Several species of *Ipomoea* have been reported as weeds causing economic losses in

agricultural systems and monocultures (Lorenzi, 2014; Pagnoncelli et al., 2017). However, except for *Ipomoea obscura* Linnaeus (1762: 220) Ker-Gawler (1817:239), a species native to Asia and Africa, recently recorded as an invasive alien species in Brazil, no other *Ipomoea* species have been documented as invasive in natural ecosystems in the country (Garcia et al., 2025).

The six ruderal species recorded on *cangas* (*I. bahiensis, I. hederifolia, I. ramosissima, I. setifera, I. nil* and *I. triloba*) were found in areas influenced by human activities, particularly associated with mining operations (N3, N4, N5, S11D, Sossego, and Salobo), and urban areas. Notably, *I. setifera* was the only Convolvulaceae species included in the management guide to invasive species in the S11D sector of the FLONA of Carajás (Giulietti et al., 2018).

Diagnostic Morphology of the Species

Among the 28 species recorded, 25 are twining climbers. Whereas *I. carnea* subsp. *fistulosa* is a shrub reaching up to approximately 2.5 m in height and is cultivated as an ornamental plant, and *I. asarifolia* and *I. batatas* are generally decumbent herbs. Additionally, *I. cavalcantei* and *I. marabaensis* exhibit variation in growth form, ranging from lianas (woody climbers) with twining or scrambling stems to erect subshrubs. Individuals of these two species typically occur as subshrubs on duricrust *canga*, where soil is scarce and vegetation is sparse, providing few neighboring plants of similar stature to serve as support. The climbing habit predominates in *Ipomoea*, with 134 climbing species, 34 subshrubs, and six shrub species documented in the Flora and Funga of Brazil (Simão-Bianchini et al., 2026).

Species of *Ipomoea* are recognized and distinguished by a combination of characters, including leaf shape, inflorescence type, flower size, sepal shape and indumentum, corolla shape and color, and seed indumentum. Sepal morphology is particularly important for species identification in *Ipomoea*, exhibiting remarkable diversity in shape, size, texture, and indumentum (Simão-Bianchini, 1998; Wood et al., 2020).

The flowers of *I. cavalcantei* are highly conspicuous, readily distinguishing the species from other *Ipomoea* species by their intense red, and hypocrateriform corolla. Similar characters are also found in *I. hederifolia*, differing by its smaller flowers, with a corolla 3–4.5 cm long, ovate leaves that are entire to 3-lobed, and a cordate base (vs. corolla 5–5.5 cm long, leaves oblong to obovate, entire, with an attenuate to rounded base in *I. cavalcantei*). In addition, *I. hederifolia* typically occurs in disturbed habitats. *Ipomoea marabaensis* is very similar to *I. cavalcantei*, differing mainly in its pink, infundibuliform to campanulate corolla. Another species frequently found on *cangas*, *I. carajasensis*, can be readily distinguished by its narrow sagittate leaves and sepals with rounded to obtuse apex, a glabrous surface, and prominent veins. This species has been treated as a synonym of *I. maurandioides* Meisn. (Wood & Scotland, 2017; Wood et al., 2020) and is part of a species complex, requiring further investigation to clarify species boundaries.

Among the remaining species occurring on *cangas*, *I. procumbens* is morphologically most similar to *I. carajasensis* due to its glabrous sepals with obtuse apex, pink infundibuliform to campanulate corolla, and sericeous seeds. On the other hand, *I. procumbens* may be confused with *I. marabaensis* because of their oblong leaves and similarly shaped corolla. However, *I. marabaensis* is readily distinguished by its narrower, sericeous leaves (vs. wider, glabrous in *I. procumbens*), sericeous sepals, and seeds bearing long trichomes along the margins. One of the most distinctive species is *I. minutiflora*, as it is among the few in the genus with yellow flowers and has remarkably small ones, only 5–8 mm long. Finally, *I. asplundii, I. decora*, and *I. goyazensis* are very similar in having cordate leaves and concave, coriaceous sepals. *Ipomoea asplundii* is distinguished by the whitish to silvery indumentum on the leaves and by its pubescent outer sepals. *Ipomoea decora* and *I. goyazensis* both possess glabrous sepals and a purple to pink corolla with a white tube, differing mainly in the indumentum of the leaves and stems, which is hirsute to pubescent in *I. decora* and glabrous in *I. goyazensis*.

Among the forest species, all are twining climbers with cordate leaves, and some may be woody at the base to along the lower portion of the stem. An exception is *I. squamosa*, which may occasionally have cordate leaves but more commonly exhibits sagittate leaves. *Ipomoea alba* is readily distinguished by its white hypocrateriform corolla with a long tube (7–12 cm long) and rostrate sepals. *Ipomoea peruviana* stands out for its remarkably large leaves and corolla, measuring 7–17 cm long and 10–12 cm long, respectively. *Ipomoea marcellia* is characterized by its inflorescences borne on long peduncles (30–40 cm long) and its narrow-infundibuliform, pale yellowish-white corolla. *Ipomoea philomega* is distinguished by its purple to deep pink corolla, similarly colored sepals, and glabrous seeds. Finally, *I. batatoides* and *I. reticulata* are similar in possessing glabrous sepals and inflorescences in thyrse. However, *I. reticulata* is readily distinguished by its white corolla, whereas *I. batatoides* has a pink corolla.

Among the species occurring in disturbed areas, *Ipomoea bahiensis* and *I. setifera* are readily distinguished by their sepals bearing prominent structures: *I. bahiensis* with conspicuous angles near the apex, and *I. setifera* with winged veins. *Ipomoea quamoclit* Linnaeus (1753: 159-160) is readily distinguished by its pinnatisect leaves and red hypocrateriform corolla. *Ipomoea nil* is also easily recognized by its long-acuminate sepals and blue corolla with a white tube. *Ipomoea indica* (Burman f. 1768: 51) Merrill (1917: 445) stands out for its variegated purple flowers with a pink tube, offering great ornamental potential. *Ipomoea asarifolia* is distinguished by its suborbiculate to reniform leaves and its rugose sepals, with the outer sepals shorter than the inner ones. *Ipomoea batatas* and *I. triloba* may be confused, however, *I. batatas* has tuberous roots and larger flowers, with a corolla 4–5 cm long (vs. 1–2.5 cm long in *I. triloba*).

Ipomoea ramosissima and *I. cynanchifolia* are very

similar in having small flowers with corolla 1–2.5 cm long and glabrous sepals with rounded apex. These two species can be distinguished by fruit morphology: the capsule is ovoid in *I. cynanchifolia* and depressed-subglobose in *I. ramosissima*. In the absence of fruits, however, reliable morphological characters to separate the two species are often absent from herbarium specimens, resulting in frequent misindentifications. Phylogenetic analyses support the recognition of *I. cynanchifolia* and *I. ramosissima* as distinct species (Jarret et al., 1992; Muñoz-Rodríguez et al., 2019).

Phenology of the Species

The flowering peak of *Ipomoea* species on the *cangas* occurs in April, corresponding to the end of the rainy season and coinciding with the reproductive period of most herbaceous or subshrub species inhabiting the open vegetation (Simão-Bianchini et al., 2016; Costa et al., 2023). *Ipomoea cavalcantei* and *I. marabaensis* flower from December to June and fruit from May to July. In contrast, *I. carajasensis* begins flowering slightly later, from February to July, and fruits from June to August. *Ipomoea procumbens* flower slightly earlier, from November to March. These three species are perennial climbers with tuberous roots that lose their leaves and whose aerial parts dry during the dry season (Costa et al., 2023). Among the species occurring in the transition zone between *cangas* and forest, *I. decora* and *I. goyazensis* flower from February to July, whereas *I. asplundii* flowers from November to June.

There are relatively few records of the forest species, making it difficult to establish precise phenological patterns. However, based on the available specimens, *I. batatoides, I. reticulata*, and *I. philomega* probably flower between February and May; *Ipomoea alba* in April and May; *I. peruviana* in June; *I. marcellia* in April and September; and *I. squamosa* in July and August. Ruderal species are generally reproductive in the region from the end of the rainy season through the dry season, with most flowering and fruiting records concentrated between March and August.

Knowledge of species phenology proved information to support the conservation of threatened species, the management of invasive species, and the restoration of degraded areas (Calle et al., 2010). Therefore, it is important that taxonomic studies provide phenological data on species, in addition to information on root and seed morphology. In the Serra dos Carajás, studies on the phenology and reproductive biology of *canga* species have been conducted to support conservation actions and the restoration of degraded areas, including studies involving species of *Ipomoea* (Costa et al., 2023; Valentin-Silva et al., 2025).

Conclusions

Our study provides important updates on *Ipomoea* diversity and new data for species identification in the Serra dos Carajás, thereby contributing to ongoing conservation efforts in the region. Ten years after the taxonomic treatment of Convolvulaceae for Carajás, substantial advances have been made in our understanding of plant diversity and species distribution in the region. Our findings reinforce the importance of documenting and investigating the full diversity of taxonomic groups and ecosystems as a foundation for advancing ecological and evolutionary research. Further efforts are needed to increase botanical sampling in the forested areas of the Serra dos Carajás, where plant diversity remains poorly documented, despite the relatively low representation of *Ipomoea* in these environments. Greater efforts are also required to document and map granite and sandstone outcrops throughout the region. Expanding our knowledge of the taxonomic plant groups occurring in these forests will contribute to studies of evolutionary history and ecology, as well as to the identification of priority areas for conservation. In addition, our study documents the presence of ruderal *Ipomoea* species in the region, highlighting the importance of monitoring and managing them to support the conservation of native vegetation.

Acknowledgments

We thank the Museu Paraense Emílio Goeldi (MPEG) and the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) for support and infrastructure. We are also grateful to the curators of the BHCB, HCJS, IAN, MG, and SP herbaria for providing access to their collections, especially Arlindo Chagas for his assistance at HCJS. We thank Ana Maria Giulietti, Daniela Zappi, Vera Imperatriz Fonseca, Valéria Tavares and Guilherme Oliveira for their logistical support; the anonymous reviewers; and Taiana Fonseca da Silva for providing the Serra Arqueada shapefile.

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APPENDIX

Appendix. Species of *Ipomoea* from Serra dos Carajás discriminated by locality in Serra dos Carajás, general distribution, and voucher. Legend: Rock Outcrop (RO), Forest (F), Disturbed Vegetation (DV), Floresta Nacional de Carajás (FC), Parque Nacional dos Campos Ferruginosos (PNCF), Serra Norte (N1-8), Serra Sul (S11), Serra Leste (L), Serra da Bocaina (SB), Serra do Tarzan (ST), Cristalino (C), Serra de São Félix (SF), Serra Arqueada (SA), * threatened species.

Species	RO	F	DV	FC	PNCF	Locality in Serra dos Carajás	Distribution	Voucher
Ipomoea alba L.		x	x	x		Forest, disturbed vegetation	Cruz, R.P. 399	Cruz, R.P. 399
Ipomoea asarifolia (Desr.) Roem. & Schult.			x	x		Disturbed vegetation	Pantropical	Cruz, R.P. 322
Ipomoea asplundii O'Donell	x			x	x	N3, N6, N7, ST, SA	Pará, Goiás, Mato Grosso	Mota, N.F.O. 1212
Ipomoea bahiensis Willd. ex Roem. & Schult.	x		x	x		C, Disturbed vegetation	Bolivia, and Brazil	Pastore, M. 1712
Ipomoea batatas (L.) Lam.				x		Cultivated	Native from Mexico to Ecuador	Araújo, C.M. 16
Ipomoea batatoides Choisy		x		x		Forest	Tropical America	Silva, R.G.B.1390
Ipomoea carajasensis D.F.Austin*	x			x	x	N1-N8, S11, ST	Northern and Northeastern Brazil	Viana, P.L. 4089
Ipomoea carnea subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin				x		Cultivated	America	Ribeiro, B.G.S. 1431
Ipomoea cavalcantei D.F. Austin*	x			x		N1-N5 and sandstone	Endemic Carajás	Pastore, M. 729
Ipomoea cynanchifolia Meisn.			x	x		Disturbed vegetation	Bolivia, and Brazil	Silva, A.S.L. 1895
Ipomoea decora Meisn.	x			x	x	N3, N4, S11, ST, SF, SL, forest, sandstone	Brazil North to Southeast	Lobato, L.C. 4406
Ipomoea goyazensis Gardner	x			x	x	N5, S11, ST, forest	Brazil North to Southeast	Viana, P.L. 4048
Ipomoea hederifolia L.	x		x	x		N5, disturbed vegetation	Pantropical	Silva, D.F. 554
Ipomoea indica (Burm.f.) Merr.			x	x		Disturbed vegetation	Pantropical	Silva, J.P. 220
Ipomoea marabaensis D.F.Austin & Secco	x			x	x	N4-N8, S11, ST, SB, C, L, SF, SA, sandstone and granite	Pará, Tocantins	Vasconcelos, L.V. 826
Ipomoea marcellia Meisn.		x		x		Forest	Northeast of Brazil	Arruda, A.J. 1072
Ipomoea minutiflora House	x			x		S11, SB, C	Mexico to Northern Brazil	Gontijo, F.D. 183
Ipomoea peruviana O'Donell		x		x		Forest	Amazonia	Tyski, L. 585
Ipomoea philomega (Vell.) House		x		x		Forest	Tropical America	Pastore, M. 810
Ipomoea procumbens Mart. ex Choisy	x			x		S11	South America	Pastore, M. 1896
Ipomoea quamoclit L.			x	x		Disturbed vegetation	Pantropical	Silva, J.P. 422
Ipomoea ramosissima (Poir.) Choisy	x		x	x	x	N4, N5, L, disturbed vegetation	Tropical America	Silva, D.F. 841
Ipomoea reticulata O'Donell	x	x		x		N5, S11, forest edge	Tropical America	Pastore, M. 847

Species	RO	F	DV	FC	PNCF	Locality in Serra dos Carajás	Distribution	Voucher
Ipomoea setifera Poir.	x		x	x		S11, disturbed vegetation	Pantropical	Zappi, D. 3561
Ipomoea squamosa Choisy		x		x		Forest	Tropical America	Pastore, M. 1733
Ipomoea triloba L.	x		x	x		N3, N5, disturbed vegetation	Pantropical	Costa, J.B.R.
Ipomoea nil (L.) Roth	x		x	x		N4, N5	Pantropical	Chagas, A.S. 282
Ipomoea sp.	x					C (Serra do Rabo)	Pará	Varotto, R.J.H. 613