



## *Passiflora echinasteris*: a new species of subgenus *Passiflora*, series *Serratifoliae* (Passifloraceae) from the Brazilian Amazon

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### Abstract

*Passiflora echinasteris* from a secondary vegetation area on the Great Curve of the Xingu River, in the Brazilian Amazon, is newly described. It belongs to the series *Serratifoliae* with three other Brazilian species. The new species is illustrated and its affinities with related species are discussed, and a key to the Brazilian species of the series is provided.

**Key words:** Brazilian Amazon, Belo Monte, Passion flower, Xingu River

### Introduction

*Passiflora* Linnaeus (1753: 955) is a genus that could be easily used to demonstrate the need of taxonomic studies for several further groups of plants in the Amazon. As a result of only a few isolated taxonomic studies in the Brazilian Amazon, the number of new species of *Passiflora* recently increased as showed by Koch *et al.* (2013, 2014), as well as the register of new records.

During the activities of the project “Survey and Scientific exploration of the Flora of the UHE Belo Monte” in the Xingu region, several individuals of a *Passiflora* of the series *Serratifoliae* Killip ex Cervi (1997: 30) were found. The specimens morphologically resemble *P. malacophylla* Masters (1872: 563), but proved to belong to a new species. The aim of this paper is to describe this new species of *Passiflora* from the Brazilian Amazon.

### Material and methods

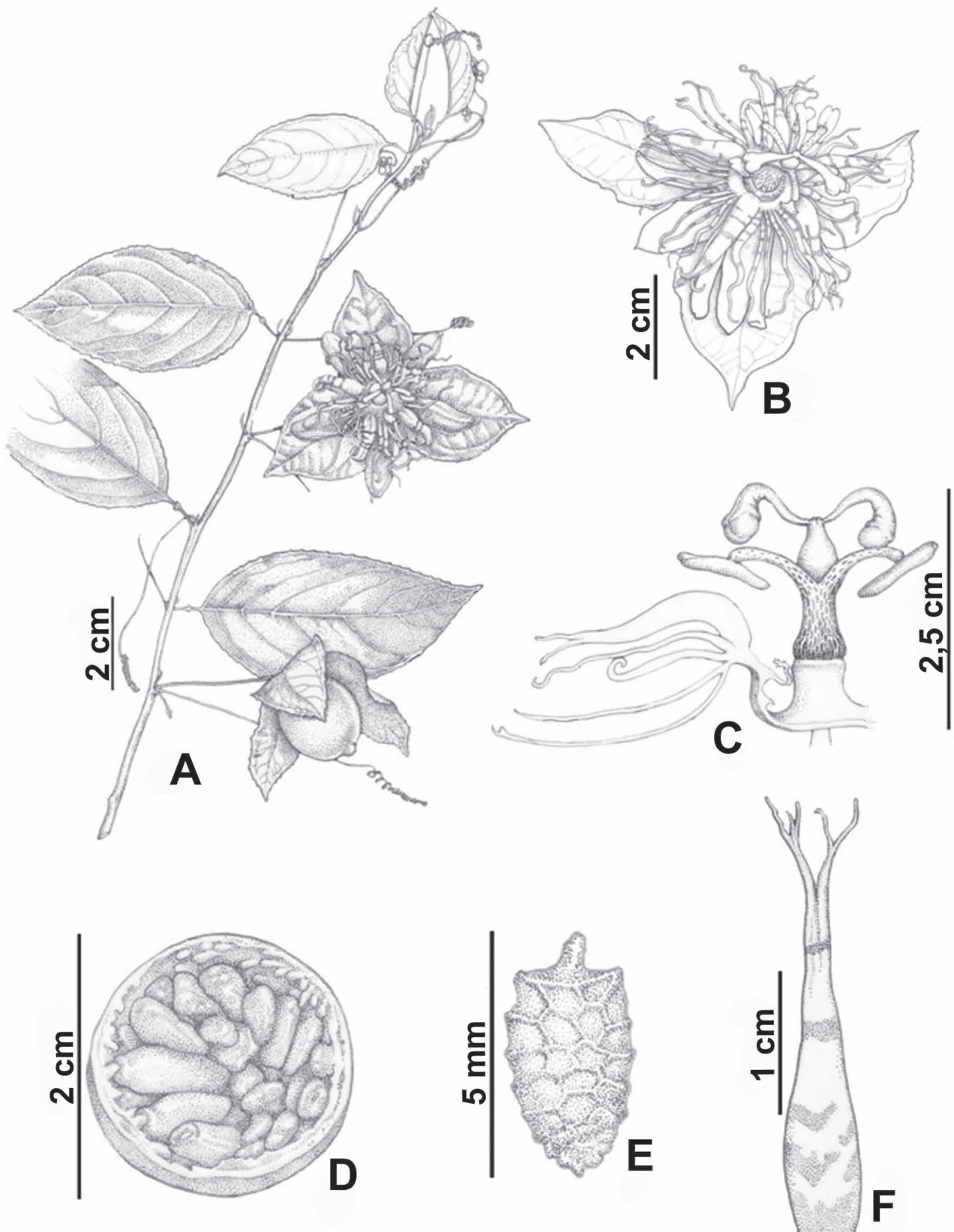
The new species was collected in two secondary vegetation areas at the river shore, which were probably originally covered by alluvial tropical rainforest, in Vitória do Xingu municipality, situated on the Great Curve of the Xingu River, Pará State, Brazil.

The areas of collection present latosol yellowish-red with clayey-sandy texture (Vieira 1971), 100–120 m elevation. The climate is tropical humid, classified as type Am, rainfall of ca. 2.289 mm per year, and with average temperature of 26° C (Sousa-Júnior *et al.* 2006).

The botanical material was prepared according to Fidalgo & Bononi (1984). The description and illustrations were based on fertile material. The descriptive terminology was based on Killip (1938), Radford *et al.* (1974), Cervi (1997), and Ulmer & MacDougal (2004). The type specimens of the new species were deposited in MG, IAN, INPA, RB, SP, and UEC.

## Taxonomy

*Passiflora echinasteris* A.K.Koch, A.Cardoso & Ilk.-Borg. *sp. nov.* (Figs. 1 and 2)

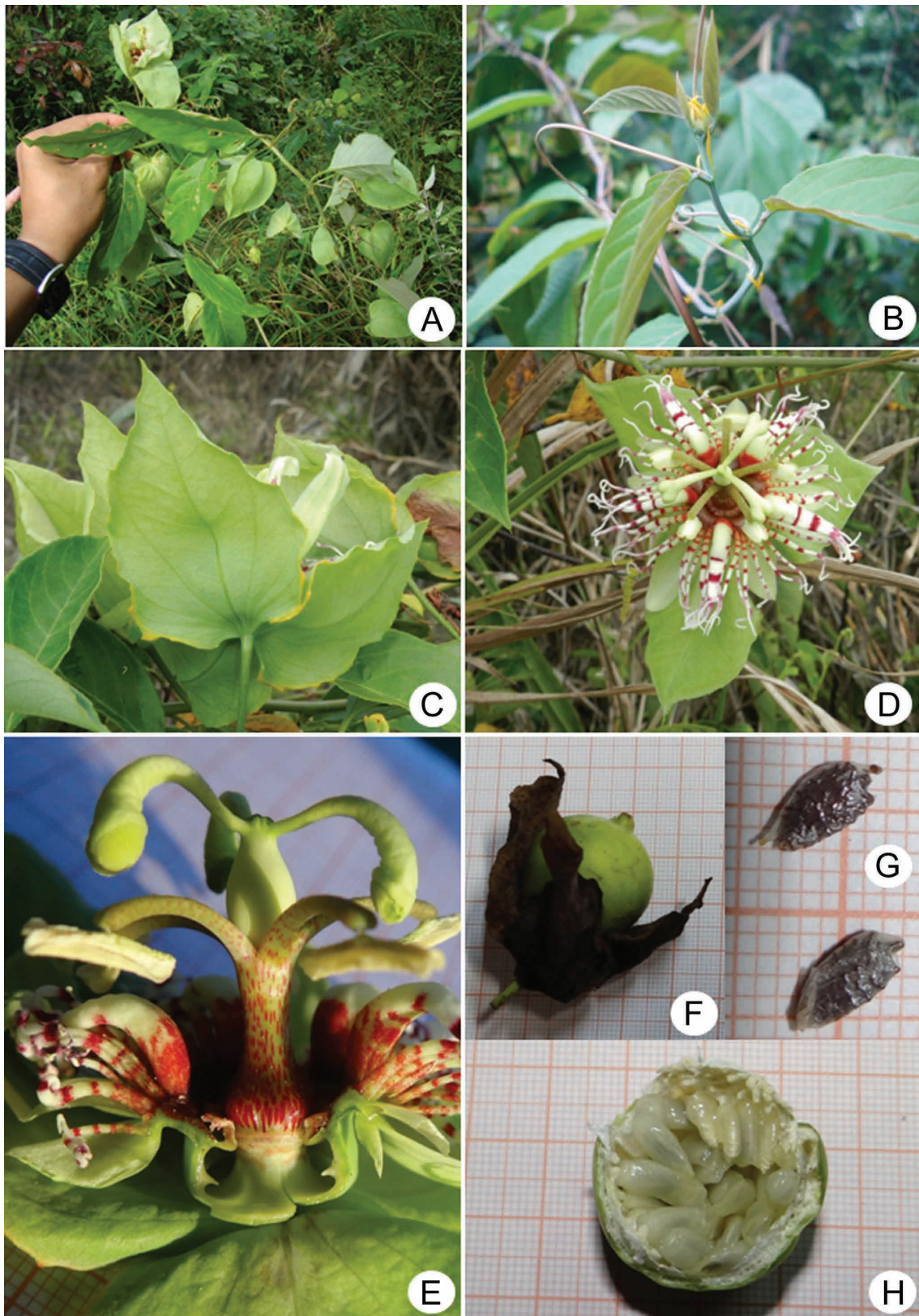


**FIGURE 1.** *Passiflora echinasteris*. A. Habit; B. Flower with bracts; C. Cross section of flower; d. Cross section of fruit; E. Seed; F. Strongly thickened filaments. Illustrated by João Silveira (from L.P. Santos PSACF 453 MG).



*Passiflora echinasteris* differs from *P. malacophylla* by glabrous and waxy stem, corona with two series, and the presence of five strongly thickened filaments in the second series of the corona.

**Type:**—BRAZIL. Pará: Vitória do Xingu, Trans-Catitu, 3° 22' 51,26"S, 51° 56' 06,67"W, 16 February 2012, D.A.G. de Araújo PSACF 114 (holotype MG!; isotypes IAN!, RB!, SP!).



**FIGURE 2.** *Passiflora echinasteris* A.K.Koch, A.Cardoso & Ilk.-Borg. A. Habit; B. Shoot apex, stipules and tendrils; C. Detail of bracts; D. Flower front view; E. Cross section of flower; F. Fruit with persistent bracts; G. Seeds without pulp; H. Cross section of the fruit and seeds with pulp. Photos by André Luiz de Rezende Cardoso and Vinícius Martins Barbacena.

Plant woody, glabrous. Stem terete, greenish, waxy. Stipules linear-subulate, 8–10 × 1 mm, bright yellow with green base, margin entire, glands absent. Petioles subterete, 1–1.5 cm long, greenish, with one pair of tuberculate yellow glands, at the half length of the petiole, less than 1 mm diam. Leaf blade elliptic to ovate, unlobed, 5.5–8.5 × 2.3–5 cm, green on both surfaces, base rounded, apex cuspidate, margin denticulate, pinnately veined, subcoriaceous, nectaries absent. Tendrils weak to well-developed, greenish-white. Flowers solitary, from older parts of the plant, suberect, 5–6 cm diam.; peduncles terete, 2.5–4.5 cm long, greenish; pedicels terete, 5–6 mm long; bracts verticillate, inserted 5–6 mm below the flower, ovate, 3.5–6 × 2.5–3.5 cm, connate ca. 3.5–5 mm very base, greenish, bright yellow at free margins toward base, margin irregularly serrulate, with 5–6 glands; hypanthium subcampanulate, 7–10 mm long, green, glabrous; sepals lanceolate, 3–5 × 0.8–1 cm, adaxial surface whitish-green, abaxial surface greenish-white, base obtuse, apex acuminate; awn hooked, 4–5 mm long; petals oblong-linear, 2–4 × 0.5–0.7 cm, green-whitish, base obtuse, apex rounded; corona with 2 series of filaments, outermost series of filaments filiform, declined, 3–3.5 cm long, white and red near the base, becoming white toward the apex, 6 whitish and red to reddish purple transverse bands split through the filament, base robust, slightly wavy at apex, second series of filaments intercalate filiform filaments and five conspicuous strongly thickened filaments, formed by the fusion of 5–6 regular filaments, the five thick parts of the corona in the petal sectors of the flower, declined, 3–3.5 cm long, whitish with red and reddish purple bands, the same color as the previous series, the operculum denticulate united by a membrane to its half, declined, 2–3 mm long, greenish at base and white-reddish at apex; annulus membranaceous, declined, 1–2 mm long, green, margin obscurely denticulate; trochlea absent, androgynophore dilated at base, 1.1 cm long, greenish with red spots; staminal filaments 1–1.3 cm long, greenish and slightly mottled with red spots; ovary glabrous, 5–6 mm long × 4 mm diam., greenish waxy; styles 6–9 mm long including the stigmas. Mature fruits globose, 2.5–3 cm long × 2–2.5 cm diam., greenish to yellowish waxy; pulp whitish, sweet flavor resembling mango taste; seeds black, pitted, 6–7 × 3–5 mm, 30 to 60 seeds per fruit.

**Distribution and habitat:**—The new species is only known from two secondary vegetation areas in the shore of the Xingu River. *Passiflora echinasteris* is found as a scandent and prostrate vine, growing under grasses and little shrubs in exposed places with dry soil.

**Etymology:**—The epithet refers to the corona having the shape of like starfish of the genus *Echinaster*.

**Additional specimens examined (paratypes):**—BRAZIL. Pará: Vitória do Xingu, proximidades do Centro de Estudos Ambientais da Norte Energia S.A., 19 June 2012, L.P. Santos PSACF 392 (MG!); *idem*, 22 June 2012, L.P. Santos PSACF 453 (MG!, INPA!, SP!, UEC!); *idem*, 20 July 2012, S.R.M. Carvalho PSACF 597 (MG!).

**Phenology:**—The material was collected with fruits, of which seeds were sown for germination. The germination was fast and in less than three months the plants developed the first flower buds. Under cultivation for over a year, the plants were continuously flowering.

**Conservation status:**—*Passiflora echinasteris* is classified in the Data Deficient (DD) category according to the IUCN (2014).

## Discussion

The new species belongs to *Passiflora* subgenus *Passiflora*, series *Serratifoliae* Killip ex Cervi (1997: 30) which includes three other species that occur in Brazil. This series is characterized by pubescent plants, leaves simple and unlobed and more than 2.5 cm wide, leaf margin serrulate or denticulate, and two glands on the petiole (Cervi 1997). *Passiflora echinasteris* belongs to the series *Serratifoliae* by presenting simple and unlobed leaves with denticulate margin, and one pair of gland in the petioles. In the series *Serratifoliae* it is morphologically similar to *P. malacophylla*, because of the elliptic to ovate or elliptic-lanceolate leaves, solitary peduncles, color of petals, bracts covering the flower bud, and one pair of glands on the petioles.

The new species differs from *P. malacophylla* by glabrous plant (vs. ferruginous-tomentose plant), waxy stem (vs. ferruginous-tomentose stem), stipules linear-subulate (vs. setaceous stipules), and by two filaments series of corona (vs. six series). Moreover, the remarkable characteristic of *Passiflora echinasteris* is the presence of five strongly thickened filaments in the second series of the corona, formed by the fusion of five to six regular filaments.

In addition, *Passiflora malacophylla* is distributed in South, Southeast and Northeast regions of Brazil, occurring in Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, and Santa Catarina states (Cervi 1997; Bernacci *et al.* 2014).

The further species of the *Serratifoliae* series in Brazil, *Passiflora bahiensis* Klotzsch (1840: 293) and *P. farneyi*



Pessoa & Cervi (1992: 631) can be distinguished from *P. echinasteris* by their densely pubescent plants, and ovate leaves with cordate base. Additionally, *P. bahiensis* and *P. farneyi* are endemic to Bahia and Rio de Janeiro states, respectively (Cervi 1997; Bernacci *et al.* 2014).

### Key to the species of *Passiflora* series *Serratifoliae* in Brazil, based on Cervi (1997)

- |    |   |                                |
|----|---|--------------------------------|
| 1. | Pubescent plants, corona with 5 to 8 filaments series ..... | 2                              |
| –  | Glabrous plants, corona with 2 filaments series .....       | <i>Passiflora echinasteris</i> |
| 2. | Stipules linear to linear-subulate, persistent .....        | 3                              |
| –  | Stipules setaceous, caducous .....                          | <i>Passiflora malacophylla</i> |
| 3. | Grouped flowers .....                                       | <i>Passiflora bahiensis</i>    |
| –  | Solitary flowers .....                                      | <i>Passiflora farneyi</i>      |

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