A new species of *Passiflora* subgenus *Passiflora* series *Quadrangulares* (Passifloraceae) from the Brazilian Amazon

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**Abstract**

A new species of *Passiflora* is described from reforested post bauxite-mined area in the National Forest of Saracá-Taquera in the Brazilian state of Pará. The species is illustrated and its affinities with related species are discussed, and a key to the species of supersection *Laurifoliae*, series *Quadrangulares* is presented. The series *Quadrangulares* is composed of four species that constitute a small complex of large-flowered and large-fruited passionflowers with 3–4-angularate-winged stems that occurs naturally in the moist lowlands from Nicaragua to Brazil and French Guiana. However, among the four species of the series, *Passiflora trialata* is closely related to the new species by the 3-angular stems, the color and shape of sepals and petals, the 3-angular petioles and peduncles, and the single operculum.

**Key words:** Calha Norte, Eastern Amazon, *Passiflora* supersection *Laurifoliae*, Passionflower, Saracá-Taquera National Forest

**Introduction**

*Passiflora* Linnaeus (1753: 955) is the largest genus of Passifloraceae with ca. 530 species. Its species vary from lianescent herbs to trees and woody vines (Hansen 2006), which are distributed in large parts of the New World from the southern and eastern United States and the West Indies to northern Chile and Argentina, with a few species also occurring in Southeast Asia, Australia and Oceania (Ulmer & MacDougal 2004). In Brazil, the genus is represented by 136 species (Cervi et al. 2012).

Taxonomic studies of *Passiflora* in the Amazon biome are scarce, except for the treatment of the family in the Adolpho Ducke Forest Reserve in Manaus (Hopkins & Souza 1999), and the description of three new species in recent years: *Passiflora kikiana* Cervi & Linsingen (2010: 1062), *Passiflora cristalina* Vanderplank & Zappi (2011: 149), and *Passiflora fissurosa* M.A.D. Souza (in Souza & Hopkins 2011: 449).

A species collected in reforested areas after bauxite mining in the Saracá-Taquera National Forest, Pará State, Brazil, could not be identified. It proved to be a new species which is described here.

**Material and methods**

The new species was collected in a six year old reforested area of Saracá-Taquera National Forest, Pará State, in northeastern Brazilian Amazon. The material was prepared according to Fidalgo & Bononi (1989). The description and illustrations are based on fertile material, the descriptive terminology was based on Killip (1938), Cervi (1997), and Ulmer & MacDougal (2004). Collections of the herbaria IAN and MG were consulted. Type specimens of the new species were deposited in MG and RB.
Taxonomy

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

*Passiflora longifilamentosa* is closely related to *Passiflora trialata*, differing by oblanceolate stipules, elliptic to obovate leaves, ovate to oval-lanceolate bracts, and a corona with seven series of stamens.

**Type:**—BRAZIL. Pará: Oriximiná, Saracá-Taquera National Forest, Platô Periquito, 150 m, 1° 37’ 43,6”S, 56° 26’ 04,1”W, 01 January 2011, *J.B.F. da Silva* 3516 (holotype MG!, isotype RB!).

**FIGURE 1.** *Passiflora longifilamentosa* A.K.Koch, A.Cardoso & Ilk.-Borg. a) Habit; b) Bracts; c) Flower longitudinal section; d) Detail of glands; e) Stipule; f) Fruit. Illustrated by João Silveira (from *J.B.F. da Silva* 3516, MG).
Plant a woody vine, glabrous. Stem sharply 3-angular, greenish-brown. Stipules ob lanceolate, 1.3–2.5 × 0.2–0.3 cm, brownish-green, margin entire, glands absent. Petioles sharply 3-angular, 2–2.5 cm long, greenish-brown, with two pairs of tubicular green glands, less than 1 mm diam., 1.5–2 cm from the petiole base. Leaf blade elliptic to obovate, 13–14 × 6.4–6.6 cm, obtuse at base, margin entire, apex cuspidate, pinnately veined, coriaceous, olive-green in both surfaces, nectaries absent. Tendrils weak to well-developed, greenish-brown.
Flowers solitary, from older parts of the plant, pendant, 3–7 cm diam.; peduncles 3-angular, 2.5–4 cm long, greenish-brown; pedicels 3-angular, 0.8–1 cm long; bracts verticillate, ovate to ovate-triangular, 4.3–5 × 2–3.1 cm, greenish, margin entire, glands absent, free from the hypanthium, inserted 0.8–1 cm below the flower; hypanthium campanulate, 1–1.5 cm long, glabrous, whitish-green; sepals oblong-lanceolate to triangular, 2–4.5 × 1–2 cm, obtuse at base, rounded at apex, adaxial surface whitish-green, abaxial surface greenish-white with purple spots; awn absent; petals oblong-lanceolate to triangular, 2–4 × 0.8–1.2 cm, obtuse at base, rounded at apex, adaxial surface whitish-green with purple spots near the margin, abaxial surface greenish-white with purple spots; corona with 7 series of filaments, the two outer series linear-hairy, slender, 3–6.5 cm long, inclined, wavy and matted above the middle, yellowish-green near the base, 11–13 whitish and purple banded, becoming white toward the apex, the third, fourth and fifth series equal, filaments stout, tubicular, less than 1 mm long, inclined, yellowish-green, the sixth series of filaments stout, filiform, 2 mm long, declined, greenish-yellow the innermost series exceeding the previous rank, filaments ligulate, slightly flattened, free or sometimes united by a membrane to its half, declined, yellowish-green; operculum membranaceous, declined, 3–5 mm long, margin entire, yellowish-green; trochlea present, yellowish-green, 0.5–1 cm beneath ovary, androgynophore 2–3.3 cm long, yellowish-green; staminal filaments 4–7 mm long, greenish and slightly mottled with red-purple spots; ovary glabrous, yellowish-green, 6–8 mm long, 2–3 mm diam.; styles 6–8 mm long including the stigmas. Mature fruits ovoid, ca. 12 cm long, 7 cm diam., greenish-yellow; pulp whitish-orange, sweet; seeds black, 1 × 6 mm, 150–200 seeds per fruit.

**Distribution and ecology:**—This remarkable new species is known from a reforested area in eastern Amazonian Brazil. The area of collection exhibits lateritic soil, 150–160 m elevation, and rainfall of 2300–2800 mm per year. The species was also collected in lowland tropical rainforest of Saiul in French Guiana as *Passiflora christianii* Lorrain (2002: 18) (**nom. inval.**, ICN Art. 39.1; McNeill et al. 2012), near an active gold mine (Bouana 2002, Lorrain 2002). *Passiflora longifilamentosa* may be found in the original tropical rainforest as scandent vine, blooming only when it reaches the canopy of large trees. The opening of favorable environment provides high luminosity, which promotes the colonization of the new environment by this pioneer species. Besides the type, flowers were observed in two other localities, Platô Aviso (reforested in 2002, 1º 45’ 56,2"S, 56º 28’ 55,7"W), and Platô Papagaio (reforested in 2001, 1º 35’ 59,3"S, 56º 23’ 45,9"W), both in Saracá-Taquera National Forest, Pará; they proved to be populations of the new species.

**Etymology:**—The epithet refers to the length of the two outer filaments series of the corona.

**Aditonal specimen examined (paratype):**—FRENCH GUIANA. Inini: Saiul and vicinity, 3º 37’N, 53º12’W, 17 September 1994, S.A. Mori, C. Snyder & R. Fowler 23947 (paratype NY!)

**Discussion**


**Key to species of Passiflora series Quadrangulares**

1. Stems 4-angular, bracts ovate, corona with 4–6 series of filaments ................................................................. 2
   - Stems 3-angular, bracts ovate-triangular, corona with 7–12 series of filaments ........................................... 4
2. Petioles with 2–8 glands ................................................................................................................................. 3
   - Petioles with only 2 glands ........................................................................................................... *Passiflora phoenicea*
3. Stipules ovate or ovate-lanceolate, >1 cm wide, sepals not aristate .......................................................... *Passiflora quadrangularis*
   - Stipules linear-lanceolate, <1 cm wide, sepal aristate .............................................................................. *Passiflora alata*
4. Leaves ovate, stipules ovate to narrowly oblong-ovate, petioles with 2 glands, corona with 10–12 series of filaments ........................................................................................................... *Passiflora trialata*
   - Leaves elliptic to obovate, stipules oblanceolate, petioles with 4 glands, corona with 7 series of filaments ..........

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*Passiflora longifilamentosa* is closely related to *P. trialata* Feuillet & MacDougal (1996: 351), as suggested by the 3-angular stems, the color and shape of sepals and petals, the 3-angular petioles and peduncles, and the single operculum. The new species differs however in the size and shape of stipules, petiole size, number and shape of petiole glands, size and shape of leaves, diameter of flowers, size and shape of bracts and, mainly in the number of corona series (Table 1). *Passiflora longifilamentosa* has oblanceolate stipules, elliptic to obovate leaves, ovate to ovate-lanceolate bracts. In *P. trialata* stipules are ovate to oblong-ovate, leaves are ovate, and bracts are ovate-triangular.

### Table 1. Comparison of morphological characteristics between *P. longifilamentosa* and *P. trialata*.

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>Passiflora longifilamentosa</em></th>
<th><em>Passiflora trialata</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stipules size</td>
<td>1.3–1.5 × 0.2–0.3 cm</td>
<td>2.3–3.2 × 0.8–1.3 cm</td>
</tr>
<tr>
<td>Leaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petiole length</td>
<td>2–2.5 cm</td>
<td>2.8–5 cm</td>
</tr>
<tr>
<td>Number of petiole gland pairs</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Lamina size</td>
<td>13–14 × 6.4–6.6 cm</td>
<td>15–26.5 × 8.5–16 cm</td>
</tr>
<tr>
<td>Flower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>3–7 cm</td>
<td>13–15 cm</td>
</tr>
<tr>
<td>Peduncle length</td>
<td>2.5–4 cm</td>
<td>4–7 cm</td>
</tr>
<tr>
<td>Bracts size</td>
<td>4.3–5 × 2–3.1 cm</td>
<td>7–8.5 × 4.4–6.5 cm</td>
</tr>
<tr>
<td>Sepals size</td>
<td>2–4.5 × 1–2 cm</td>
<td>4.4–6 × 1.8–2.5 cm</td>
</tr>
<tr>
<td>Petals size</td>
<td>2–4 × 0.8–1.2 cm</td>
<td>4.5–6.1 × 1.3–1.7 cm</td>
</tr>
<tr>
<td>Number of corona series</td>
<td>7</td>
<td>10–12</td>
</tr>
<tr>
<td>Outer series length</td>
<td>6.5–8 cm</td>
<td>5.5–8 cm</td>
</tr>
<tr>
<td>Ovary size</td>
<td>6–8 × 2–3 mm</td>
<td>11–13 × 5–6 mm</td>
</tr>
<tr>
<td>Staminal filaments length</td>
<td>4–7 mm</td>
<td>2.8–3.2 mm</td>
</tr>
<tr>
<td>Style with stigma length</td>
<td>6–8 mm</td>
<td>8–9 mm</td>
</tr>
</tbody>
</table>

*Passiflora trialata* is placed in the series *Quadrangulares* together with *P. alata* Curtis (1788: 66), *P. quadrangularis* Linnaeus (1759: 1248), and *P. phoenicea* Lindley (1833: 1603). Those four species constitute a small complex of large-flowered and large-fruited passionflowers with 3–4-angulate-winged stems that ranges from moist lowlands in Nicaragua to Brazil and French Guiana (Feuillet & MacDougal 1996).

*Passiflora alata* differs from *P. longifilamentosa* by its 4-angular stems, linear-lanceolate to ovate-lanceolate stipules, 1–2 or occasionally 3 pairs of petiolar glands at and above the middle, ovate leaves, aristate sepals, red flowers and violet and white corona with 4–6 filament series.

*P. quadrangularis* can be distinguished from *P. longifilamentosa* by having 4-angular winged stems, ovate to ovate-lanceolate stipules, petioles with 2–8 large mostly paired glands, ovate leaves, cordate-ovate bracts with margins entire or serrate near the base, pinkish flowers, purple, violet and white corona with 5–6 filament series.

Originating from eastern Peru, *Passiflora phoenicea* can be differentiated from *P. longifilamentosa* in the 4-angular winged stems, ovate stipules with entire or slightly serrate margin, petioles with two large and bright yellow glands near the apex, ovate leaves, ovate bracts with glandular serrate margin, purple-red flowers, violet and white corona with 5–6 filament series.

After examining the photos and description of *Passiflora christianii* collected from northeast of Saül (Bouana 2002), we could confirm that it is *P. longifilamentosa*.

**Conservation status:**—Data Deficient (DD) according to IUCN (2012). The species is known from a conservation unit in Brazil, which belongs to a mosaic of state and national conservation units of about 12 million hectares (Mosaico de Unidades de Conservação da Calha Norte). In French Guiana, it occurs in a largely untouched, poorly explored area.
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