A new species of *Passiflora* supersection *Tacsonia* (Passifloraceae) from Amazonas, Northern Peru

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Abstract

A new species, *Passiflora kuethiana* (Passifloraceae) is described and illustrated from Cordillera Calla Calla, Amazonas Department, Northern Peru. This species shares morphological characteristics more related with *Passiflora tripartita* and *Passiflora runa* on stipules and flowers but differs mainly from the former in the size, shape and color of the involucre, peduncles length and arrangement, and the latter in shape and margin of stipules. This species is considered as a new endemic to the Peruvian flora. Its location within the section *Elkea* according to the new classification of *Passiflora* is proposed. Comparative data of related species and a key to the species of the section *Elkea* from Northern Peru are too added.

Key words: Calla Calla, Chachapoyas, endemic, Leymebamba-Balsas, passionflower, section *Elkea*, subgenus *Passiflora*

Resumen

Una nueva especie, *Passiflora kuethiana* (Passifloraceae) es descrita e ilustrada de la Cordillera Calla Calla, Departamento de Amazonas, en el norte del Perú. Esta especie comparte características morfológicas más cercanas con *Passiflora tripartita* y *Passiflora runa* en las estípulas y flores pero difiere principalmente de la primera en el tamaño, forma y color del involucro, longitud y disposición de los pedúnculos; y de la segunda en la forma y margen de las estípulas. Esta especie es considerada como un nuevo endemismo para la flora peruana. Se propone su ubicación dentro de la sección *Elkea* de acuerdo a la nueva clasificación de *Passiflora*. Se añaden también datos comparativos de especies afines y una clave de las especies de la sección *Elkea* del norte del Perú.

Palabras clave: Calla Calla, Chachapoyas, endémica, flor de la pasión, Leymebamba-Balsas, sección *Elkea*, subgénero *Passiflora*

Introduction

The genus *Passiflora* Linnaeus (1753: 955) is the largest in the Passifloraceae with 520 species including herbaceous vines, lianas, shrubs and trees, distributed mainly in the tropical areas of the Neotropics (Ulmer & MacDougal 2004: 31). In the Andean Region of South America, *Passiflora* is present with a very representative group, the long-tubed flower species called “tacsonias” currently placed in subgenus *Passiflora* supersection *Tacsonia* (Jussieu 1789:398) Feuillet & MacDougal (2003:38).

Within this supersection, there is a diverse subgroup in Peru with pendent flowers, the section *Elkea* Feuillet & MacDougal (1997: 337). These species occur mainly in the northern and central Andean area of the country, some tolerating the generally negative human impact on their habitat, while others, such as *Passiflora tripartita* (Jussieu 1805: 395) Poiret (1811: 843) and *Passiflora tarminiana* Coppens & Barney(2001: 8), have been cultivated for their nutritional interest and have spread to distant regions as New Zealand (Heenan & Sykes 2003: 217).

Studies of the species of supersection *Tacsonia* in Peru include Killip (1938), Macbride (1941), Killip & Cuatrecasas (1960) and Escobar (1980). The last species published in supersection *Tacsonia* from Peru were *Passiflora huamachucoensis* L.K.Escobar (1986:88), *Passiflora runa* L.K.Escobar (1986: 90) and *Passiflora trifoliata* var.
tarmensis L.K. Escobar (1986:93). Since the thesis by Escobar (1980) and the publication of the new species in 1986 little has been written about the group in Peru.

A species collected in the cloud forest from Chachapoyas Province, Department of Amazonas, Peru, is described as new species to science, constituting the first Peruvian species of Passiflora in supersection Tacsonia published in the 21st century.

Material and methods

The new species was collected on the slopes of Cordillera Calla Calla, in the high cloud forest from Northern Peru during a botanic expedition in December 2013. The material was prepared according to Rodríguez & Rojas (2002). The descriptive terminology was based on Tillett (1988). Specimens of the herbaria CPUN, HUT, MO, PRG, UC, US and G (Thiers 2013) were consulted.

Taxonomy

Key to the species of Passiflora section Elkea from Northern Peru

1. Leaves 3-foliate, flowers pendent ................................................................. \( P. \) huamachucoensis
   - Leaves 3-lobed, flowers horizontal or pendent ................................................................. \( P. \) anastomosans
   2. Flowers horizontal, spheroidal perianth at anthesis ................................................................. \( P. \) anastomosans
      - Flowers pendant, not spheroidal perianth at anthesis ................................................................. \( P. \) tarmensis
   3. Perianth reflexed at anthesis, hypanthium green throughout ................................................................. \( P. \) tarmensis
      - Perianth not reflexed at anthesis, hypanthium green or colored ................................................................. \( P. \) anastomosans
   4. Peduncles 11–13.2 cm, hypanthium generally green throughout. ................................................................. \( P. \) kuethiana
      - Peduncles less than 11 cm, hypanthium greenish with red, pink, violet or purple ................................................................. \( P. \) parvifolia
   5. Relatively small leaves, 2–5 × 3–7 cm ................................................................. \( P. \) parvifolia
      - Relatively big leaves, 4.5–17 × 3.5–25 cm ................................................................. \( P. \) glaberrima
   6. Hypanthium 6–9 cm long, pink to reddish or purplish ................................................................. \( P. \) cumbalensis
      - Hypanthium 3–5 cm long, violet ................................................................. \( P. \) glaberrima
   7. Hypanthium pubescent, 7–12 cm long, stipules reniform ................................................................. \( P. \) tripartita
      - Hypanthium glabrous or sparsely pubescent, 5–13 cm, stipules subreniform to obliquely ovate ................................................................. \( P. \) runa
   8. Stipules subreniform, glandular-serrate, hypanthium glabrous up to 13 cm long ................................................................. \( P. \) tripartita
      - Stipules obliquely ovate, lacerate, hypanthium glabrous or sparsely pubescent (rarely) up to 8.2 cm long ................................................................. \( P. \) runa

Passiflora kuethiana B. Esquerre, sp.nov., Fig. 1–2.

Similar to Passiflora tripartita and Passiflora runa, differing from the former in its broad greenish involucre of bracts with red-flushed areas and very long peduncles in pairs (versus narrow greenish involucre, rarely yellowish or with red-flushed areas and generally short solitary peduncles in \( P. \) tripartita). It differs from the latter in its aristate and glandular-dentate stipules, lateral nerves divergent from mid nerve below 90° in leaves, bracts pubescent, hypanthium generally green through out, and very long peduncles (versus lacerate stipules, lateral nerves divergent from mid nerve equal or greater than 90° in leaves, bracts glabrous, hypanthium generally green with purplish red, and long peduncles in \( P. \) runa).

Type:—PERU. Amazonas: Provincia de Chachapoyas. Carretera de Leymebamba a Balsas, Cordillera Calla Calla lado oeste, 2860 m, 29 December 2013, B.Esquerre, L.Vásquez, C.Rojas, J.Escurra & Y.Murillo 63 (holotype HUT!, isotypes CPUN!, PRG!).

Vine 4–6 m, pubescent throughout, indumentum with translucent trichomes 0.2–0.8 mm. Stipules subreniform 3.2 ×1.2 cm, asymmetrical base, acuminate at apex with arista ca. 1 cm long, glandular-dentate. Petiole 2–3 cm long, grooved on the adaxial side, with 6–8 nectaries about 1.3–2 mm long, subsessile. Lamina 3-lobed, mature leaves 12–14.7 × 8–10 cm incised ca. 2/3 with ovate-lanceolate lobes, sometimes triangular in young leaves, the lateral and mid nerves diverging at an angle of 60–82°; cordate at base, acute at apex, margin glandular-serrate. Leaf blade covered with translucent trichomes, abaxially with a fine reticulum of veins. Tendrils stout. Peduncles slender 11–13.2 cm long, in pairs; bracts 3.3–4.5 × 2.3–2.7 cm, lanceolate-obleng, connate at base ca. 2/3, margin entire, pubescent,
greenish with pinkish to flush areas on the outer surface, apex acute, bracts forming an involucre 2.7 cm in diameter (pressed). Flowers axillary, paired, pendent; hypanthium with indumentum of short trichomes; floral cup ca. 0.6–1 × 1.4 cm, floral tube 6.8–8 cm, generally entirely green outside, cylindrical, slightly expanded at the base. Sepals 2.5–1.3 cm, greenish and dark pink abaxially, the main veins greenish, pink adaxially, aristate, with an awn 2 mm long. Petals pink to purplish pink, similar in size to the sepals, oblong. Corona in 1 series, dentate, with white teeth ca. 1 mm long located in a purple ring. Operculum white, incurved, smooth. Nectar chamber and nectar ring white, limen white, inconspicuous. Ovary fusiform 10–12 × 4 mm, pubescent, green. Immature fruit pubescent, 5.5 × 2.3 cm, greenish. Aril orange. Seed 5 × 4 mm, reticulate, black.

**Distribution and ecology:**—*Passiflora kuethiana* was collected in the cloud forests of the western slopes of the Calla Calla mountains in the Department of Amazonas, Northern Peru. Its habitat is shared with species of ferns, orchids and vines. From a distance, hummingbirds were observed around the plants. Since hummingbirds are the pollinators of most other *Tacsonia* species (Ulmer & MacDougal 2004:76), it is assumed they also pollinate this passionflower.

**Phenology:**—Know to flower in December, when also many flower buds develop.

**Conservation:**—This new species is only known from one locality, where it was collected in 2013. According to the IUCN (2001) criteria B, C and D this species should be classified as Critically Endangered (CR). The Calla Calla mountains are a region with some *Passiflora* species endemic to Peru, such as *P. runa*, *P. callacallensis* Skrabal & Weigend (2001:316) and now *P. kuethiana*. Because human colonization is increasing and deforestation is now evident, this area should be a priority for conservation by the Peruvian Government, the Regional Government of Amazonas and private conservation entities.

**FIGURE 1.** *Passiflora kuethiana* B. Esquerre. A, Habit; B, Flower; C, Stipule. Drawn by Boris Esquerre (from B. Esquerre 63, HUT).
Etymology:—The epithet refers to Dr. Yero Kuethe, professional in the Passiflora Project International who is reviewing *Passiflora* species in the tropics, with some collections and recent sightings of little-known and new taxa in Peru.

Additional specimen examined (related species):—*Passiflora tripartita*. PERU. Ancash: Huaylas Province, 17 July 1976, A. Lópe, J. Veneros, A. Aldave 8376 (HUT); Cajamarca: Cajamarca Province, La Encañada, 17 August 1973, A. Sagástegui 7778 (HUT); Baños del Inca, 17 November 1996, T. Tejeda 38 (CPUN); Cutervo Province, Route to La Capilla, 8°18’S, 78°49’W, 20 March 2009, I. Sánchez, U. Molau, S. Nylinder 13890 (CPUN); Cuzco: Anta...

Discussion:—The new species is very similar to *P. tripartita*. It is also similar to *P. runa*, which can also be found in the same collection area of the Department of Amazonas.

*P. tripartita* differs in having a narrow involucre of bracts around the hypanthium base, generally stout-short peduncles and solitary flowers. *P. runa* differs from the new species in having stipules obliquely ovate and lacerate, lateral-mid nerves diverging in 90–120°, and glabrous hypanthium (Table 1).

<table>
<thead>
<tr>
<th>Characters</th>
<th>Passiflora kuethiana</th>
<th>Passiflora tripartita</th>
<th>Passiflora runa</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stipules</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>3.2 ×1.2 cm</td>
<td>0.6–3 × 0.6–1.2 cm</td>
<td>3–3.5 × 1.5–2.2 cm</td>
</tr>
<tr>
<td>Margin</td>
<td>Glandular-dentate</td>
<td>Glandular-serrate</td>
<td>Lacerate</td>
</tr>
<tr>
<td><strong>Leaves</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indumentum</td>
<td>Pubescent both sides</td>
<td>Glabrous adaxially or pubescent both sides</td>
<td>Glabrous adaxially, pubescent abaxially</td>
</tr>
<tr>
<td>Divergence between lateral-mid veins</td>
<td>≤ 82°</td>
<td>&lt; 90°</td>
<td>≥ 90°</td>
</tr>
<tr>
<td>Abaxial reticulum of veins</td>
<td>Present</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td><strong>Peduncles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max size</td>
<td>13.2 cm</td>
<td>7.5 cm</td>
<td>9.5 cm</td>
</tr>
<tr>
<td>Thickness</td>
<td>Very slender</td>
<td>Slender</td>
<td>Very slender</td>
</tr>
<tr>
<td>Arrangement</td>
<td>In pairs</td>
<td>Solitary</td>
<td>Solitary</td>
</tr>
<tr>
<td><strong>Bracts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>3.3–4.5 × 2.3–2.7 cm</td>
<td>2.5–6 × 0.5–2 cm</td>
<td>4–5 × 2–2.8 cm</td>
</tr>
<tr>
<td>Outer indumentum</td>
<td>Pubescent</td>
<td>Pubescent</td>
<td>Glabrous</td>
</tr>
<tr>
<td>Outer color</td>
<td>Green with reddish</td>
<td>Green sometimes with yellow or red</td>
<td>Green with reddish</td>
</tr>
<tr>
<td><strong>Hypanthium</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>Up to 9 cm</td>
<td>Up to 12 cm</td>
<td>Up to 8.2 cm</td>
</tr>
<tr>
<td>Indumentum</td>
<td>Sparsely pubescent</td>
<td>Pubescent</td>
<td>Glabrous</td>
</tr>
<tr>
<td>Outer color</td>
<td>Green</td>
<td>Green occasionally with red or purplish red</td>
<td>Green with purplish red</td>
</tr>
</tbody>
</table>

According to the classification of *Passiflora* by Feuillet & MacDougal (2003: 38), this new species finds its placement within the section *Elkea*, supersection *Tacsonia*. This placement is justified based on its 3-lobed leaves, subreniform stipules, entire bracts conspicuous-connate, and especially pendent flowers (Ulmer & MacDougal 2004: 331).

*Passiflora kuethiana* is now the species with the longest peduncles in pairs within the section *Elkea*, with a recorded length of 13.2 cm. Very long peduncles are unusual and so far present in only few species of section *Elkea* from Peru, such as *P. runa*. However, it is a very common feature in section *Colombiana* L.K. Escobar (1988:26) from Colombia. Another distinctive feature of this new species is the flower arrangement in pairs, something uncommon in the section *Elkea*, rarely seen in *P. tripartita* but common in Ecuadorian *Passiflora sanctaebarbarae* Holm-Nielsen & Jørgensen (Holm-Nielsen et al. 1987:132).

The morphological differences of this new species and *P. tripartita* are only in the width of the involucre of connate...
bracts that surround the base of the hypanthium, the length of the peduncles, and paired flowers in \textit{P. kuethiana} (see above). It is noteworthy that after conducting observations during explorations and botanical collections in Andean Peru and observing numerous specimens in herbaria, the three known varieties of \textit{P. tripartita} in the Peruvian territory generally have no slender peduncles, which are rather stout, solitary, and do not exceed 7.5 cm long in average. Besides, the involucre is always narrow on the hypanthium base, not broad.

Other species of supersection \textit{Tacsonia} reported for the same area (Department of Amazonas, Peru) are \textit{Passiflora anastomosans} (Lambert ex De Candolle 1828: 335) Killip (1927: 428), \textit{P. cumbalensis} (Karsten 1859: 161) Harms (1894: 13) and \textit{P. mathewsi} (Masters 1872: 539) Killip (1927: 428). \textit{P. anastomosans} has horizontally oriented flowers and a ball-like perianth with zygomorphic androecium, leaves thick-coriaceous and lustrous above (versus pendent flowers, not ball-like perianth, actinomorphic androecium and not thick-coriaceous leaves in \textit{P. kuethiana}). \textit{P. cumbalensis} has a very elongated, glabrous hypanthium, upper leaf surface and ovary glabrous (versus elongated sparsely or finely pubescent hypanthium, leaves and ovary pubescent in \textit{P. kuethiana}). \textit{P. mathewsi} has horizontally oriented flowers with solitary short stout peduncles (versus pendent flowers with slender paired peduncles in \textit{P. kuethiana}).

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\section*{References}


