

A NEW SPECIES OF *BEGONIA* SECT. *RUIZOPAVONIA* FROM COLOMBIA AND ECUADOR

P. W. Moonlight ¹ & Á. J. Pérez ²

A new species of *Begonia* sect. *Ruizopavonia* A.DC., *B. pseudodendron* Moonlight & Á.J.Pérez, is described from the western slopes of the Andes in the Colombian Department of Nariño and the Ecuadorian Province of Carchi. The new species is diagnosed against *Begonia cymbalifera* L.B.Sm. & B.G.Schub. and compared with other similar species. We also provide photographs, a distribution map, and an IUCN conservation assessment for the new species, which is classified as Endangered (EN) due to habitat destruction.

Keywords. Andean slopes, *Begonia*, Chocó biogeography region, Colombia, Ecuador, montane forest, new species, taxonomy.

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Introduction

Begonia sect. *Ruizopavonia* includes 32 currently accepted species and is endemic to the Americas. Its distribution stretches from Chiapas State in southeastern Mexico to Bolivia. Species in this section are distinguished from members of other sections as large, upright, usually scandent herbs, lacking tubers or rhizomes, with more or less straight leaves with distinct pinnate (rarely palmate-pinnate) venation, and winged fruits (Doorenbos *et al.*, 1998; Tebbitt *et al.*, 2017; Moonlight *et al.*, 2018). Members of the section are typically found at the edge of montane forest patches, where they scramble through dense vegetation. The centre of diversity for *Begonia* sect. *Ruizopavonia* is the northern Andes and in particular Colombia, which is home to 10 species.

During preparation for an upcoming account of the Peruvian Begoniaceae (Moonlight *et al.*, submitted), the first author came across several specimens that are morphologically distinct and geographically isolated from all similar members of the section; we describe these specimens here as a new species. The species was collected within a small area spanning the Colombia–Ecuador border on the western slopes of the Andes. In Ecuador and southern Colombia, all members of *Begonia* sect. *Ruizopavonia* are found on the eastern slopes of the Andes, except those of the ‘*tilliifolia* group’ (see Tebbitt *et al.*, 2017). Members of the *tilliifolia* group are distinguished by the short internodes in their inflorescences, which appear umbellate; this is not the case in the new species. *Begonia cuatrecasasiana* L.B.Sm. & B.G.Schub. is found on the western slopes of the western cordillera but only as far south

¹ Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR, Scotland, UK. E-mail: pmoonlight@rbge.ac.uk.

² Herbario QCA, Department of Biological Sciences, Pontificia Universidad Católica del Ecuador, Apartado Postal 17-01-2184, Quito, Ecuador.

as the Colombian Department of Valle del Cauca, about 400 km north of the distributional range of the new species.

The new species is allied to a northern Andean group of species with four tepals on the staminate flower but elongate inflorescence internodes and that includes *Begonia consobrina* Irmsch., *B. cuatrecasasiana*, *B. cymbalifera* L.B.Sm. & B.G.Schub. and *B. dugandiana* L.B.Sm. & B.G.Schub., which are collectively found in Ecuador and Colombia. It differs from these species in lacking conspicuous, persistent bracteoles and in having two tepals on the pistillate flower, rather than three. It is further distinguished by its habit. The new species is a large scandent shrub reaching up to 10 m in height. To our knowledge, no other northern Andean members of *Begonia* sect. *Ruizopavonia* reach more than 2 m in height.

We diagnose the new species against *Begonia cuatrecasasiana* and *B. cymbalifera* and provide a table to help distinguish it from these and other similar species. We provide photographs, a distribution map, and a provisional IUCN *Red List* assessment for the new species, which is classified as Endangered under IUCN criteria (IUCN, 2016).

The new species is only the second species of *Begonia* described for Ecuador since the publication of the *Flora of Ecuador* account in the mid-1980s (Smith & Wasshausen, 1986) that is not the result of a nomenclatural change. *Begonia botryoides* Moonlight & Tebbitt was described recently (Tebbitt *et al.*, 2017) but was recognised in the *Flora of Ecuador* under the misapplied name *B. albomaculata* C.DC.

Taxonomic treatment

Key to the Colombian and Ecuadorian species of Begonia sect. *Ruizopavonia*

- 1a. Stipules persistent, remaining on the stem long after the leaves _____ *Begonia tonduzii* C.DC.
- 1b. Stipules early deciduous, lost before the leaves are fully grown _____ 2
- 2a. Inflorescence internodes elongated, > 5 mm long; pistillate flowers with 3 of 5 tepals
see key in Tebbitt *et al.* (2017)
- 2b. Inflorescence internodes short, < 2 mm long; pistillate flowers with 2 or 3 tepals ____ 3
- 3a. Staminate flowers with 2 tepals _____ *Begonia alnifolia* A.DC.
- 3b. Staminate flowers with 4 tepals _____ 4
- 4a. Tepals on the staminate and pistillate flowers > 10 mm long, orange, apices
long-acuminate _____ *Begonia cuatrecasasiana* L.B.Sm. & B.G.Schub.
- 4b. Tepals on the staminate and pistillate flowers < 10 mm long, white to pink, apices
rounded, glabrous on both surfaces _____ 5
- 5a. Terrestrial herb to > 5 m tall; bracteoles lacking; 2 tepals on the pistillate flowers
Begonia pseudodendron

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- 5b. Terrestrial herb to < 2 m tall; 2 or 3 bracteoles present directly beneath the ovary, persistent; 3 tepals on the pistillate flower (unknown in *Begonia dugandiana*) _____ 6
- 6a. Stamens c.20; leaf laminae with 6–8 secondary veins on the broadest side; styles unknown but presumed bifid _____ *Begonia dugandiana* L.B.Sm. & B.G.Schub.
- 6b. Stamens > 25; leaf laminae with 8–12 secondary veins on the broadest side; styles multifid _____ 7
- 7a. Leaf laminae straight, ovate; inner tepals on the staminate flower c.5 × 2 mm
Begonia cymbalifera L.B.Sm. & B.G.Schub.
- 7b. Leaf laminae transversely ovate; inner tepals on the staminate flower c.3 × 1 mm
Begonia consobrina Irmsch.

Species description

Begonia pseudodendron* Moonlight & Á.J.Pérez, sp. nov. § *Ruizopavonia

Begonia pseudodendron is most similar to *B. cuatrecasasiana* L.B.Sm. & B.G.Schub. but differs in its white to pink, glabrous tepals (versus orange tepals that are sparsely pilose on the outside), the rounded apices of its staminate tepals (versus long acuminate apices), and its pistillate flowers with two tepals (versus three) and that lack bracteoles.

– Type: Ecuador, Carchi Province, Trail beginning above Rafael Quindí Finca, above Untal (along road to Chical), and partly ascending Cerro Oscura, 0°52'N, 78°09'W, 1670 m, 26 xi 1987, W.S. Hoover & S. Wormley 1651 (holotype MO [[MO-2256936](#)], isotype QCA [[QCA-19712](#)]). [Figure 1](#).

Caulescent terrestrial herb, lacking a tuber or rhizome. *Stem* erect or scrambling, to 10 m tall, woody at the base, frequently branching, internodes 2–10 cm, 4–6 mm in diameter, glabrous, smooth, green-flushed red, browning with age. *Stipules* early deciduous, lanceolate, 2.5–10 × 0.5–4 mm, apex acute, margin entire, aciliate. *Leaves* alternate, basifixed, straight; petioles joining blade in the direction of the main vein, 2–11 mm long, glabrous; blade subsymmetrical, oblanceolate to elliptic, 7.5–16.5 × 3–6.2 cm, apex short-attenuate, base decurrent, rounded on the broad side of the lamina, cuneate on the narrow side of the lamina, margin entire, serrate towards the apex, ciliate, upper surface green, glabrous, lower surface glabrous, green, pinnately veined, 7- to 9-veined on the broad side of the lamina, 5- to 7-veined on the narrow side of the lamina. *Inflorescences*: many, axillary but often appearing terminal, arising close to the apex of the stem, erect, a 6–8 times dichotomous cyme, protandrous; *peduncle* 1.5–4.5 cm long, internodes elongate, > 10 mm long, glabrous, pale green–flushed red; *pedicels of staminate flowers* 5–15 mm long, glabrous, white to pale green; *pedicel of pistillate flowers* 9–18 mm long, glabrous, white to pale green; *bracts* early deciduous, unknown. *Staminate flowers*: *tepals* 4, white to pink, outer two ovate, 3–6 × 2–4 mm, apex rounded, margin entire, glabrous; inner two narrowly oblanceolate,

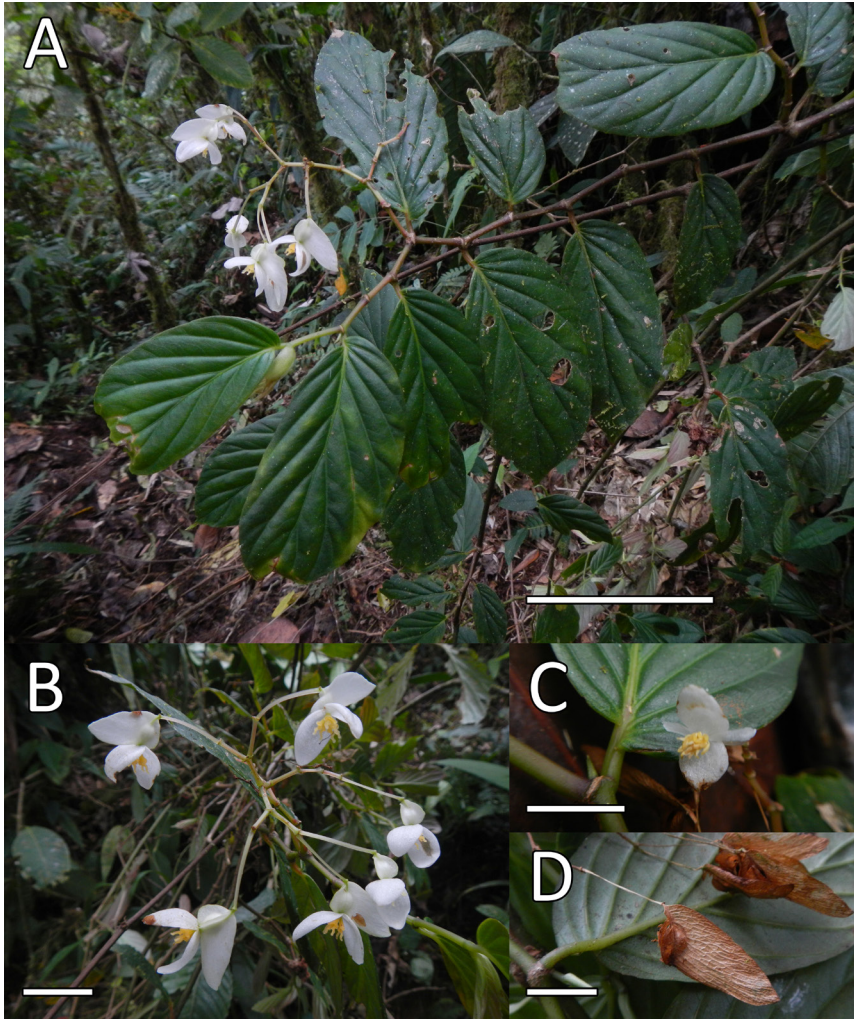


Figure 1. *Begonia pseudodendron* Moonlight & Á.J.Pérez, sp. nov. A, Habit, showing the leaves and a mature, pistillate inflorescence; B, inflorescence, showing pistillate flowers; C, staminate flower, front view; D, fruit, side view. Estimated scale bars: A, 10 cm; B, 5 mm; C and D, 1 cm. Photographs taken by Á. J. Pérez as part of the collection Á.J.Pérez 9728.

c.4 × 1.5–2 mm, apex rounded, margin entire, glabrous; *stamens* c.20, free, filaments 0.2–0.4 mm long, anthers symmetrically basifixed, oblong, 1–1.5 mm long, dehiscing via lateral slits, connectives extended to 0.2 mm. *Pistillate flowers*: *bracteoles* lacking; *tepals* deciduous in fruit, 2, projecting, white or pink, ovate to lanceolate, 4–12 × 3–10 mm, apex rounded, margin entire, glabrous; *ovary body* narrowly ovoid, 2–4 × 1–2 mm, white, glabrous, 3-winged, wings white, unequal, largest wing band-like to triangular, apex obtuse, margin

entire to lacerate, 4–5 mm tall, 3–8 mm wide, smaller two wings semicircular, margins entire, apex rounded, 4–5 mm tall, 0.5 mm wide; 3-locular, placentae axile bifid, bearing ovules on both surfaces; *styles* 3, free, 3–6 mm long, bifid from half their length and swollen at the bifurcation, stigmatic papillae in a twice-twisted spiral band. *Fruiting pedicel* to 24 mm long. *Fruit* pendant, body broadly ovate, expanding to 8 × 4 mm, light brown, glabrous, largest wing expanding to 12 × 20 mm, triangular, ascending, shorter two wings expanding to 10 × 2 mm. *Seeds* unknown.

Distribution and ecology. Known from Nariño Department in Colombia and Carchi Province in Ecuador. Found in lower and middle-elevation montane forest of the Andean Chocó region at an elevation of 600–1700 m (Figure 2). *Begonia pseudodendron* is a large, scrambling species most frequently found on the edge of dense montane forests remnants or in open areas. According to the Ministerio del Ambiente de Ecuador (2013), the type locality and surrounding areas lie within a much larger zone dominated by Bosque siempreverde piemontano de Cordillera Occidental de los Andes (BsPn01, evergreen lower montane forest of the western Andean cordillera). The characteristic tree species of this area include *Magnolia mindoensis* A.Vázquez, D.A.Neill & A.Dahua, *Vochysia awasensis* Huamantupa, *Isertia pittieri* (Standl.) Standl. and the palm *Wettinia quinaria* (O.F.Cook & Doyle) Burret. This area is extremely humid, and most tree trunks are covered by bryophytes, orchids, bromeliads and aroids.

Phenology. *Begonia pseudodendron* has been collected in flower from August to January and in fruit from August to November.

Etymology. The epithet is from the Greek *pseudo* ('false') and *dendron* ('tree') and refers to the species' habit and the height it can reach: about 10 m tall, achieved by scrambling through surrounding vegetation.

Proposed IUCN conservation category. The known extent of occurrence of *Begonia pseudodendron* is < 1000 km² and includes no protected governmental areas in either Colombia or Ecuador; however, it has been collected in a private reserve managed by the Ecominga Foundation, which protects forest remnants around the Chical area in Ecuador. The species' range appears to include a large extent of original vegetation, but there has been significant and recent deforestation due to farming and road-building in the border region. We have no information on the population size of *Begonia pseudodendron* so assess the species as Endangered (ENB1abiii) based on its small range and the reduction in suitable habitat.

Additional specimens examined. COLOMBIA. **Nariño Department:** Municipio de Ricaurte, Resguardo Indígena Nulpe Medio, camino al basal, 1°6'N, 78°13'W, 760 m, 7 i 1996, B.R. Ramírez P. & M.S. González 9506 (QCA [QCA235167]); Mpio. Barbacoas, corregimiento Altaquer, Vereda El Barro, Reserva Natural Río Nambi, 1°18'N, 78°8'W, 1325 m, 5 xii 1993, P. Franco, D. Giraldo, W. Beltrán, A. Prieto & O. Rivera

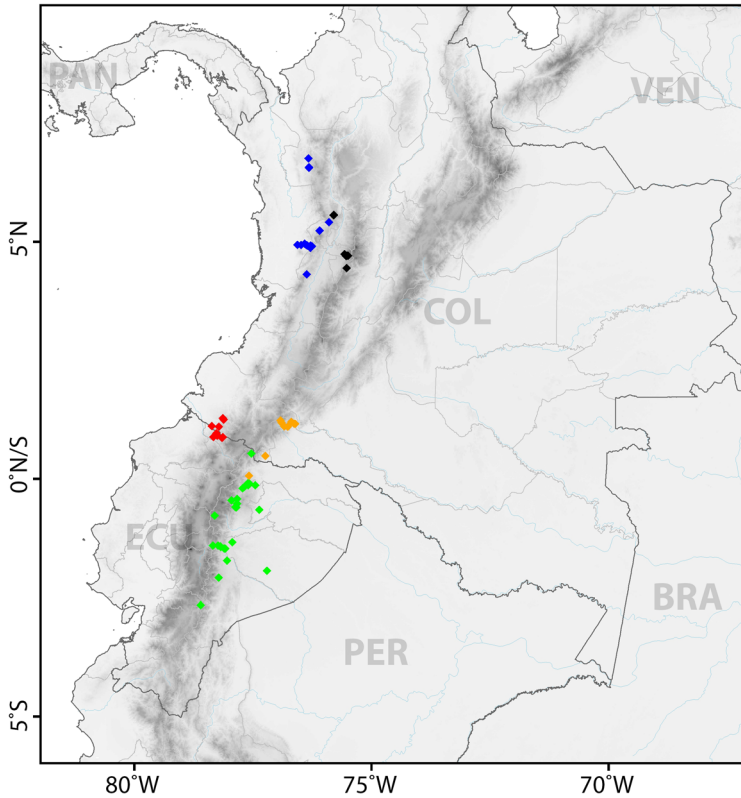


Figure 2. Distribution of *Begonia pseudodendron* Moonlight & Á.J.Pérez (red), *B. consobrina* Irmsch. (green), *B. cuatrecasiana* L.B.Sm. & B.G.Schub. (blue), *B. cymbalifera* L.B.Sm. & B.G.Schub. (orange) and *B. dugandiana* L.B.Sm. & B.G.Schub. (black). Black lines indicate country borders; grey lines, first-order administrative divisions; and blue lines, major rivers. Shading indicates altitude. All distribution records are available through the *Begonia* Resource Centre (Hughes *et al.*, 2015–). BRA, Brazil; COL, Colombia; ECU, Ecuador; PAN, Panama; PER, Peru; VEN, Venezuela.

2926 (COL [COL000137627]); Altaquer, [1°15'S, 78°7'W], 3500 ft, *M.B. Foster & R. Foster* 2110 (COL [COL000137625]).

ECUADOR. Carchi Province: San Marcos Valley, farmland and rainforest disturbed by the local Coaiquer (Awa) Amerindians, 1°7'N, 78°22'W, 600 m, 20–24 xi 1983, *A.S. Barfod, L.P. Kvist & D. Nissen* 48818 (MO [MO-098158], QCA [QCA19633], QCNE); *ibid.*, *A.S. Barfod, L.P. Kvist & D. Nissen* 48819 (MO [MO-098159], QCA [QCA19634]); Near encampment in Gualpi Chico area of Awá Reserve, 0°58'N, 78°16'W, 1330 m, 20 i 1988, *W.S. Hoover, A. Arguello, P. Gelpi & R.A. Lorentzen* 2847 (MO [MO-1956278], QCA [QCA19427]); Along bank of Quebrada Mongon at point where Scott finished on 11/18/88, 0°58'N, 78°16'W, 1200–1400 m, 19 i 1988, *W.S. Hoover, A. Arguello, P. Gelpi & R.A. Lorentzen* 2948 (MO [MO-2364070], QCA [QCA19428]); Trail to Pilon encampment, Gualpi Chico area of Awá Reserve, 0°58'N, 78°16'W, 1350–1400 m, 21 i 1988, *W.S. Hoover, A. Arguello, P. Gelpi & R.A. Lorentzen* 3613 (MO [MO-2364072], QCA [QCA19431]); *ibid.*, 1000–1450 m, 14 i 1988, *W.S. Hoover, P. Gelpi, R.A. Lorentzen &*

A. Arguello 2416 (QCA [QCA19657]); South on main trail from camp (away from Pylus) for 1/12 m mile from camp East down to río Gualpi Chico, 0°58'N, 78°16'W, 1100 m, 21 i 1988, W.S. Hoover, A. Arguello, P. Gelpi & R.A. Lorentzen 3018 (MO [MO-1956276], QCA [QCA19429]); South-east trail, primary forest in Gualpi Chicó area of Awa reserve, near encampment, 0°58'N, 78°16'W, 1330 m, W.S. Hoover, A. Arguello, P. Gelpi & R.A. Lorentzen 2804 (QCA [QCA19426]); Tulcán Canton, Reserva Indígena Awá, Parroquia Tobar Donoso, sector El Baboso, 0°53'N, 78°20'W, 1600 m, 3 x 1991, G. Tipaz, D. Rubio & M. Taucuz 308 (MO [MO-2907067]); Trail from Untal to Rafael Quindís Finca, south of Cerro Golondrinas, 0°55'N, 78°15'W, 1700 m, W.S. Hoover & S. Wormley 1444 (MO [MO-2194164], QCA [QCA19711]); Cantón Tulcan, Parroquia Chical, Reserva Cerro Colorado, 0°54'N, 78°12'W, 1550–1850 m, 21 viii 2016, A.J.Pérez, N. Zapata, H. Yela & W. Santillán 9728 (QCA); Trail from Rafael Quindís finca to río Verde and along río Verde, 0°53'N, 78°8'W, 1700 m, 26 xi 1987, W.S. Hoover & S. Wormley 1731 (MO [MO-2186975]).

Most specimens of *Begonia pseudodendron* Moonlight & Á.J.Pérez cited here were previously identified as *Begonia holtonis* A.DC., which is a distantly related member of *Begonia* sect. *Lepsia* (Klotzsch) A.DC. but with a similar habit and similar-shaped leaves (Moonlight et al., 2018). These two species can be distinguished by the number of tepals in the pistillate flowers, which is two in *Begonia pseudodendron* and five in *B. holtonis*.

Begonia pseudodendron is part of a group of species in *Begonia* sect. *Ruizopavonia* that have four tepals on the staminate flowers and elongate inflorescence internodes. We provide a key to all Colombian and Ecuadorian species of *Begonia* sect. *Ruizopavonia* and a table to aid in distinguishing between similar species (Table). We suspect that *Begonia pseudodendron* is most closely related to *B. cuatrecasiana* on account of its very similar straight, oblanceolate to elliptic leaf blades. We have been unable to confirm the texture of these leaves in the field, but they appear relatively coriaceous whereas several other species in this group have semisucculent leaves (e.g. *Begonia consobrina* and *B. cymbalifera*). Although the flowers of the new species are more similar to those of all other species in the group, we suspect this is indicative of rapid, recent adaptation to a hummingbird pollination syndrome in *Begonia cuatrecasiana* rather than a distant relationship.

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ORCID iDs

P. W. Moonlight  <https://orcid.org/0000-0003-4342-2089>

Á. J. Pérez  <https://orcid.org/0000-0002-0644-9111>

Table. Distinguishing characters for northern Andean members of *Begonia* sect. *Ruizopavonia* with four tepals on the staminate flowers and elongate inflorescence internodes^a

Character	<i>B. pseudodendron</i>	<i>B. consobrina</i>	<i>B. cuatrecasasiana</i>	<i>B. cymbalifera</i>	<i>B. dugandiana</i>
Distribution	Ecuador and Colombia, <i>western slopes of the Andes, Nariño and Carchi</i>	Ecuador, eastern slopes of the Andes, Sucumbios to Azuay	Colombia, western slopes of the western cordillera, Valle del Cauca to Antioquia	Ecuador and Colombia, eastern slopes of the Andes, Putumayo to Sucumbios	Colombia, both slopes of the Western cordillera, Antioquia to Tolima
Habit	<i>Terrestrial herb to 10 m</i>	Terrestrial herb to 1.5 m	Terrestrial or rarely epiphytic herb to 50 cm	Terrestrial herb to 1.5 m	Terrestrial herb to 1 m
Leaves	Straight, oblanceolate to elliptic	Transversely ovate	Straight, oblanceolate to elliptic	Straight, oblanceolate to ovate	Straight to transversely ovate
Venation	Pinnate, 7–9 secondary veins on the broad side of the lamina, 5–7 on the narrow side	Palmate-pinnate, 9–12 secondary veins on the broad side of the lamina, 7–9 on the narrow side	Pinnate, 6–8 secondary veins on the broad side of the lamina, 6 or 7 on the narrow side	Pinnate, 8–10 secondary veins on the broad side of the lamina, 6–8 on the narrow side	Palmate-pinnate, 6–8 secondary veins on the broad side of the lamina, 4–6 on the narrow side
Outer two tepals on the staminate flowers	Ovate, apex rounded, 3–6 × 2–4 mm, white to pink, glabrous	Ovate, apex rounded, 4–5 × 4–5 mm, white to pink, glabrous	Ovate, <i>apex long-acuminate, 20–28 × 12–15 mm, orange, pilose outside</i>	Ovate, apex rounded, c.5 × 9 mm, white, glabrous	Ovate, rounded, c.5.5 × 5 mm, white, glabrous
Inner two tepals on the staminate flowers	Oblanceolate, c.4 × 1.5–2 mm, white to pink, glabrous	Oblanceolate to oblong, c.3 × 1 mm, white, glabrous	Oblong, <i>13–18 × 3.5–4 mm, orange, glabrous</i>	Oblong, c.5 × 2 mm, white, glabrous	Oblong, c.3.5 × 1.5 mm, white, glabrous
Stamens	c.20	Numerous (> 25)	<i>11–14</i>	Numerous (> 25)	c.20
Bracteoles	<i>Lacking</i>	3, persistent	2, persistent	2 or 3, persistent	3, persistent
Tepals on pistillate flowers	2, 4–12 × 3–10 mm, white to pink, glabrous	3, the largest two c.8 × 8 mm, white to pink, glabrous	3, <i>the largest two c.25 × 18 mm, orange, pilose outside</i>	3, the largest two c.5 × 7 mm, white, glabrous	Unknown
Styles	<i>Bifid</i>	<i>Multifid</i>	Bifid	<i>Multifid</i>	Unknown

^a Key distinguishing characters are in bold italic text.

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