Begonia Fragae L. Kollmann & Peixoto and Begonia Wasshauseniana L. Kollmann & Peixoto (Begoniaceae), Two New Species from the State of Espírito Santo, Brazil

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Begonia fragae L. Kollmann & Peixoto and Begonia wasshauseniana L. Kollmann & Peixoto (Begoniaceae), two new species from the state of Espírito Santo, Brazil

Ludovic Jean-Charles Kollmann & Ariane Luna Peixoto

Abstract

KOLLMANN, L. J.-C. & A. LUNA PEIXOTO (2012). Begonia fragae L. Kollmann & Peixoto and Begonia wasshauseniana L. Kollmann & Peixoto (Begoniaceae), two new species from the state of Espírito Santo, Brazil. *Candollea* 67: 59-64. In English, English and French abstracts.

Begonia fragae L. Kollmann & Peixoto and *Begonia wasshauseniana* L. Kollmann & Peixoto *(Begoniaceae),* two new species from the Atlantic Forest of the State of Espírito Santo, Brazil, are described and illustrated. Comments on their ecology and distribution are also provided. If *Begonia fragae* is most similar to *Begonia santoslimae* Brade, *Begonia kautskyana* Handro and *Begonia leopoldinensis* L. Kollmann, *Begonia wasshauseniana* is similar to *Begonia ruschii* L. Kollmann. Their morphological affinities are discussed.

Key-words

BEGONIACEAE – *Begonia* – Atlantic Forest – Brazil – Taxonomy

Résumé

KOLLMANN, L. J.-C. & A. LUNA PEIXOTO (2012). Begonia fragae L. Kollmann & Peixoto et Begonia wasshauseniana L. Kollmann & Peixoto (Begoniaceae), deux nouvelles espèces de l'Etat d'Espírito Santo, Brésil. *Candollea* 67: 59-64. En anglais, résumés anglais et français.

Begonia fragae L. Kollmann & Peixoto et *Begonia wasshauseniana* L. Kollmann & Peixoto *(Begoniaceae),* deux nouvelles espèces de la Forêt Atlantique de l'Etat d'Espírito Santo, Brésil, sont décrites et illustrées. Des commentaires sont donnés sur leur écologie et distribution. Si *Begonia fragae* est proche de *Begonia santoslimae* Brade, *Begonia kautskyana* Handro et *Begonia leopoldinensis* L. Kollmann, *Begonia wasshauseniana* est proche de *Begonia ruschii* L. Kollmann. Leurs affinités morphologiques sont discutées.

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Introduction

There are approximately 230 species of *Begonia* L. in Brazil (Smith & al., 1986; Doorenbos & al., 1998; Golding & Wasshausen, 2002; Jacques, 2010a), with approximately 185 species distributed along the Atlantic Forest (Duarte, 1961; Golding, 2007; Jacques, 2009; Jacques, 2010b; Kollmann, 2007, 2009), where they occur in all major vegetation types, except mangrove.

Recently during field work in Espírito Santo state, Brazil, some new species have been discovered (Kollmann, 2003, 2006, 2007, 2008, 2009; Kollman & Fontana, 2008) demonstrating how *Begonia* has been generating narrow endemics species and showing that Espírito Santo state merits intensive botanical research and conservation programs.

While undertaking fieldwork in Espírito Santo state, we collected two species of *Begonia* that we describe here as new.

1. ***Begonia fragae*** L. Kollmann & Peixoto, **spec. nova** (Fig. 1).

Typus: Brazil. Espírito Santo: Santa Leopoldina, colina Boqueirão do Santilho, 300 m, 20º13'32.8"S 40º29'55.4"W, 11.IV.2009, *L. Kollmann, A. P. Fontana, C. Fraga, A. Amorim, R. Goldenberg & R. C. Forzza 11530*, fl. fr. (holo-: RB!; iso-: CEPEC!, MBML!, UPCB!).

Species haec Begonia santoslimae, B. kautskyanae et B. leopoldinensi affinis, sed petiolis canaliculatis et laminis non peltatis differt.

Rhizomatous herb, rupicolous to saxicolous, 35-55(-73) cm tall (excluding inflorescence), prostate, glandular trichomes and flattened peltate-stellate trichomes. *Stem* 2.3-2.7 cm diameter, brown, stellate trichomes, internodes 0.7-1.2 cm long, with big petiolar scars. *Stipules* 2.2-3.5 × 1.8-2.1 cm, brown-reddish, persistent, asymmetric, papyraceous when dry, ovate to triangulate, apex apiculate to retuse, adaxial face glabrous, stellate trichomes on abaxial face, carinate. *Petiole* 31-64 cm long, 0.8-2 cm diam., green covered by grey stellate trichomes, sulcate, 5-8 sulci. *Lamina* 22-45 × 21-42 cm, ovate to cordate, asymmetric, apex obtuse, sometime with a little obtuse lobe, base cordate, adaxial face green, shiny, glabrescent, abaxial face red to whitish, stellate trichomes, margins revolute, crenate with hydathodes; venation actinodromous, veins 7-10 at base, stomata single. *Inflorescence* thyrsiform, 63-168 cm long, with (3-) 6-7 nodes, brown-reddish, rounded, slightly canaliculated, 1.6-2.6 cm diameter at base, stellate trichomes. *Bracts* of first node leaf-like, when present, petiole 2-5 cm, lamina 7-22 × 7-18 cm, persistent, bracts of first node note leaf-like, 2.2-2.7 × 1.5-1.9 cm, brown-reddish, ovate, deciduous, adaxial face glabrous, abaxial face with stellate trichomes, carinate, all others, 6-9 × 6-9 mm, green, deciduous, cordate, apex obtuse, abaxial face glandular. *Staminate flowers:* pedicel 1.3-3.5 cm long, glandular; 4-tepals, pinkish-white, 2-sepals, 1.1-1.7 × 1.3-1.7 cm, cordate, apex obtuse to rounded; 2-petals, 0.9-1.3 × 0.65-0.7 cm, obovate, apex rounded; stamens 30-36, yellow, filament 0.5-1 mm long, unequal, fused below into a column, anthers longer than the filament, 1.2-1.5 mm long, obovate, rimose, connective not extended. *Pistillate flowers:* pedicel 1.5-3.2 cm long, pinkish, glandular; 2-sepals, pinkish-white, 1.9-2.2 × 1.5-1.6 cm, ovate to obovate, apex obtuse, abaxial face glandular, 3-petals, pinkish-white, 1.2-2.1 × 0.5-1.3 cm, ovate to obovate, apex obtuse, abaxial face glandular; 3-styles, yellow, united at base, flabellate, bifurcate, spirally twisted, with bands of filamentous stigmatic papillae on margins of the branches; ovary 3-locular, placentation axial, one placenta per locule, bifurcate, ovules on both sides of placentae. *Capsules* 1.2-1.4 × 0.9-1 cm, basally dehiscent, glandular when young; 3-wings, unequal, glandular when young, chartaceous when dry, larger 1.6-2.2 × 1.5-2 cm, ascending, apex obtuse, smaller wings, 1.6 × 0.4-0.7 cm. *Seeds* ca. 0.3 × 0.2 mm, cylindrical, oblong to obovate.

Taxonomy. – Begonia fragae is part of sect. *Knesebeckia* (Klotzsch) A. DC. characterized by their rhizomatous habit, persistent stipules, stellate trichomes, a connective not extending beyond the anther, bifurcate placental branches, and ovules present on both faces of the placental branches.

Relationships. – Begonia fragae is similar to *B. santoslimae* Brade, *B. kautskyana* Handro and *B. leopoldinensis* L. Kollmann with its rhizomatous stem, stellate trichomes, and thyrsiform inflorescence. It can be distinguished from them by its petiole canaliculate (vs. rounded or square), lamina not peltate (vs. peltate) (Table 1).

Table 1. – Morphological comparison of *Begonia fragae* Kollmann & Peixoto and its closest relatives (*B. santoslimae* Brade, *B. kautskyana* Handro and *B. leopoldinensis* L. Kollmann).

	B. fragae	***B. santoslimae***	***B. kautskyana***	***B. leopoldinensis***
Leaves	cordate	peltate	peltate	peltate
Petiole	canaliculate	rounded	square	rounded
Trichomes	peltate-stellate	stellate	peltate-stellate	stellate
Stipules	ovate to triangulate	ovate	ovate to triangulate	ovate to oblong
State [ES: Espírito Santo, RJ: Rio de Janeiro]	ES	ES, RJ	ES	ES

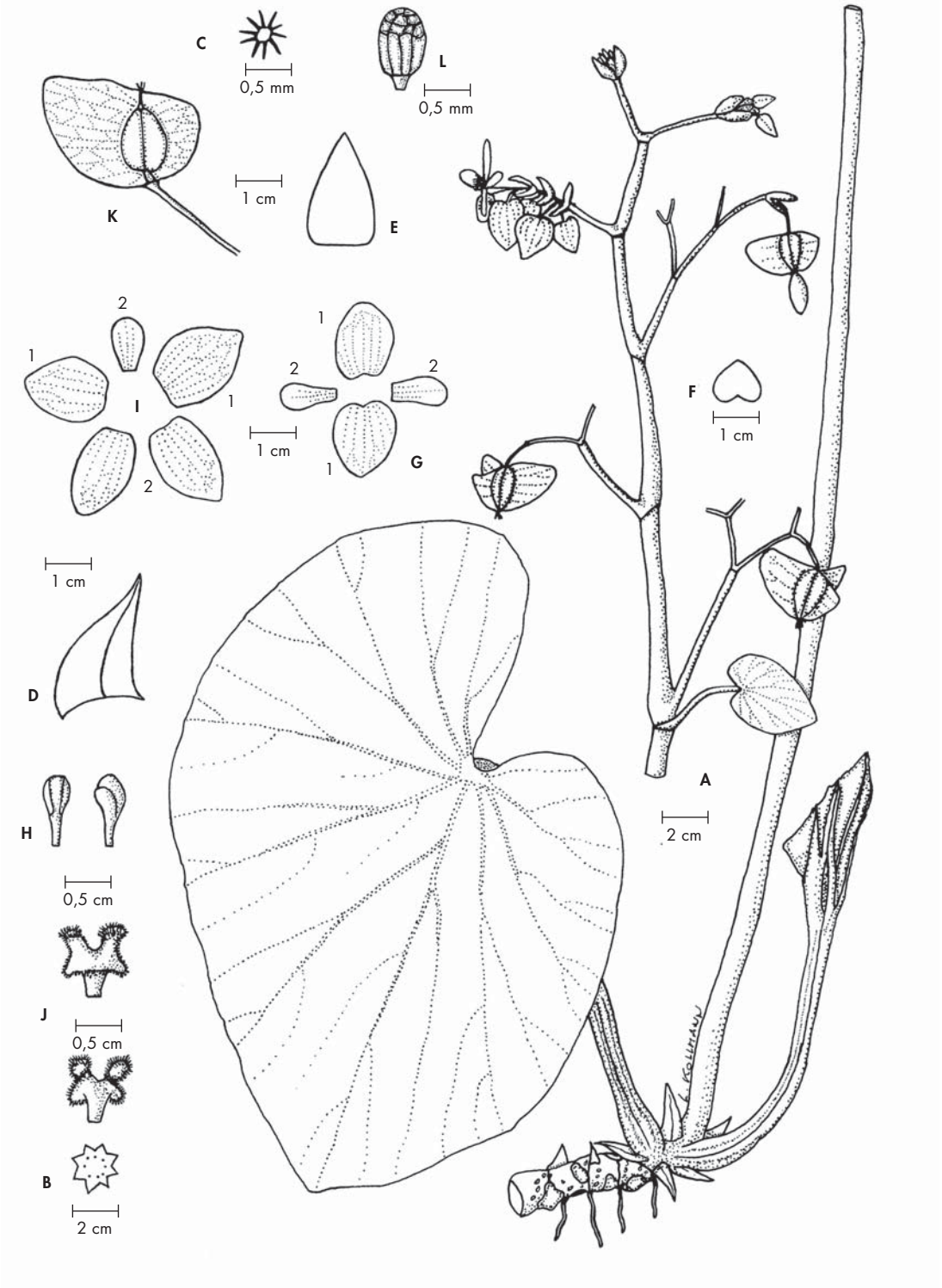

Fig. 1. – *Begonia fragae* L. Kollmann & Peixoto. **A.** Habit; **B.** Transversal view of the petiole; **C.** Stellate trichome, dorsal view; **D.** Stipule flattened, front view; **E.** Basal bract; **F.** Apical bract; **G.** Staminate flower, sepals (1), petals (2); **H.** Stamens, left dorsal view, right lateral view; **I.** Pistillate flower, sepals (1), petals (2); **J.** Styles, above ventral view, below dorsal view; **K.** Fruit; **L.** Seed.

[*Kollmann & al. 11530*] [Drawn by L. J.-C. Kollmann]

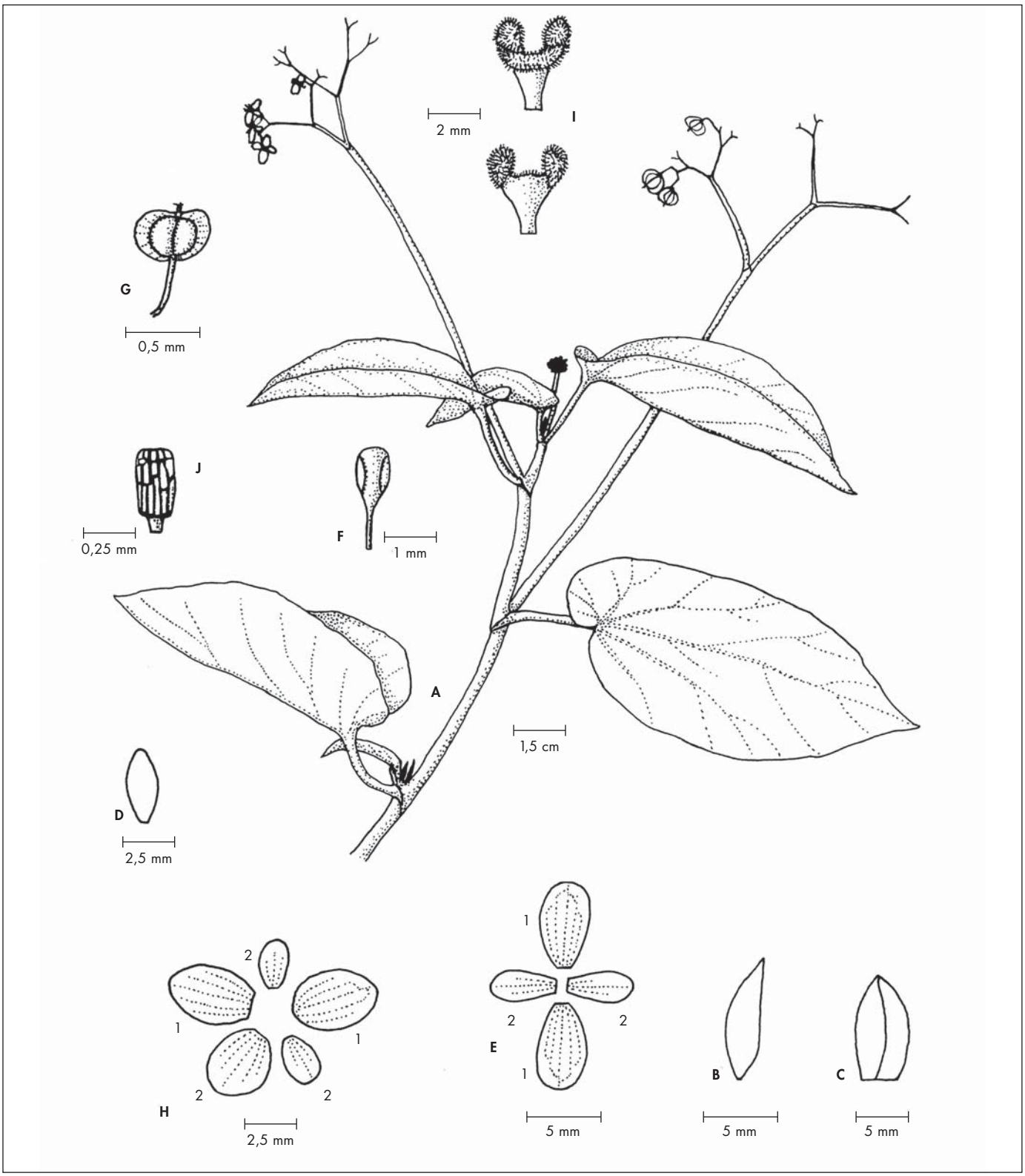

Fig. 2. – *Begonia wasshauseniana* L. Kollmann & Peixoto. **A.** Habit; **B.** Stipule flattened, front view; **C.** Bract; **D.** Prophyll flattened, front view; **E.** Staminate flower, sepals (1), petals (2); **F.** Stamen; **G.** Fruit; **H.** Pistillate flower, sepals (1), petals (2); **I.** Styles, above dorsal view, below ventral view; **J.** Seed.
[*V. Demuner & al. 3550*] [Drawn by L. J.-C. Kollmann]

Etymology. – The name of the new species pays homage to Claudio Nicoletti de Fraga, who found this new species and has made an important contribution to botany.

Distribution and ecology. – *Begonia fragae* was found growing in semi-shaded places, in rocky outcrops, in sub-mountain dense ombrophilous forest of the Atlantic Forest at 300-620 m above sea level.

Conservation status. – Due to the apparent very restricted distribution of *B. fragae,* with an extent of occurrence estimated to be less than 10 km^2, it would appear prudent to include this species in the Critically Endangered species list (CR) (B2ab(iii)) according to the IUCN (2001) criteria.

Paratypi. – **Brasil. Espírito Santo:** Cariacica, Reserva Biológica Duas Bocas, Pau Amarelo, ex-Condominio Rural Cantinho do Céu, 619 m, 20°16'42"S 40°32'26"W, 21.X. 2008, *L. Kollmann & al. 11244,* fr. (RB!); Santa Leopoldina, Colina Boqueirão do Santilho, 300 m, 20º13'32.8"S 40º29'55.4"W, 11.IV.2009, *C. N. Fraga & al. 2323*, fr. (CEPEC!, MBML!, RB!, UPCB!); Boqueirão do Santilho, floresta na beira da Estrada, 302 m, 20°13'00"S 40°29'00"W, 11.IV.2009, *A. P. Fontana & al. 5868,* fl. (CEPEC, MBML!, RB!).

2. *Begonia wasshauseniana* L. Kollmann & Peixoto, **spec. nova** (Fig. 2).

Typus: Brazil. Espírito Santo: Águia Branca, Santa Luzia, Propriedade de Ciro Ferreira, 180-300 m, 18°59'9"S 40°40'6"W [flowering in cultivation at Mello Leitão Biological Museum greenhouse], 30.XII.2008, *L. Kollmann 11348,* fl. fr. (holo-: MBML!).

Species haec Begonia ruschii affinis, sed plantae majoribus, foliis statura, floribus pistillatis 2-prophyllum et fructus minoribus differt.

Suffrutescent herb 1.5-2 m tall, rupicolous to saxicolous, peltate trichomes, ca. 0.1 mm in diam. *Stems* 0.7-1.1 cm in diameter, brown to reddish, ferruginous trichomes, grey when dry, stem striate when dry, internodes 1-14 cm long. *Stipules* 8-9 × 3-3.5 mm, ferruginous, asymmetrical, falcate, deciduous, apex acute, stellate trichomes on abaxial face. *Leaves* alternate. *Petioles* 0.8-3.5 cm, reddish, peltate trichomes. *Lamina* 8-11.2 × 3.2-5.2 cm, adaxial face glossy, dark green; abaxial surface light green with grey stellate trichomes, simple, asymmetrical, transversely ovate to obovate, apex acuminate, base cordate, margins entire to crenulate with hydhatodes, venation actinodromous, veins 5-7, reddish abaxially, stomata in groups (clustered), multiple upper epidermis. *Inflorescence* 15-25 cm long, reddish, dichasium, five dichotomous cymes, grey peltate trichome when dry, bracts white-greenish with ferruginous trichomes, 0.4-1 × 0.15-0.5 cm flattened, ovate, falcate, concave, deciduous, apex obtuse. *Staminate flower:* pedicels ca. 6 mm long, pinkish with ferruginous trichomes; 2-prophylls in the first open staminate flower, ca. 7 × 5 mm, obovate, apex rounded, abaxial face with trichomes; 2-sepals, 4.5-6 × 3-4 mm, white, obovate, apex rounded, abaxial face with trichomes, 2-petals, 3-4.5 × 1.5-2.5 mm, white, obovate, apex rounded, glabrous; stamens ca. 25, yellow, filaments fused in a short column, 1-1.7 mm long, the filaments 0.5-1 mm long, the anthers 0.5-0.7 mm long, obovate, the connective lightly projecting, apex obtuse. *Pistillate flower*: pedicels 4-5.5 mm long, stellate trichomes; 2-sepals, white, 4.5 × 3-3.5 mm, elliptic, apex obtuse, stellate trichomes on abaxial face; 3-petals, white, 2.5-3.8 × 1.6-3 mm, unequal, elliptic to obovate, apex obtuse to rounded, stellate trichomes on abaxial face; style three, 1.3-1.5 mm long, yellow, bifurcate, united at base, spirally twisted, with bands of stigmatic papillae on the branches, glandulate papillae. *Ovary* 3-locular, placentation axile, one placenta per locule, ovules on both sides of placenta. *Capsules* 3-5 × 3-4.5 mm, white, basally dehiscent, 3-wings, 3.5-4 × 1-1.3 mm sub-equals, rounded. *Seeds* ca. 0.4 × 0.2 mm, cylindrical, oblong.

Taxonomy. – *Begonia wasshauseniana* has a compact inflorescence with the flowers touching each other when young but at inflorescence maturity the flowers are not in contact anymore, as *B. ruschii* L. Kollmann. The first staminate flower, in the middle of the first dichasium, has 2 prophylls in the apex of the pedicel, the other flowers do not have any prophylls.

This new species should be classified in sect. *Pritzelia* (Klotzsch) A. DC. due to the presence of one placenta per locule with ovules on both sides of the placenta and anther connectives extended.

Relationships. – *Begonia wasshauseniana* resembles *B. ruschii*, an endemic species from Espírito Santo state, by its suffrutescent habit, stellate trichomes, form of stipules, tepals, stamens and stigmas, and entire placenta. Nevertheless, it can be distinguished from *B. ruschii* by larger habit (1.5-3 m vs. 0.5-1.5 m), leaf size (8-11 × 3-5 cm vs. 6.5-18 × 4.5-10 cm), 2-prophylls in the first staminate flower only (vs. 2-prophylls in the base of the ovary); fruit smaller (0.6 × 0.6-0.7 cm vs. 0.6-1.2 × 1.1-1.6 cm). *Begonia wasshauseniana* resembles *B. albidula* Brade and *B. kuhlmannii* Brade, two endemic species from Espírito Santo, by the suffrutescent habit, rupicolous to saxicolous, leaves tranversely ovate, adaxial face glossy green. Nevertheless, it can be distinguished from them by its entire placenta (vs. placenta bifurcate), 2-prophylls on the first staminate flower (vs. 2-prophylls in the base of the ovary) (Table 2).

Etymology. – The epithet of this new species honors Dieter Carl Wasshausen for his outstanding contributions to the knowledge of *Begoniaceae*.

Distribution and ecology. – *Begonia wasshauseniana* grows in leaf litter and humus on rocks in sub-montane dense ombrophilous forest within inselberg habitats of the Atlantic Forest at 100-300 m. Flowers have been collected in December; fruits in April.

Table 2. – Morphological comparison of *Begonia wasshauseniana* L. Kollmann & Peixoto and its closest relatives (*B. ruschii* L. Kollmann, *B. kuhlmannii* Brade and *B. albidula* Brade).

	B. wasshauseniana	***B. ruschii***	***B. kuhlmannii***	***B. albidula***
Size [m]	1.5-3	0.5-1.5	1.5-2.5	0.5-2
Leaves [cm]	8-11 x 3-5	6.5-18 x 4.5-10	6-12.5 x 4-6.5	6.5-16 x 3.5-9
Prophylls (2)	first staminate flower	pistillate flowers	pistillate flowers	pistillate flowers
Fruit [cm]	0.6 x 0.6-0.7	0.6-1.2 x 1.1-1.6	0.5-0.8 x 1-1.2	0.7-1.1 x 0.8-1.1
Ovary	entire	entire	bifurcate	bifurcate

Conservation status. – Due to the apparent endemic distribution of *B. wasshauseniana,* with extent of the occurrence estimated to be less than 10 km^2, habitat severely fragmented and continuing decline of the area, extent and quality of habitat, it seems prudent to include this species in the Critically Endangered species list (CR) (B2ab(iii)) according to the criteria of the IUCN (2001).

Paratypus. – **Brazil. Espírito Santo:** Águia Branca, Santa Luzia, Propriedade de Ciro Ferreira, 18°59'9"S, 40°40'16"W, 180-300 m, 4.IV.2007, *V. Demuner & al. 3550,* fr. (MBML!, NY!, P!, RB!, SP!, VIES!).

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