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Five new species of *Ruellia* (Acanthaceae) from the Atlantic Forest of northeastern Brazil

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ABSTRACT

Five new species of *Ruellia* from the Atlantic Forest of northeastern Brazil are described: *Ruellia curupira*, *R. fulozinha*, *R. insurrecta*, *R. jiboia*, and *R. taboleirana*. *Ruellia curupira* (from the States of Alagoas and Bahia), *R. fulozinha* (Alagoas and Pernambuco), *R. insurrecta* (Alagoas), and *R. jiboia* (Alagoas and Bahia) occur exclusively in forested areas, whereas *R. taboleirana* is restricted to "Tabuleiros litorâneos" (Tabuleiro savanna) vegetation from Rio Grande do Norte to Alagoas. Due to the restricted distribution, resulting from high fragmented areas and the imminent threats, the five new species here proposed are provisionally considered under some degree of threat in accordance with the IUCN criteria. We provide morphological descriptions, comments on morphological affinities, data on habitat and distribution, as well as illustrations and photographs of living plants.

1 | INTRODUCTION

Ruellia L. is the second largest genus of Acanthaceae, after *Justicia* L., and includes ca. 300 species with tropical, subtropical, or temperate distribution (Daniel *et al.* 1984; Tripp 2007). The Neotropics are a very important center of diversity for this genus, and Brazil has a high species richness with 83 species, mainly distributed in the Cerrado and Atlantic Forest biomes (Ezcurra 1993; Tripp 2007; BFG 2018).

Studies based on molecular data indicate that *Ruellia* is a natural group (see Tripp 2007; Tripp & Darbyshire 2017), with New World taxa composed of nine lineages: three quite diverse lineages in species number (i.e., Euruellia, Physiruellia, and Ebracteolate lineages), and six somewhat less diverse lineages (Tripp 2007). Nonetheless, these studies have not contemplated all morphological diversity from Brazilian species of *Ruellia*, a country in which the genus is especially species rich. Future studies sampling the above mentioned groups may change or better clarify some of the phylogenetic arrangements already known. *Ruellia* is easily recognized by its flowers with corolla usually infundibuliform, blue (and its shades), almost actinomorphic, and four didynamous

stamens (Ezcurra 1993). However, due to its species richness and morphological diversity, its clearest synapomorphies are related to pollen morphology (Tripp & Darbyshire 2017).

In Brazil, the Atlantic Forest biome is the richest in *Ruellia* species, with 41 (out of 84 in the country) species being registered (BFG 2015, 2018). However, the Atlantic Forest is one of the most threatened biomes in the world and is considered as an important biodiversity hotspot for conservation priorities (Myers *et al.* 2000). In this context, northeastern Brazil is currently the most threatened portion of this biome due to its small and disconnected forest fragments, which were caused by the deforestation processes since the colonization of Brazil in the 16th century (Ranta *et al.* 1998).

2 | MATERIALS AND METHODS

In addition to the specimens from our field expeditions in forest fragments in the Atlantic Forest of northeastern of Brazil in the past 12 years, we studied herbarium specimens housed at CEPEC, HUEFS, K, MAC, NY, and UFP. The specimens were compared to types of morphologically related species at BM, G, GZU, K, P, and W (all acronyms are in accordance with Thiers 2019; except K and W, the type specimens were studied through JSTOR® Global Plants <https://plants.jstor.org/>), their protologues and other literature (e.g., Kunth 1818; Schlechtendal & Chamisso 1831; Nees 1847; Lindau 1897; Ezcurra & Wasshausen 1992; Ezcurra 1993; Wasshausen & Wood 2004; Tripp & McDade 2012). The general terminology used in the morphological descriptions follows Radford *et al.* (1974) and Harris & Harris (2001).

To infer the preliminary conservation status, we used the criteria "B" of the International Union for the Conservation of Nature – IUCN (2017). The GeoCAT tool (see Bachman *et al.* 2011; <http://geocat.kew.org/>) was used to calculate the area of occupancy (AOO), the extent of occurrence (EOO), and the AOO was based on 2 km^2 grids.

3 | TAXONOMY

Ruellia curupira E.C.O.Chagas & Costa-Lima, ***sp. nov.*** (Figures 1A, 2A–B).

Ruellia curupira resembles *R. ochroleuca* Mart. ex Nees but differs by the suffruticose few-branched habit (vs. many-branched), branches and leaves covered by red to brown trichomes (vs. white to hyaline), leaf-blades elliptic (vs. ovate to deltate), calyx lobes covered by eglandular trichomes (vs. stipitate-glandular), and corolla lobes purple (vs. creamy to greenish-yellow).

Typus—BRAZIL: Alagoas, Mun. Ibateguara, Coimbra, Grota da Burra, 29 March 2011 (fl, fr), *Chagas-Mota 10612* (holotype: MAC; isotypes to be distributed to: HUEFS, UFRN).

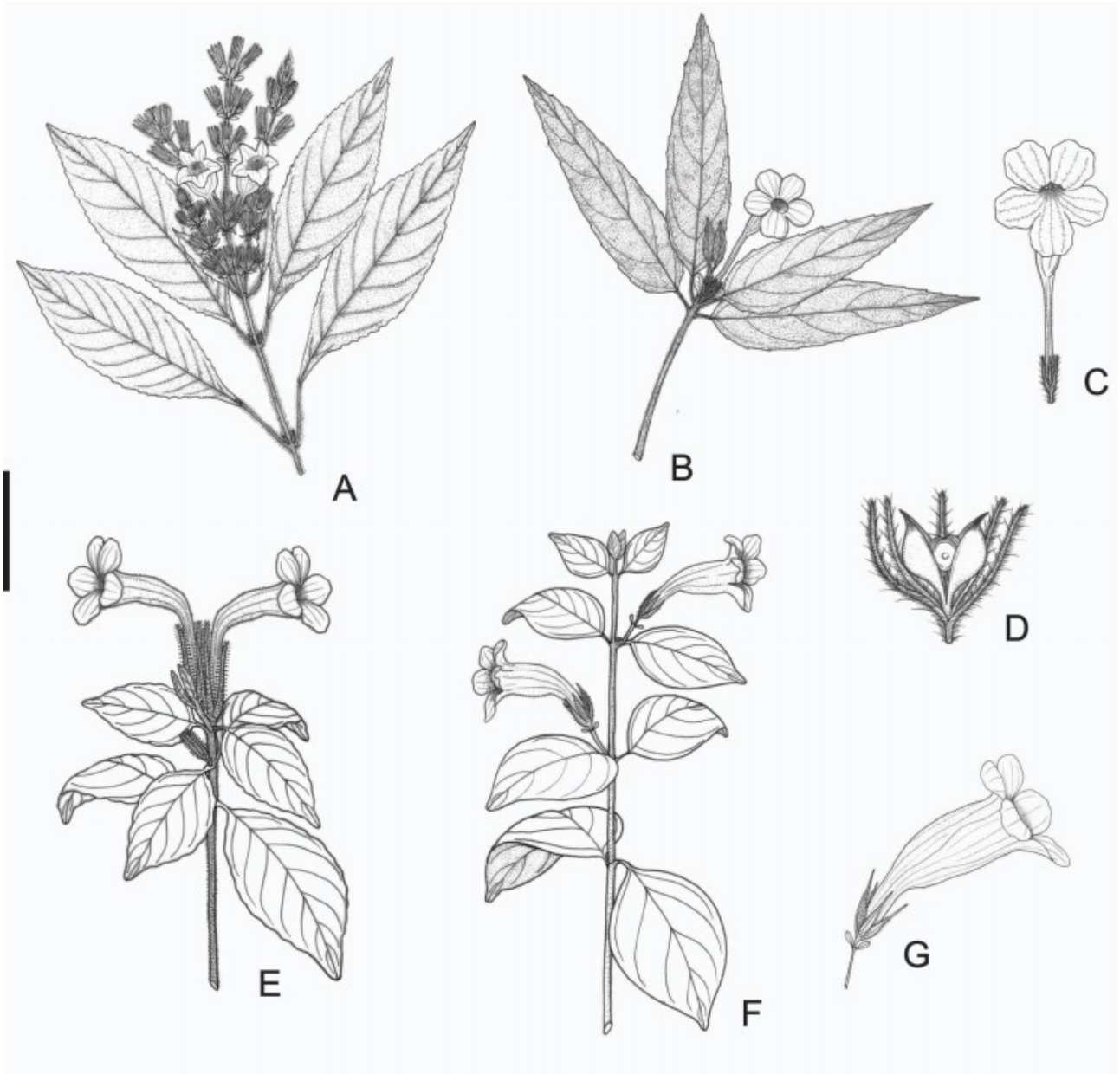

Figure 1. *Ruellia curupira*. A. Flowering branch (scale: 7 cm). *Ruellia fulozinha*. B. Flowering branch (scale: 5 cm). C. Flower detail (scale: 5 cm). D. Capsule (scale: 2.5 cm). *Ruellia insurrecta*. E. Flowering branch (scale: 5 cm). *Ruellia jiboia*. F. Flowering branch (scale: 6 cm). G. Lateral view of the flower (scale: 3 cm). Line drawings by Felipe Martins.

Suffruticose perennial 0.4–1 m tall; stems erect, few-branched, quadrangular, hispid, with pluricellular trichomes, 5–10-segmented gradually, translucent, filled with red to brown mucilage, deciduous. Petiole 1.5–6.6 cm long, hispid; leaf-blades 9–25.5 × 3.5–9 cm, elliptic, base attenuate, margin crenate, apex acute, hispid on both surfaces, with sparse pluricellular trichomes similar to those on the stems, eucamptodromus venation, secondary veins 10–14 pairs, alternately or suboppositely arranged, veins prominent on both surfaces. Inflorescences often spiciform cymes,

secund by abortion, or even developing on many-branched dichasial cymes, terminal, axis up to 20 cm long, hispid. Bracteoles 2, 2–4 mm long, oblong, rounded at the apex, hispid. Flowers sessile or

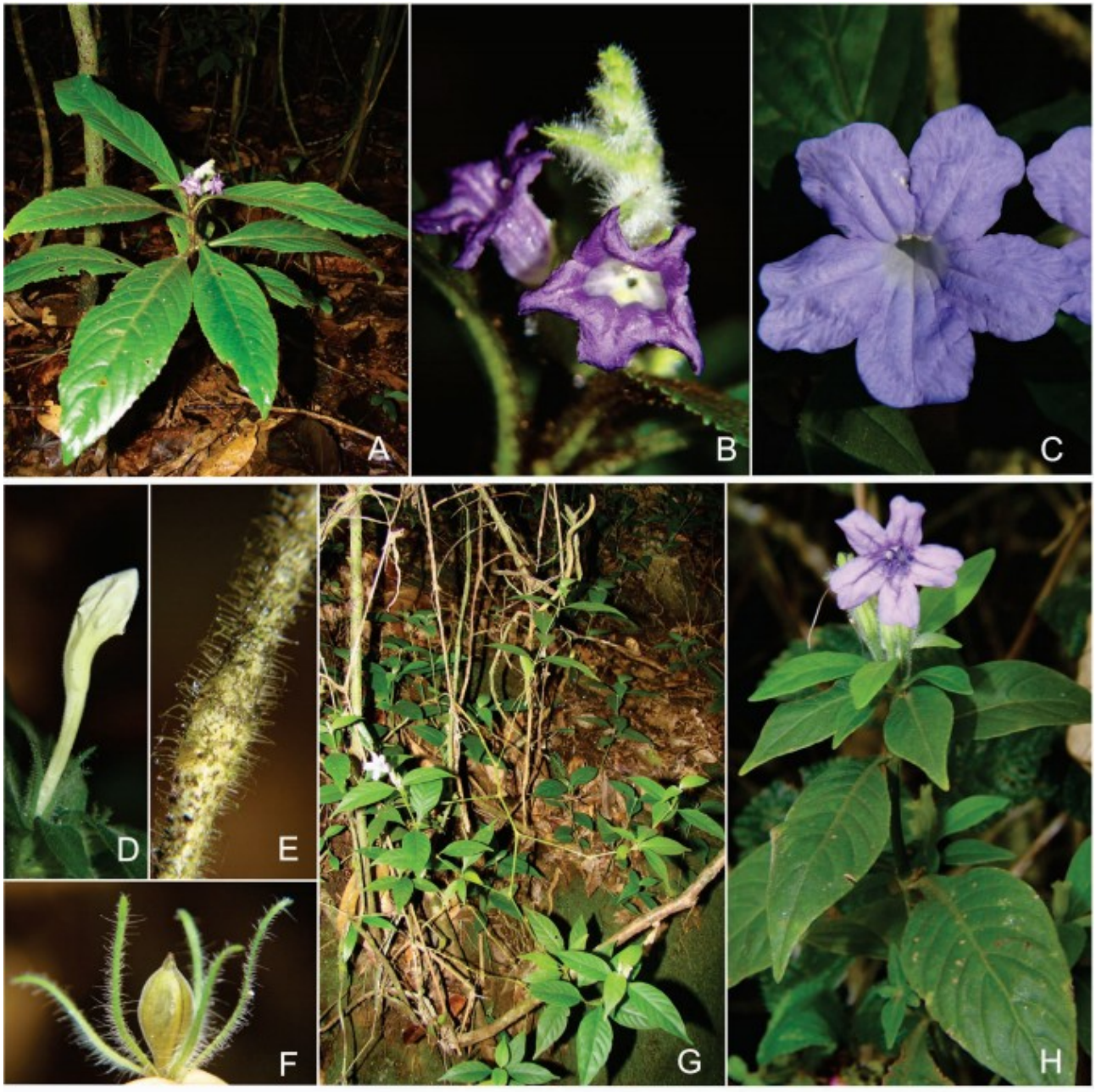

Figure 2. *Ruellia curupira*. A. Habit. B. Inflorescence detail. *Ruellia fulozinha*. C. Corolla, frontal view. D. Flower bud, showing the long corolla tube. E. Detail of the stem, showing the trichomes. E. Capsule. *Ruellia insurrecta*. G. Habit. H. Detail of the flowering branch. All photographs by the authors.

short-pedicellate. Calyx 5-lobed, free almost to the base, lobes 1.2–2.3 × 0.1–0.2 cm, equal, linear, apex rounded, hispid, trichomes pluricellular, 5–10-segmented gradually, hyaline. Corolla infundibuliform, purple outer, tube white inner, basal tube 1.5–1.8 × 0.3–0.5 cm, throat 1.5–2 × 0.6–0.8 cm, the lobes 0.5–0.7 × 0.3–0.4 cm, sparsely pubescent on both surfaces, the central lobe of the lower lip generally expanded, apex rounded, the other lobes recurved with deltoid appearance.

Stamens 4, included within corolla tube, strongly didynamous; filaments inserted ca. 1.5 cm above the base of the corolla, sparsely pubescent; the shorter pair 0.5–0.6 cm long, the longer pair 0.7–0.9 cm long; anther thecae 2.5–3 mm long, equal, base sagittate, glabrous. Ovary glabrous; style 2.5–2.7 cm long, sparsely pubescent, stigma minutely papillose; nectar disc annular. Capsule 0.9–1.4 cm long, ellipsoid, glabrous. Seeds 6–8 per capsule, ca. 2 mm diam., suborbicular, covered by dense hygroscopic adpressed trichomes, longer at the margin.

Additional specimens examined (paratypes)—BRAZIL: Bahia, Mun. Almadina, Serra do Corcovado, 13.8 km ao SW de Coaraci na estrada para Almadina, Fazenda São José, 14°42'21"S, 39°36'12"W, 650–900 m, 16 January 2007 (fr), *R.A.X. Borges* et al. *562* (CEPEC, HUEFS, NY, RB, UB, UESC); Mun. Apuarema, Concessão da Rio Tinto, 13°52'46"S, 39°41'18"W, 633 m, 22 November 2013 (fl), *L.Y.S. Aona* et al. *3328* (HURB, RB); Mun. Barra do Choça, estrada que liga Barra do Choça à Faz. Roda d'Água, 3–6 km a E de Barra do Choça, 22 November 1978 (fr), *S.A. Mori* et al. *11308* (CEPEC, K, NY, RB); Mun. Boa Nova, Fazenda São José, 8.8 km east of Boa Nova then 1.4 km north on Fazenda road, 14°23.42'S, 40°08.765'W, 850–1000 m, 14 October 2000 (fl, fr), *W.W. Thomas* et al. *12254* (NY); Mun. Gandu, estrada a Ituberá, 21 October 1970 (fl), *T.S. Santos 1162* (CEPEC); Mun. Ituberá, km 20 da estrada Gandú – Ituberá, rod. BA 120, 11 August 1980 (fr), *A.M. de Carvalho* et al. *315* (CEPEC, RB); Mun. Santa Teresinha [Elísio Medrado], Serra da Jibóia, 12°51'13"S, 39°28'32"W, 822 m, 25 October 2010 (fl, fr), *M.L. Guedes* et al. *17781* (ALCB, RB, VIES).

Etymology—According to Cascudo (1954), Curupira is one of the most popular forest protector entities in Brazilian folklore and is represented by a child (or dwarf) with the body covered with reddish hairs and feet facing backwards. This epithet was attributed to the new species by the fact that this species inhabits the interior of the woods, as Curupira, has hispid and reddish to brownish indumentum, like Curupira's hairy body, and the inflorescences sometimes are secund, such as Curupira's backward-facing feet.

Distribution and habitat—*Ruellia curupira* is known so far in the Atlantic Forest of the States of Alagoas and Bahia. It inhabits ombrophilous and semideciduous seasonal forests in elevations between 600–1000 m and is found in forest subcanopy or, less commonly, in open shaded areas.

Suggested conservation status— *Ruellia curupira* has a relatively large EOO (i.e., a little more than 46,000 km^2), and a small known AOO (32 km^2), especially considering the discontinuous and highly fragmented areas where this species occurs in the Atlantic Forest. Its subpopulations were recorded only within two protected areas: the Área de Proteção Ambiental (APA) de Murici, Alagoas (the type locality) and the Parque Nacional (PARNA) de Boa Nova, Bahia (the specimen *Thomas* et al. *12254* at NY), both consist of small forest fragments surrounded by large monocultures. Due to its reduced AOO, it is provisionally classified as Endangered (EN) based on IUCN (2017) criteria B2ab (i, ii, iii). *Ruellia curupira* was recorded in small forest fragments, and the habitat fragmentation is

undoubtedly its main threat. The main pressures that affect the maintenance of its subpopulations are the deforestation for sugarcane cultivation in the region of the type locality – the main sugarcane and ethanol mills of the State of Alagoas – and the extensive cattle farming in the other areas where this species was recorded.

Taxonomic comments—*Ruellia curupira* is characterized by its indumentum with long trichomes, long petioles, dichasial and many-branched inflorescences, sessile or short-pedicellate flowers, corolla lobes recurved and deltoid-like, and elliptical capsules. These characters are also shared with *R. ochroleuca*, a species disjointly distributed between eastern Brazil and Central America (i.e., Costa Rica, Guatemala, Honduras, and Nicaragua) in humid and dry environments (Tripp & McDade 2012). *Ruellia ochroleuca* was included in the Ruellia inundata clade (sensu Tripp 2007). This clade comprises odoriferous plants (due to its glandular trichomes) with capsules generally clavate (ellipsoid only in *R. paniculata* L. and *R. ochroleuca*). *Ruellia curupira* has these characteristics and is morphologically related to this clade, especially by the shape of the corolla similar to *R. ochroleuca*. However, both species can be easily separated by many vegetative and reproductive characters, as presented in its diagnosis. Additionally, *R. curupira* can be confused with *R. cearensis* Lindau, a species endemic to northeastern Brazil (BFG 2018), due to its many-branched inflorescences. However, *R. curupira* can be distinguished from *R. cearensis* by its infundibuliform (vs. cylindrical) and purple (vs. magenta) corolla.

Ruellia fulozinha E.C.O.Chagas & Costa-Lima, ***sp. nov.*** (Figures 1B–D, 2C–F).

Ruellia fulozinha is similar to *R. jussieuoides* Schltdl. & Cham. but differs from this species for being a few-branched subshrub (vs. many-branched) with woody (vs. herbaceous), cylindrical (vs. tetragonal to subtetragonal), and nodose (vs. not-nodose) stems, indumentum villous to hirsute when young and hirsute to pubescent when older (vs. glabrescent), leaf-blades lanceolate to ovate-lanceolate (vs. ovate to oblong-ovate), glandular trichomes 2–3 mm long (vs. 0.5–1 mm long), and capsule clavate (vs. oblong-clavate) with 1–4 (vs. 6–12) seeds.

Typus—BRAZIL: Alagoas, Mun. Quebrangulo, Reserva Biológica de Pedra Talhada, Grota do Cassaco, 23 October 2011 (fl), *Chagas-Mota, E.S. França & W.T.C.C. Santos 11327* (holotype: MAC; isotypes to be distributed to: HUEFS, UFRN).

Subshrubs 0.2–1.5 m tall; stems few-branched, cylindrical, nodose, woody, villous to hirsute when young, hirsute to pubescent when older, indumentum with glandular and eglandular trichomes mixed, the eglandular 3–5 mm long, hyaline, the glandular ones 2–3 mm, hyaline. Petiole 2–3 cm long, villous to hirsute; leaf-blades 9–14.5 × 3.2–4 cm, lanceolate to ovate-lanceolate, base decurrent, margin sparsely dentate and ciliate, apex acute to acuminate, pubescent on both surfaces, trichomes densely concentrated on the veins, hyaline, eucamptodromous venation, secondary veins

8–10 pairs, alternately or oppositely arranged, veins impressed on adaxial surface, prominent on abaxial surface. Inflorescences reduced to a solitary axillary flower. Bracteoles 2, 1.5–2.3 × 0.6–0.9 cm, green, elliptic, spatulate to ovate-lanceolate, apex rounded or obtuse, hirsute to pubescent on both surfaces, with glandular and eglandular trichomes mixed, margin long ciliate. Flower with pedicels 0.1–0.3 cm long, villous to hirsute. Calyx 5-lobed, free almost to the base, lobes 2–2.4 × 0.08–0.1 cm, equal, linear, apex rounded, pubescent to hirsute on both surfaces, margin ciliate. Corolla infundibuliform, pale lavender, tube white inner, basal tube 3.2–4.5 × 0.2–0.4 cm, throat 1.8–2.2 × ca. 0.5 cm, sparsely pilose on both surfaces, the lobes 1.8–2.2 × 1–1.4 cm, glabrous on both surfaces. Stamens 4, included, strongly didynamous; filaments inserted 2.2–3 cm above the base of the corolla, sparsely pilose; the shorter pair 0.8–1 cm long, the longer pair 1.6–2 cm long; anther thecae 3–3.5 mm long, equal, base sagittate, glabrous. Ovary 3–3.5 × 0.8–1 mm, sericeous; style 3.9–4.2 cm long, arcuate, pubescent, with glandular and eglandular trichomes mixed, stigma minutely papillose; nectar disc annular. Capsule 1.1–1.6 cm long, ellipsoid, clavate, sericeous. Seeds 4 per capsule, 4–5 mm diam., orbicular, covered by hygroscopic trichomes concentred on the margins.

Additional specimens examined (paratypes)—BRAZIL: Alagoas, Mun. Chã Preta, Reserva do Patrimônio Particular de Vera Cruz, 16 October 2006 (fl), *M.N. Rodrigues* et al. *2075* (MAC); ibidem, Serra Lisa, 16 October 2010 (fr), *Chagas-Mota & J.M. Ferreira 9099* (MAC); Mun. Quebrangulo, Reserva Biológica de Pedra Talhada, 4 October 2010 (fr), *Chagas-Mota 8770* (MAC); ibidem, 5 October 2010 (fr), *Chagas-Mota 8912* (MAC – 2 sheets); ibidem, 22 October 2011 (fl), *Chagas-Mota* et al. *11293* (MAC); ibidem, 22 October 2011 (fl, fr), *Chagas-Mota* et al. *11311* (MAC); ibidem, 27 November 2011 (fl, fr), *D. Araújo 1862* (HRCB, NY); ibidem, 6 October 2013 (fr), *R.P. Lyra-Lemos* et al. *13799* (MAC); ibidem, 6 October 2013 (fl, fr), *R.P. Lyra-Lemos* et al. *13844* (MAC); ibidem, 7 December 2013 (fl), *J.S. Correia* et al. *35* (MAC); ibidem, 22 October 2014 (fl, fr), *L. Nusbaumer 4191* (JPB, MAC, UFP); ibidem, 28 October 2014 (fl), *L. Nusbaumer 4244* (JPB, MAC); Mun. São José da Lage, Grota do Inácio, 13 August 2013 (fl, fr), *J.W. Alves-Silva & J.S. Correia 1379* (MAC). Pernambuco, Mun. Caruaru, Brejo dos Cavalos, Distrito de Murici, 1100 m, 4 September 1995 (fr), *M. Oliveira* et al. *63* (K, PEUFR); ibidem, 5 September 1995 (fl, fr), *K. Andrade & M. Andrade 205* (K, PEUFR); ibidem, 11 September 1995 (fr), *M.R.C.S. Melo* et al. *215* (K, PEUFR); ibidem, 19 October 1996 (fr), *M.C. Tschá* et al. *302* (K, PEUFR); ibidem, 19 October 1996 (fl, fr), *M.C. Tschá* et al. *313* (K, PEUFR); ibidem, 750–1000 m, 20 October 1996 (fl), *J.A. Siqueira-Filho & G.S. Baracho 222* (UFP); ibidem, 1 December 1998 (fl), *E. Locatelli & P. Medeiros s.n.* (UFP 39157); ibidem, 28 September 1999 (fl), *E. Locatelli & P. Medeiros s.n.* (UFP 39228).

Etymology—The name derives from Comadre Fulozinha [misspelling of Comadre Florzinha], a common character in the folklore of some States of northeastern Brazil (e.g., Rio Grande do Norte, Paraíba, Pernambuco) who protects the woods. Also called Flor-do-Mato (Cascudo 1954), it is

usually associated with Curupira (see *Ruellia curupira* etymology) and Caipora, sometimes considered as the same entity and with the same customs.

Distribution and habitat—*Ruellia fulozinha* occurs in the States of Alagoas and Pernambuco, and is common in subcanopy of ombrophilous and semideciduous seasonal forests in the Borborema Plateau, in elevations between 600–1100 m. The vegetation type where this species occurs is locally known as "*brejo de altitude*," which, based on Thomas & Barbosa (2008) compilation, are seasonal forests in high elevation in northeastern Brazil, especially in the Borborema Plateau, surrounded by the xeric vegetation.

Suggested conservation status—*Ruellia fulozinha* has a reduced EOO (ca. 1,820 km^2) and AOO (32 km^2) and occurs in insular vegetation. In addition to the confinement, these areas are historically fragmented by human occupation, extensive cattle farming, and sugarcane cultivation, especially in the State of Alagoas. Most of its subpopulations were recorded in protected areas: Reserva Biológica de Pedra Talhada (Mun. Quebrangulo, Alagoas), Reserva Particular do Patrimônio Natural Vera Cruz (Mun. Chã Preta, Alagoas), and Parque Natural Municipal Professor João Vasconcelos Sobrinho (Mun. Caruaru, Pernambuco). Nonetheless, *R. fulozinha* is provisionally classified as Endangered (EN) based on IUCN (2017) criteria B12ab (i, ii, iii).

Taxonomic comments—*Ruellia fulozinha* has pubescent seeds with hygroscopic trichomes concentrated on the margins, like other species in the Physiruellia group (sensu Ezcurra 1993) or Physiruellia clade (sensu Tripp 2007). Several species in this clade have flowers with red or pink corollas or rarely lavender to purple corollas, as *Ruellia jussieuoides*, with whom *R. fulozinha* is most morphologically related. Both species share leaf-blades with prominent secondary venation, axillary and solitary flowers with lavender to purple corolla, and long and extremely narrow tubes, uncommon among species of *Ruellia*. However, *R. fulozinha* differs from *R. jussieuoides* by the characters presented in its diagnosis. Additionally, *R. fulozinha* occupies the subcanopy of ombrophilous and seasonally dry forests in the Atlantic Forest domain in the States of Alagoas and Pernambuco. On the other hand, *R. jussieuoides* sensu Tripp & McDade (2012) is a quite common species in corridors of seasonally dry forests of Mexico and Central and South America (Brazil, Bolivia, Ecuador, and Peru).

Ruellia insurrecta E.C.O.Chagas & Costa-Lima, ***sp. nov.*** (Figures 1E, 2G–H).

Ruellia insurrecta resembles *R. epallocaulos* Leonard ex C.Ezcurra & Wassh. but differs by the leaves decurrent (vs. non-decurrent), patelliform glands present (vs. absent) on young branches and leaf-blades, bracteoles absent (vs. present), flowers solitary (vs. flowers 1–2 in shortly pedunculate reduced cymes), pedicels covered by stipitate-glandular trichomes (vs. eglandular), calyx lobes

densely covered by mixed glandular and eglandular trichomes (vs. glabrescent only with eglandular trichomes), corolla lobes emarginate at the apex (vs. rounded), and capsules with stipitate-glandular trichomes (vs. glabrous).

Typus—BRAZIL: Alagoas, Mun. Murici, Serra do Ouro, 14 September 2012 (fl), *E.C.O. Chagas & J.W. Silva 12566* (holotype: MAC, isotype to be distributed: HUEFS).

Suffruticose perennial 0.2–0.5 m tall; stems erect or somewhat decumbent, quadrangular, glabrescent, with patelliform glands on young branches; rooting at the nodes. Leaves slightly anisophyllous, sessile; petiole 2–3 cm long, villous to hirsute; blades 2.8–8.8 × 0.9–2.5 cm, elliptic to broadly elliptic, base decurrent, margin setulose, apex acuminate, adaxial surface with sparse hyaline and short trichomes on both surfaces, puberulent on the veins, with patelliform glands on both surfaces, irregularly crenulate, eucamptodromus venation, secondary veins 5–8 pairs, alternately or subopposite arranged, impressed on adaxial surface, prominent on abaxial surface. Inflorescences reduced to solitary axillary flower; pedicels 0.7–1 cm long, covered by stipitate-glandular trichomes. Calyx 5-lobed, free almost to the base; lobes 11–25 × 1–2.2 mm, equal, linear, apex rounded, chartreuse-green in sicco, indumentum with glandular and eglandular trichomes mixed on both surfaces, glandular trichomes papillose-setulose and stipitate-glandular. Corolla infundibuliform, lavender with purple striae, tube white inner, basal tube 1.6–2.2 × 0.3–0.5 cm, throat 1.8–2.2 × 0.6–0.8 cm, the lobes 1–1.4 × 0.6–1 mm, apex emarginate, pubescent outer, glabrous inner. Stamens 4, included, strongly didynamous; filaments inserted ca. 1.6 cm above the base of the corolla, glabrous; the shorter pair 0.7–1.6 cm long, the longer pair 1.4–2 cm long; anther thecae 3–4 mm long, equal, falciform, glabrous. Ovary densely covered by glandular trichomes; styles 15–28 mm long, pilose, stigma minutely papillose; nectar disc annular. Capsule 13–15 mm long, clavate, with stipitate-glandular trichomes. Seeds 4 per capsule, suborbicular, the 2 upper long seed 3–4 mm diam., the 2 lower short seeds 2–2.5 mm diam., covered by dense hygroscopic adpressed trichomes, longer at the margin.

Additional specimen examined (paratype)—BRAZIL: Alagoas, Mun. Murici, Serra do Ouro, 5 July 2012 (fl, fr), *E.C.O. Chagas & M.C.S. Mota 12219* (MAC, UFRN).

Etymology—The epithet originates from the Latin "*insurrectio*," which means insurgent. The name is in honor of Quilombo dos Palmares, the most iconic refuge of African slaves and its descendant in Brazil, which resisted for almost a century (from 1633 to 1697) to the attacks of the Portuguese Kingdom (Espindola 1871). The Quilombo dos Palmares was settled in the surrounding areas of where the new species is found.

Distribution and habitat—*Ruellia insurrecta* is so far only known in the Serra do Ouro, municipality of Murici, in the State of Alagoas. It occupies the subcanopy in shady areas of ombrophilous submontane forests in the Atlantic Forest domain, in elevations between 400–600 m.

Suggested conservation status—*Ruellia insurrecta* is known only from the type locality, with an AOO of 4 km^2, within the Estação Ecológica of Murici, State of Alagoas. However, this protected area still suffers from deforestation for sugarcane crops and extensive cattle farming. Thus, it is provisionally classified as Critically Endangered (CR) based on IUCN (2017) criteria B12ab (i, ii, iii).

Taxonomic comments—*Ruellia insurrecta* has glandular trichomes, especially in the calyx lobes, sharing this character with *R. brachysiphon* (Nees) Benth. & Hook.f. ex Hiern, *R. macrosolen* Lillo ex C.Ezcurra, and *R. multifolia* (Nees) Lindau. Despite the presence of glandular trichomes, *R. insurrecta* has reduced foliar structures and gemmae associated to the inflorescence (which commonly lacks floral bracteoles). This morphology matches that of *R.* sect. *Dipteracanthus* (Nees) Lindau, the informal taxonomic group Ebracteolati (sensu Ezcurra 1993), or the Ebracteolati lineage (sensu Tripp 2007). It is also morphologically similar to *R. epallocaulos* due to both sharing the erect to decumbent habit, stems rooting at nodes, and identical corolla color. Those species differ on the characters mentioned in the diagnosis of *R. insurrecta*. Additionally, *R. insurrecta* is restricted to the ombrophilous submontane forests in the State of Alagoas, northeastern Brazil, whereas *R. epallocaulos* is found in shaded areas within gallery forests near watercourses in eastern Paraguay, northeastern Argentina, and southern Brazil (State of Paraná) along the Paraná River Basin (Ezcurra & Wasshaussen, 1992).

Ruellia jiboia E.C.O.Chagas & Costa-Lima, ***sp. nov.*** (Figures 1F–G, 3A).

Ruellia jiboia is morphologically similar to *R. sprucei* Lindau, differing by the shorter petiole (0.5–0.7 vs. 1–5 cm long), leaf-blades glabrous on both surfaces with sparse hyaline trichomes on the veins (vs. glabrescent to pubescent), calyx and corolla with glandular trichomes (vs. eglandular) externally, calyx lobes ovate to elliptic-lanceolate (vs. linear), corolla lavender (vs. white), and lobes of the upper lip shorter than the lower lip (vs. equal).

Typus—BRAZIL: Alagoas, Mun. Flexeiras, Serra das Águas Belas, 14 September 2012 (fl), *E.C.O. Chagas & J.W. Alves-Silva 12493* (holotype: MAC; isotypes to be distributed to: HUEFS, UFRN).

Woody vine; stems tetragonal, usually with internodes inflated at the base, pubescent. Petiole 0.5–0.7 cm long, with sparse eglandular trichomes; leaf-blades 5–7.7 × 2–3.5 cm, elliptic to ovate, base convex to cuneate, margin ciliate with glandular and eglandular trichomes mixed, the eglandular trichomes 0.2–0.4 mm long, hyaline trichomes, apex acute to acuminate, glabrous on both surfaces, with sparse hyaline eglandular trichomes only on the veins, eucamptodromus venation, secondary

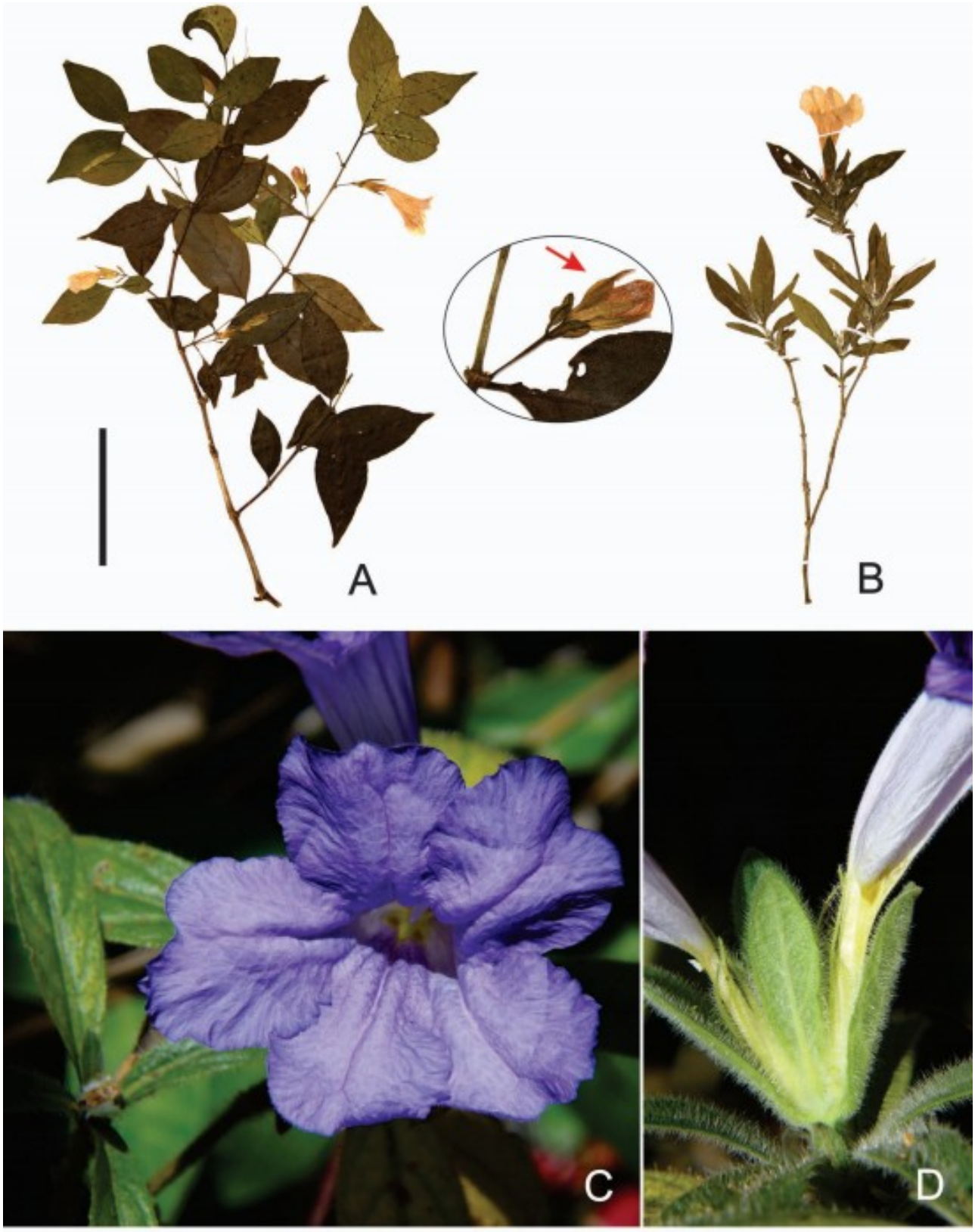

Figure 3. *Ruellia jiboia*. A. Flowering branch in sicco, with detail of the upper calyx lobe (pointed out by the red arrow). *Ruellia taboleirana*. B. Flowering branch in sicco. C. Corolla, frontal view. D. Corolla tube, lateral view. Scale: 6 cm. All photographs by the authors.

veins 5–10 pairs, alternately or suboppositely arranged, veins impressed on the adaxial surface, prominent on the abaxial surface. Inflorescences dichasial cymes with solitary flowers by abortion, flowers alternately arranged on the nodes (noted by the scars), axis 1–2 cm long, glabrescent to glabrous. Bracteoles 2, 0.5–0.6 × 0.2–0.3 cm, narrowly elliptic, apex obtuse. Flowers with pedicels 0.25–0.3 cm long, glabrescent to glabrous. Calyx 5-lobed, free almost to the base; lobes 1.2–1.5 × 2.5–3 cm, ovate to elliptic-lanceolate, glabrescent to glabrous on both surfaces, sparse glandular and eglandular hyaline trichomes on veins, apex acuminate, margin ciliate with glandular and eglandular hyaline trichomes, dorsal lobe slightly longer than the others. Corolla infundibuliform, lavender, basal tube 1.2–1.5 × 0.3–0.5 cm, throat 2.2–2.6 × 0.6–0.8 cm, the lobes 1–1.4 × 0.6–1 cm, apex emarginate, tube and lobes glabrous inner, pubescent outer, trichomes glandular and eglandular concentred on veins, margin ciliate. Stamens 4, included within corolla tube, strongly didynamous; filaments inserted ca. 1.2 cm above the base of the corolla, pubescent at the base, arcuate; the shorter pair 3.2–3.5 cm long, the longer pair 4–4.2 cm long, anther thecae 3–3.5 mm long, equal, glabrous. Ovary 2.5–3 × 1.5–2 mm, sericeous; style 3–3.2 cm long, pubescent, arcuate; stigma minutely papillose; nectar disc annular. Capsule not seen.

Additional specimen examined (paratype)—BRAZIL: Bahia, Mun. Entre Rios, Algodão, 12°10’00”S, 37°58’00”W, 150 m, 19 February 2016 (fl), *A.V. Popovkin & J.C. Mendes 1976* (HUEFS).

Etymology—The name “jiboia” comes from the Old Tupi language “mboîa” and means snake (Navarro 2013). This name is widely applied to South American boid snakes, especially to *Boa constrictor* (Linnaeus, 1758). The epithet was attributed due to the uncommon climbing habit in *Ruellia*, alluding to a snake.

Distribution and habitat—*Ruellia jiboia* was recorded in the States of Alagoas and Bahia. It occurs in clearings of semideciduous seasonal forests, in elevations between 100–300 m.

Suggested conservation status—*Ruellia jiboia* is known, so far, from two localities, Serra das Águas Belas, Alagoas, where it was also observed (without herbarium specimens) in adjacent areas, and at Fazenda Algodão, in northern Bahia. Although with relatively wide EOO (224,542 km^2), this species occurs in discontinuous and historically degraded areas, with AOO = 12 km^2. The main threat to this species is habitat fragmentation due to deforestation for sugarcane crops (in the State of Alagoas) and orange crops (in the State of Bahia), as well as cattle farming. Thus, we suggest to provisionally classify this species as Endangered (EN) based on the IUCN (2017) criteria B2ab (i, ii, iii). Only the subpopulations from the State of Alagoas are located within the limits of a protected area, the Estação Ecológica de Murici.

Taxonomic comments— *R. jiboia* is one of the few species of this genus with scandent or climbing habit, such as: *Ruellia affinis* (Schrad.) T.Anderson (from Brazil), *R. beckii* Wassh. & J.R.I.Wood

(Bolivia), *R. exserta* Wassh. & J.R.I.Wood (Brazil), *R. haenkeana* (Nees) Wassh. (Bolivia and Peru), *R. inflata* Rich. (Bolivia, Brazil, French Guiana, and Suriname), *R. liesneri* Wassh. (Venezuela), *R. sprucei* (Brazil and Venezuela), and *R. steyermarkii* Wassh. (Venezuela). Except for *R. affinis*, which is endemic to the Brazilian Atlantic Forest, most of the remaining species occur in the Amazonia rainforest (Wasshausen 1992; Wasshausen & Wood 2003, 2004; Kameyama 2006; Funk et al. 2007; BFG 2018). Among the known climbing species of *Ruellia*, *R. jiboia* is morphologically related to the Amazonian *R. sprucei*, especially by the foliar and floral morphology, as well as by the presence of exerted stamens. Those species can be separated by the characters presented in the abovementioned diagnosis. *Ruellia jiboia* can also be readily separated from the other climbing species of *Ruellia* from the Atlantic Forest (i.e., *R. affinis*) by the shape of the corolla tube (broad in *R. jiboia* vs. narrow in *R. affinis*), position of the corolla lobes (non-reflexed vs. reflexed), color (lavender vs. deep red), scission of the 3 inferior lobes (slightly partite vs. deeply partite) and the insertion of stamens in the corolla (included vs. exerted).

Ruellia taboleirana E.C.O.Chagas & Costa-Lima, ***sp. nov.*** (Figure 3B–D).

Ruellia taboleirana resembles *R. geminiflora* Kunth, but both can be separated by the stems hirsute in *R. taboleirana* (vs. pubescent and hirsute only at the nodes in *R. geminiflora*), leaf-blades lanceolate or elliptic (vs. widely elliptic), with eglandular trichomes (vs. glandular), margin flat (vs. sinuous), bracteoles present (vs. absent), calyx lobes densely covered by eglandular trichomes (vs. glandular), corolla colour (lavender vs. purple or white tinted with purple), length (5–6 cm long vs. 3–4 cm long), filaments length (1–2.2 vs. 0.5–1 cm long), and capsule pilose (vs. puberulous).

Typus—BRAZIL: Rio Grande do Norte, Mun. Macaíba, Escola Agrícola de Jundiaí, área de tabuleiro após a cachoeira, 5°53'11.6"S, 35°21'27.6"W, 40 m, 3 March 2017 (fl, fr), *J.L. Costa-Lima & E.C.O. Chagas 2781* (holotype: HUEFS; isotypes to be distributed to: F, MAC, UFRN, W).

Herbs or subshrubs 0.3–0.5 m tall; stems tetragonal, usually with inflated internodes at the base, hirsute, with hyaline eglandular trichomes. Petiole 0.2–0.4 cm long, sometimes absent, hirsute to pubescent, with hyaline eglandular trichomes; leaf-blades 1–4 × 0.3–1.1 cm, lanceolate or elliptic, base acute to decurrent, margin ciliate, apex acute, adaxial surface pubescent with hyaline eglandular trichomes, setose on veins, abaxial surface setose, trichomes more concentrated on the veins, eucamptodromus venation, secondary veins 4–5 pairs, alternately or subopposite arranged, veins impressed on adaxial surface, prominent on abaxial surface. Inflorescences reduced to solitary axillary flower; bracts 5–6 mm, spatulate; bracteoles absent. Flower sessile. Calyx 5-lobed, free almost to the base, deciduous; lobes 0.8–1.2 × 0.15–0.2 cm, slightly unequal, narrowly triangular to linear, villous on both surfaces, margin ciliate. Corolla infundibuliform, lavender, lobes with deep lavender line at the margin, tube yellow inner, basal tube 2.8–2.2 × 0.3–0.5 cm, throat 1.8–3.4 × 0.6–0.8 cm, tube sparsely pilose inner, the lobes 0.8–1.4 × 0.6–1 cm, apex deeply emarginate, setose

outer, glabrous inner. Stamens 4, included within corolla tube, strongly didynamous; filaments inserted ca. 1.5–3 cm above the base of the corolla, arcuate, glabrous; the shorter pair 1–1.6 cm long, the longer pair 1.8–2.2 cm long; anther thecae 2–3 mm long, equal, non-appendiculate, glabrous. Ovary 1.5–2 × 0.5–0.8 mm, pubescent; style 2–2.8 cm long, pilose, arcuate; stigma minutely papillose; nectar disc annular. Capsule 6–8 mm long, ellipsoid, pilose, green when young, green or chestnut-brown when ripe. Seeds 4, 3–4 mm diam., suborbicular.

Additional specimen examined (paratypes)—BRAZIL: Alagoas, Mun. Maceió, Campus UFAL, 17 February 2011 (fl, fr), *Chagas-Mota 10203* (MAC); Mun. Satuba, APA do Catolé e Fernão Velho, 27 November 2010 (fl), *Chagas-Mota 7049* (MAC). Rio Grande do Norte, Mun. Ceará-Mirim, RN 309 sentido Pureza, 5º34'38"S, 35º26'45"W, 63 m, 8 August 2014 (fl, fr), *J. Jardim* et al. *6723* (UFRN); ibidem, área para instalação da LT [Linha de Transmissão] Ceará-Mirim – João Câmara, 5º40'20"S, 35º38'53"W, 53 m, 23 January 2016 (fl), *E.O. Moura & A.R.V. Nunes 480* (UFRN); Mun. Macaíba, Escola Agrícola de Jundiaí, trilhas no tabuleiro ao lado do açude, 5º53'18"S, 35º21'16"W, 48 m, 23 August 2018 (fr), *V.P. Moreira 385* (UFRN); ibidem, 5º53'20"S, 35º21'30"W, 39 m, 12 January 2019 (fl), *V.P. Moreira 388* (UFRN); Mun. Parnamirim, área do empreendimento Alto do Cotovelo, 5º57'37"S, 35º09'11"W, 17 m, 13 September 2016 (fl, fr), *E.O. Moura* et al. *976* (UFRN).

Etymology—The epithet refers to the environment where the species occurs, "Tabuleiros litorâneos."

Distribution and habitat—*Ruellia taboleirana* is known in the State of Rio Grande do Norte and Alagoas. It occurs in the areas of the "Tabuleiros litorâneos" [or "Tabuleiros Costeiros"]. According to the Thomas & Barbosa (2008) compilation, the "Tabuleiros litorâneos" are areas with savanna physiognomy vegetation on flat relief scattered along the coast of northeastern Brazil.

Suggested conservation status—*Ruellia taboleirana* has a relatively extensive EOO (i.e., ca. 13,240 km^2), its AOO is extremely reduced (i.e., 20 km^2) due to the fact that this species has its distribution limited to savanna fragments scattered along the coast of northeastern Brazil, a region also known as "Tabuleiros litorâneos". *Ruellia taboleirana* was recorded in the States of Rio Grande do Norte and Alagoas, but it is likely that other subpopulations might be found in the remaining "Tabuleiros litorâneos" from the States of Paraíba, Pernambuco, and Sergipe. In this context, due to the discontinuity of the environment in which this species occurs (i.e., scattered savanna fragments within the Atlantic Forest), it is provisionally classified as Endangered (EN), based on the IUCN (2017) criteria B2ab (i, ii, iii). The "Tabuleiros litorâneos" are severely endangered ecosystems in northeastern Brazil because they occur along the coast and occupying plane areas, which has been historically occupied by urban environments or sugarcane crops (especially within the State of Alagoas). This species has been recorded, so far, within the limits of a single protected area – Área de Proteção Ambiental do Catolé e Fernão Velho – located between the municipalities of Satuba and

Maceió (State of Alagoas capital city). The area where *R. taboleirana* occurs is constantly declining due to the allotment of areas for urban expansion in the outskirts of the municipalities of Maceió (State of Alagoas) and Natal (State of Rio Grande do Norte).

Taxonomic comments—*Ruellia taboleirana* has small foliar structures and gemmae associated with the inflorescences, absence of bracteoles, sessile and solitary flowers, and infundibuliform and lavender corollas. These characters place this species in *R*. sect. *Dipteracanthus*, also known as the informal taxonomic group Ebracteolati (sensu Ezcurra 1993) or Ebracteolati lineage (sensu Tripp 2007). The presence of the not markedly swollen nodes on stems and deciduous calyx after capsule opening demonstrates the morphological proximity of *R. taboleirana* with *R. geminiflora*, a widely distributed species in open grasslands of Central America, West Indies, and savannas of South America (Colombia/Venezuela to eastern Bolivia and southern Brazil, Paraguay, and northeastern Argentina) (Ezcurra 1993). However, both species can be distinguished by the indumentum of the stems, shape of leaf-blades and trichome type, presence/absence of bracteoles, glandular trichomes on the calyx lobes, corolla and filaments, and by the capsule indumentum, as presented in the above diagnosis. Additionally, *R. taboleirana* is restricted to the "Tabuleiros litorâneos" in northeastern Brazil, whereas *R. geminiflora* occurs in savannas from Central Brazil, especially in periodically burnt areas.

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