Velloziaceae in honorem appellatae

Phytotaxa, Auckland, v.175, n.2, p.85-96, 2014
http://www.producao.usp.br/handle/BDPI/46069

Phytotaxa 175 (2): 085–096
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.175.2.3

Velloziaceae *in honorem appellatae*

RENATO MELLO-SILVA & NANUZA LUIZA DE MENEZES
University of São Paulo, Department of Botany, Rua do Matão, 277, 05508-090 São Paulo, SP, Brazil; E-mail: mellosil@usp.br

Abstract

Four new species of *Vellozia* are described and named after people linked to Velloziaceae and Brazilian botany. *Vellozia everaldoi*, *V. giuliettiae, V. semirii* and *V. strangii* are endemic to the Diamantina Plateau in Minas Gerais, Brazil. *Vellozia giuliettiae* and *V. semirii* are small species that share characteristics that would assign them to *Vellozia* sect. *Xerophytoides*, which include an ericoid habit with no leaf furrows and six stamens. *Vellozia everaldoi*, although a small, ericoid species, could not be placed in that section because it has conspicuous furrows, although it is considered closely related to species of that section. The fourth species, *V. strangii*, is a relative large species closely related to *V. hatschbachii*. Descriptions and illustrations of the species are followed by a discussion of their characteristics and putative relationships.

Key words: Brazil, *campos rupestres*, Espinhaço Range, *Vellozia*, *Vellozia* sect. *Xerophytoides*, *Xerophyta*

Introduction

Vellozia Vandelli (1788: 32) comprises a few more than 100 species endemic to the Neotropics, mostly in relatively dry, rocky or sandy habitats (Mello-Silva 2010, Mello-Silva *et al.* 2011). Following revision of Neotropical members of the family (Smith & Ayensu 1976), several new species have been described (Smith & Ayensu 1979, 1980, Smith 1985a,b, 1986, Menezes 1980a, Menezes & Semir 1991, Mello-Silva & Menezes 1988, 1999a,b, Mello-Silva 1991a, 1993, 1994, 1996, 1997, 2004a, in press, Alves 1992, 2002, Alves *et al.* 2014, Ibisch *et al.* 2001), probably indicating a large number of species yet to be discovered. Factors that led to this result are the restricted distribution of most of the species and the difficulty of accessing large areas of central Brazil (Mello-Silva & Menezes 1999a). The four species described here are endemic to the Diamantina Plateau in the southern portion of the Espinhaço Range in Minas Gerais State, Brazil, an undoubtedly rich area (Giulietti *et al.* 1997) where the family has achieved its maximum diversity (Menezes 1980b, Mello-Silva 2004b, 2010). Three of these are inconspicuous species, although forming dense populations on rocky outcrops, but one is a showy and locally abundant species. They are all named after distinguished Brazilian botanists and/or people linked to Velloziaceae. One of the drawings is by Rogério Lupo, a Margaret Flockton Award recipient.

Taxonomic Treatment

Vellozia everaldoi N.L.Menezes, *sp. nov.* (Figs. 1, 5A)

Vellozia everaldoi differs from all other species of *Vellozia* by its aquiferous hypodermis extending to furrows only. It is closer to *V. taxifolia* but differs from it by its arcuate leaves.

Type:—BRAZIL. Minas Gerais: Gouveia, Fazenda Contagem, 13 km à direita da rodovia Curvelo-Diamantina, 29 August 1981 (fl, fr), *Giulietti, Semir, Menezes, Giulietti & Mattos CFCR1760* (holotype SPF!, isotypes K!, L!, NY, RB!, SP!, US).

Solitary, ericoid herbs, 5–25 cm tall. Stem much branched, to 1 cm diam. at base and 2–3 mm diam. at apex. Leaves spirotristichous, arcuate, sheaths brown, stramineous with serrate margins at apex, lamina 6.0–18.0 × 1.5–2.0 mm, linear-triangular, conduplicate and semiterete at distal half or third when dry, glabrous, soon deciduous, the margins

Accepted by Mark Chase: 15 Jul. 2014; published: 1 Aug. 2014

serrate. Flowers solitary; peduncles 2.5–3.5 mm long, trigonous, glabrous, covered by the leaf sheaths; hypanthium 4–6 mm long, 2–3 mm diam. at apex, obdeltoid, trigonous, glabrous. Tepals ca. 8.0 × 2.5 mm, oblong-elliptic, violet, glabrous. Stamens 12, 1 opposite each sepal and 3 opposite each petal, of different lengths, filaments of the longer stamens ca. 3 mm long, of the shorter ca. 1.5 mm long, anthers ca. 1.5 mm long, yellow; staminal appendages alate; style ca. 5 mm long, stigma ca. 0.5 mm diam., trilobate. Capsule 4–7 mm long, 2–5 mm diam. at apex, stramineous, glabrous, dehiscent by apical large slits on the loculi. Seeds ca. 0.5 mm long, deep brown, reticulate-foveate.

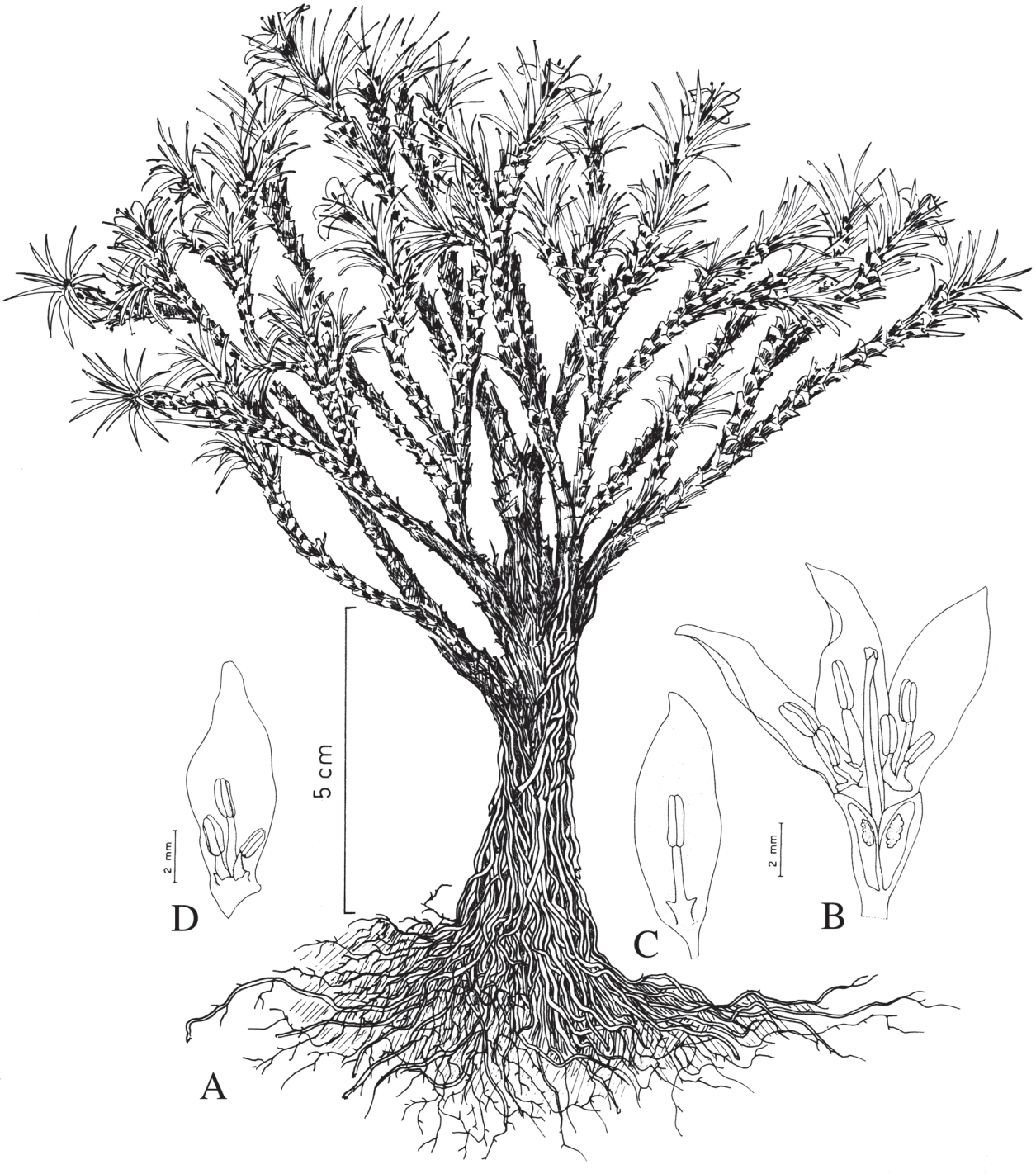

FIGURE 1. *Vellozia everaldoi*. A. Habit. B. Flower, longitudinal section, showing hypanthium, placentation, androecium, gynoecium, and perianth. C. One sepal with stamen and staminal appendages. D. One petal with stamens and coronal appendages. Drawn from *Menezes 1001* by Toyomi Naruto.

Leaf anatomy:—Blade dorsiventral. Cuticle thickened on both surfaces. Abaxial furrows about one-third thickness of lamina, papillae conspicuously coronulate. Stomata confined to furrows. Adaxial epidermis pluriseriate, adaxial uniseriate. Aquiferous 2–3-seriate hypodermis present on adaxial surface, extending adaxialy to the furrows as aquiferous parenchyma. Palisade mesophyll 3–4 cell-layers thick, adaxially merging with lacunar mesophyll. Fibro-vascular bundles surrounded by a distinct endodermis. No large vessels present in each fibro-vascular bundle. Phloem strands 2, V-shaped, separated beneath the xylem by pericyclic fibres and parenchyma. Pericyclic fibres extending as girders, adaxially to the endodermis near palisade mesophyll and abaxially to the endodermis near epidermis; sometimes abaxial girder separated from vascular bundle by mesophyll cells. Strands of epidermal sclerified cells 1–3(–4) cell-layers thick present in both surfaces (based on *Menezes 1001*).

Habitat:—On rocky (quartzite) outcrops.

Distribution:—*Vellozia everaldoi* is only found in a restricted area in the Diamantina Plateau, central Espinhaço Range, in Minas Gerais State.

Etymology:—The species is named after Everaldo Gonçalves, a geologist and journalist, former instructor at University of São Paulo and Federal University of Minas Gerais, who guided Nanuza Menezes to interesting Velloziaceae spots and on whose farm populations of *V. everaldoi* were found for the first time.

Observations:—*Vellozia everaldoi* resembles species from *Vellozia* sect. *Xerophytoides* Smith & Ayensu (1976: 48, Mello-Silva 1991), with an ericoid habit and soon deciduous, short and semiterete leaf-blades. Nevertheless, its conspicuous furrows in leaf-blade are a feature present in most *Vellozia* outside that section. Here, it resembles *V. taxifolia* (Martius ex Schultes & Schultes 1829: 291) Martius ex Seubert (1847: 75) in its habit, but differs in the transverse posture of leaf blade, which is arcuate in *V. everaldoi* and flat in *V. taxifolia*. Moreover, the aquiferous hypodermis extending only to furrows is an anatomical character of *V. everaldoi* that is unique among all species of *Vellozia* thus far studied (Mello-Silva *et al.* 2011). Its 12 stamens are distributed in the same manner as typical in the species with 12 stamens, e.g. *V. jolyi* Smith (1985a: 133) and *V. prolifera* Mello-Silva (1991a: 321), one opposite to each sepal and three opposite each petal. It has also short alate staminal appendages like those of *Vellozia abietina* Martius (1823: 14)*, V. prolifera* and *V. giuliettiae*. This feature together with spirotristichous phyllotaxis, a leaf blade that is involute when dry, hypanthial emergences absent to laxly disposed, and poricidal capsules support *Vellozia* sect. *Xerophytoides* (Mello-Silva *et al.* 2011) and are all present in *V. everaldoi*, which is, then, expected to belong to that section. It has been collected with flowers in the cold, dry season, August and September.

Other specimens examined:—BRAZIL. Minas Gerais: Gouveia, entre Fazenda Contagem e a fazenda vizinha, em cultivo no Departamento de Botânica da Universidade de São Paulo, 23 August 1980 (fl), *Menezes 1001* (SPF); Fazenda Contagem, a 3 km da estrada Gouveia - Curvelo, 3 November 1993 (fr), *Benko-Iseppon 326* (SPF); Fazenda Contagem, 1 February 1998 (fr), *Menezes 1375* (SPF); Serro: estrada Datas - Serro Km 419, cabeceiras do Rio Jequitinhonha, ca. 35 km de Datas, 6 September 1989 (fl) *Menezes & Souza CFCR12287* (SPF).

Vellozia giuliettiae N.L.Menezes & Mello-Silva, *sp. nov.* (Figs. 2, 5B)

Vellozia giuliettiae is close to *V. abietina* but differs from it by the subdensely setose leaf lamina with glabrous sheath and the geniculate internal stamens.

Type:—BRAZIL. Minas Gerais: Diamantina, estrada Diamantina - Conselheiro Mata, 12 km de Diamantina, 30 August 1981 (fl, fr), *Giulietti, Menezes, Semir, Giulietti & Mattos CFCR1781* (holotype SPF!, isotypes, K!, NY, RB!, SP!).

Caespitose, ericoid herbs, 3–22 cm tall. Stem few- to much-branched, 2–4 mm diam. at base and 1–2 mm diam. at apex. Leaves spirotristichous, straight, sheaths orange-brown, stramineous at apex, glabrous, margins entire, lamina 4.0–10.0 × 0.5 mm, linear-triangular, conduplicate and semiterete at distal third or fourth when dry, mucronate, abaxial side setose, adaxial glabrous, soon deciduous, the margins ciliate. Flowers solitary; peduncles ca. 1.5 mm long, trigonous, ribbed, glabrous; hypanthium 2–4 mm long, 2–3 mm diam. at apex, campanulate, trigonous, 12-ribed, glabrous. Tepals 1.00–1.50 × 0.03–0.06 cm, elliptic-spatulate, violet, glabrous. Stamens 6, the internal stamens geniculate at base, filaments of external stamens ca. 4 mm long, of internal stamens ca. 3 mm long, anthers ca. 1.5 mm long; staminal appendages alate; style 5–10 mm long, stigma 0.5–1 mm diam., trilobate. Capsule 2–6 mm long, 3–5 mm diam. at apex, campanulate, 12-ribed, stramineous, glabrous, dehiscent by apical large slits on the loculi. Seeds ca. 0.7 mm long, black, ruminate.

Leaf anatomy:—Blade dorsiventral. Cuticle slightly thickened on both surfaces. Furrows absent. Stomata on both surfaces. Epidermis uniseriate. Uniseriate hypodermis present on both surfaces. Mesophyll almost uniform, with a inconspicuous 3–4 cell-layers palisade mesophyll adaxially merging with lacunar mesophyll. Fibro-vascular bundles

surrounded by a distinct endodermis. Vessels 1(–2) large, present in each fibro-vascular bundle. Phloem strands 2, V-shaped, separated beneath the xylem by parenchyma. Fibres extending as girders, adaxially to the palisade mesophyll and abaxially to hypodermis. Strands of subepidermal sclerified cells absent (all based on *Menezes 1207*).

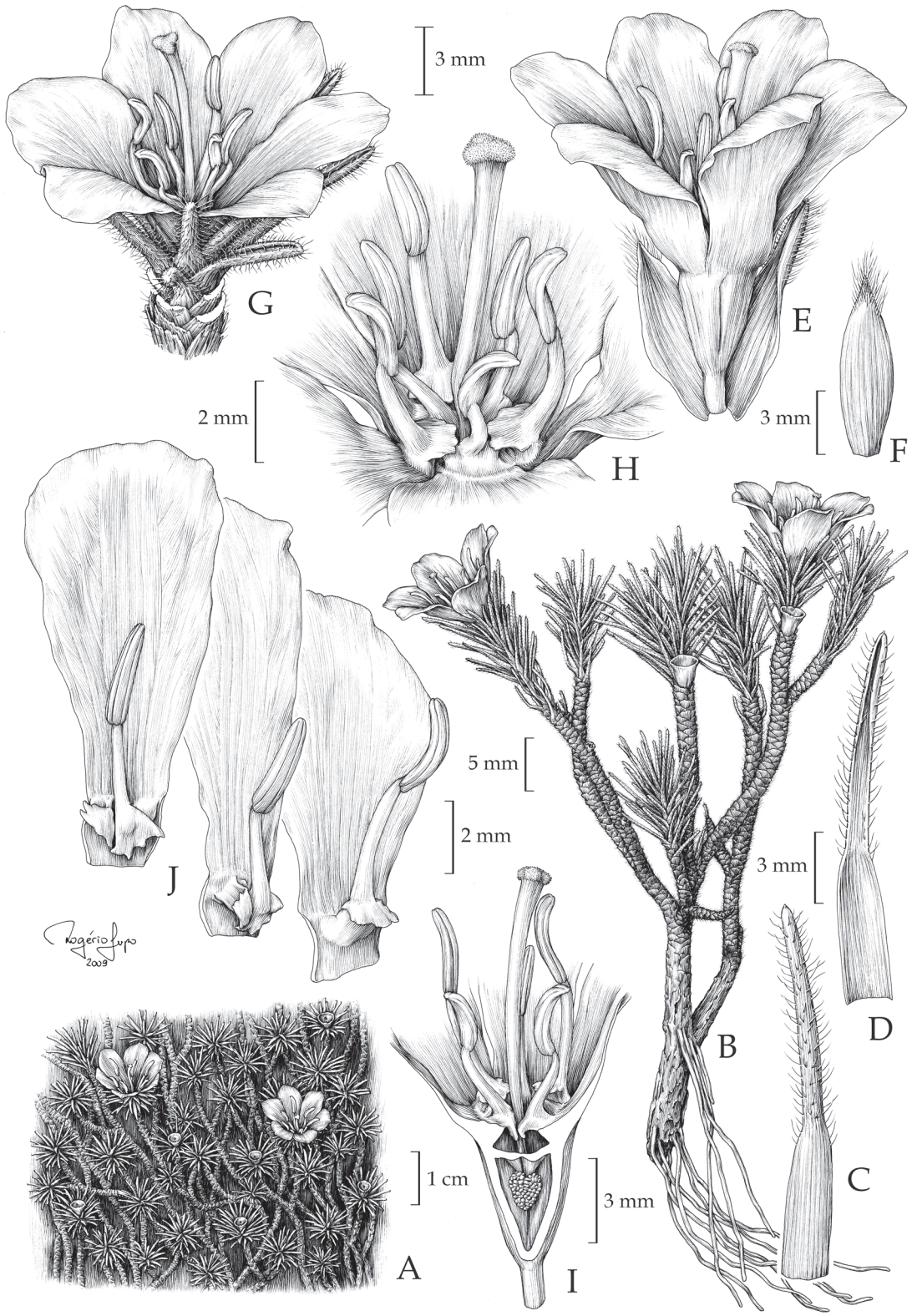

FIGURE 2. *Vellozia giuliettiae*. A. Detail of a plants in nature. B. Habit with flowers and fruits. C. Leaf, abaxial view. D. Leaf, adaxial view. E. Flower, lateral view. F. One bract, abaxial view. G. Flower, front view. H. Detail of androecium, style and stigma. I. Flower, longitudinal section, showing hypanthium, placentation, androecium, gynoecium, and basal portion of perianth. H. Two petals lateral to one sepal, showing stamens and staminal appendages. Drawn from *Mello-Silva 1774* by Rogério Lupo.

Habitat:—In sandy soil among rocky (quartzite) outcrops.

Distribution:—Diamantina Plateau, central Minas Gerais State, forming large populations.

Etymology:—*Vellozia giuliettiae* is named after Ana Maria Giulietti Harley, a former professor at Universidade de São Paulo and Universidade Estadual de Feira de Santana, and a Brazilian botanical leader. Together with Nanuza Menezes, they initiated and supported the study of the *campos rupestres* vegetation with which Velloziaceae are always associated. She has produced many students, including one of the co-authors (RMS).

Observations:—*Vellozia giuliettiae* is one of the smallest species of *Vellozia* so far described, sometimes forming massive localized populations together with *V. semirii*. Distinctive features are the setose, mucronate leaf laminas, geniculate internal stamens, alate staminal appendages and many-ribbed, campanulate capsules. It has been collected with flowers and fruits both in the hot, rainy season, January and February, and in the cold, dry season, July to September. The illustration of *V. giuliettiae* (Fig. 2) by Rogério Lupo received the 2010 Margaret Flockton Award from the Royal Botanic Gardens in Sydney, Australia (RBG Sydney 2010).

Other specimens examined:—BRAZIL. Minas Gerais: Diamantina, estrada para Conselheiro Mata, 29 km da rodovia Curvelo–Diamantina, 4 November 1993 (st), *Benko-Iseppon 361* (SPF); estrada para Conselheiro Mata (MG 220), 38,4 km da saída de Diamantina e 29,4 km da rodovia Diamantina–Datas (BR 367), 31 January 2000 (fl, fr), *Mello-Silva & Forzza 1766* (G, M, RB, SPF, UB, US); estrada Diamantina–Conselheiro Mata, depois das pedras gigantescas, na beira da estrada, 1 February 1998 (fr), *Menezes, Melo, Pita, Vitirti, Yoshitake, Kitakawa & Pinna 1378* (SPF); Gouveia, Fazenda Contagem, em cultivo no Departamento de Botânica da Universidade de São Paulo, 14 August 1984 (fl), *Menezes 1207* (SPF); Fazenda Contagem, s.d. (fl, fr), *Menezes, Cavalcanti & Gonçalves CFCR10323a* (CTES, K, SPF); afloramento em frente à usina eólica Morro do Camelinho, outro lado da estrada, 8 July 2006 (fl, fr), *Soares, Marino & Oliveira 45* (BHCB, SPF); Contagem, às margens do córrego Contagem, nos sopés da extremidade norte da Serra do Indaial, fazenda de Júlio Caetano Rodrigues (vulgo Júlio Barbalho), ao lado sul da Fazenda Contagem, 31 January 2000 (fr), *Mello-Silva & Forzza 1774* (B, BHCB, F, HUEFS, L, MO, SPF, US); Fazenda Galheiros, de Júlio Caetano Rodrigues (vulgo Júlio Barbalho), sopés da extremidade norte da Serra do Indaial, base de inselberg próximo ao Ribeirão da Contagem, 7 February 2009 (fl, fr), *Mello-Silva & Sajo 3167* (MBM, SPF); Contagem, estrada vicinal do Morro do Camelinho até mineradora de rochas, 2,9 km a partir da rodovia Curvelo-Gouveia (BR 259), 18°35'53.8''S 43°52'24.1''W, elev. 1003 m, 11 January 2014 (fl, fr), *Mello-Silva, Lovo & Cota 3647* (SPF). Serro: estrada Datas - Serro, Km 419, cabeceiras do rio Jequitinhonha, ca. 35 km de Datas, 6 September 1989 (fl, fr), *Menezes & Souza CFCR12289* (SPF).

Vellozia semirii Mello-Silva & N.L.Menezes, *sp. nov.* (Figs. 3, 5C)

Vellozia semirii is closely related to *V. prolifera* from which it differs by absence of the disproportionately long branches associated with vegetative propagation and by the six to nine staminate androecium, which has no appendages.

Type:—BRAZIL. Minas Gerais: Gouveia, Contagem, às margens do córrego Contagem, nos sopés da extremidade norte da Serra do Indaial, fazenda de Júlio Caetano Rodrigues (vulgo Júlio Barbalho), ao lado sul da Fazenda Contagem, 31 Jan 2000 (fl, fr), *Mello-Silva & Forzza 1773* (holotype SPF!, isotypes, B!, BHCB, CTES, G, K!, L!, M!, MBM, NY, P, RB!, SP!, UEC, UB, US).

Solitary, small ericoid herbs, sometimes caespitose when young, 6–28 cm tall. Stem much–branched, to 4–20 mm diam. at base and 2–3 mm diam. at apex. Leaves spirotristichous, straight, sheaths brown, cinereous at apex, the new ones ciliate at margins, the old ones entire, lamina 1.000–4.000(–6.000) × 0.005–0.01 cm, linear, conduplicate and semiterete at distal third when dry, glabrous, soon deciduous, the margins serrate towards apex and ciliate towards base. Flowers solitary; peduncles 1–4 cm long, trigonous, glabrous, becoming curved at fructification; hypanthium 2–5 mm long, 2–4 mm diam. at apex, obdeltoid to obovoid, sometimes oblong-obovoid, strong trigonous, alate, glabrous. Tepals 1.00–1.50 × 0.05–0.07 cm, elliptic, violet, glabrous. Stamens 6, filaments ca. 3 mm long, anthers ca. 3 mm long, yellow; staminal appendages absent; style ca. 1 cm long, stigma ca. 1.5 mm diam., trilobate. Capsule 5–10 mm long, 2–5 mm diam. at apex, stramineous, glabrous, sometimes minutely and laxly verruculous, dehiscent by apical large slits on the loculi. Seeds deep brown, reticulate-foveate.

Leaf anatomy:—Blade dorsiventral. Cuticle thin on both surfaces. Furrows absent. Stomata present on both surfaces. Epidermis uniseriate. Uniseriate hypodermis present on both surfaces. Mesophyll almost uniform, with a inconspicuous 3–4 cell-layers palisade mesophyll adaxially merging with lacunar mesophyll. Fibro-vascular bundles surrounded by a distinct endodermis. Large vessels, 1(–3), present in each fibro-vascular bundle. Phloem strands 2, V-shaped, separated beneath the xylem by parenchyma. Fibres extending as girders, adaxially to the palisade mesophyll and abaxially to hypodermis. Strands of subepidermal sclerified cells 1 cell-layer thick present beneath adaxial surface (all based on *Menezes 1159, Mello-Silva 1769*).

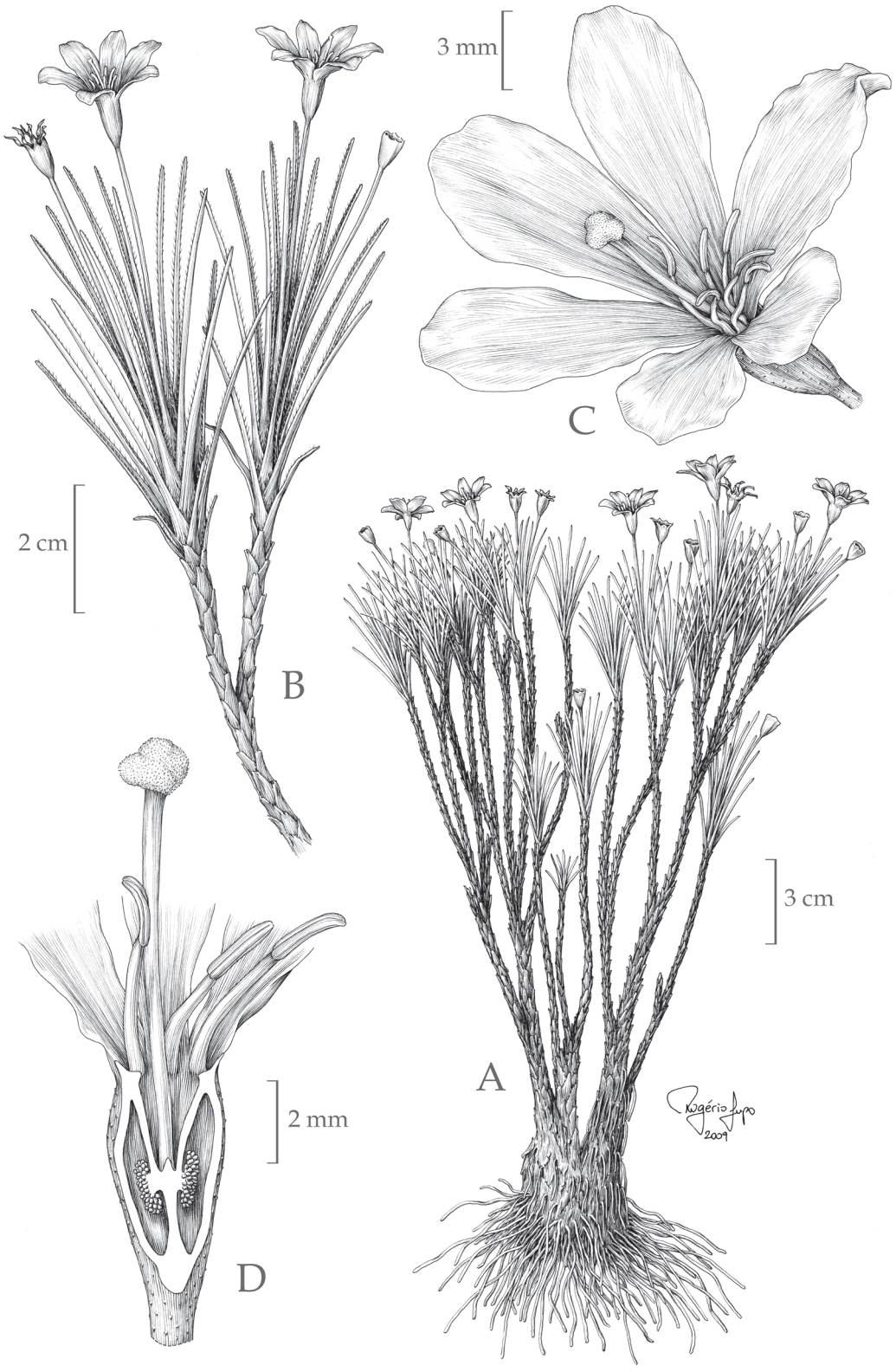

FIGURE 3. *Vellozia semirii*. A. Habit with flowers and fruits. B. Branch flowers and fruits. C. Flower, front view. D. Flower, longitudinal section, showing hypanthium, placentation, androecium, gynoecium, and basal portion of perianth. Drawn from *Mello-Silva 1773* by Rogério Lupo.

Habitat:—Bare (quartzite) rocky plains that accumulate sand and organic material in deeper places.

Distribution:—*Vellozia semirii* is found on the Diamantina Plateau, central Minas Gerais State, forming large populations.

Etymology:—The species is named after João Semir, a general systematist from Universidade Estadual de Campinas. He has always been interested in Velloziaceae and for many years has debated their classification with Nanuza Menezes, with whom he has published (Menezes & Semir 1990, 1991).

Observations:—Among species of *Xerophytoides* group, *V. semirii* mostly resembles *V. prolifera* and can be distinguished by lacking the characteristic mode of vegetative propagation of *V. prolifera*, whereby some of its branches become disproportionately long, as much as 1 m. *Vellozia prolifera* has also staminal appendages and twelve-staminate flowers. By contrast, the flowers of *V. semirii* lack the staminal appendages and are normally six staminate, although sometimes they can have nine stamens, one opposite each sepal and two opposite each petal. Nine staminate flowers is a condition not present in any other Velloziaceae except for a few populations of *V. hirsuta* Goethart & Henrard in Henrard (1937: 374, Mello-Silva 1990). The two stamens opposite the petals have different lengths, a situation similar to those species with one stamen opposite to each sepal and three opposite to each petal (e.g. *V. everaldoi*, *V. jolyi* and *V. prolifera*), in which the two lateral stamens are shorter than the central one. Also, *V. giuliettiae*, and sometimes populations of *V. minima* Pohl (1828: 119, *Mello-Silva CFCR5400*), exhibit the internal row of stamens shorter than the external one. These situations could indicate a possible evolutionary reduction in length before suppression of the lateral stamens (Menezes 1980b, 1984, 1988), leading to the six-staminate flowers now present in most of the species of this group, e.g., *V. abietina*, *V. giuliettiae*, *V. minima*, *V. tragacantha* (Martius ex Schultes & Schultes 1829: 290) Martius ex Seubert (1847: 75), and *V. virgata* Goethart & Henrard (in Henrard 1937: 382). *Vellozia semirii* has been found flowering and fruiting throughout the year, although more intensively during the hot, wet season.

Other Specimens Examined:—BRAZIL. Minas Gerais: Diamantina: margem da estrada Diamantina–Conselheiro Mata, 12 km de Diamantina, 30 August 1981 (fl), *Giulietti, Semir, Menezes, Giulietti & Mattos CFCR1782* (SPF); Serro: estrada Datas–Serro, km 419, cabeceiras do rio Jequitinhonha, ca. 35 km de Datas, 6 September 1989 (fl, fr), *Menezes & Souza CFCR12284, CFCR12290* (SPF); Gouveia: rodovia BR 259, elev. 1300 m, 21 January 1972 (fl, fr), *Hatschbach, Smith & Ayensu 29081* (K, MBM n.v.); estrada Curvelo–Diamantina, km 68, 14 December 1977 (fl, fr), *Menezes 729, 731, 732, 734, 735* (SPF); Fazenda Contagem, km 6 da estrada da Fazenda, 14 December 1980 (fl, fr), *Menezes, Cordeiro, Furlan, Pirani & Rodrigues 1085* (G, K, RB, SP, SPF, UEC, US); Fazenda Contagem, em cultivo no Departamento de Botânica da Universidade de São Paulo, 20 December 1980 (fl), *Menezes s.n.* (SPF 33517); Fazenda Contagem, em cultivo no Departamento de Botânica da Universidade de São Paulo, 16 November 1981 (fl), *Menezes 1159* (SPF); 23 km da cidade em direção a Curvelo, margem direita da rodovia BR 259, pouco antes da sede da Fazenda Contagem, 9 June 1991 (fr), *Mello-Silva, Salatino, Salatino & Affonso 393* (BHCB, K, SPF); Fazenda Contagem, 1 February 1998 (fr), *Menezes, Melo, Pita, Vitirti, Toshitake, Kitakawa & Pinna 1376* (SPF); 22.5 km ao sul de Gouveia, próximo à Fazenda Contagem, grande inselberg em frente à entrada da estrada para o Camilinho, ao lado da rodovia Gouveia–Curvelo (BR 259), 31 January 2000 (fl, fr), *Mello-Silva & Forzza 1769* (B, CTES, G, MBM, MO, RB, SPF, UB); ca. 23 km ao sul de Gouveia, 2,7 km em estrada vicinal saindo a leste da rodovia Gouveia–Curvelo (BR 259), em frente à usina eólica, próximo a torre de repetição de TV, 31 January 2000 (fr), *Mello-Silva & Forzza 1771* (F, HUEFS, L, SPF); Contagem, Fazenda Galheiros, de Júlio Caetano Rodrigues (vulgo Júlio Barbalho), ca. 3 km em estrada vicinal a leste da rodovia Gouveia–Curvelo (BR 259), ao sul da fazenda Contagem, sopés da extremidade norte da Serra do Indaial, base de inselberg próximo ao Ribeirão da Contagem, 6 February 2009 (fl, fr), *Mello-Silva & Sajo 3161* (K, M, MBM, SPF); Fazenda Contagem, sopés da extremidade norte da Serra do Indaial, base de inselberg próximo ao Ribeirão da Contagem, 18°35'48.0''S 43°52'48.6''W, elev. 1150 m, 24 January 2012, *Mello-Silva , Alcantara, Lovo, Lima, Pinto, Nascimento & Sanches 3567* (F, SPF); Contagem, estrada vicinal do Morro do Camelinho até mineradora de rochas, 2,9 km a partir da rodovia Curvelo–Gouveia (BR 259), 18°35'53.8''S 43°52'24.1''W, elev. 1003 m, 11 January 2014 (fl, fr), *Mello-Silva, Lovo & Cota 3648* (SPF).

Vellozia strangii L.B.Sm. ex Mello-Silva, *sp. nov.* (Figs. 4, 5D)

Vellozia strangii is morphologically similar to *V. hatschbachii*. It is, however, a more robust plant, and the hypanthium is subdensely covered with stipitate glandular emergences and has a much longer tube.

Type:—BRAZIL. Minas Gerais: Gouveia: 22 km ao sul de Gouveia, ao lado da rodovia Gouveia - Curvelo (BR 259), 1 February 2000 (fl, fr), *Mello-Silva & Forzza 1782* (holotype SPF 2 sheets!, isotypes B!, BHCB! CTES!, F!, G!, K!, L!, M!, NY!, P!, RB!, SP!, UB!, US!).

Herbs, caespitose or not. Stems 5–80 × 3–9 cm. Leaves spirotristichous, arcuate, sheaths brown, abundantly covered with orange resin, lamina 17.0–40.0 × 0.8–3.0 cm, linear-triangular, glabrous, marcescent and reflexed, margins serrate, midrib serrate towards apex at abaxial side. Flowers 3–6; peduncles 6–14 cm long, trigonous, subdensely covered with

short to 1 mm long stipitate, glandular emergences. Hypanthium 5.5–9.0 cm long, subdensely covered with short to 1 mm long stipitate glandular emergences, green, sometimes brownish or purplish-green; ovary region fusiform, trigonous, 3.0–5.0 × 0.8–1.8 cm; hypanthial tube cylindric, trigonous, 2.0–4.0 × 0.4–0.8 cm, sometimes slightly attenuated towards apex. Sepals 5.0–6.5 × 2.0–3.5 cm, elliptic, white, sometimes abaxial side of sepals purplish, specially towards base, glabrous; petals 4.5–6.5 × 3.0–5.0 cm, broad-elliptic, white, glabrous. Stamens 18–36, filaments ca. 1.5 cm long, white; anthers ca. 2 cm long, yellow; staminal appendages absent; style 5.5–7.5 cm long, stigma 5–9 mm diam., peltate-trilobate. Capsule 8.0–10.0 cm long, 2.0–2.5 cm diam. at ovary region, fusiform with persistent hypanthial tube, strong trigonous, stramineous, subdensely covered with short to 1 mm long stipitate glandular emergences, dehiscent by apical slits on the loculi through the hypanthial tube, afterwards opening loculicidaly.

Leaf anatomy:—Blade dorsiventral. Cuticle not thickened on both surfaces. Abaxial furrows about one third to half thickness of lamina, papillae conspicuously coronulate. Stomata confined to furrows. Epidermis 2–3-seriate. Aquiferous 1–2-seriate hypodermis present on both surfaces, extending adaxially to the furrows and fibro-vascular bundles and abaxially to the fibro-vascular bundles as aquiferous parenchyma. Palisade mesophyll 3–4 cell-layers thick, adaxially merging with lacunar mesophyll. Fibro-vascular bundles surrounded by a distinct endodermis. Vessels 1(–2) large, present in each fibro-vascular bundle. Phloem strands 2, V-shaped, separated beneath the xylem by fibres and parenchyma. Pericyclic fibres extending as girders to the endodermis near aquiferous parenchyma. Strands of subepidermal sclerified cells 2–3 cell-layers thick present beneath both surfaces (based on *Mello-Silva 2492*).

Habitat:—In sandy soil among (quartizite) rocks, although some individuals may colonize bare rocks.

Distribution:—*Vellozia strangii* is found in the Diamantina Plateau, central Minas Gerais State, in large populations.

Etymology:—The species is named after Harold Edgard Strang, conservationist, former director of the Centro de Pesquisas Florestais e Conservação da Natureza, and one of the founders of the journal *Vellozia*. He has also been interested in Velloziaceae (e.g. Strang 1961a, b, 1967).

Observations:—*Vellozia strangii* is probably closely related to *V. caput-ardeae* Smith & Ayensu (1976: 121) and *V. hatschbachii* Smith & Ayensu (1976: 58), which are sister-species (Mello-Silva 2000). The persistent hypanthial tube of *V. strangii*, which is characteristic of that group (Mello-Silva 2000), is of an intermediate length between the two species. *Vellozia strangii* seems to share with its close relatives, *V. alata* Smith (1962: 260), *V. peripherica* Mello-Silva (2004a: 457) and *V. sincorana* Smith & Ayensu (1976: 55) the ability of blooming quick and abundantly after burning (Sazima 1978, Mello-Silva 2004a, Conceição & Orr 2012, N.L. Menezes unpublished data). *Vellozia strangii* has been found flowering and fruiting during the hot and wet season.

Other Specimens Examined:—BRAZIL. Minas Gerais: Data, estrada Datas–Serro, km 436, 19 March 1989 (fr), *Salatino, Souza, Lewinger, Justo, Dokkedal & Salatino CFCR12139* (K, SPF); Diamantina, entre Sopa e São João da Chapada, 25 January 1978 (fl), *Hatschbach 40928* (C, MBM, US); 5 km de Guinda, 12 December 1980 (fl), *Menezes, Pirani, Cordeiro & Rodrigues 1028* (K, SPF); estrada Diamantina–Conselheiro Mata, 29 km de Diamantina, 2 December 1981 (fl, fr), *Hensold, Oliveira & Kawasaki CFCR2674* (F, SPF); estrada para São João da Chapada, elev. 1180 m, 23 November 1985 (fl), *Mello-Silva, Thomas, Pirani & Cavalcanti CFCR8659* (K, NY, SPF); estrada Diamantina–Conselheiro Mata, km 176, 28 January 1986 (fl), *Menezes, Zappi, Longhi-Wagner & Cordeiro CFCR9427* (BHCB, K, M, SPF); along the road from Sopa to São João da Chapada, 10 km NW of Sopa, elev. 1050 m, 29 January 1995 (fl), *Till, Benzing, Krügel, Leme, Luther & Nahoum 11040* (SPF, WU); estrada para Conselheiro Mata, 10 km a partir da entrada da estrada, 14 April 1996 (fr), *Salatino, Salatino, Santos & Giannasi 129* (SPF); estrada Diamantina–Conselheiro Mata, km 159, 29.8 km da estrada Diamantina–Gouveia (BR 259), 18°18’36”S 43°55’7”W, elev. 1141 m, 25 January 2004 (fl, fr), *Mello-Silva, Pirani, Calió, Lepis, Riina & Lovo 2492* (CTES, F, L, RB, SPF 2 sheets); Ribeirão de Areia, estrada Sopa–São João da Chapada, entroncamento a 13.1 km da BR 259 (Diamantina–Gouveia) e 1.1 km do entroncamento, 18°09’55.3”S 43°42’03.3”W, elev. 1044 m, 19 January 2012 (fl), *Mello-Silva, Alcantara, Lovo, Lima, Pinto, Nascimento & Sanches 3537* (F, SPF); Gouveia, estrada Curvelo–Diamantina, 72–73 km de Curvelo, 13 December 1974 (fl, fr), *Menezes, Froehlich, Angialossy & Mazzoni-Viveiros 386* (SPF); rodovia BR 259, Córrego do Tigre, 20 March 1987 (fl), *Hatschbach, Cervi & Cordeiro 51188* (MBM); Fazenda Contagem, 10 December 1987 (fl, fr), *Menezes, Salatino, Salatino, Scatena, Salimena-Pires, Vitta & Godoy CFCR11864* (GH, MBM, SPF); Fazenda Contagem, 12 March 1989 (fr), *Menezes CFCR12163* (K, RB, SPF, W); Contagem, Fazenda Galheiros, de Júlio Caetano Rodrigues (vulgo Júlio Barbalho), sopés da extremidade norte da Serra do Indaial, base de inselberg próximo ao Ribeirão da Contagem, 22 January 2004 (fl), *Mello-Silva, Pirani, Calió, Lepis, Riina & Lovo 2458* (BHCB, G, GH, K, MO, RB, SP, SPF, W); Serro, ca. 3–5 km E of Serra (Serro) along road to Diamantina, 9 August 1960 (fr), *Maguire, Magalhães & Maguire 49131* (NY, R, US); unspecified municipality, estrada Curvelo–Diamantina, km 259, elev. 1000 m, 8 February 1970 (fl), *Strang 1391* (GUA, US); estrada Curvelo–Diamantina, 16 December 1977 (fl, fr), *Menezes 745* (SPF).

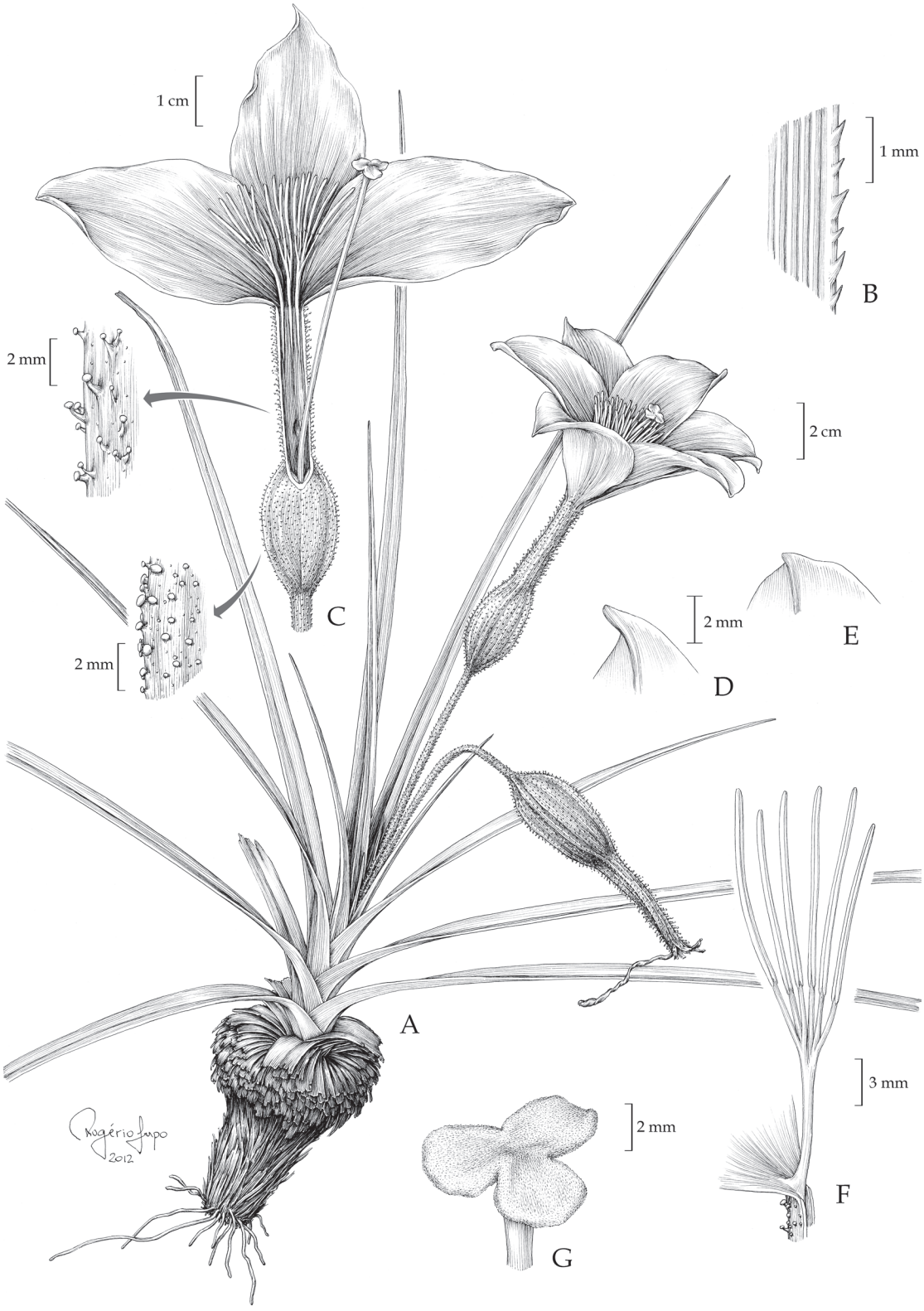

FIGURE 4. *Vellozia strangii*. A. Habit with flowers and fruits. B. Leaf margin, detail showing emergences. C. Flower, showing longitudinal section of hypanthial tube, androecium, style and stigma, with details of hypanthial emergences. D. Apex of sepal, abaxial view. E. Apex of petal, abaxial view. F. Group of six stamens. G. Trilobate stigma. Drawn from *Mello-Silva 2458* by Rogério Lupo.

Notes on all new species:—A recent, more complete analysis of Velloziaceae (Mello-Silva *et al.* 2011) permits some assumptions on the relationships of these new species in a phylogenetic framework. *Vellozia giuliettiae* and *V. semirii* share morphological characteristics that would assign them to *V.* sect. *Xerophytoides* (Smith & Ayensu 1976), such as ericoid habit with no leaf furrows and six stamens. The species from that section are among the few Neotropical

ones that were once classified as *Xerophyta* Jussieu (1789: 50, see Mello-Silva 1991b), but its representatives so far analysed always been embedded in *Vellozia*, either as monophyletic assemblages (Mello-Silva *et al.* 2011) or not (Mello-Silva 2000, 2005, Salatino *et al.* 2001). As a clade, they are supported by losses of furrows and abaxial sclerified strands in leaf and a belt of sclerified cells in the pedicel (Mello-Silva *et al.* 2011). These characters are also features of both *V. giuliettiae* and *V. semirii*. In regard to *V. everaldoi*, it is also a more or less ericoid species with 12 stamens, which are also found in *V. prolifera*, a species assigned to *Vellozia* sect. *Xerophytoides* (Mello-Silva 1991a) and always associated with species from that section (Mello-Silva 2000, 2005, Mello-Silva *et al.* 2011). Furthermore, the clade that corresponds to *Vellozia* sect. *Xerophytoides* is embedded in a larger clade supported by spirotristichous phyllotaxis, a hypanthium that is smooth or with laxly disposed emergences, fringed or alate staminal appendages and poricidally dehiscent capsules (Mello-Silva *et al.* 2011). These characters are all present in *V. everaldoi*, and thus it also could reasonably be related to *Vellozia* sect. *Xerophytoides*.

Vellozia strangii seems to be morphologically similar to *V. caput-ardeae* and *V. hatschbachii*, sharing with them three synapomorphies (Mello-Silva et al. 2011), viz., the loss of abscission line between sheath and lamina, thus the old leaves being marcescent and reflexed, and the loss of the fringed staminal appendages. This small clade is embedded in the same clade as the other species above.

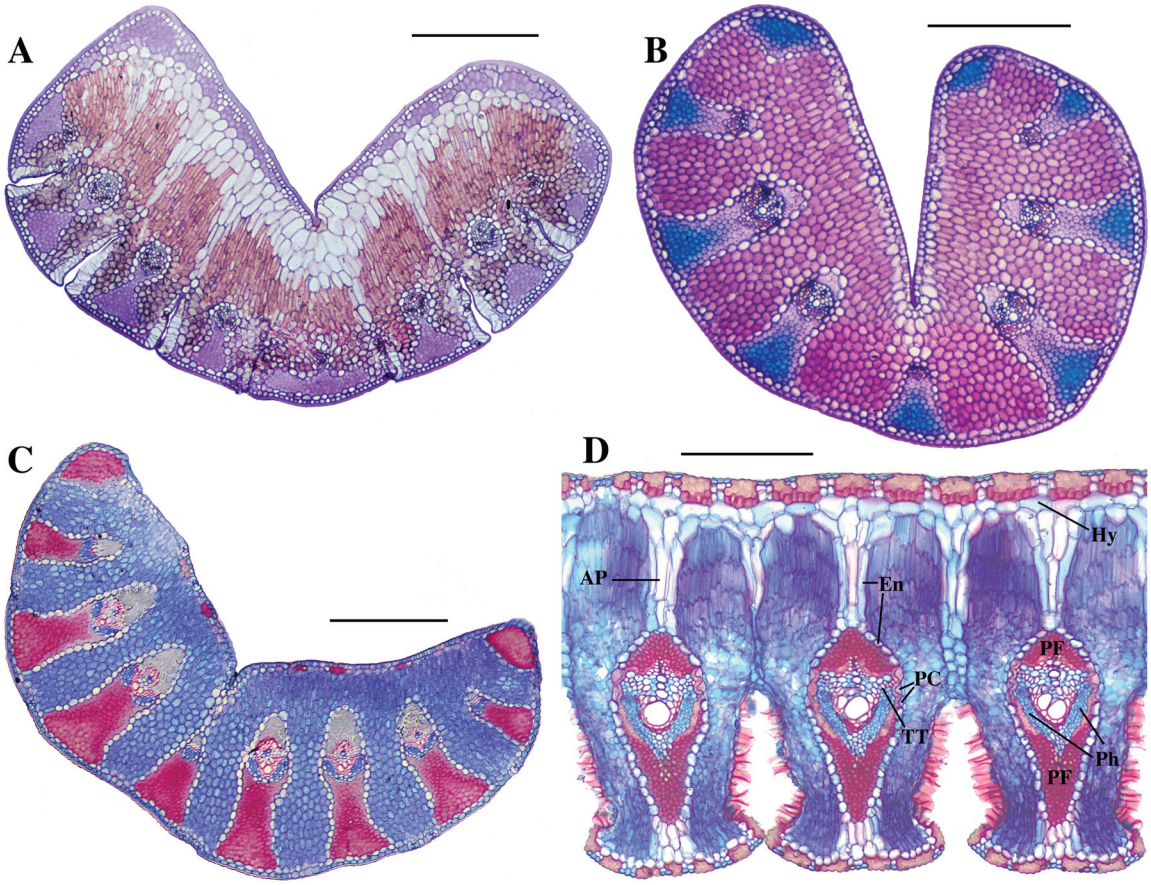

FIGURE 5. Transversal section of leaf lamina. A. *Vellozia everaldoi* (*Menezes 1001)*. B. *Vellozia giuliettiae* (*Menezes 1207)*. C. *Vellozia semirii* (*Mello-Silva 1769)*. D. *Vellozia strangii* (*Mello-Silva 2492)*. Scale bars = 200 µm. AP = aquiferous parenchyma. En = endodermis. Hy = hypodermis. PC = passage cells. PF = pericyclic fibres. Ph = phloem. TT = transfusion tracheids.

Acknowledgments

Thanks are due to curators of the herbaria cited. Visits to herbaria have been supported by Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Margaret Mee Amazonian Trust and Andrew W. Mellon Kew Latin America Botanical Fellowship (KLARF). We thank Sr. Júlio Caetano Rodrigues (Júlio Barbalho) who has always received us at his farm with great kindness, Juliana Lovo for helping with figure 5, and Rogério Lupo and Toyomi Naruto for the drawings. We also thank two anonymous reviewers and editor Mark W. Chase for their helpful comments. The authors are CNPq research fellows.

References

Alves, R.J.V. (1992) *Sarcoglottis caudata* (Orchidaceae) and *Vellozia kolbekii* (Velloziaceae), two new species from Minas Gerais, Brazil. *Novon* 2: 299–301.
http://dx.doi.org/10.2307/3391481

Alves, R.J.V. (2002) Two new species of *Nanuza* (Velloziaceae) from Brazil. *Novon* 12: 12–17.
http://dx.doi.org/10.2307/3393230

Alves, R.J.V., Guimarães, A.R., Rezende, C.M., Braga, L.D.S. & Silva, N.G. (2014) A new giant *Vellozia* (Velloziaceae) from Minas Gerais, Brazil with comments on the *V. compacta* complex and conservation. *Phytotaxa* 172: 13–21.
http://dx.doi.org/10.11646/phytotaxa.172.1.2

Conceição, A.A. & Orr, B.J. (2012) Post-fire flowering and fruiting in *Vellozia sincorana*, a caulescent rosette plant endemic to Northeast Brazil. *Acta Botânica Brasílica* 26: 94–100.
http://dx.doi.org/10.1590/s0102-33062012000100011

Giulietti, A.M., Pirani, J.R. & Harley, R.M. (1997) Espinhaço Range Region. *In:* Davis, S.D., Heywood, V.H., Herrera-MacBryde, O., Villa-Lobos, J. & Hamilton, A.C. (Eds.) *Centres of plant diversity, vol. 3, The Americas*. IUCN Publications Unit, Cambridge, pp. 397–404.

Henrard, J.T. (1937) Velloziaceae americanae nonnulae novae vel minus cognitae. *Blumea* 2: 339–384.

Ibisch, P.L., Nowicki, C., Vásquez, R. & Koch, K. (2001) Taxonomy and biology of Andean Velloziaceae: *Vellozia andina sp. nov.* and notes on *Barbaceniopsis* (including *Barbaceniopsis castillonii comb. nov*.). *Systematic Botany* 26: 5–16.

Jussieu, A.L. (1789) *Genera plantarum*. Hérissant & Th. Barrois, Paris, 498 pp.

Martius, C.F.P. (1823) *Vellosia*. *Barbacenia*. *In:* Martius, C.F.P. & Zuccarini, J.G. (Eds.) *Nova genera et species plantarum*, vol. 1. Lindauer, Münich, pp. 13–21.

Mello-Silva, R. (1991a) A new species of *Vellozia* from the Espinhaço Range, Brazil, with some considerations on the section *Xerophytoides*. *Kew Bulletin* 46: 321–326.
http://dx.doi.org/10.2307/4110605

Mello-Silva, R. (1991b) The infra-familial taxonomic circumscription of the Velloziaceae. A historical and critical analysis. *Taxon* 40: 45–51.
http://dx.doi.org/10.2307/1222921

Mello-Silva, R. (1993) Three new species of *Vellozia* from the Pico das Almas, Bahia, Brazil, with an account of their leaf anatomy. *Kew Bulletin* 48: 1–8.
http://dx.doi.org/10.2307/4115739

Mello-Silva, R. (1994) A new species, new synonyms and a new combination in Brazilian Velloziacae. *Novon* 4: 271–275.
http://dx.doi.org/10.2307/3391654

Mello-Silva, R. (1996) Two new species of *Vellozia* (Velloziaceae) from Minas Gerais, Brazil. *Botanical Journal of the Linnean Society* 120: 257–263.
http://dx.doi.org/10.1111/j.1095-8339.1996.tb00775.x

Mello-Silva, R. (1997) *Vellozia sessilis* L.B.Sm. ex Mello-Silva (Velloziaceae), espécie nova de Goiás, Brasil. *Boletim de Botânica da Universidade de São Paulo* 16: 65–69.
http://dx.doi.org/10.11606/issn.2316-9052.v16i0p65-69

Mello-Silva, R. (2000) Partial cladistic analysis of *Vellozia* and characters for the phylogeny of Velloziaceae. *In:* Wilson, K.L. & Morrison, D.A. (Eds.) *Monocots: systematics and evolution*. CSIRO, Melbourne, pp. 505–522.

Mello-Silva, R. (2004a) Novitates velloziacearum florae phanerogamicae Sancti Pauli. *Revista Brasileira de Botânica* 27: 453–462.
http://dx.doi.org/10.1590/s0100-84042004000300006

Mello-Silva, R. (2004b) Velloziaceae. *In:* Smith, N., Mori, S.A., Henderson, A., Stevenson, D.W. & Heald, S.V. (Eds.) *Flowering plants of the Neotropics*. Princeton University Press, Princeton, pp. 490–491.

Mello-Silva, R. (2005) Morphological analysis, phylogenies and classification in Velloziaceae. *Botanical Journal of the Linnean Society* 148: 157–173.
http://dx.doi.org/10.1111/j.1095-8339.2005.00399.x

Mello-Silva, R. (2010) Velloziaceae. *In:* Forzza, R.C., Stehmann, J.R., Nadruz, M., Costa, A., Carvalho Jr., A.A., Walter, B.M.T., Bicudo, C., Moura, C.W.N., Zappi, D., da Costa, D.P., Peralt, D.F., LIeras, E., Martinelli, G., de Lima, H.C., Prado, J., Baumgratz, J.F.A., Pirani, J.R., Sylvestre, L.S., Maia, L.C., Lohmann, L.G., Paganucci, L., Alves, M.V.S., Silveira, M., Mamede, M.C.H., Bastos, M.N.C., Morim, M.P., Barbosa, M.R., Menezes, M., Soares, M.L., Evangelista, P.H.L., Goldenberg, R., Secco, R., Rodrigues, R.S., Cavalcanti, T., Souza, V.C. (Eds.) *Catálogo de plantas e fungos do Brasil*. Jardim Botânico do Rio de Janeiro, Rio de Janeiro, pp. 1666–1672.

Mello-Silva, R. (in press) Four of queens: shuffling new *Barbacenia* from Brazil (Velloziaceae). *Novon*.

Mello-Silva, R. & Menezes, N.L. (1988) Duas espécies novas de Velloziaceae de Minas Gerais. *Acta Botânica Brasílica* 1(supl.): 195–207.
http://dx.doi.org/10.1590/s0102-33061987000300019

Mello-Silva, R. & Menezes, N.L. (1999a) Two new Brazilian Velloziaceae, *Vellozia auriculata* and *Vellozia gigantea*, and a key to the related dracenoid species of *Vellozia*. *Novon* 9: 536–541.
http://dx.doi.org/10.2307/3392159

Mello-Silva, R. & Menezes, N.L. (1999b) *Barbacenia lymansmithii* (Velloziaceae). *Harvard Papers in Botany* 4: 271–274.

Mello-Silva, R., Santos, D.Y.A.C., Salatino, M.L.F., Motta, L.B., Cattai, M.B., Sasaki, D., Lovo, J., Pita, P.B., Rocini, C., Rodrigues, C.D.N., Zarrei, M. & Chase, M.W. (2011) Five vicariant genera from Gondwana: the Velloziaceae as shown by molecules and morphology. *Annals of Botany* 108: 87–102.
http://dx.doi.org/10.1093/aob/mcr107

Menezes, N.L. (1980a) Nova espécie e novas combinações no gênero *Pleurostima* Raf. (Velloziaceae). *Boletim de Botânica da Universidade de São Paulo* 8: 65–69.
http://dx.doi.org/10.11606/issn.2316-9052.v8i0p65-69

Menezes, N.L. (1980b) Evolution in Velloziaceae with special reference to androecial characters. *In:* Brickell, C.D., Cutler, D.F. & Gregory, M. (eds.) *Petaloid monocotyledons: horticultural and botanical research*. Academic, London, pp. 117–139.

Menezes, N.L. (1984) *Características anatômicas e a filogenia na família Velloziaceae*. Associate Professor Thesis, University of São Paulo, São Paulo.

Menezes, N.L. & Semir, J. (1990) New considerations regarding the corona in the Velloziaceae. *Annals of the Missouri Botanical Garden* 77: 539–544.
http://dx.doi.org/10.2307/2399517

Menezes, N.L. & Semir, J. (1991) *Burlemarxia*, a new genus of Velloziaceae. *Taxon* 40: 413–426.
http://dx.doi.org/10.2307/1223219

Pohl, J.B.E. (1828) *Vellosia*. *In: Plantarum Brasiliae icones et descriptiones*, vol 1. Strauss, Vienna ('1827'), pp. 116–131.

RBG (Royal Botanic Gardens) Sydney (2010) *Vellozia sp. nov.* Margaret Flockton Award 2010. *Annual report 2009-2010*. pp. 55. Available from: http://www.rbgsyd.nsw.gov.au/__data/assets/pdf_file/0019/107353/SPP_AR_2010.pdf (accessed on 11 July 2014).

Sajo, M.G., Mello-Silva, R. & Rudall, P.J. (2010) Homologies of floral structures in Velloziaceae with particular reference to the corona. *International Journal of Plant Sciences* 171: 595–606.
http://dx.doi.org/10.1086/653132

Salatino, A., Salatino, M.L.F., Mello-Silva, R., van Sluys, M.-A., Giannasi, D.E. & Price, R.A. (2001) Phylogenetic inference in Velloziaceae using chloroplast *trnL-F* sequences. *Systematic Botany* 26: 92–103.

Schultes, J.A. & Schultes, J.H. (1829) *Barbacenia*. *Xerophyta*. *Vellozia*. *In:* Roemer, J.J. & Schultes, J.A. (Eds.) *Systema vegetabilium*, vol. 7(1). Cottae, Stuttgart ('1826'), pp. 284–293.

Seubert, M.A. (1847) Vellosieae. *In*: Martius, C.F.P. (Ed.) *Flora brasiliensis*, vol. 3(1). Fleischer, Leipzig, pp. 65–84, t. 8–10.

Smith, L.B. (1985a) Notulae brasilianae I. *Bradea* 4: 133–134.

Smith, L.B. (1985b) Notulae brasilianae I. *Bradea* 4: 157–160.

Smith, L.B. (1986) Notulae brasilianae II. *Bradea* 4: 211–214.

Smith, L.B. (1962) A synopsis of the American Velloziaceae. *Contributions from the United States National Herbarium* 35: 251–292, pl. 1–12.

Smith, L.B. & Ayensu, E.S. (1976) A revision of American Velloziaceae. *Smithsonian Contributions to Botany* 30: i–viii, 1–172.
http://dx.doi.org/10.5479/si.0081024x.30

Smith, L.B. & Ayensu, E.S. (1979) Velloziaceae Brasiliae I. *Bradea* 2: 326–328.

Smith, L.B. & Ayensu, E.S. (1980) Velloziaceae Brasiliae II. *Bradea* 3: 105–114.

Strang, H.E. (1961a) Catálogo sinótico do gênero *Barbacenia* Vandelli (1788). *Vellozia* 1: 22–35.

Strang, H.E. (1961b) *Barbacenia*. Fam. Velloziaceae. *Barbacenia squamata* Herb. *Vellozia* 1: 67.

Strang, H.E. (1967) *Barbacenia squamata* Herbert non Hooker. *Taxon* 16: 69–70.
http://dx.doi.org/10.2307/1217126

Vandelli, D.A. (1788) *Florae lusitanicae et brasiliensis specimen*. Academico-Regia, Coimbra, 96 pp.
http://dx.doi.org/10.5962/bhl.title.51092