

Two New Brazilian Velloziaceae, *Vellozia auriculata* and *Vellozia gigantea*, and a Key to the Related Dracenoid Species of *Vellozia*

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ABSTRACT. Two new species of Velloziaceae, *Vellozia auriculata* and *V. gigantea*, from Espinhaço Range, Minas Gerais, Brazil, are described. Both are characterized by a large dracenoid habit. *Vellozia auriculata* has large tepal appendages and is endemic to the Ambrósio Range, northeast of the Diamantina plateau. It reproduces in an unusual way, with conspicuous vegetative propagation by lodging branches. *Vellozia gigantea* may attain a height of up to 6 m, being the largest species of *Vellozia* so far described. Its one known population is located within the limits of the National Park of Serra do Cipó. Morphological and anatomical descriptions as well as illustrations of both species are presented. Comments are made on their geographic distribution and putative taxonomic relationships. A key to the accepted species with dracenoid habit related to *Vellozia auriculata* and *V. gigantea*, and comments on the delimitation of this group are also presented.

Since the revision by Smith and Ayensu (1976), many additional Brazilian Velloziaceae have been described (Smith & Ayensu, 1979, 1980; Smith, 1985, 1986; Mello-Silva & Menezes, 1988; Mello-Silva, 1991, 1994, 1996, 1997; Menezes & Semir, 1991). This suggests that there are still a large number of undescribed species. Factors that support this conclusion are the restricted distribution of most of the species as well as the difficult access to wide areas of the Espinhaço Range in central Brazil, where the family reaches maximum diversity. The two species herein described are spectacular, both in terms of their morphology and their geographical distribution, constituting examples of the richness and uniqueness of the flora of the Brazilian *campos rupestres* (for maps, see Mello-Silva, 1994: 273, and Mello-Silva & Pirani, 1994: 149).

Vellozia auriculata and *V. gigantea* can be included in the group of *Vellozia* species with dracenoid habits, reaching more than 2 m high. Other dracenoid members of this group are *V. compacta* Martius ex Schultes & Schultes f., *V. glabra* J. C. Mikan, *V. piresiana* L. B. Smith, and *V. spiralis* L.

B. Smith (Mello-Silva, 1995). Their stems are thickened at the base with leaves apically concentrated and soon deciduous, leaving persistent leaf sheaths. The flowers are long-pedicellate with violet tepals, numerous stamens (at least 18), and conspicuous staminal appendages, and the capsules have apical dehiscence. In addition, the anatomical structure of the leaf lamina is quite characteristic of the group, presenting an aquiferous hypodermis extending adaxially to bundle sheaths and furrows, as well as fibro-vascular bundles with two phloem strands. For phylogenetic interpretation of these external and anatomical characters, see Menezes et al. (1994) and Mello-Silva (in press).

KEY TO THE ACCEPTED SPECIES OF THE DRACENOID GROUP OF *VELLOZIA*

- 1a. Leaf lamina arcuate; peduncle and hypanthium always smooth.
- 2a. Plants to 6 m tall; leaf arrangement densely imbricate; leaf sheaths brown but apically cinereous, obliquely truncate and sharp pointed at apex (Serra do Cipó) . . . *V. gigantea*
- 2b. Plants to 3 m tall; leaf arrangement laxly imbricate; leaf sheaths lustrous brown throughout, evenly truncate at apex (Serra do Cipó to Diamantina) *V. glabra*
- 1b. Leaf lamina plane; peduncle and hypanthium with emergences, rarely the hypanthium solely smooth.
- 3a. Margins of leaf lamina smooth, serrate only at the base *V. piresiana*
- 3b. Margins of leaf lamina serrate throughout.
- 4a. Outer tepals auriculate; hypanthium and capsule spheroid to obloid, $\pm$ as long as broad (Serra do Ambrósio) *V. auriculata*
- 4b. Outer tepals not auriculate; hypanthium and capsule oblong to obtriangular, longer than broad (Ouro Branco to Grão-Mogol).
- 5a. Apex of leaf sheath and base of leaf lamina with short-ciliate, entire margins; hypanthium evenly covered with emergences (Grão-Mogol) *V. spiralis*
- 5b. Apex of leaf sheath and base of leaf lamina with serrate margins; hypanthium generally with emergences only at angles and base, if pres-

ent (Ouro Branco to Diamantina)
..... *V. compacta*

Vellozia auriculata Mello-Silva & N. L. Menezes, sp. nov. TYPE: Brazil. Minas Gerais: Mun. Rio Vermelho, Pedra Menina, Morro do Ambrósio, 31 Mar. 1985 (fl, fr), N. L. Menezes, A. M. Giuliatti, M. G. L. Wanderley, M. G. Sajo & M. Meguro in *CFCR* 7678 (holotype, SPF; isotypes, BHCB, K, MBM, MO, SP, US). Figures 1A–I, 3C–E.

Ab omnibus speciebus familiae tepalis externis auriculatis optime distincta. Inter affines hypanthio capsulae sphaeroideis vel obloideis diagnositur.

Solitary, dracenoid plants, 1.5–3.5 m tall. Stems much-branched, to 20 cm diam. at base and 1.5–2.8 cm at apex. Leaves spirotristichous, straight; leaf sheaths brown; leaf lamina plane, 14–33 cm × 8–13 mm, linear-triangular, glabrous, soon deciduous, the margins serrate. Flowers 1 to 3, biseriate with petaloid perianth; peduncles 5–13 cm long, with glandular emergences toward apex; hypanthium 1.2–1.5 cm long, 1.0–1.3 cm diam., spheroid or obloid, trigonous, glabrous except for few small glandular emergences at base and apex. Tepals ca. 5 × 2.5 cm, elliptic-lanceolate, violet, glabrous, the outer ones auriculate, the auricles 1.0–1.8 × 0.7–1.5 cm, obscuring the hypanthium. Stamens 36, with purple lacerate appendages, filaments 0.7–1.0 cm long, violet, anthers ca. 1.5 cm long, yellow; style 3.5–4.0 cm long, violet, stigma 3–5 mm diam., trilobate, yellow. Capsule 1.8–2.0 cm long, 1.8–2.0 cm diam., dehiscence by apical slits on the loculi. *Leaf anatomy* (Fig. 3C–E). Lamina dorsiventral. Trichomes absent but some emergences present (Fig. 3C, arrow). Cuticle thickened on both surfaces. Abaxial furrows about one-half thickness of lamina, papillate. Stomata confined to deep blade furrows, tetracytic. Adaxial epidermis 2–3-seriate, with fiber strands separated by non-thickened cells; abaxial epidermis 1–2-seriate, with fibers. Aquiferous 1-seriate hypodermis present on both surfaces, but less developed abaxially, extending to furrows as a bridge of bulliform cells. Palisade mesophyll 3–4 cell layers thick, abaxially merging with spongy parenchyma. Fibro-vascular bundle surrounded by endodermis as leaf-bundle sheaths. Three passage cells of endodermis flanking the xylem with thickened walls facing the transfusion tracheids (Fig. 3E). Endodermis extending adaxially and abaxially to hypodermis and involving pericycle fibers on both sides of bundles. Phloem strands 2, protophloem separated by parenchymatous cells (Fig. 3E, arrow). Metaxylem with two lateral extensions, the transfusion tracheids.

Vellozia auriculata is found in the Ambrósio and Bocaina Ranges, dividing the Rio Jequitinhonha and Rio Doce basins, within the municipalities of Rio Vermelho and Itamarandiba, Minas Gerais. The new species is locally abundant, and in the Ambrósio Range is a significant floristic feature (Meguro et al., 1994; Pirani et al., 1994). It appears to be endemic to that region. Its vegetative reproduction is an obvious feature in this Minas Gerais landscape. Very tall plants (to 2 m) eventually spread their branches on the ground; these branch apices then become erect with adventitious roots developing. These self-sufficient branches eventually detach from the mother plant, and it is common to find young individuals, generated by this process, surrounding an old or already dead plant (Fig. 1A). This same phenomenon was also observed by Morawetz (1983) for *Vellozia* cf. *glochidea* Pohl (probably *V. dasypus* Seubert) in the Itapoã restinga, Bahia, and by Mello-Silva (1991) for *V. abietina* Martius, *V. maxillarioides* L. B. Smith, *V. minima* Pohl, and *V. scoparia* Goethart & Henrard, in Minas Gerais, and in a much more specialized way in *V. prolifera* Mello-Silva, from Grão-Mogol, Minas Gerais. *Vellozia auriculata* differs from all similar species by its auriculate tepals and by the spheroid to obloid hypanthium and fruit. These auricles of the outer tepals occur nowhere else among the Velloziaceae. However, their adaptative significance, if one exists, is obscure.

Paratypes. BRAZIL. **Minas Gerais:** Mun. Itamarandiba, Penha de França, elev. 1040 m, 11 Mar. 1995 (st), *S. Splet* 865 (SPF, UB not seen); Mun. Rio Vermelho, Pedra Menina, Serra do Ambrósio, Fazenda Várzea do Anjo, Morro do Ambrósio, 15 July 1984 (fr), M. G. L. Wanderley, E. Varanda, A. Furlan, A. M. Giuliatti & R. M. Harley in *CFCR* 4507 (K not seen, SPF, U); Espigão do Meio, 13 Oct. 1984 (fr), R. Mello-Silva, J. R. Pirani, E. M. Isejima & M. Meguro in *CFCR* 5464 (F, SPF, UB); 830 m alt., 8 Sep. 1986 (fr), N. L. Menezes, R. Mello-Silva, T. B. Cavalcanti, I. Cordeiro & J. C. C. Gonçalves in *CFCR* 10227 (CTES, G, SP, SPF), 10 June 1991 (fl), R. Mello-Silva, M. L. F. Salatino, A. Salatino & P. Affonso 413 (SPF); Morro da Virada do Mato Virgem, 31 July 1985 (fr), R. Mello-Silva, J. R. Pirani & M. Meguro in *CFCR* 7837 (NY, SPF, UEC).

Vellozia gigantea N. L. Menezes & Mello-Silva, sp. nov. TYPE: Brazil. Minas Gerais: Santana do Riacho, Parque Nacional da Serra do Cipó, próximo à sede do IBAMA do Alto do Palácio, 24 Mar. 1989 (fl, fr), R. Mello-Silva, J. R. Pirani & M. Meguro in *CFSC* 11319 (holotype, SPF; isotypes, K, MBM, MO). Figures 2A–E, 3A, B.

Ab omnibus speciebus familiae habitu giganteo optime distincta. Affinis est *V. glabrae* a qua foliis imbricationibus

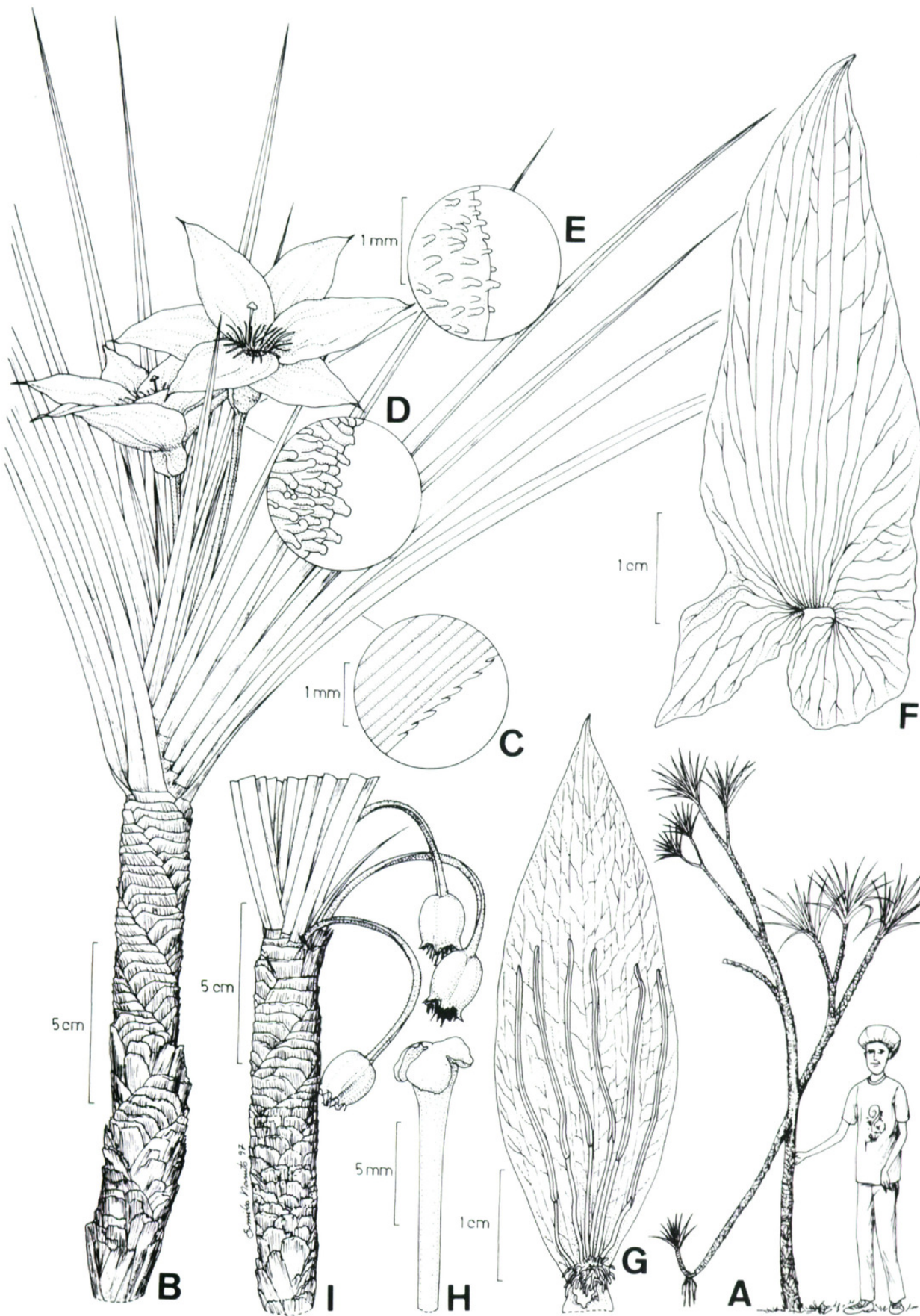


Figure 1. *Vellozia auriculata* Mello-Silva & N. L. Menezes. —A. Habit. —B. Flowering shoot. —C. Leaf margin. —D. Glandular emergences on pedicel. —E. Glandular emergences on hypanthium. —F. Outer tepal, abaxial surface. —G. Inner petal, adaxial surface, with stamens and lacerate appendages. —H. Style apex and trilobate stigma. —I. Fruiting shoot. A, from Meguro et al. (1994). B–H, Menezes in *CFCR* 7678. I, Mello-Silva in *CFCR* 5464.

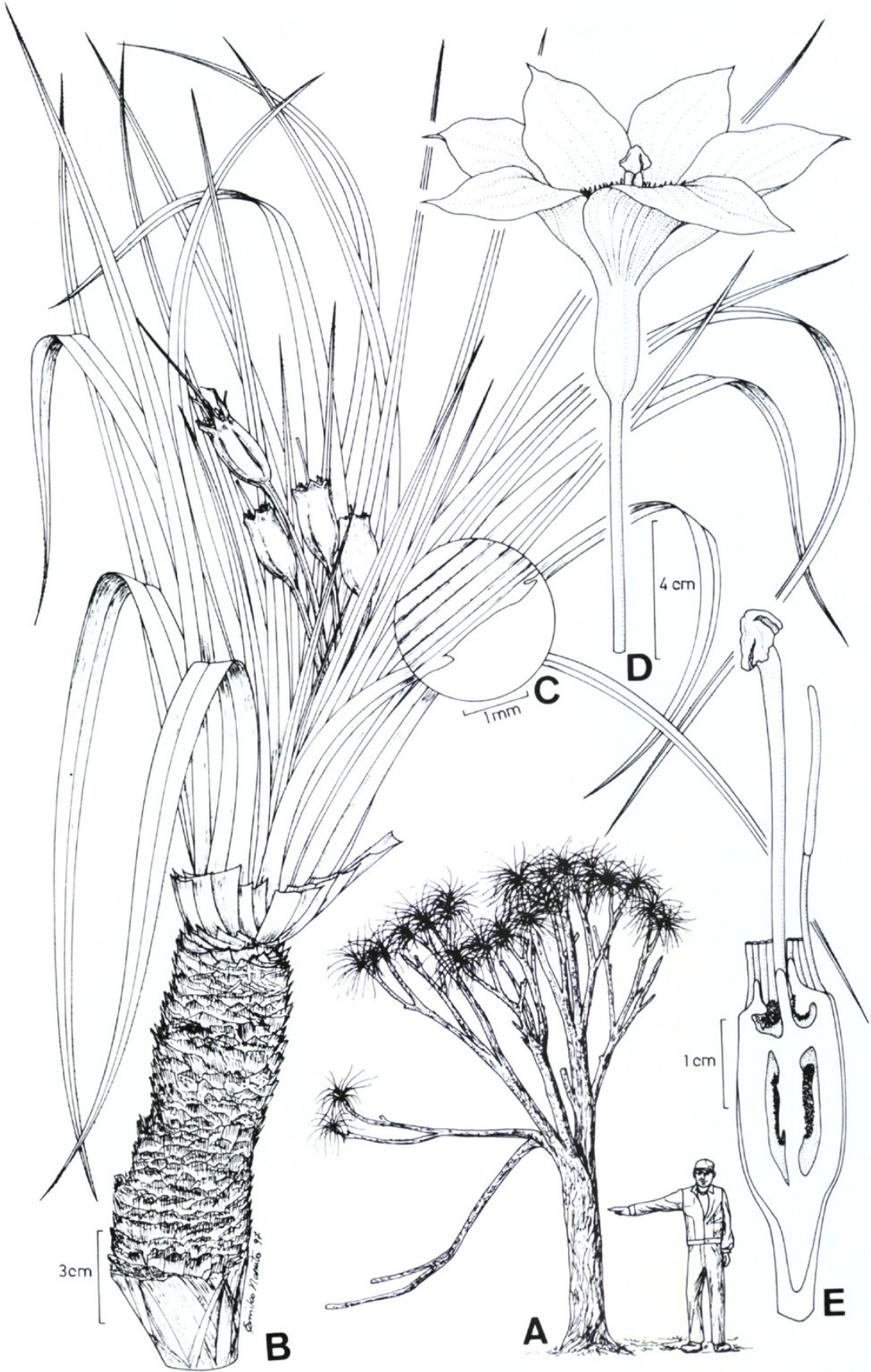


Figure 2. *Vellozia gigantea* N. L. Menezes & Mello-Silva. —A. Habit. —B. Fruiting shoot. —C. Leaf margin. —D. Flower. —E. Longitudinal fertile section showing hypanthium, axile placentation, and two of the three locules typical of the family; an entire stamen and lacerate appendages, style and stigma; tepals removed. A, from a photograph by Mello-Silva. B, E, Mello-Silva in CFSC 11319. C, Menezes 1327. D, Pereira 998.

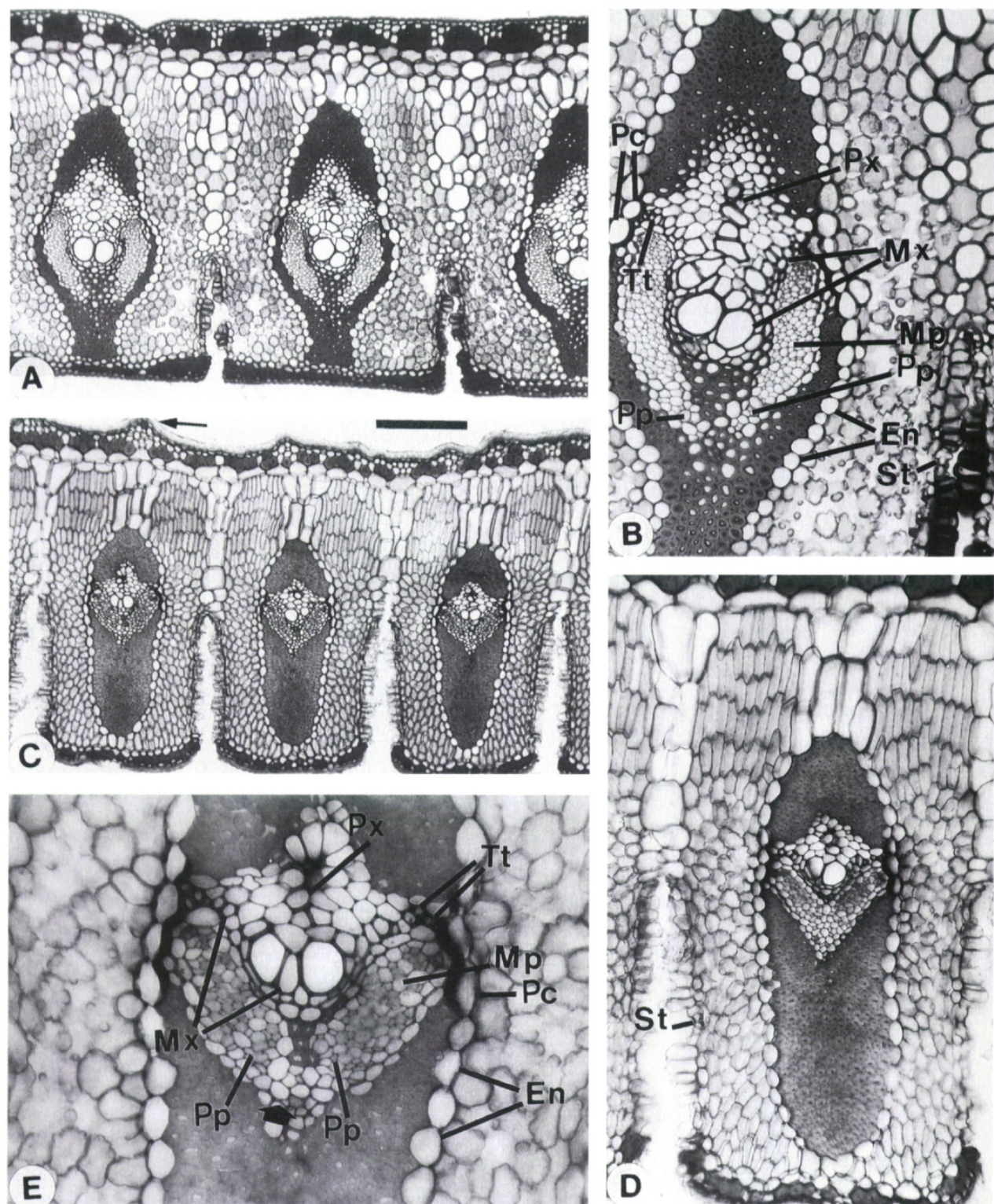


Figure 3. Cross section of median region of lamina. —A, B. *Vellozia gigantea*, from Menezes 1327. —C–E. *Vellozia auriculata*, from Menezes in CFCR 7678. —En. Endodermis. —Mp. Metaxylem. —Pc. Passage cell. —Pp. Protophloem. —Px. Protoxylem. —St. Stomata. —Tt. Transfusion tracheids. —C, arrow, indicating emergence. —E, arrow, indicating parenchyma cells. Scale bar = 200 μ m (A, C), 100 μ m (B, D), 50 μ m (E).

vaginae foliorum apicibus cinereis oblique truncatisque differt.

Solitary, dracenoid plant, 1.5–6 m tall. Stem much branched, to 60 cm diam. at base and 3–5 cm at the apex. Leaves spirotristichous, arcuate; leaf sheaths

brown, cinereous toward the apex; leaf lamina 13–45 $\times$ 0.8–1.5 cm, linear-triangular, glabrous, soon deciduous, the margins serrate. Flowers 1 to 4; peduncles smooth, 9–25 cm long, glabrous; hypanthium smooth, 2–3 cm long, 0.8–1 cm diam., cylindric-triangular,

glabrous. Tepals 6–9 × 1–1.5 cm, narrowly elliptic, violet, glabrous. Stamens 36, with purple lacerate appendages basally, filaments 5–8 mm long, violet, anthers 2.5–3.0 cm long, yellow; style 4–5 cm long, whitish, stigma ca. 6 mm diam., trilobate, yellow. Capsules 2.5–3.5 cm long, 1.2–1.8 cm diam., dehiscence by large apical slits on the loculi. *Leaf anatomy* (Fig. 3A, B). Similar to *Vellozia auriculata* except as noted. Trichomes and emergences absent. Abaxial furrows only about one-third thickness of lamina, papillate. Adaxial epidermis 3–4-seriate, with fiber strands separated by non-thickened cells; abaxial epidermis 1–2-seriate, 4-seriate at entrances of furrows, with fibers. Aquiferous 2-seriate adaxial hypodermis extending to furrows as bulliform cells; abaxial hypodermis only 1-seriate. Palisade mesophyll 4–5 cell layers thick. Phloem strands 2, protophloem separated by fibers.

Vellozia gigantea appears to be extremely rare, much more so than *V. auriculata*. There is only one known population, within the Cipó Range National Reserve, in Minas Gerais. Individuals up to 6 m tall inhabit a sandstone outcrop of ca. 20,000 m² on the northwestern edge of the park, thus forming a unique landscape. These plants do not regularly flower, and the production of new individuals appears to be limited. Although the plants are protected by the Park limits, the frequent visiting of tourists threatens this population. *Vellozia glabra*, found in the Serra do Cipó and in the Diamantina plateau, is the species most similar to *V. gigantea*. Both possess smooth, oblong hypanthia and long, arching leaves. Other related species differ with more or less glandular hypanthia and more or less straight leaves. *Vellozia gigantea* can be distinguished from *V. glabra* by its leaf arrangement, which is more imbricate; its leaf sheaths are matte but apically cinereous. *Vellozia glabra* has less imbricate leaves, and its leaf sheaths are lustrous brown throughout. Given its large stature (to 6 m), mature individuals of *Vellozia gigantea* are unlikely to be confused with any of its smaller relatives.

Paratypes. BRAZIL. **Minas Gerais:** Mun. Santana do Riacho, Serra do Cipó, entroncamento da estrada Conceição do Mato Dentro–Morro do Pilar, 27 Apr. 1978 (fl, fr), G. Martinelli 4370 (RB, SPF); Parque Estadual da Serra do Cipó, 18 Dez. 1979 (fl), N. L. Menezes, J. Semir, M. G. Sajo, M. C. H. Mamede, R. Altikes, M. C. E. Amaral & M. T. U. Rodrigues 870 (SPF, US), 29 Jun. 1988 (fr), I. Cordeiro, S. Romaniuc Neto, M. G. L. Wanderley & E. L. M. Catharino in CFSC 11187 (SP, SPF), 5 Jan. 1993 (fl, fr), M. Lucca et al. 74 (BHCB); elev. 1400 m, 5 Jan. 1993 (fl), M. Lucca et al. 76 (BHCB), 8 Mar. 1993 (fl), M. Pereira & M. Lucca 998 (BHCB), 1 May 1993 (fl, fr), J. R. Pirani, A. M. Giulietti & F. Barros in CFSC 13048 (SPF), 13 Apr. 1994 (fl, fr), N. L. Menezes 1327 (SPF), 11 Jan. 1999 (fl, fr), R. C. Forzza, S. Buzato & A. Christianini

1076 (SPF), 25 Jan. 1999 (fr), R. C. Forzza, S. Buzato & A. Christianini 1082 (SPF).

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