

Griffinia angustifolia (Amaryllidaceae), a new endangered species endemic to the Brazilian Caatinga biome

Griffinia angustifolia (Amaryllidaceae), una nueva especie en peligro endémica de la Caatinga brasileña

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Abstract

A new species of *Griffinia* (Amaryllidaceae) endemic to the Caatinga and considered endangered is here described and illustrated. *Griffinia angustifolia*, a species known from only three collections, is characterized by having the narrowest leaves of all species of the genus. Due to its small size, *G. angustifolia* can be compared to *G. itambensis*, *G. liboniana*, and *G. rochae*, however, *G. angustifolia* is easily distinguished from these species by the yellow color of the pollen. Data on ecology, conservation, and illustrations of the new taxon are provided. Additionally, an identification key for the species of small-sized *Griffinia* is presented.

Key words: Griffinieae; endemism; semiarid; taxonomy.

1. Introduction

Griffinia Ker Gawl. is a genus of the family Amaryllidaceae endemic to Brazil, represented by roughly 15 species [1, 2, 3], mostly considered threatened [4]. The genus is characterized by its primarily pseudopetiolate leaves with reticulate venation, zygomorphic predominantly lilac and/or white flowers with three sepals and three petals connate at the base forming a tube of variable length, and globular seeds without phytomelanin and with a whitish elaiosome. It is currently divided into two morphologically different, but not necessarily monophyletic [5], subgenera: *Griffinia* Ravenna and *Hylina* (Herb.) Ravenna.

Subg. *Griffinia* has both small-statured and larger species, pseudopetiolate leaves, inflorescences with two spathe bracts, free to basally-fused, in which case appearing as one with a bifid apex on the longer face; pedicellate flowers that open consecutively, most often lilac-colored, rarely white, greenish or purplish,

Resumen

Una nueva especie de *Griffinia* (Amaryllidaceae) endémica de la Caatinga y considerada en peligro de extinción es descrita e ilustrada. *Griffinia angustifolia*, una especie conocida de solamente tres registros, es caracterizada por presentar las hojas más estrechas entre todas especies del género. Por su tamaño pequeño, *G. angustifolia* es similar a *G. itambensis*, *G. liboniana* e *G. rochae*, de las cuales se distingue fácilmente, cuando en flor, por presentar polen amarillo. Se presentan datos sobre ecología, conservación e ilustraciones del nuevo taxón. Adicionalmente, se presenta una clave de identificación para las especies de *Griffinia* de tamaño pequeño.

Palabras clave: Griffinieae; endemismo; semiárido; taxonomía.

funnel-shaped, highly zygomorphic, diurnal; stamens generally 6, with 1 ascending episepal stamen apart from the others that may occasionally be obsolete (a unique condition for the family) with white and/or lilac filaments, rarely greenish or purplish, inserted at the base of the hypanthium tube; pollen grayish or very rarely yellowish.

Subg. *Hylina* has only two recognized species, medium sized, leaves sessile or petiolate, inflorescence with 2 spathe bracts, free from the base, large flowers that open simultaneously, sessile or pedicellate, white, rarely pink, infundibuliform, fragrant, nocturnal and ephemeral, with 6 fasciculate and declinate stamens, white filaments adhered to the base of the hypanthium and yellow pollen [1, 3].

The Caatinga, a vegetation found exclusively in Brazil, is included within the Seasonally Dry Tropical Plant Formations (SDTFs) domain in South America, covering a large area, the largest semiarid tropical region in the continent,

comprising a mosaic of thorn scrub and patches of seasonally dry forests, with higher biodiversity and levels of endemism than was first assumed [6, 7, 8, 9]. Despite its better understood levels of endemism for several groups of plants, the Caatinga can still be considered poorly diverse in *Griffinia* species, with only one species of each subgenus recorded – *G. liboniana* C. Morren and *G. gardneriana* (Herb.) Ravenna, neither of which are restricted to this phytogeographical domain [3], although both are officially recognized as endangered species [4].

During the review of the genus currently under preparation by the authors, three collections examined were identified as a new species of *Griffinia* belonging to the subgenus *Griffinia*, endemic to the Caatinga and considered critically endangered, described and illustrated here.

2. Methods

Specimens of Herbaria with the most representative collections of the Caatinga or Amaryllidaceae of Brazil were examined (ALCB, CEPEC, EAC, HUESC, K, MBM, NY, P, PEUFR, RB, SP, SPF, UEC, UESC, UFP and UPFR). Online databases were also consulted (<http://plants.jstor.org/>; <http://reflora.jbrj.gov.br/>; <http://www.splink.org.br/>). Morphological terminology follows Radford [10] and Meerow & Snijman [11]. In addition to the descriptions, brief comments are provided on the conservation status of the new taxon in accordance with the standards of the International Union for Conservation of Nature [12]. The extent of occurrence (EOO) and the area of occupancy (AOO) were both estimated using the software GeoCAT [13]. The distribution maps was elaborated using ArcMap 10.5.1 and geographical coordinates were obtained from label data or from approximate locality taken from Google Earth.

3. Results

Griffinia angustifolia Campos-Rocha, Dutilh & Semir, sp. nov. Figure 1.

Griffinia angustifolia, with linear leaves and a single hyaline spathe bract with bifid apex can be considered similar to *G. itambensis*, another species of small size from which *G. angustifolia* differs by having narrower leaves (0.4-1 cm vs. 1.2-2.4), flowers with six stamens, yellowish

pollen and capitate to trilobed stigma (vs. five stamens, grayish pollen and punctate to capitate stigma).

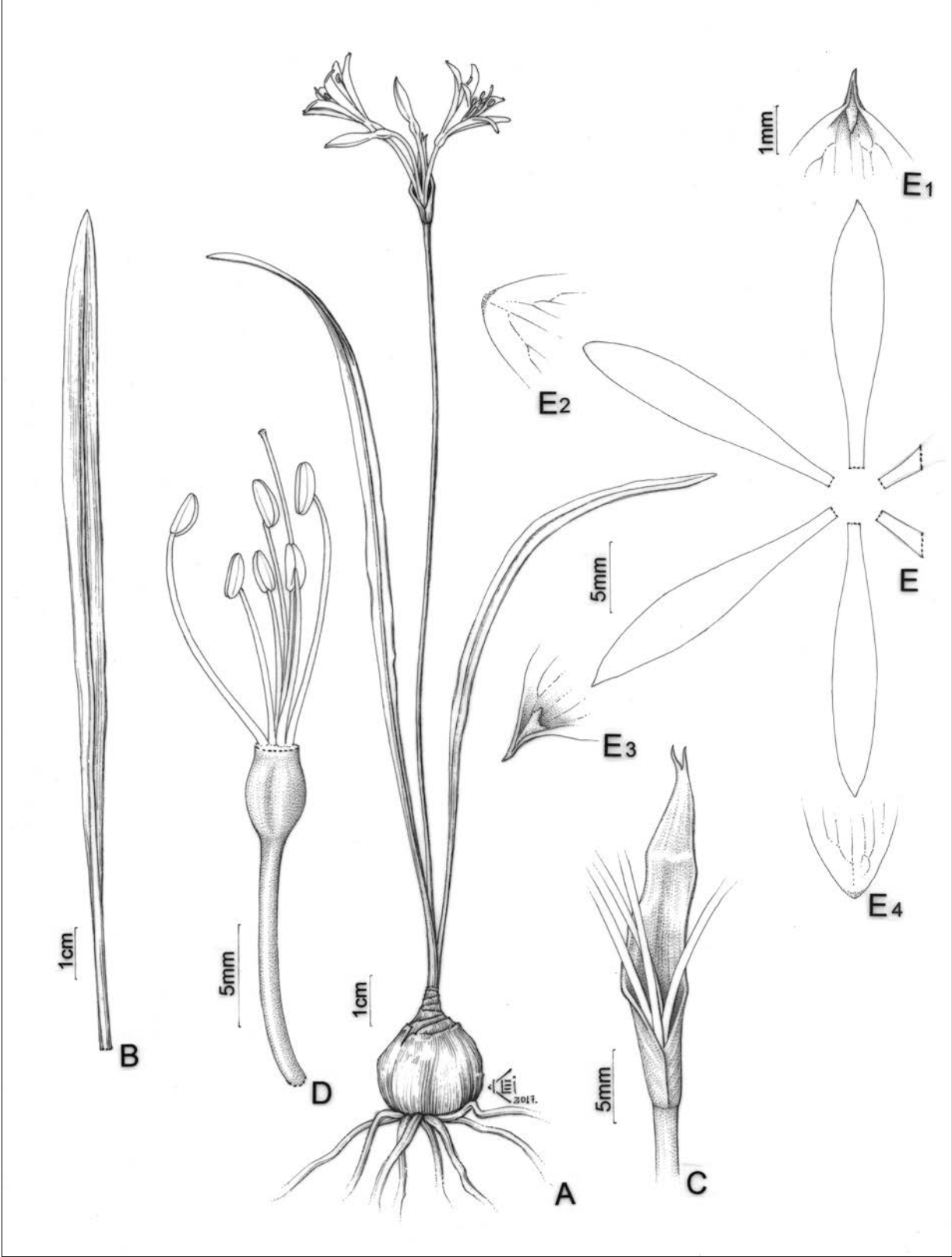
Type: BRAZIL. **Bahia:** Povoado Bizamum. Fazenda de Seu Jonas. 10°53'43"S, 38°58'47"W, 236 m, 20 April 2005 (fl.), D. Cardoso & W.J. Lima 465 (holotype HUEFS!; isotype CEN).

Perennial herbs 10–17 cm tall. Bulb subterranean, in sandy to rocky soil, whitish or with thin grey brownish outer tunic, elliptic, ovoid or obovoid to broadly elliptic, 1.8–3 × 1.2–2.6 cm diameter; neck formed by a sheath at the base of the leaves 0.5–2.5 cm long. Leaves 1 or 2 per bulb, adaxially dark green, abaxially pale green, pseudopetiolate; pseudopetiole up to 5 cm long; lamina linear to linear-obtriangular, apex acute, base attenuate, margin entire, with prominent transverse reticulate venation, up to 15.5 cm long at anthesis, 0.4–1 cm wide. Inflorescence 2–5 flowered; scape erect, up to 15.2 cm long, 2–3 mm wide distally; spathe bract 1, hyaline with apex bifid, 1.8–2.5 cm long on the longer, 3–6 mm on the shorter side, 3–5 mm wide basally; bracteoles subulate. Pedicel 1.4–2.2 cm long. Perianth lilac, zygomorphic, funnel-shaped, 1.5–2.2 cm long; hypanthium tube brownish, 1–2 mm long. Sepals oblanceolate with acute, apiculate apex; upper 1.5–2.1 × 0.3–0.5 cm, apicule 1–2 mm long; lateral slightly asymmetrical, patent, 1.4–2 × 0.25–0.45 cm, apicule 1–2 mm long. Petals slightly shorter than the sepals, oblanceolate with rounder apex, apicule inconspicuous; lateral 1.3–1.9 × 0.2–0.45 cm; lower slightly narrow and descending, 1.3–2 × 0.2–0.4 cm. Stamens 6, 5 declinate, the upper episeal ascending and distant from the others, attached at the top of the hypanthium tube, free. Filaments lilac, of different length, shorter than the sepals and petals; upper episeal 0.7–1.2 cm long; lateral episeal 0.6–1.3 cm long; epipetal 0.5–0.9 cm long. Anthers oblong to oblong-reniform, dorsifixed, versatile, dehiscing longitudinally, 2–3.5 mm long; pollen yellow. Ovary inferior, elliptic to obovate, 0.3–0.6 × 0.2–0.3 cm, 2–4 ovules per locule. Style filiform, declinate, exceeding the longest filaments, 1–1.6 cm long; stigma capitate to slightly trilobed. Fruit and seed unknown.

Distribution and habitat

'Species with only three known records for the states of Alagoas, Bahia and Sergipe (Fig. 3). Found in the understory of the shrubby to arboreal Caatinga, on sandy to rocky soil.

Figure 1. *Griffinia angustifolia*. (A) Habitat; (B) Leaf (adaxial surface); (C) Spathe bract; (D) Flower with perianth removed, showing stamens and style; (E) Detail of sepals and petals apex; (E1) upper sepal; (E2) lateral petal; (E3) lateral sepal; (E4) lower petal.



Conservation status

With estimated EOO = 4200 km² and AOO = 12 km², according to standards of the International Union for Conservation of Nature (IUCN), this species should be considered as endangered (EN) according to sub-criteria B1ab(iii)+B2ab(iii), due to low number of locations (≤ 5) and possible decline of habitat quality. Furthermore,

none of the three known populations is in a protected area.

Etymology

The specific epithet *angustifolia* refers to one of the diagnostic characteristics of the taxon, its leaf blade, the narrowest among all species of the genus *Griffinia*.

Figure 2. Species similar to *Griffinia angustifolia*. (A-B) *G. itambensis*; (C) *G. liboniana*; (D) *G. rochae*. A of W.S. Borges. s.n., VIES-39505; B of A. Campos-Rocha 1463, UEC; C of A. Campos-Rocha 1155, UEC; D of A. Campos-Rocha 1069, UEC. Photos by W.S. Borges (A); A. Campos-Rocha (B-D).



Phenology

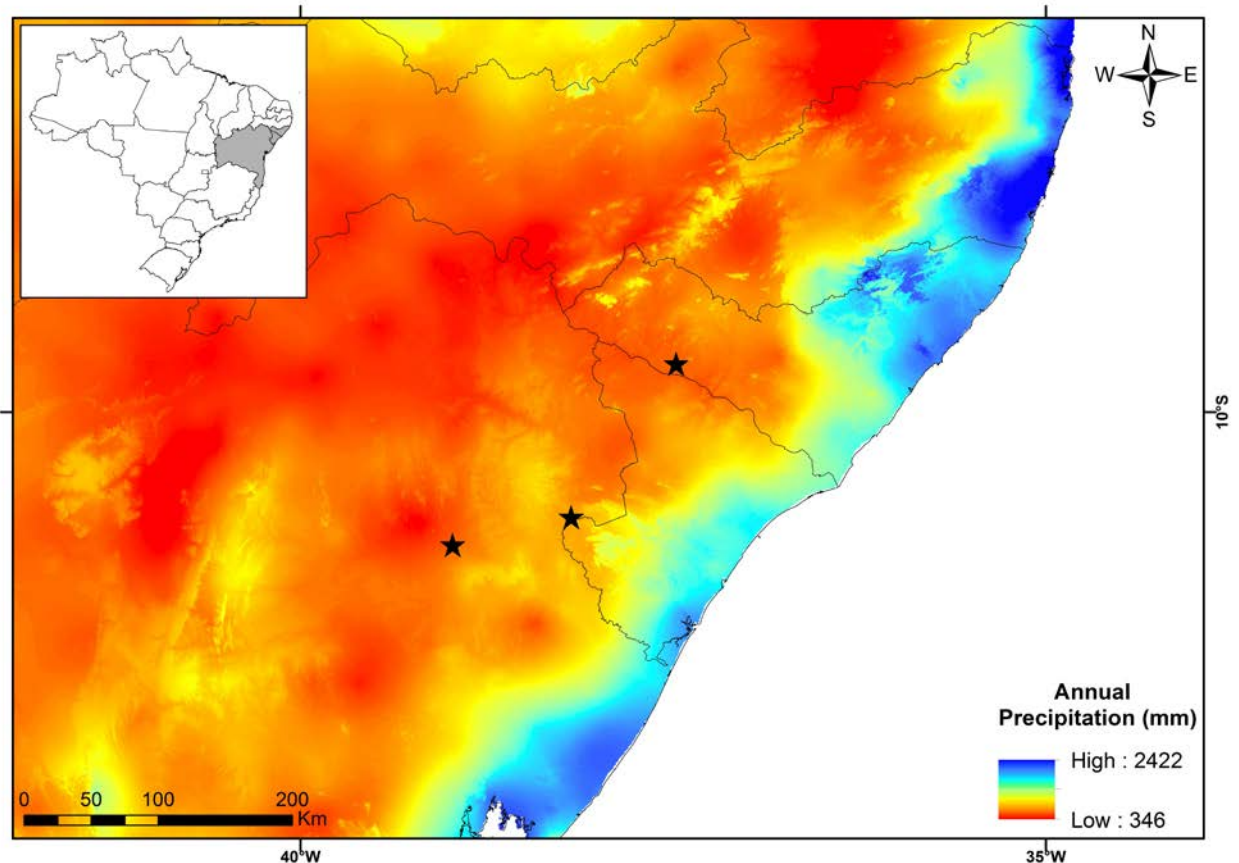
The few available collections reveal its flowering in April and May.

Other material examined

BRAZIL. **Alagoas**: Pão de Açúcar, Entra no Meirus, Povoado Rua Nova, Fazenda Estiva.

Caatinga arbórea, 9°40'29"S, 37°28'51"W, 20 April 2006, *R.P. Lyra-Lemos 9482* (MAC!).
Sergipe: Poço Verde, Faz. Lages, Caatinga hiperxerófila, 06 May 1982, *G. Viana 444* (ASE!; IPA!).

Figure 3. Distribution map of *Griffinia angustifolia* (black star).



4. Discussion

Griffinia angustifolia resembles, by its small narrow leaf blades and small flowers, *G. itambensis* Ravenna, a species with limited distribution at the Serra do Espinhaço, in Minas Gerais State. It can be distinguished by an even narrower leaf blade (0.4-1 cm vs. 1.2-2.4 cm) than *G. itambensis*, flowers with six stamens (vs. five in *G. itambensis*), yellow pollen, and capitate to trilobed stigma and (vs. grayish/cream colored pollen and punctate stigma). Species of subg. *Griffinia* generally have grayish to cream pollen, and punctate to capitate (very rarely trilobed) stigmas [1, 3, 14]. The only exception reported before now is *G.*

alba K.D. Preuss & Meerow, a larger-growing white-flowered species with prominently elliptic laminae, ca. 50 cm long and 15 cm wide [3].

Griffinia angustifolia can also be considered similar to *G. liboniana* and *G. rochae* G.M. Morel (Fig. 2C and 2D, respectively), the other small sized species of the genus, both with narrowly elliptical to lanceolate or oblanceolate leaves. In *G. angustifolia* the leaf blade is linear to linear-obtriangular, the flowers have six stamens and the lower petal has flat margins, while in *G. liboniana* and *G. rochae* the flowers have five stamens (rarely also six in *G. liboniana*) and the lower petal has revolute margins.

Key to distinguish *Griffinia angustifolia* from related species

1. Lamina less than 1 cm wide; flowers with six stamens; pollen yellow; stigma capitate to trilobed *G. angustifolia*
1. Lamina more than 1 cm wide; flowers with five stamens, rarely six; pollen grayish to cream; punctate to capitate stigma, rarely trilobed 2
2. Lamina linear to slightly falcate (ratio length/width 7:1 to 15:1); lower petal with flat margins *G. itambensis*
2. Lamina narrowly elliptic to lanceolate blade or oblanceolate (ratio length/width 2:1 to 6:1); lower petal with revolute margins 3
3. Plants over 12 cm high; frequently with spotted leaf blades, occasionally without spots, rarely with longitudinal lighter colored stripe on the adaxial midrib *G. liboniana*
3. Plants up to 12 cm high; blade leaves without spots or longitudinal lighter colored stripe on the midrib adaxially *G. rochae*

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