

## Two new species of *Handroanthus* Mattos (Bignoniaceae) from the state of Bahia, Brazil

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### RESUMO

(Duas novas espécies de *Handroanthus* Mattos (Bignoniaceae) para o estado da Bahia, Brasil) Duas novas espécies de *Handroanthus* Mattos (Bignoniaceae), endêmicas da Floresta Estacional Semidecidual da Bahia, são aqui descritas sob o nome de *H. diamantinensis* e *H. parviflorus*. São apresentadas ilustrações, mapa de distribuição, bem como uma discussão sobre as diferenças morfológicas que distinguem tais espécies daquelas mais relacionadas.

**Palavras-chave:** Floresta Estacional Semidecidual, ipê, Nordeste, taxonomia

### ABSTRACT

(Two new species of *Handroanthus* Mattos (Bignoniaceae) from the state of Bahia, Brazil). Two new species of *Handroanthus* Mattos (Bignoniaceae), endemic to Semideciduous Seasonal Forest of Bahia, are here described as *H. diamantinensis* and *H. parviflorus*. Illustrations, distribution maps, as well as a discussion about the morphological characteristics that distinguish the new species from related species are presented.

**Key words:** Semideciduous Seasonal Forest, Northeastern Brazil, ipê, taxonomy

## Introduction

Bignoniaceae have a Pan-tropical distribution and are most diverse in the Neotropics, especially South America (Gentry 1980; Lohmann 2004). The family comprises 82 genera and approximately 827 species (Lohmann & Ulloa 2007), and is currently divided into seven clades (Bignoniaceae, Catalpeae, Oroxyloae, Crescentiina, Tecomeae, Tourrettieae, and Jacarandae; Olmstead *et al.* 2009). Crescentiina is composed of two “subclades”, one exclusively Paleotropical and the other Neotropical, comprising several species traditionally included in Tecomeae. The Neotropical “subclade” contains 14 genera and 147 species, and has been given the informal name “*Tabebuia* Alliance” due to the high number of *Tabebuia* species (Grose & Olmstead 2007a; Olmstead *et al.* 2009) that together with *Handroanthus* represent about 66% of the species within the group (Grose & Olmstead 2007b).

*Handroanthus* displays ample morphological variability. Species in the genus have the following characteristics: an arboreal or occasionally shrubby habit; palmately compound

leaves that are (3–)5–9-foliolate (rarely 1-foliolate), with simple and / or branched trichomes; inflorescences that are dichotomously branched, with poorly developed rachises many times contracted and covered in simple, stellate, or dendroid trichomes; a calyx that is coriaceous, campanulate, and mostly 5-lobed, with indumentum also composed of simple, stellate or dendroid trichomes; a corolla that is predominantly yellow (lilac in only four species), tubular-infundibuliform to tubular-campanulate, with a glabrous or tomentose internal surface; fruits that are capsular, linear-cylindrical, smooth to slightly ribbed, pubescent, glabrous or sparse-lepidote; and seeds that are bi-winged, with wings clearly demarcated from the seminiferous body. The genus comprises 30 species and is widely distributed in Central and South America, with one species, *H. billbergii*, (Bureau & K.Schum.) S.O.Grose occurring in the Antilles (Grose & Olmstead 2007b).

While working on the taxonomic treatment of the “*Tabebuia* Alliance” for the flora of Bahia State, Brazil, two new species of *Handroanthus* were found. These taxa are here described as *H. diamantinensis* and *H. parviflorus*.

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## Taxonomic treatment

*Handroanthus diamantinensis* Espírito-Santo & M.M. Silva-Castro, **sp. nov.**

Fig. 1; 3: A–D.

*Handroanthus diamantinensis* is similar to *H. botelhensis* (A.H. Gentry) S.O. Grose, differing due to the strongly discoloured leaflets (*vs. concolorous to weakly discoloured*) when adult, opening of floral tube 2.8–4.1 cm (*vs. 2–2.5 cm*) wide, villous region of stamen insertion (*vs. glabrous*) and capsules 39.3–66.0 × 1.5–2.3 cm (*vs. 21–23 × 1.3–1.4 cm*).

Tree up to 30 m high; branches cylindrical to subtetragonal, slightly fissured longitudinally, pubescent, trichomes stellate and dendroid up to 2 mm long. Leaves 5(6)7-foliolate; petiole 11.8–32.4 cm long, cylindrical, densely tomentose, trichomes stellate and dendroid; central petiolule 3.4–14.6 cm long, densely tomentose, trichomes stellate and dendroid; leaflets 12.2–30.8 × 4.6–17.3 cm, elliptic to oblong-elliptic, base truncate, rounded or obcordate, apex acute to acuminate, margin entire, coriaceous, strongly discoloured, adaxial surface olive-green, glabrescent, with trichomes restricted to the main and secondary veins, abaxial surface cream-yellow, densely tomentose, with stellate and dendroid trichomes covering the whole surface; when young: membranous, margin sometimes irregularly serrated from the middle apical region, adaxial surface moss-green, abaxial surface cream-ferruginous, tomentose in both surfaces, trichomes stellate and dendroid; petiolules and leaflets progressively smaller towards the extremities. Inflorescences open panicles c. 30 × 20 cm, terminal; peduncle densely tomentose, trichomes dendroid; bracts and bracteoles 0.3–0.5 cm long, lanceolate, persistent. Flowers with pedicel c. 2.5 cm long; calyx 1.9–2.9 × 1–1.6 cm, tubular, brownish-ferruginous, 2–3-lobed, irregularly partite, apex obtuse, densely villous, dendroid trichomes to 1.5 mm long, and also stellate trichomes; corolla tubular-infundibuliform, 8–8.8 cm long, floral tube 4.1–5.5 cm long, opening 2.8–4.1 cm wide, lobes 1.5–2.8 cm long, yellow, with reddish striations, base fleshy and apex membranous, externally densely glandular, internally villous, trichomes simple; stamens inserted, free part of the dorsal stamens c. 1.2 cm long, free part of the ventral stamens c. 1.6 cm long, free part glabrous, adnate part tomentose, anthers glabrous, thecae c. 2.5 × 1 mm; ovary c. 8 × 3 mm, linear-oblong, not ribbed, minutely lepidote-glandular; nectarial disk annular, conspicuous; style c. 2.3 cm long, glabrous, stigma c. 2.5 mm long, glabrous, bifid. Capsules 39.3–66 × 1.5–2.3 cm, linear-cylindrical, brownish-ferruginous, longitudinally striated, densely tomentose, trichomes dendroid. [Seeds not seen].

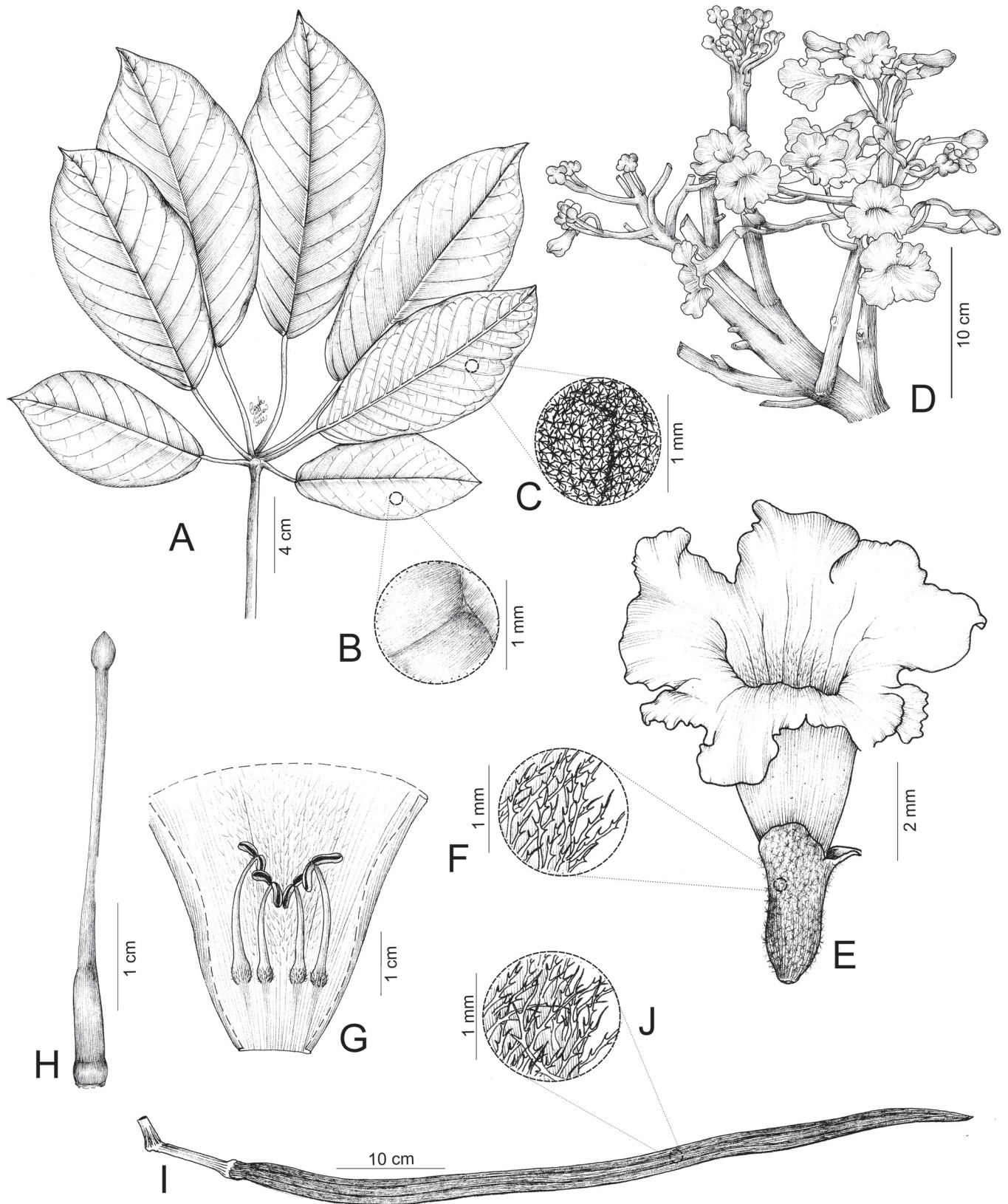
Type: **BRAZIL. Bahia:** Palmeiras, Chapada Diamantina National Park, Vale do Pati, Mucugê-Andaraí trail (12°47'2.5"S, 41°27'20.3"W), 28/IX/2011, fr., F.S. *Espírito-Santo* & G.B. *Siqueira* 189 (holotype HUEFS; isotype RB).

Epitype: **BRAZIL. Bahia:** Palmeiras, Chapada Diamantina National Park, Vale do Pati, Mucugê-Andaraí trail (12°47'2.5"S, 41°27'20.3"W), 20/VIII/2010, fl., F.S. *Espírito-Santo et al.* 138 (HUEFS).

**Distribution, habitat, and conservation status** – *Handroanthus diamantinensis* is restricted to Semideciduous Seasonal Forest in the Chapada Diamantina (Fig. 4), and is known only from the Vale do Pati, a valley with a trekking path of approximately 80 km that links the municipalities of Mucugê and Andaraí, traversing the Chapada Diamantina National Park, Bahia. In spite that the area is in a good conservation state and is legally protected, less than 10 individuals of the new species were located in the field. Considering the conspicuous flowering of the whole group, it can be inferred that the species has a punctual distribution and occurs in low frequency in the area. On the other hand, collection efforts at this locality are not intensive, and the flora is still poorly known. Since the species was collected only recently, and its only record is within a protected area, it is still premature to classify it at any level of threat. Thus, the species should be considered as Data Deficient (DD; IUCN 2001) for the assessment of its conservation status.

**Etymology** – The epithet refers to the area where this species occurs, which is the Chapada Diamantina, in Bahia, Brazil.

**Notes** – In the taxonomic treatment of tribe Tecomeae for the Neotropical region, Gentry (1992) informally subdivided *Tabebuia s.l.* into ten groups using vegetative and reproductive characters. *Handroanthus diamantinensis* is more closely related to group IV, characterized by the yellow flowers with a calyx that is densely pubescent or occasionally villous, with stellate or dendroid trichomes; leaflets with few trichomes restricted to the main vein on the abaxial surface or, more frequently, densely distributed on the whole surface; and capsules that are puberulous or villous, and covered with stellate or dendroid trichomes. Among the species of this group, *H. diamantinensis* is most similar to *H. botelhensis*, but also has morphological similarities with *H. albus* (Cham.) Mattos, *H. vellosi* (Toledo) Mattos, and *H. catarinensis* (A.H. Gentry) S.O. Grose (Tab. 1). It differs from *H. botelhensis* due to the strongly discoloured leaflets of adult plants (*vs. concolorous to weakly discoloured*), calyx 2–3-lobed (*vs. 2–5-lobed*), longer corolla (8–8.8 *vs. 6–8 cm*), larger opening of the floral tube (2.8–4.1 *vs. 2–2.5 cm*), tomentose region of stamen insertion (*vs. glabrous*), and the bigger capsules (39.3–66 × 1.5–2.3 *vs. 21–23 × 1.3–1.4 cm*). *Handroanthus diamantinensis* can be promptly distinguished from the remaining mentioned species due to the entire margins of mature leaflets (*vs. regular and conspicuously serrated*), among other characters (Tab. 1). The epitype was designated to help with the species interpretation because the type lacks flowers.



**Figure 1.** *Handroanthus diamantinensis* Espírito-Santo & M.M.Silva-Castro. A. Leaf; B. Indumentum of adaxial surface; C. Indumentum of abaxial surface; D. Inflorescence; E. Flower; F. Indumentum of calyx; G. Open corolla, showing the stamens; H. Gynoecium; I. Capsule; and J. Indumentum of capsule. (From the holotype)

**Table 1.** Comparison of diagnostic morphological characters of *Handroanthus diamantinensis* Espírito-Santo & M.M.Silva-Castro with its most closely related species, according to the informal division of *Tabebuia* s.l. proposed by Gentry (1992).

<i>Handroanthus</i> species	Habit	Leaflets		Inflorescence	Calyx		Corolla		Capsules		
		Margin	Color		Nº of lobes	Type of trichome	Length (cm)	Opening of floral tube (cm)	Region of insertion of stamens	Size (cm): length × width	Type of trichome
<i>H. diamantinensis</i>	Arboreal	Entire	Strongly discoloured	Open panicle	2 or 3	Dendroid and stellate	8–8.8	2.8–4.1	Villous	39.3–66 × 1.5–2.3	Dendroid
<i>H. albus</i>	Arboreal	Serrated	Strongly discoloured	Open panicle	5	Dendroid	6–18	1.5–3.0	–	25–50 × 1–1.7	Dendroid
<i>H. botelhensis</i>	Arboreal	Entire	Concolorous or weakly discoloured	Open panicle	2–5	Barbate, dendroid and stellate	6–8	2–2.5	Glabrous	21–23 × 1.3–1.4	Mostly barbate
<i>H. catarinensis</i>	Shrubby	Serrated	Concolorous	Contracted panicle	3–5	Barbate	5–7	1.4–2.2	Glabrescent	5–9 × 1.5–1.8	Mostly barbate
<i>H. vellosi</i>	Shrubby/ Arboreal	Serrated	Strongly discoloured	Contracted panicle	2–5	Simple and stellate	5–8	1.5–2.5	Glabrous	10–40 × 1.3–1.5	Stellate and simple

***Handroanthus parviflorus*** Espírito-Santo & M.M. Silva-Castro, **sp. nov.**

Fig. 2; 3: E-F.

*Handroanthus parviflorus* is similar to *H. spongiosus* (Rizzini) S.O.Grose but differ due to the leaves (3–)5(–7)-foliolate (vs. 3-foliolate), lepidote leaflets (vs. stellate-tomentose), with acute apex (vs. attenuate to cuspidate), sessile to subsessile flowers (vs. pedicellate), calyx 2–3-lobed (vs. 5-lobed), and region of stamen insertion pilose (vs. glabrous). The species possess the smallest flowers recorded so far in *Handroanthus*.

Tree up to 12 m high; branches cylindrical, longitudinally fissured, pubescent, trichomes simple and stellate. Leaves (3–)5(–7)-foliolate; petiole 2.2–6.7 cm long, cylindrical to subtetragonal, pubescent, trichomes simple and stellate; central petiolule 0.8–2.1 cm long, pubescent, trichomes simple and stellate; central leaflets 5.2–12.7 × 2–4.4 cm, elliptic, base cuneate, apex acute, margin entire, flat, membranous to chartaceous, concolorous, adaxial surface sparsely lepidote, with main and secondary veins densely tomentose, trichomes stellate, abaxial surface lepidote, few stellate trichomes sparsely dispersed in both surfaces; petiolules and leaflets progressively smaller towards the extremities. Inflorescences glomerulate, terminal, few-flowered; peduncle rather reduced, smaller than 4 mm long, stellate-tomentose; bracts and bracteoles absent. Flowers sessile or subsessile; calyx 0.5–0.6 × 0.3–0.5 cm, campanulate, 2–3-lobed, irregularly partite, apex cuneate to rounded, densely tomentose, trichomes stellate, ferruginous; corolla tubular-infundibuliform 2.2–3.2 cm long, flower tube 1.7–2.3 cm long, opening 0.8–1.2 cm wide, lobes 0.6–0.8 cm long, yellow, with reddish striation in the face, externally glabrous, internally densely villous; stamens inserted, free part of the dorsal stamens c. 0.6 cm long, free part of the ventral stamens

c. 1.2 cm long, free part glabrous, adnate part villous, anthers glabrous, thecae c. 1.5 × 1 mm; ovary c. 4.0 × 1.5 mm, ovoid-oblong, lepidote-glandular; nectarial disk annular, conspicuous; style 1.4–1.5 cm long, glabrous, stigma c. 1.5 mm long, glabrous, bifid. Capsules c. 20.6 × 1.1 cm, linear-cylindrical, brownish, not ribbed, glabrescent. Nucleus seminiferous c. 0.4 × 0.6 cm, elliptic; wings c. 0.6 cm long.

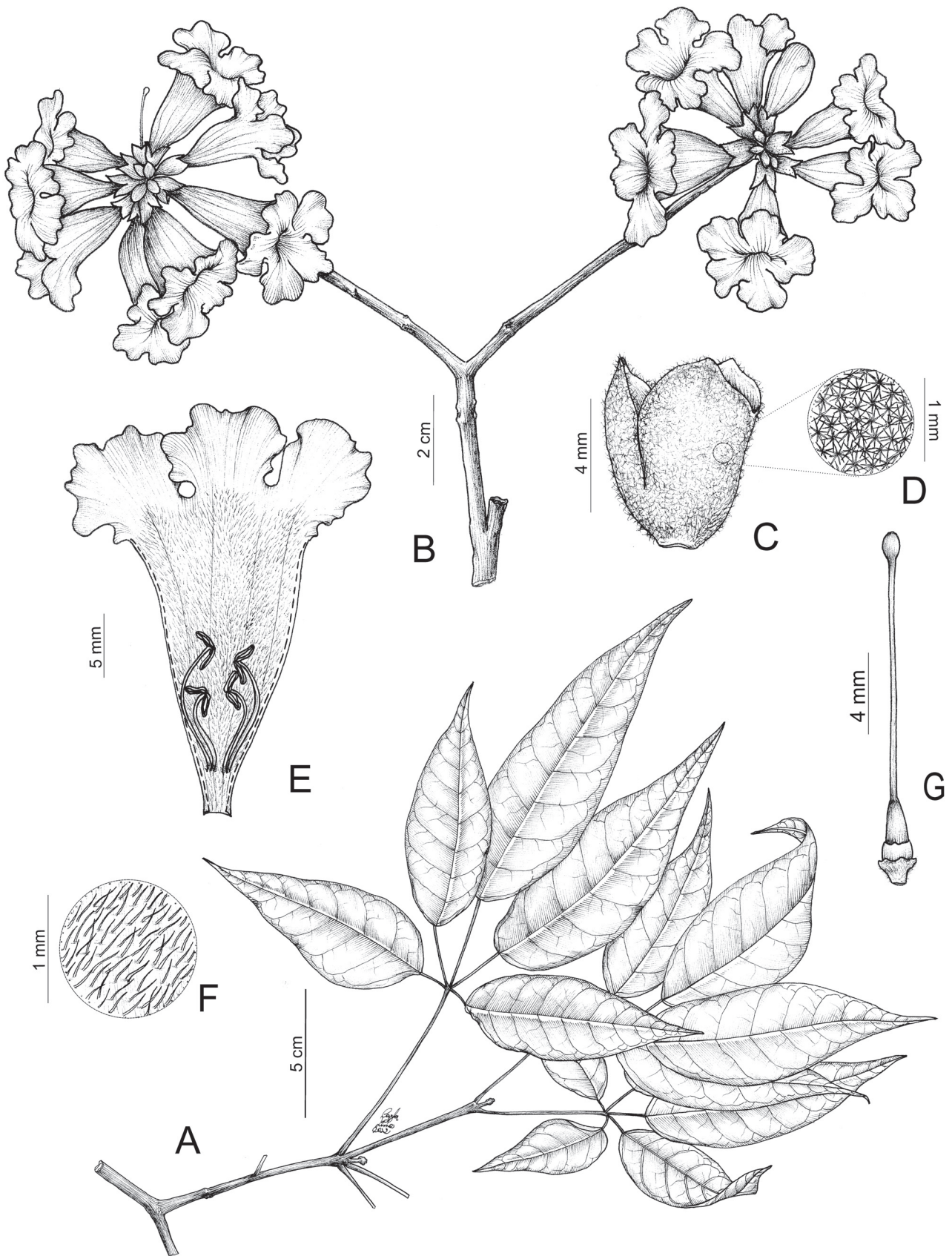
Type: **BRAZIL. Bahia:** Itapé, road from Itapé to Itaju do Colônia, in a branch 19,7 km from the exit of Itaju do Colônia (14°57'37"S, 39°36'35"W), 27/X/2004, fl., A.M.A. Amorim et al. 4323 (holotype CEPEC, isotype SPF).

Paratype: **BRAZIL. Bahia:** Itapé, road from Itapé to Itaju do Colônia, in a branch 19,7 km from the exit of Itaju do Colônia (14°57'37"S, 39°36'35"W), 08/XII/2011, fr., F.S. Espírito-Santo et al. 190 (CEPEC, HUEFS, SPF).

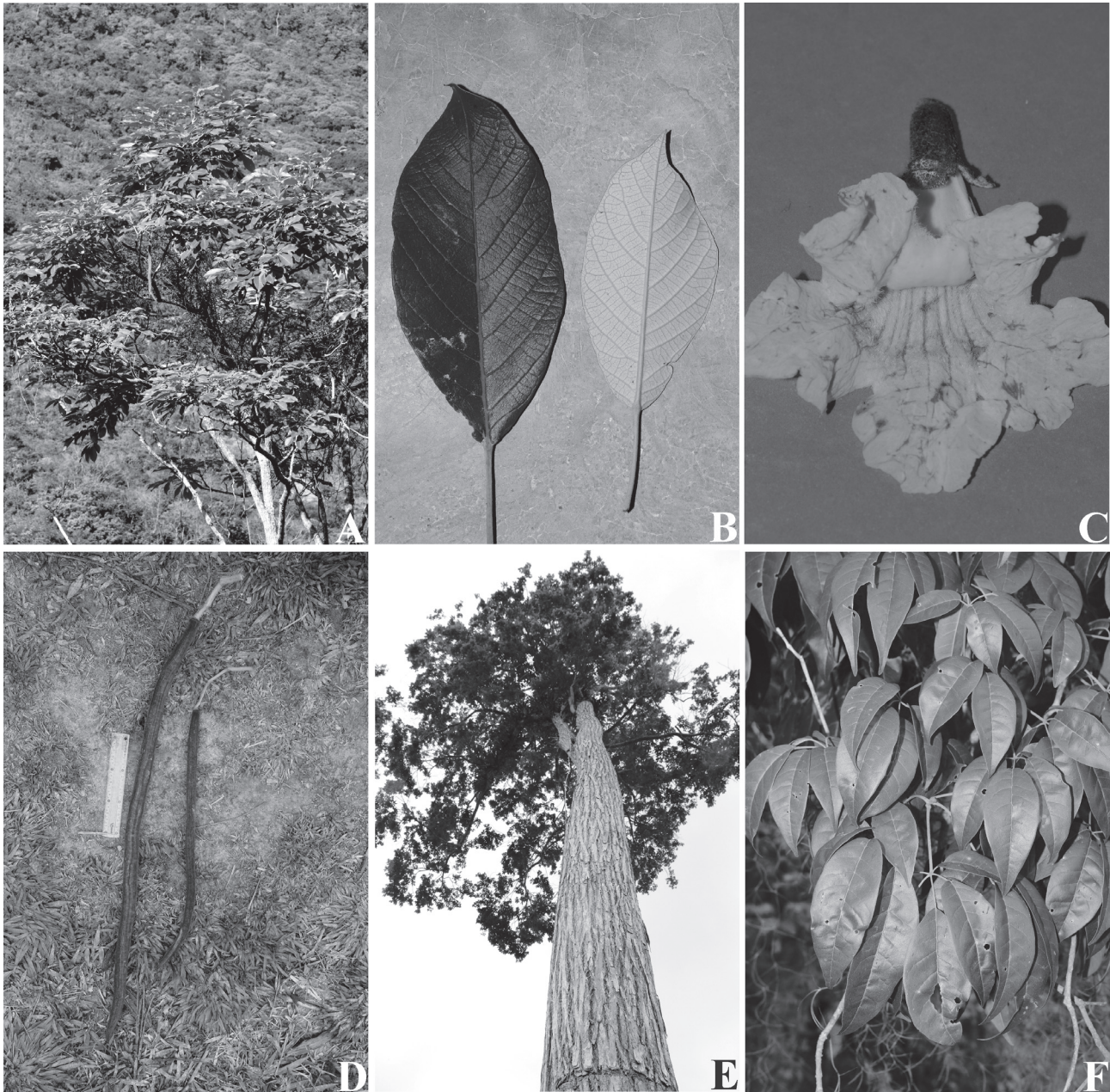
**Distribution, habitat, and conservation status** – *Handroanthus parviflorus* is known from a single location in Semideciduous Seasonal Forest, in the municipality of Itapé, in the state of Bahia (Fig. 4). The area is in an advanced stage of degradation, which is especially due to agriculture and cattle farming; the original vegetation is rather impoverished and reduced to small patches. Therefore, according to the criteria proposed by the IUCN (2001), *H. parviflorus* should be classified as Endangered [EN B1ab(iii) + D1].

**Etymology** – The epithet refers to the reduced dimensions of floral characters in this species.

**Notes** – As with *H. diamantinensis*, *H. parviflorus* would also be positioned within group IV proposed by Gentry (1992), and displays floral characters that are only similar to *H. spongiosus*. *Handroanthus parviflorus* can be distinguished from *H. spongiosus*, a species endemic



**Figure 2.** *Handroanthus parviflorus* Espírito-Santo & M.M.Silva-Castro. A. Branch with leaves; B. Flowering branch; C. Calyx; D. Indumentum of calyx; E. Open corolla, showing the stamens; F. Indumentum of internal surface of corolla; and G. Gynoecium. (A. F.S. Espírito-Santo et al. 190; B-G. A.M.A. Amorim et al. 4323)

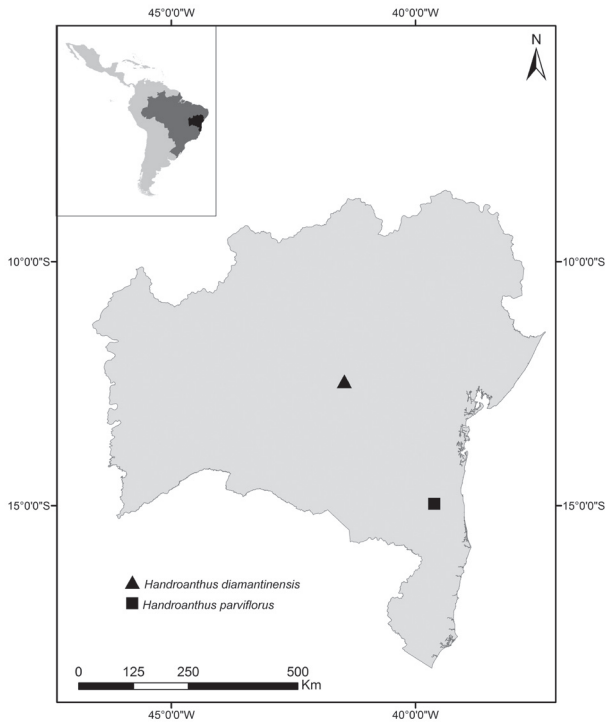


**Figure 3.** A-D. *Handroanthus diamantinensis* Espírito-Santo & M.M.Silva-Castro, municipality of Palmeiras, Chapada Diamantina National Park, state of Bahia, Brazil. A. Habit; B. discoloured leaflets; C. Flower; D. Capsules. E-F. *Handroanthus parviflorus* Espírito-Santo & M.M.Silva-Castro, municipality of Itapé, Bahia, Brazil. E. Habit; F. Leaves. (Photos by FSES)

to the caatinga dry forest, due to the sessile to subsessile flowers (*vs.* pedicellate), calyx 2–3-lobed (*vs.* 5-lobed), acute to rounded apex of lobes (*vs.* mucronate) and pilose region of stamen insertion (*vs.* glabrous). Additionally, *H. parviflorus* generally has smaller flowers than *H. spongiosus* (corolla 2.2–3.2 *vs.* 2.5–4.2 cm long, with tube 1.7–2.3 *vs.* 2–3 cm long), a trunk with rhytidome not detaching in long longitudinal strips, and leaves that are (3–)5(–7)-foliolate (*vs.* always 3-foliolate), lepidote (*vs.* stellate-tomentose), with leaflets with acute (*vs.* attenuate to cuspidate) apex.

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**Figure 4.** Map indicating the locations of *Handroanthus diamantinensis* Espírito-Santo & M.M. Silva-Castro, municipality of Palmeiras, and *H. parviflorus* Espírito-Santo & M.M. Silva-Castro, municipality of Itapé, Bahia, Brazil.

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