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Original Paper

Deguelia tenuiflora (Leguminosae, Papilionoideae), a remarkable new species from the Brazilian Amazon

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Abstract

A new species of *Deguelia* from north of Manaus (Amazonas state), Brazil, is described and illustrated here as *Deguelia tenuiflora*. It is vegetatively similar to *D. amazonica*, while its flowers resemble *D. negrensis* and *D. scandens.* This new species exhibits the following unique characteristics: mostly unifoliolate leaves covered abaxially by a peculiar indumentum, and calyx with vexillary lobes triangular-depressed, which allows for its recognition as a distinct species. We provide a table of characters for distinguishing the new species from congeners and a distribution map of the new taxon.

Key words: Fabaceae, liana, PDBFF, terra firme, unifoliolate.

Resumo

Uma nova espécie de *Deguelia* encontrada perto de Manaus (Amazonas), Brasil é descrita e ilustrada aqui como *Deguelia tenuiflora*. Esta espécie é similar à *D. amazonica* vegetativamente enquanto suas flores se assemelham à *D. negrensis* e *D. scandens*. Esta nova espécie apresenta características únicas: folhas geralmente unifolioladas com pilosidade peculiar abaxialmente e cálice com os lobos vexilares triangular-deprimidos, o que permite o seu reconhecimento como uma espécie distinta. Uma tabela com caracteres selecionados é fornecida para distinguir as espécies deste gênero, além de um mapa de distribuição para este novo táxon.

Palavras-chave: Fabaceae, liana, PDBFF, terra firme, unifoliolada.

Introduction

According to its current circumscription, *Deguelia* Aubl. is represented by 21 species, found only in the neotropics (Camargo & Tozzi 2014a, 2014b, 2016, 2018). The genus was described by Aublet (1775) from French Guiana and later synonymized with *Derris* by Bentham (1860). The species were later described in or combined with *Lonchocarpus* Kunth in Humboldt *et al.* (1824) by Bentham (1839, 1850, 1860, 1862), Pittier (1917, 1923), Harms (1921), Ducke (1925, 1942), Killip & Smith (1930), Kleinhoonte in Pulle (1933), Smith in Krukoff & Smith (1937), Hermann (1947), Lemée (1952); *Derris* by Bentham (1860, 1862), Killip (1934, 1936), Macbride (1943), Ducke (1944, 1949); and *Millettia* by Ducke (1953). *Deguelia* was reestablished by Geesink (1984), who recognized it as distinct from *Derris* and *Lonchocarpus*. Previously, most of the *Deguelia* species had been described in these other genera.

The genus *Deguelia* includes plants that are highly variable in habit, presence and type of floral dots, indumentum covering the corolla, number of ovules, and type of fruit. The genus can only be characterized by its inflorescence type: a pseudoraceme in which the secondary axes form brachyblasts (shoots with little internode elongation) containing more than five flowers (Camargo & Mansano, unpublished). Phylogenetic studies suggest a drastic reduction in the number of species in the genus, while the inflorescence type, also typical in many Phaseoleae genera, seems to

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have appeared in Millettieae at least three different times (Camargo & Mansano, unpublished).

A recently updated analysis shows that *Deguelia* should be restricted to species that show a defined suite of characters, instead of just the inflorescence type (Camargo & Mansano, unpublished). That important characters defining the genus include the presence of darkened dots smaller than 0.1 mm on the calyx and corolla (although absent in one species), lack of indumentum on the corolla, a membranaceous corolla, a standard lacking basal callosities, keel petals subequal to the wings, fewer than six ovules (usually up to four), indehiscent fruits with an evident wing along the adaxial suture (lacking in one species, which bears elastically dehiscent fruits). These restrictions result in reducing the number of *Deguelia* species to four (Camargo & Mansano, unpublished).

A new species of *Deguelia*, conforming to the new circumscription, was collected by one of the authors at PDBFF (Biological Dynamics of Forest Fragments Project) north of Manaus, in an Area of Relevant Ecological Interest (ARIE) between Manaus and Rio Preto da Eva in the state of Amazonas. Here we provide a full description of the new species, its known ecological preferences, IUCN status, a distribution map, taxonomic comments, and a table of morphological characters that distinguish this species from others of the genus.

Materials and Method

The discovery of the new species occurred during an ecological study of intact and fragmented forests within the PDBFF, executed by the second author. Sterile and fertile specimens were collected and sent for identification to the first and third authors (Leguminosae specialists), who recently had completed a revision of *Deguelia* (Camargo & Mansano, unpublished). Once determined to be a new species, it was described using terminology based on Radford *et al.* (1974) and Font Quer (1985). The microscopic measurements were taken with the aid of a stereoscopic microscope and a Starfer 150 × 0.02 mm caliper. The specimens collected during the fieldwork are deposited in UEC and INPA herbaria. Preliminary values for conservation status were based on IUCN Standards and Petitions Committee (2022), and the scenarios were evaluated using the GEOCAT tool (Bachman *et al.* 2011).

Taxonomic treatment

Deguelia tenuiflora R.A. Camargo, R.J. Burnham & Mansano *sp. nov.* Type: BRAZIL. AMAZONAS: Manaus, BR-174, km 64, east on ZF-03 about 0.5 km before km 37, along roadside in treefall, 02º24'19"S, 59º52'30"W, 31.V.2017, fl., *R.J. Burnham & J.B. da Silva 8009* (Holotype: INPA!; Isotype: UEC!). Fig. 1

The species differs from all others in the genus mainly by the presence of almost exclusively unifoliolate leaves, present on the reproductive branches and rarely up to five leaflets on sterile branches, presence of stipels and leaflets abaxially covered by a long, dense ferrugineous tomentum (unique in the genus).

Lianas to scandent shrubs, robust with a usually 1–3 cm diameter terete trunk, however the largest stem found was 7.2 cm in diameter. Young branches densely tomentose, becoming sparser in older material. Stipules lanceolate-acuminate, usually caducous. Leaves with 1(–5) leaflets, pulvinus 0.4–1(–1.3) cm, petiole (0.9–)1.8–5.6 (–9.2) cm long and rachis (1–)7.8–9.5 long (only present in 3-foliolate and 5-foliolate specimens), striate and adaxially sulcate, densely tomentose. Stipels caducous, 1.5–2.1 mm, linear, tomentose, petiolules 0.8–1.1 cm, densely tomentose. Leaflets 8.3–19.9 × 3.9–10.2 cm, elliptic, apex obtuse to acuminate (sometimes with a long acumen), base obtuse, adaxially glabrous, sometimes with sparse, short trichomes over the veins, abaxially dense-ferrugineous tomentose on primary and secondary veins, dark green and shiny adaxially, pale olive abaxially, primary and secondary veins adaxially immersed, abaxially strongly prominent. Pseudoracemose inflorescence 7.4–14.2 cm, axillary, 2–3 per node, densely ferrugineous tomentose, brachyblasts 6.1–6.3 mm, subterete, tomentose, bracts 1.4–2.6 × 0.7–1.6 mm, ovate to deltoid, acuminate, abaxially tomentose, bracteoles 1.2–1.5 × 0.4–0.6 mm, ovate, acuminate, abaxially tomentose. Flowers fragile, falling off readily, pedicel 2.7–5.8 mm, tomentose, calyx 5-dentate, ferrugineous-tomentose, almost totally united, 0.8–0.9 mm, triangular-depressed, apex obtuse, lateral carinal teeth 0.6–0.7 mm, shallowly-triangular, apex acuminate, central carinal tooth slightly longer 0.8–0.9 mm, shallowly-triangular, apex acuminate, corolla pale cream, drying yellowish; standard 5.7–6.7 × 3.2–4.2 mm, obovate to obovate-panduriform, apex emarginate, base attenuate to sub-auriculate, glabrous, wings 5.2–6.1 × 1.5–1.8 mm, oblong,

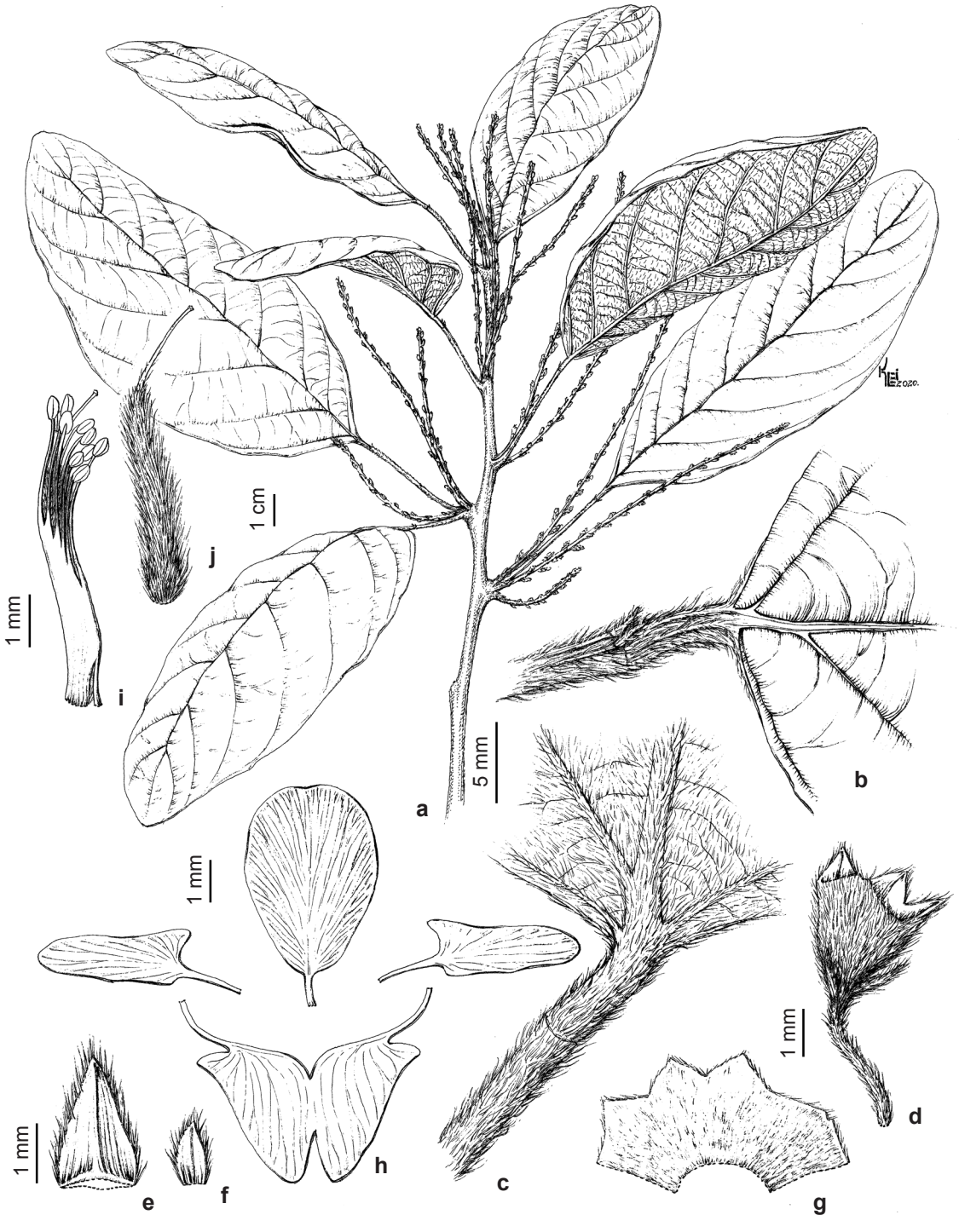

Figure 1 – a-j. *Deguelia tenuiflora* – a. habit; b. stipel; c. leaflet indumentum on the abaxial side; d. pedicel with calyx and bracteoles attached; e. bract; f. bracteole; g. calyx showing the indumentum on the abaxial side; h. corolla (standard, wings and keel petals); i. staminal tube sheathing the ovary; j. carpel showing ovary and style indumentum (a-j, *R.J. Burnham 8009*, UEC - drawn from isotype by Klei Sousa).

apex round, base oblique (vexillary side hastate and carinal side attenuate), keel petals 5.1–6.7 × 2.1–2.4 mm, elliptic-falcate, apex round, base oblique (vexillary side hastate and carinal side attenuate), stamens pseudomonadelphous, filaments 1.2–2.7 mm, membranaceous, glabrous; anthers 0.2–0.5 × 0.2–0.3 mm, oblong, elliptic to suborbicular, ovary 3.1–3.6 mm long, velutinous, two ovules, stipe very short: 0.3–0.4 mm in length; disc absent; style 1.8–2.8 mm long, slightly reflexed on the proximal half (distal half straight), forming a 90 to 120º angle with the ovary, trichomes sparse on the first half, stigma short. Fruit unknown.

Additional specimens examined (paratypes): BRAZIL. AMAZONAS: Manaus, BR-174, km 64, east on ZF-03, 50 ha plot at km 37, 3.VII.2011, *R.J. Burnham & J.B. da Silva 4202* (INPA); BR-174, km 64, east on ZF-03, 50 ha plot at km 37, 3.VII.2012, *R.J. Burnham & J.B. da Silva 5060* (INPA); BR-174, km 80, 5 km west on Dimona Fazenda, 10 ha plot Liana Tag 9588, 21.VII.2016, *R.J. Burnham & J.B. da Silva 6900* (INPA); BR-174, km 80, 5 km west on Dimona Fazenda, 10 ha plot Liana Tag 9842, 23.VII.2016, *R.J. Burnham & J.B. da Silva 6999* (INPA).

Deguelia tenuiflora is only known from the type locality, Manaus, Amazonas, Brazil (Fig. 2). It grows in continuous (unfragmented) "terra firme" forests and is one of the five most abundant liana species in a 25-hectare ForestGEO plot at km 37 in the PDBFF (unpublished data R.J. Burnham). It is notably less common in other forest plots at PDBFF where forest plots are isolated in a matrix of deforested areas. As a preliminary conservation assessment for this species, it can be stated that it is critically endangered (CR) based on criteria B (geographic range; extent of occurrence, area of occupancy). In spite of the well-studied Flora of the Reserva Ducke (Ribeiro *et al.* 1999) only 65 km away, it has not been reported from that site. For a more refined assessment, additional information must be gathered so other criteria can also be evaluated.

The species was only found in May with flowers, in spite of being collected in almost every month of the year in sterile form. The etymology refers to its fragile flower parts, in particular the petals and staminal tube.

Figure 2 – Distribution map of *Deguelia tenuiflora* showing the locality near Manaus (Amazonas, Brazil) where it was collected.

Table 1 – Morphological table of characters and their variation among *Deguelia* species.

	D. amazonica	***D. negrenis***	***D. occidentalis***	***D. scandens***	***D. tenuiflora***
Leaflet number	7–9	(3–)5–7	5	5–7	1 on fertile branches; rarely 3–5 on sterile
Leaflet indumentum (abaxially)	sericeous	glabrescent to sparse-sericeous	sparse-pubescent to glabrescent	glabrescent to puberulous	dense-tomentose
Calyx lobes (vexillary side)	shallowly-triangular	ovate-depressed	ovate-depressed	ovate-depressed	triangular-depressed
Calyx lobes (carinal side)	deltoid	shallowly-triangular	shallowly-triangular	shallowly-triangular	shallowly-triangular
Calyx dots	absent	present	present	present	present
Corolla color	purple to pink	white	White	white	pale cream
Corolla dots	absent	present	absent	present	present
Disc (ovary)	absent	absent	present	absent	absent
Fruit dehiscense	indehiscent	indehiscent	dehiscent	indehiscent	unknown
Fruit shape	elliptic-oblong	suborbicular to oblong	oblong-linear	oblong to elliptic-oblong	unknown

Deguelia tenuiflora bears the following unique features: regularly unifoliolate leaves, although some sterile individuals may have 1, 3, or 5 leaflets, abaxially dense-tomentose, and a calyx with vexillary lobes triangular-depressed (Tab. 1). Vegetative morphological traits place this species closest to *D. amazonica* Killip, which bears very distinct flowers, with longer, purple to pink petals (versus pale cream in the new species), and a consistently higher number of leaflets (the new species normally bears just one leaflet on leaves of fertile branches and regularly bears just one leaflet on sterile branches) with a different indumentum type (short-adpressed versus long-tomentose abaxially). The flowers resemble *D. negrensis* (Benth.) Taub. and *D. scandens* Aubl. but the new species can be distinguished mainly by its vexillary calyx lobe shape, and vegetative characters, in particular the presence of a dense indumentum on the abaxial surface of leaflets. The new species bears stipels, rarely seen elsewhere in the genus (only in *D. amazonica* in few specimens with very young leaflets, as they fall off frequently). Field censuses found consistent presence of dark red latex in stems 2 cm and larger in diameter.

Deguelia tenuiflora was frequently observed sterile and unifoliolate, being collected only one time with flowers. Few individuals were seen with up to 5 leaflets, such as *R.J. Burnham & J.B. da Silva 4202* (3 leaflets), *R.J. Burnham & J.B. da Silva 5060* (1–3 leaflets), *R.J. Burnham & J.B. da Silva 6900* (1 or 5 leaflets) and *R.J. Burnham & J.B. da Silva 6999* (5 leaflets).

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