



Catasetum brasilandense (Orchidaceae), a new species from Mato Grosso, Brazil

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Abstract

Catasetum brasilandense, a new species from the Brazilian state Mato Grosso is described. This species was found in a difficult access area with rugged topography, in the municipality of Nova Brasilândia, in the vicinity of the Rio das Mortes. It is closely related to *Catasetum gladiatorium*, differing mainly by the labellum structure.

Résumé

Une nouvelle espèce de *Catasetum*, *Catasetum brasilandense*, est décrite. Originnaire de l'état brésilien du Mato Grosso, cette espèce a été découverte dans une zone d'accès difficile, présentant une topographie accidentée, sur la commune de Nova Brasilândia, à proximité du Rio das Mortes. Elle est étroitement apparentée à *Catasetum gladiatorium*, s'en distinguant principalement par la structure du labelle.

Resumo

Catasetum brasilandense, uma nova espécie descoberta no Estado de Mato Grosso, é descrita aqui. Essa espécie foi encontrada em zona escarpada e de

difícil acesso, no município de Nova Brasilândia, próximo ao Ríó das Mortes. A espécie aqui descrita se relaciona com *Catasetum gladiatorium*, do qual se diferencia principalmente pela estrutura do labelo.

Keywords: Biodiversity, endangered species, native flora, Savannah.

Mots clés : Biodiversité, Cerrado, espèces menacées, flore indigère.

Palavras chaves: Biodiversidade, Cerrado, espécies ameaçadas, flora nativa.

Introduction

The genus *Catasetum* L.C.M. Richard *ex* Kunth is extremely diverse, comprising species with high ornamental potential and economic value (Petini-Benelli, 2012; Petini-Benelli *et al.*, 2016). The genus shows a neotropical distribution and is present in several habitats. The number of its species is controversial: 130 according to Romero-González (2009), *versus* 202 species listed in the World Checklist of Selected Plant Families (Govaërts *et al.*, 2017). However two reasons may explain this difference: (a) the second list includes as good species some taxa nowadays treated as synonyms by most authors and (b) it is continuously updated and includes recent taxa not considered in Romero-González (2009). In Brazil, in the state of Mato Grosso the genus is represented by 43 species or natural hybrids (Petini-Benelli, 2017).

Eight of these taxa are endemic to Mato Grosso: *C. cirrhaeoides* Hoehne, *C. longipes* F.E.L. Miranda & K.G. Lacerda, *C. punctatum* Rolfe, *C. schmidtianum* F.E.L. Miranda & K.G. Lacerda, *C. × apolloi* Benelli & Grade, *C. × altaflorestense* Benelli & Grade, *C. × canaense* Benelli and *C. colidense* Engels, Ferneda Rocha & Benelli. This diversity can be explained by the high diversity of vegetation structure in the state. However, as Mato Grosso is an agribusiness frontline, a significant portion of the habitats, consisting of areas of native vegetation, is being converted year in year out into pastures and crop lands (Domingues & Bermann, 2012; Ganem, 2015).

Consequently, there is a tremendous loss of biodiversity associated with these habitat conversions in all biomes. Facing this scenario, there is an urgent need to get a better knowledge of the biodiversity in general and of *Catasetum* in particular, in the region, to evaluate conservation status of each species and contribute to public conservation policies. In this context,

the present study aims to describe and illustrate a new species recently discovered in Mato Grosso during activities connected to the project “Phylogeny of *Catasetum* Rich. ex Kunth and the Monograph of the genus for the State of Mato Grosso, Brazil”.

Materials and methods

The only population of *Catasetum brasiladense* known hitherto is located in the central portion of the state of Mato Grosso, in the municipality of Nova Brasilândia, in the Cerrado. There the original vegetation is quite modified by eucalyptus plantations, cattle ranching and monocultures such as rice and corn (IBGE, 2015), whereas the urbanization has already reached 78% of the total area (Furtado, 2008).

The material studied (five plants) was collected by Mr. Paulo R. Paêlo in 2013, in a very steep rocky outcrop in a small remaining fragment of Cerrado biome, close to the Rio das Mortes river. These plants were put in cultivation where the first bloom was obtained in December of the same year. The flowers were compared with herbarium material from BHCB, CNMT, IAN, RB, UFMT and UPCB (acronyms according to Thiers, 2016). Among the material compared special attention was paid to *Catasetum gladiatorium* K.G. Lacerda due to a particular similarity with the new taxon. Herbarium specimens were collected as soon as December 2013, as flowers became available, and prepared following the methodology of Petini-Benelli (2016) which consists in removing the mucilage contained in the pseudobulb, in order to accelerate the process of herborization, and maintaining some extra flowers conserved in glycerin, alcohol and water – GAA solution (Spirit). The material has been deposited in herbaria CNMT, RB, UFMT and UPCB, and samples were sent for DNA extraction in the Laboratory of Systematics and Molecular Ecology of Plants of the Federal University of Paraná, Brazil.

Taxonomic treatment

Catasetum brasilandense Benelli, *sp. nov.*

Types: Brazil, Mato Grosso, Nova Brasilândia, Rio das Mortes, close to the municipality of Campo Verde. 15°18' S, 55°06' W, 652 m s.m., *P.R. Paêlo ADA0562a*, fl. in cult. 14-XII-2013 (holotype UFMT 41211) (♂); Fig. 1 and 2. *Idem, P.R. Paêlo ADA0562b*, fl. in cult. 18-I-2014 (paratypes RB 445563,

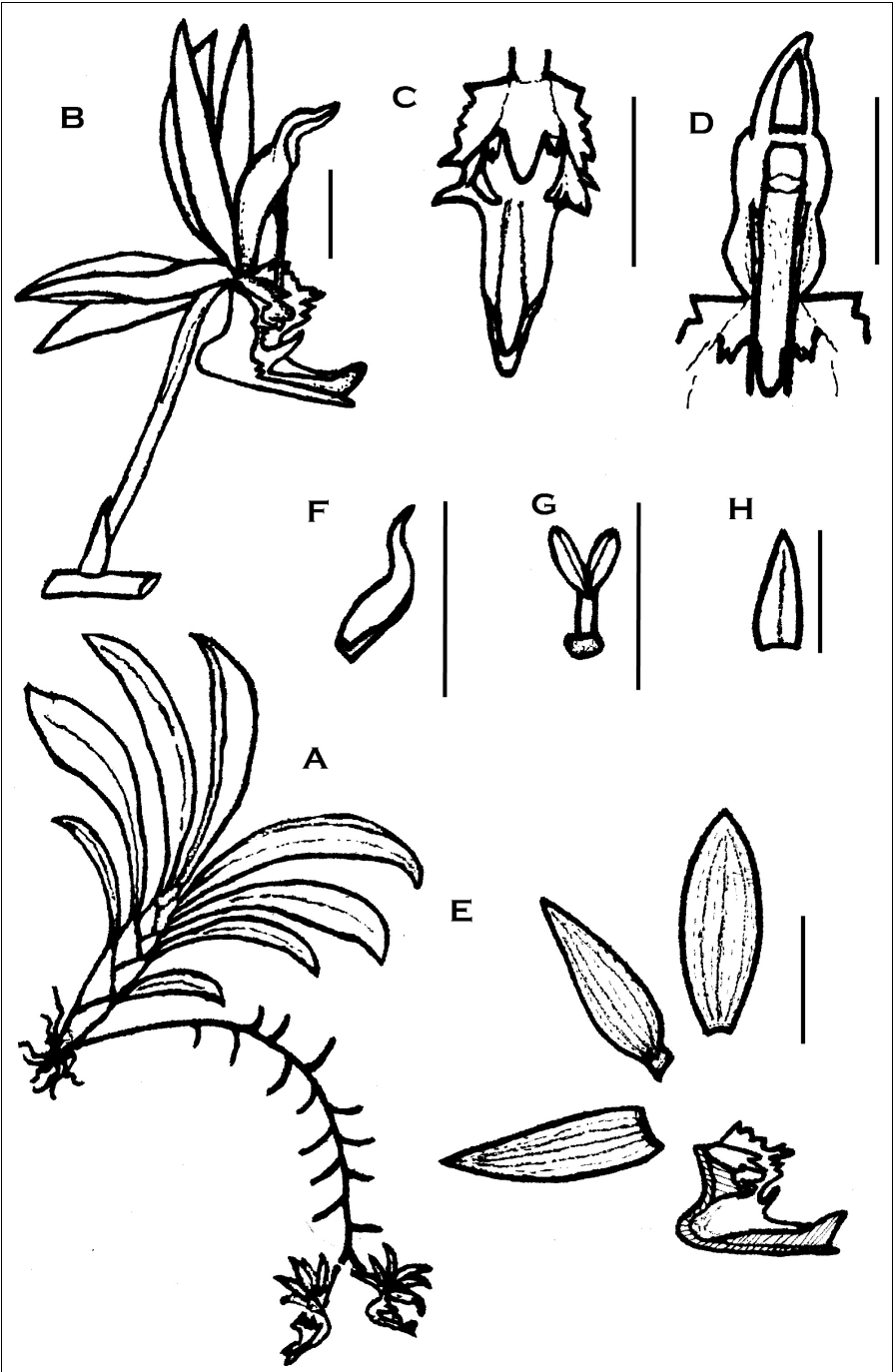
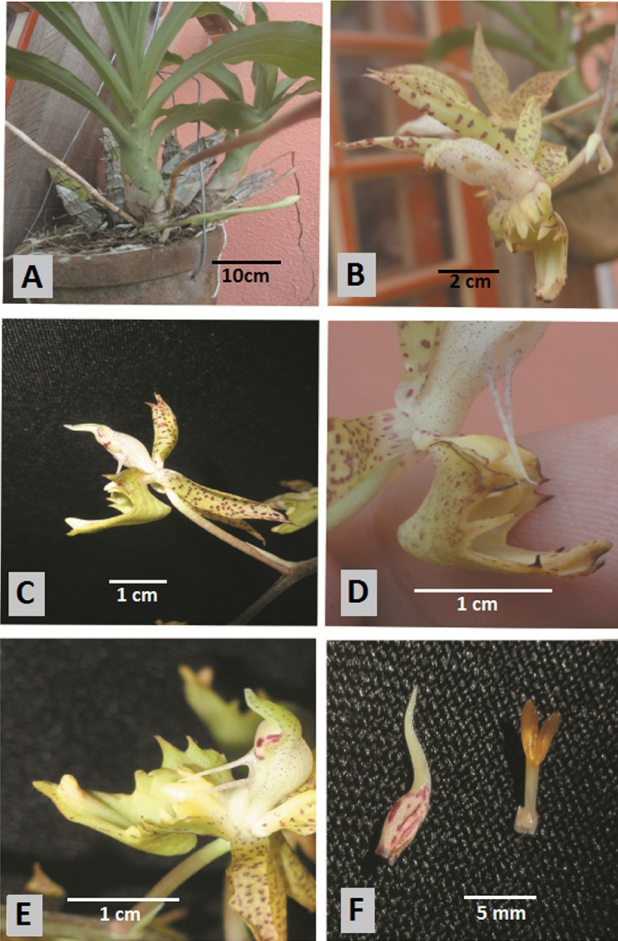


Fig. 1. *Catasetum brasilandense* [opposite page]

A. flowering plant (male flowers). B. male flower, lateral view. C. labellum, frontal view. D. column, frontal view. E. dorsal sepal, petal, lateral sepal and labellum longitudinally sectioned of the male flower. F. anther cap, lateral view. G. pollinarium, frontal view. H. floral bract.
After ADA 562a (UFMT). Scale bars = 1 cm [drawing A. Petini-Benelli]

**Fig. 2.** *Catasetum brasilandense*

different views of the male flowers and the inflorescence

A, B, D, after ADA 00562a (UFMT), C, E, F, after ADA 00562c (RB) [ph. A. Petini-Benelli]

UPCB and UFMT 41210) (♂). Idem, *P.R. Paêlo ADA0562c*, fl. in cult. 8-III-2014 (paratype RB 444959) (♂). Idem, *P.R. Paêlo ADA0562d*, fl. in cult. 12-XII-2014 (paratype CNMT 6823; spirit UPCB) (♂).

Epiphyte herb; pseudobulbs 4-7 × 2-3 cm, aggregate, multi-annulate, multi-foliate, fusiform, erect, with a abruptly acuminate apex; leaves 5-10 on each pseudobulb, 29-45 × 2.8-4.3 cm, membranous, oblong-lanceolate, apically acute and basally narrowed, with slightly undulate margins, with 3 thin ribs barely separate; inflorescences 2-4 on each pseudobulb, 20-30 cm, basal, multiflowered racemes (ca. 20 flowers), initially semi-erect, in both terminal thirds slightly fallen and pending; floral bracts 8-8.5 × 3-3.5 mm, acute, triangular, tightly sheathing the pedicels; pedicel 30-35 × 1.8-2.1 mm including ovary, cylindrical, gently curved; staminate flowers resupinated, cream-yellow to greenish, with tiny brown specks covering all the floral parts, including the column and anther; dorsal sepal 22-23 × 7-7.5 mm, straight and slightly concave, linear-lanceolate, acute, partially covering the petals; lateral sepals 23-24 × 8-9 mm, erect, linear-lanceolate, acute, reflexed on the pedicel, parallel; petals 23-24 × 7.5-8 mm, linear-lanceolate, acute, cream-yellow speckled brown, with margins reflexed on the dorsal sepal; labellum 18-18.5 × 10-13 mm, fleshy, subtrapezoidal, light green, with, at mid-length, a narrow and deep (9-10 mm) sacciform portion, geniculate when viewed from rear, forming an angle of 40°; central callus at the base, fleshy, rhomboid, flanked by two pairs of smaller calli looking like small teeth; these calli are connected to the raised margins of the lip, covering the sac and thus forming a cavity; midlobe oblong-triangulate, apex acute, with a distinct callus, long, high and rhomboid, that goes from the bottom of the sac to the apex of the midlobe; lip margins duplicate, the outer smooth, occasionally with a tooth on the uppermost portion near the lip base and the internal adorned on the opening of the sac with 2-4 denticulate and flexible structures directed inwards; column 13-15 × 6 mm, erect, fleshy, subtriangular, straight at the base and apiculate towards the apex, white with tiny brown spots on the back; rostellum 6-7 mm, recurved; antennae 9-10 mm, parallel and straight, leaning on the side of the central tooth of the basal callus and projecting over the sac; anther 4-4.3 × 2.7-3.1 mm, subtriangular, rostrate, white with brown spots, bilocular; anther beak ca. 4 mm long; pollinia 2, 2.8-3 × 1-1.1 mm, yellow. Pistillate flowers and fruits not seen.

Etymology: the epithet *brasilandense* refers to the place of collection of the type, native from the Nova Brasilandia municipality. Spelling according to the Brazilian usage.

Distribution and habitat: hitherto *Catasetum brasilandense* was found only in the southernmost portion of the Nova Brasilandia municipality (Fig. 3), close to the municipality of Campo Verde, in a small rocky outcrop area close to the Rio das Mortes river, where survived a few trees typical of *Cerrado*. The climate in the municipality is tropical hot and subwet, dry from May to September, with maximum rainfall in December, January and February, leading to an average annual rainfall of 1,750 mm. Average temperature 24°C.

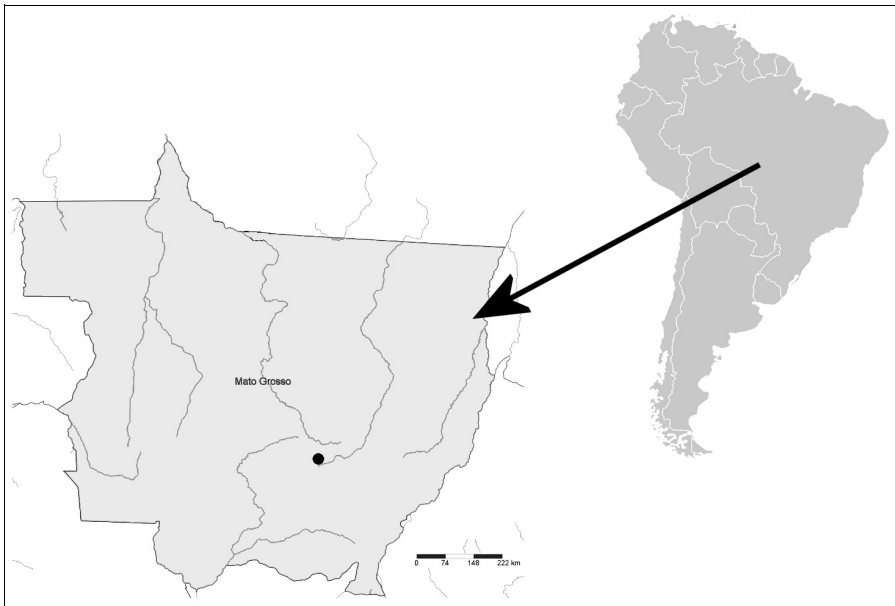


Fig. 3. Region of origin of *Catasetum brasilandense*

- *Catasetum brasilandense*

Conservation Status: despite intense field work during which the area has been well explored for new records, the species was collected just once and in an extremely isolated area where the native vegetation was quite modified by human activity. Therefore the species can be considered as Critically Endangered [CR, B2 (a)], according to the criteria of IUCN (2001).

Taxonomic notes

Among *Catasetum* species found in the state of Mato Grosso, *Catasetum brasilandense* is related to *C. gladiatorium* by the shape and the general appearance of their flowers, their sepals and petals with similar morphology and color, evenly greenish with brown splashes (Table 1). Both *C. gladiatorium* and *C. brasilandense* produce consecutive (2-4) flower stalks during the summer, often at the same time when the bulb is in development. However, the particular features of *C. brasilandense* labellum are crucial to differentiate both species since this species presents an unique structure among all the *Catasetum* members. The labellum does not show any structure in its internal portion, it is stiff, fleshy, subtrapezoidal, concave, and presents a narrow sacciform and geniculate (when seen from the rear) portion, with a set of very complex calli. The labellum of *C. gladiatorium* is bigger than in *C. brasilandense* (20-23 versus 18-18.5 mm long, respectively), fleshy, elliptical, with irregularly toothed margins, concave, with a subtrapezoidal callus at the base, erect margins, becoming progressively flatter towards the apex, flat apical region, and all the labellum is completely covered with ciliate structures, including a fleshy and protuberant callus in the central portion of the frontal lobe. While *C. gladiatorium* has a cluster of cilia or filament structures, *C. brasilandense* only has a few delicate and flexible extensions that appear sparsely on the lateral margins of the basal lobes and a elongated callus projected up to the midlobe apex. The inflorescence of *C. brasilandense* is racemose, 20-30 cm long, horizontal to somewhat pendent, with its flowers sparsely distributed along its terminal $\frac{3}{4}$. The inflorescence of *C. gladiatorium* is also racemose, up to ca. 30 cm long, but arched to perfectly hanging, with its flowers grouped in its terminal half.

We considered the possibility of a hybridization between *Catasetum gladiatorium* and another species, that would have given birth to *C. brasilandense*. However, *C. gladiatorium* was so far only registered in the extreme southeast of the state, in the region of the Portal do Araguaia, near the border with the state of Goiás, about 900 km from Nova Brasilândia, and that, in principle, makes us rule out the hybridization hypothesis.

Key to the species related to *Catasetum brasilandense* present in the State of Mato Grosso

1. Lip margins with very few elongated and sparse fimbriae, only in the lateral lobes -----*C. brasilandense*
 1a. Lip margins sparsely or densely ciliate -----2
 2(1). Lip with few cilia concentrated in the lateral lobes-----3
 2a. Lip with densely ciliate margin 4
 3(2). Callus with a prominent central acute tooth-----*C. ariquemense*
 3a. Callus with a wide truncate tooth surrounded with cilia-----*C. longipes*
 4(2). Fleshy, tridentate basal callus -----*C. gladiatorium*
 4a. Slender, simple or bifurcated basal callus -----*C. barbatum*

Acknowledgements

Thanks to the curators of all consulted herbaria. To Paulo R. Paêlo, for the donation of the material type. To Rômulo E. S. Novaes for the support with the figures. To the anonymous reviewers who have contributed to the improvement of this work. The first author thanks CAPES – Coordenação de Aperfeiçoamento de Pessoal de Nível Superior for the research grant.

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[continued on page 61]

Table 1. Morphological characters of *Catasetum brasilandense* and *C. gladiatorium*

Only characters relating to male flower are presented.

	<i>C. brasilandense</i>	<i>C. gladiatorium</i>
Pseudobulbs	aggregated, fusiform 4-7 × 2-3 cm	aggregated, fusiform to elliptical 5-17 × 4-4.2 cm
Leaves	5-10 per pseudobulb oblong-lanceolate 29-45 × 2.8-4.3 cm	5-10 per pseudobulb oblong-lanceolate 10-25 × 3-6 cm
Inflorescence	racemose horizontal to short hanging 20-30 cm long	racemose arched to perfectly hanging up to ca. 30 cm long
Floral bracts	triangular lanceolate 8-8.5 × 3-3.5 mm	lanceolate and acuminate ca. 12 × 6 mm
Pedice (incl. ovary)	slightly curved at the ovary 30-35 × 1.8-2.1 mm	obliquely erect, sigmoid ca. 20 mm long
Flowers	sparsely distributed in terminal $\frac{3}{4}$	grouped in terminal half
Flower size (extended)	43-45 mm	43-48 mm
Dorsal sepal	oblong-lanceolate acuminate erect, concave 22-23 × 7-7.5 mm	elliptical acute to slightly acuminate concave 20-27 × 13-14 mm
Lateral sepals	linear-lanceolate acuminate reflexed on the pedice and parallel to it 23-24 × 8-9 mm	elliptical acute to slightly acuminate concave 18-25 × 13-14 mm
Petals	linear-lanceolate somewhat reflexed, forming an ensemble with the dorsal sepal, hiding it in the frontal view 23-24 × 7.5-8 mm	elliptical slightly flat with revolute basal margins 20-27 × 13-16 mm

Table 1. Continued

	<i>C. brasilandense</i>	<i>C. gladiatorium</i>
Labellum	stiff, fleshy subtrapezoidal concave and narrow portion sacciform, geniculate in posterior view 18-18.5 × 10-13 mm 9-10 mm deep very complex set of calli	fleshy elliptical margins irregularly toothed, concave 20-23 × 15-17 mm 9-10 mm deep subtrapezoidal callus at the base, erect margins, becoming progressively flatter towards the apex, flat apical region, more fleshy
Column	subtriangular straight at the base, apiculate at the apex 13-15 × 6 mm	subtriangular short base, shortly rostrate 18-19 × 6 mm
Antennae	9-10 mm parallel, straight, supported on the sides of the central tooth of basal callus and projected forward on the cavity of the labellum	ca. 6 mm initially convergent and then perfectly parallel, projected forward, over the labellum
Anther	4-4.3 × 2.7-3.1 mm	4-4.2 × 2.7-2.9 mm
Pollinia	2.8-3 × 1-1.1 mm	2.8 × 1-1.1 mm

[continued]

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