



Catasetum saracataquerense (Orchidaceae, Catasetinae), a new species from Brazilian Amazon

Amauri H. Krahl^{1*}, Dayse R. Passos Krahl¹, Patrick de Castro Cantuária² & João B. F. da Silva³

1 Programa de Pós-Graduação em Botânica, Departamento de Botânica, Instituto Nacional de Pesquisas da Amazônia, Av. André Araújo, 2936, 69.060-001, Manaus, Amazonas, Brazil.

2 Instituto de Pesquisas Científicas e Tecnológicas do Amapá, Laboratório de Taxonomia Vegetal, Avenida Jucelino Kubistichck, Km 10, 68.903-419, Macapá, Brazil.

3 Mineração Rio do Norte, Rua Rio Jarí s/n°, 68.275-000, Porto Trombetas, Oriximiná, Pará, Brazil.

* Corresponding author amaurikrahl@hotmail.com

Abstract

In this article a new *Catasetum* species from Brazilian Amazon, more precisely from Pará and Amazonas, is proposed. A detailed morphological description completed by an analytic drawing and a photograph plate is given as well as comments on habitat, distribution and phenology. Finally the new species is compared to its close relatives, *Catasetum barbatum* and *Catasetum cristatum*.

Résumé

Une nouvelle espèce de *Catasetum* est ici présentée. Elle est originaire d'Amazonie brésilienne, et plus précisément des états du Pará et de l'Amazonas. L'article en propose une description détaillée accompagnée d'une planche analytique et de photographies, avec quelques commentaires sur l'habitat, la distribution géographique et la phénologie du taxon. Ce

dernier est enfin comparé aux espèces proches, *Catasetum barbatum* et *Catasetum cristatum*.

Resumo

Este estudo propõe uma nova espécie para a Amazônia brasileira, mais especificamente para os Estados do Pará e Amazonas. É fornecida uma descrição detalhada da nova espécie, bem como uma prancha ilustrativa e uma prancha fotográfica, além de comentários referentes ao habitat, distribuição e fenologia. É feita também uma comparação com as espécies relacionadas, sendo elas, *Catasetum barbatum* e *Catasetum cristatum*.

Keywords: Amazon basin, biodiversity, epiphyte, orchid, taxonomy.

Mots clés : Bassin amazonien, biodiversité, épiphyte, orchidée, taxinomie.

Palavras-chave: Bacia amazônica, biodiversidade, epífita, orquídea, taxonomia.

Introduction

Catasetum Richard ex Kunth (1822: 330) is the larger genus in the subtribe Catasetinae (Miranda & Lacerda, 1992; Romero & Jenny, 1993; Romero & Carnevali, 2009); it is widely distributed in the Neotropical area, from Mexico in the North to southern Brazil and Argentina (Miranda & Lacerda, 1992; Romero & Carnevali, 2009), whereas the Amazonian basin is considered as its diversity center (Romero & Carnevali, 2009). Based on the antennae of the gynostemium in the staminate flowers, the genus is usually divided into two subgenera: 1) subgenus *Pseudocatasetum*, with antennae not so developed or even absent; 2) subgenus *Catasetum*, with well developed antennae. Two sections are recognized in the latter, section *Catasetum*, with asymmetric and crossed antennae, and section *Isoceras* in which the antennae are symmetrical. Finally the section *Isoceras* is divided into three subsections: subsection *Isoceras*, with parallel antennae; subsection *Divaricatae*, with spreading antennae; subsection *Convergentes*, in which the antennae come close to each other so that they come into contact (Bicalho & Barros, 1988; Senghas, 1990; Senghas, 1991).

Catasetum is characterized by pseudobulbs fusiform, elliptic, ovate or conical; leaves deciduous, plicate, usually elliptic and with a basal sheath covering the entire pseudobulb; inflorescences lateral, racemose, with unisexual flowers, either staminate or pistillate, rarely bisexual (Holst,

1999). As for the vegetative parts, the species are in fact not distinct: only the characters of the male flowers are used to differentiate the species (Walker-Larsen & Harder, 2000). Three types of flower can be observed: 1) male (staminate) flowers, with two modified staminodes in front of the column, so-called antennae, the main function of which is to throw the pollinarium onto the pollinator when it visits the flower; 2) pistillate flowers, presenting a simple and uniform structure and very similar in most species; 3) hermaphrodite flowers (pistillate and staminate) which present intermediate characters without having a reproductive function – because the stigmatic cavity is dry and the pollinarium has no connexion between pollinia and stipe (Romero, 1992; Gerlach, 2007).

The genus comprises about 170 species and a great number of natural hybrids (Pridgeon *et al.*, 2009). However the World Checklist of Selected Plant Families data base (Govaerts *et al.*, 2021) accepts ca. 192 species and 29 natural hybrids (on 09/06/2021). In Brazil 127 species have been reported of which 87 (i.e. 68.5 %) are present in Brazilian Amazon (Silva & Silva, 1998; Petini-Benelli, 2020). These figures stress the high importance of the region which houses over 50% of the total species (Silva & Silva, 1998). The species richness is still growing because of the novelties discovered in the last years in the area such as *Catasetum colidense* Engels, Ferneda-Rocha & Petini-Benelli (2016: 329), *Catasetum ivanae* Petini-Benelli (2016: 27), *Catasetum paranaitense* Benelli & Soares-Lopes (2017: 33), *Catasetum dalastranum* Benelli & Chiron (2018: 13), *Catasetum sophiae* Valsko, Krahl & Benelli (2019: 117) and *Catasetum lendarium* Blind (2020: 135). Among the Brazilian species stands out *Catasetum barbatum* (Lindley, 1836: t. 1778) Lindley (1844: Misc. 28), considered as a species presenting a large morphological variation in the lip (Rocha & Silva, 2001). However the lip structure of this taxon should be more studied in order to assess possible patterns in particular individuals belonging to this group in Brazilian Amazon in view of identifying new taxa, as it was the case of *Catasetum teixeiranum* Campacci & Silva (2008: 190).

In this context the present work aims to propose a new species belonging to the same group as *Catasetum barbatum* after years of observations regarding its characteristics. It is presented with a morphological description, a set of analytic drawings, a photograph plate, and some information on phenology, distribution, habitat and comparison with the closest relatives, *Catasetum barbatum* and *Catasetum cristatum* Lindley (1824: 83).

Material and Methods

Material relating to holotype and paratypes was collected in the Saracá-Taquera National Forest, in the municipality of Oriximiná (Porto Trombetas) in the north-western Pará, in Brazil. The collection was conducted by the flora rescue team of “Mineração Rio do Norte (MRN)/Biota Projetos e Consultoria Ambiental”, who have been doing this kind of work for twelve years in this area. Specimens were herborized according to the process described by Mori *et al.* (1989); the holotype was put into the HAMAB herbarium and the paratypes in the herbaria EAFM, INPA and HUAM (acronyms after Thiers, 2021). A specimen collected in the municipality of Iranduba, in the Amazonas, from the INPA herbarium, was also examined as additional material in order to provide better information regarding its geographical distribution and habitat. Terminology used in the description follows Harris & Harris (2001).

Taxonomic treatment

Catasetum saracataquerense Krahl, Cantuária & J.B.F.Silva, *sp. nov.*

Types: Brazil, Pará, Oriximiná, Porto Trombetas, FLONA Saracá-Taquera, 05/III/2011, J.B.F. da Silva 3524 (Holotype HAMAB); *ibid.* 09/II/2013, J.B.F. da Silva 5384 (paratype INPA); *ibid.*, 27/II/2015, J.B.F. da Silva 5478 (paratype INPA); *ibid.*, 16/III/2015, J.B.F. da Silva 5382 (paratype HUAM); *ibid.*, 11/I/2018, J.B.F. da Silva 5259 (paratype HUAM); *ibid.*, 07/II/2018, J.B.F. da Silva 5240 (paratype EAFM); *ibid.*, 26/III/2018, J.B.F. da Silva 5288 (paratype EAFM).

Catasetum saracataquerense *Cataseto barbato simile est sed calli dentiformis absentia post labelli saccum ut in Cataseto barbato, petalis asymmetricis (versus symmetricis), appendicibus pluribus in labelli terminale parte, differt.*

Etymology: The specific epithet refers to the location of the type material, the Saracá-Taquera National Forest, located in the northwest of the state of Pará (Brazil).

Epiphytic caespitose plant; rhizome inconspicuous, short; pseudobulbs fusiform, 4-9.5 × 1-2 cm, 5-7-leaved, covered by the 2.3-4.3 cm long leaf-sheaths; leaves oblong-lanceolate, 9.5-34.1 × 2.1-5.1 cm, lateral, membranous, plicate, with 5-7 prominent veins, with an entire and slightly undulate margin and an acute apex; inflorescence lateral, 28.5-37.5 cm long,

10-20-flowered, arched, and more so in the apical 2/3 due to the flower weight, peduncle purple; floral bract lanceolate, 1.2-1.6 × 0.5-0.6 cm, greenish, with an entire margin and an acute apex; male flowers with petals and sepals greenish brown-spotted, lip greenish with slightly wine-red margin and whitish appendages (basal callus and fimbriae), resupinate, pedicellate; pedicel and ovary 3-3.6 cm long, terete, erect, purple; dorsal sepal elliptic, 3.3-3.6 × 0.9-1 cm, concave, with an entire margin and an acute apex; lateral sepals elliptic, ca. 3.3-3.4 × 1-1.1 cm, concave, slightly asymmetrical, with an entire involute margin and an acute apex; petals elliptic, 2.7-3 × 0.5-0.7 cm, asymmetrical, entire margin, acute apex; lip 1.7-2.1 × 1-1.2 cm (including fimbriae), 1.2-1.5 × 0.5-0.6 cm (fimbriae excluded), entire, oblong, wider at base than at apex, presenting in the middle part a 0.3-0.5 cm deep sac, densely fimbriate (fimbriae thin) on both sides and on the surface after the sac, furnished at base with a simple callosity, rounded at apex; callosity 0.7-0.9 cm long, claw-shaped, surrounded by small hairs; column 1.9-2.5 cm long, subtriangular, fleshy, rostrate, basally contracted, greenish with brownish dots concentrated on the dorsal area; rostellum 2.2-0.3 cm long; antennae 0.7-0.8 cm long, symmetrical, parallel, each one going on the side of the basal callus of the lip; anther 0.6-0.7 × 0.3-0.4 cm, yellowish green; anther cap 1-1.3 cm long, rostrate; viscidium 1.1-2.2 cm long, whitish; stipe 0.3-0.4 cm long, blade-like, rolled, yellowish; polliniae 2, obovate, 0.2-0.3 × 0.1-0.2 cm, firm, compressed, yellowish. Female flower and fruit not seen. (Fig. 1 & 2).

Distribution and habitat: the new taxon is distributed from the state of Pará to the region of Iranduba in the state of Amazonas (i.e. basin of the Rio Amazonas and Rio Negro). In the Saracá-Taquera National Forest it can be observed in dense ombrophile forest in *terra-firme* forest (flood-free environment) and also in *igapó* forest (flood areas). In the “Reserva de Desenvolvimento Sustentável do Rio Negro”, in the state of Amazonas, it can be observed in areas of *campina* and *campinarana* (vegetation on white sand).

Phenology and pollination: the species is flowering during the first half of the year, mainly from January to March, which coincides with the rainy season. During the second half of the year, which coincides with the dry season (little rain), it is observed in a dormant state (the leaves have fallen down) as most of the genus members. As the other species, *Catasetum*

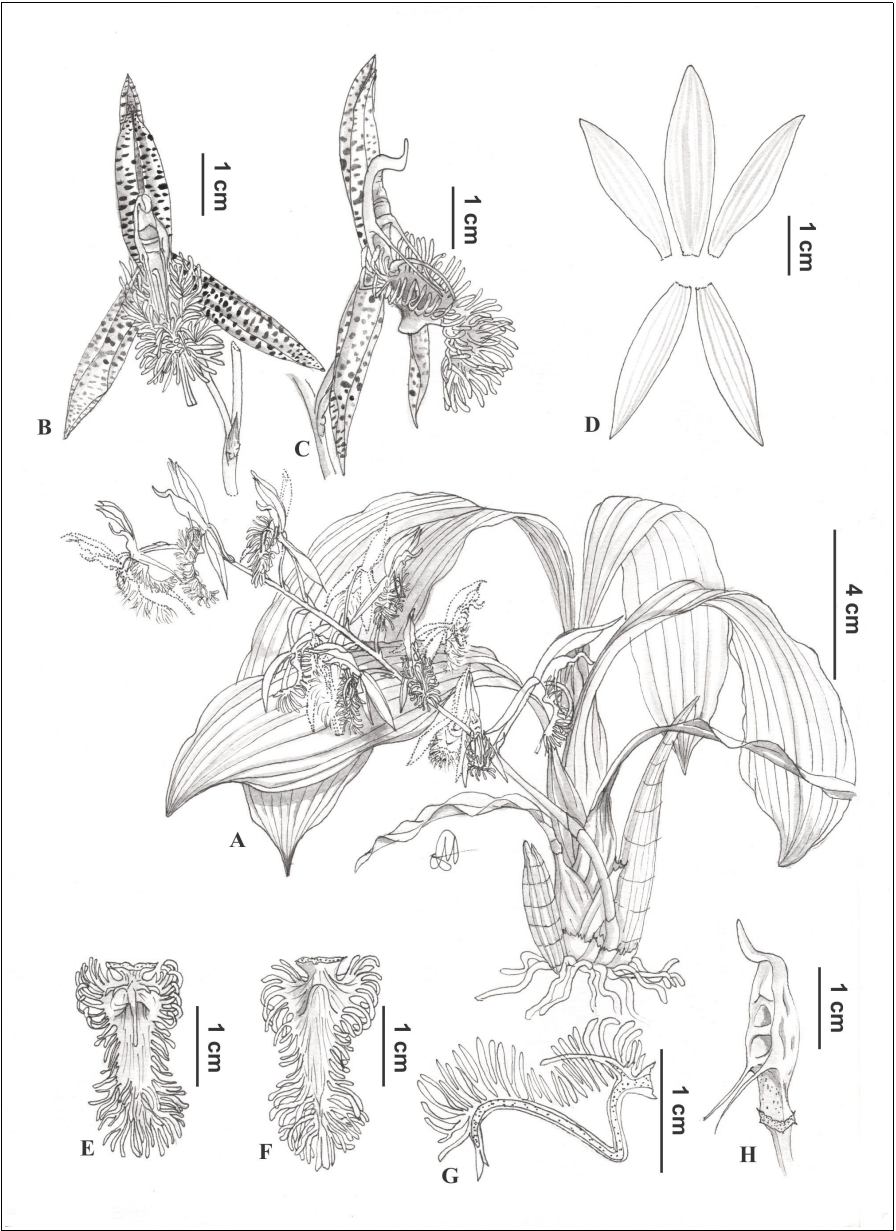


Fig. 1. *Catasetum saracataquerense*

A. Habit. B-C. Flower. D. Sepals and petals. E. Lip, front view. F. Lip, back view. G. Lip, longitudinal section. H. Gynostemium (column) [Illustration by M.F. Negrão]

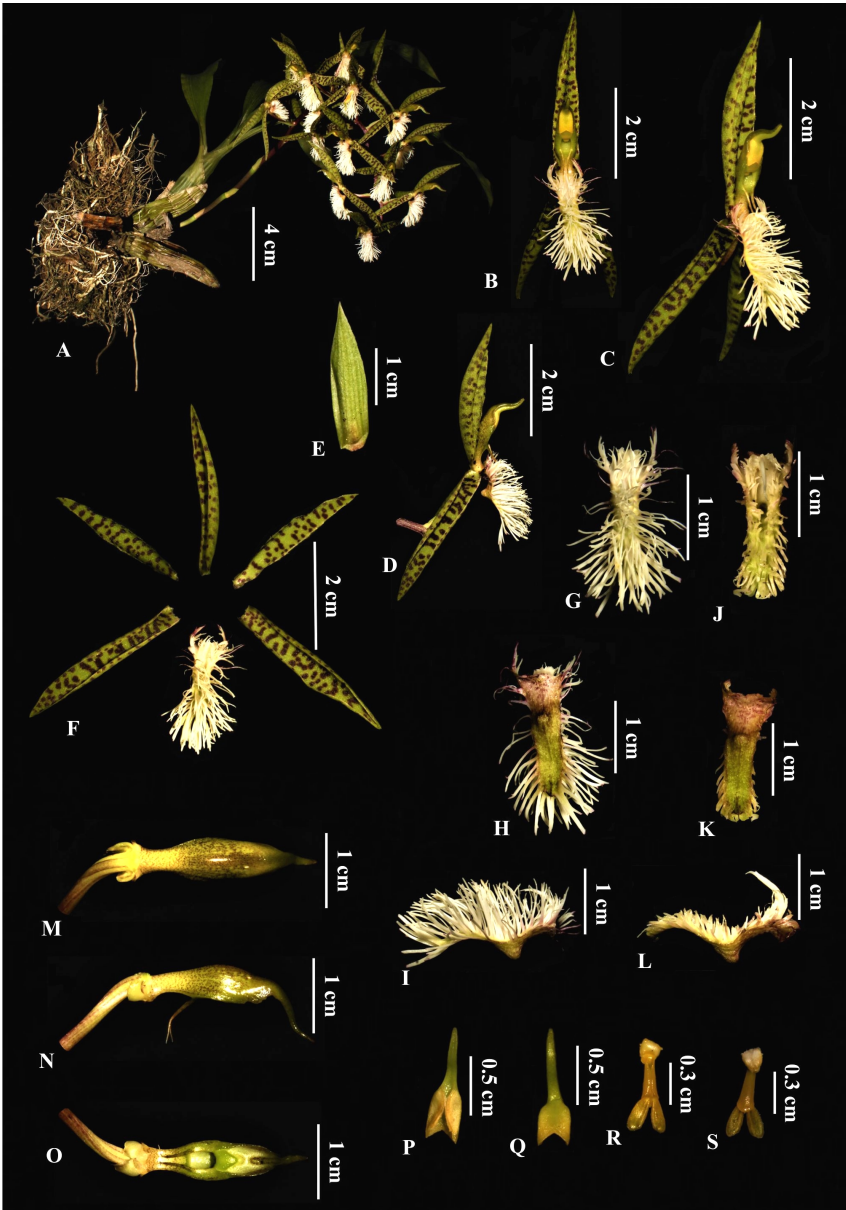


Fig. 2. *Catasetum saracataquerense*

A. Habit. B-D. Flower. E. Floral bract. F. Floral segments. G-I. Lip with the appendices. J-L. Lip without the appendices. M-O. Gynostemium (column). P-Q. Anther cap. R-S. Pollinarium.
[Ph. A.H. Krahl]

saracataquense is visited by bee males *Euglossa* spp. These bees mainly explore the appendages (fimbriae) on the lip surface, probably looking for volatile compounds (Fig. 3).



Fig. 3. Morphotypes and floral visitors of
Catasetum saracataquense
[Ph. J.B.F. da Silva]

Additional material examined: Brazil, Amazonas, Iranduba, RDS do Rio Negro, 20/I/2019, D.R.P. Krahl & A.H. Krahl 314 (INPA); *ibid.*, 29/V/2019, A.H. Krahl & D.R.P. Krahl 1250 (INPA).

Notes: *Catasetum saracataquerense* (Fig. 3) is related to the members of subgenus *Catasetum* section *Isoceras* subsection *Isoceras* the species of which have symmetrical and parallel antennae (Bicalho & Barros, 1988; Senghas, 1991) and fits into the *Catasetum cristatum* alliance (Bicalho & Barros, 1988). It presents some similarities with *Catasetum barbatum* that has symmetrical and parallel antennae as well as a similar lip morphology (densely fimbriate). However it has asymmetrical petals (*vs.* symmetrical), the surface of its lip is densely fimbriate only after the lip sac (*vs.* the entire surface) and it is devoid of the tooth-like callus present after the lip sac in *C. barbatum* (Lindley, 1836). We consider this tooth-like callus as a key character in the identification of the taxon. It is present in the holotype (kept in K) and duly illustrated in Rocha & Silva (2001).

Catasetum saracataquerense is also similar to *Catasetum cristatum*, that also has symmetrical and parallel antennae. However it has an oblong lip with a rounded apex and densely fimbriate with rather long and thin appendages on both side and on the surface after the sac (*vs.* lip with lacerate margins, covered with rather short appendages, fleshy, obtuse, sometimes emarginate) (Lindley, 1824; Petini-Benelli, 2020).

Acknowledgements

The authors thank the “Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio)” for permission of collecting; the “Mineração Rio do Norte (MRN)/Biota Projetos e Consultoria Ambiental” for funding, support and logistics, which made the work possible; and Mariellen Furtado Negrão for the drawing plate.

References

- Benelli, A.P. & G. Chiron, 2018. Nouvelle espèce de *Catasetum* (Orchidaceae) du Mato Grosso. *Richardiana, nouvelle série* 2: 8-17.
- Benelli, A.P. & C.R.A. Soares-Lopes, 2017. New taxa of *Catasetum* (Orchidaceae, Catasetinae) from Mato Grosso, Brazil. *Richardiana, nouvelle série* 1: 31-43.
- Bicalho, H.D. & F. Barros, 1988. On the taxonomy of *Catasetum* subsection *Isoceras*. *Lindleyana* 3: 87-92.

- Blind, A.D., 2020. Nova espécie de orquidaceae (Catasetinae) para o estado do Amazonas, Brasil. *Brazilian Applied Science Review* 4: 131-143.
- Campacci, M.A. & J.B.F. Silva, 2008. *Catasetum teixeiranum*. *Coletânea de Orquídeas Brasileiras* 6: 190.
- Engels, M.E., L.C. Ferneda-Rocha & A. Petini-Benelli, 2016. A new species of *Catasetum* (Orchidaceae, Epidendroideae, Cymbidieae) from the Southern Brazilian Amazon. *Lankesteriana* 16: 329-333.
- Gerlach, G., 2007. The true sexual life of *Catasetum* and *Cycnoches*. *Caesiana* 28: 57-62.
- Govaerts, R., J. Dransfield, S. Zona, D.R. Hodel & A. Henderson, 2020. World Checklist of Orchidaceae. Facilitated by the Royal Botanic Gardens, Kew. <http://apps.kew.org/wcsp/>, retrieved on 09/06/2021.
- Harris, J. & M. Harris, 2001. *Plant identification terminology - An illustrated glossary*. Payson, Spring Lake Publishing.
- Holst, A.W., 1999. *The world of Catasetums*. Portland, Timber Press.
- Lindley, J., 1824. *Catasetum cristatum*. *Transaction of the Horticultural Society of London* 6: 83.
- Lindley, J., 1836. *Myanthus barbatus*. *Edward's Botanical Register* 21: t. 1778.
- Lindley, J., 1844. *Catasetum barbatum*. *Edwards's Botanical Register* 30: Misc. 28, n. 36.
- Miranda, F.E. & K.G. Lacerda, 1992. Estudos em Catasetinae – 1. *Bradea* 6: 45-60.
- Mori, S.A., L.A. Silva, G. Lisboa & L. Coradin, 1989. *Manual de Manejo do Herbário Fanerogâmico*. Ilhéus, Ceplac.
- Petini-Benelli, A., 2016. Nova espécie de *Catasetum* para o estado do Amazonas, Brasil. *Orquidário* 30: 26-36.
- Petini-Benelli, A., 2020. *Catasetum*, in *Flora do Brasil 2020*. Jardim Botânico do Rio de Janeiro, JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB11312>, retrieved on 09/06/2021.
- Pridgeon, A.M., P.J. Cribb, M.W. Chase & F.N. Rasmussen, 2009. *Genera orchidacearum, Epidendroideae (Part II)*. Oxford, Oxford University Press Inc.
- Richard, L.C.M., 1822. *Catasetum*. *Synopsis Plantarum* 1: 330-331.
- Rocha, E.S. & J.B.F. Silva, 2001. Variações morfológicas do labelo de *Catasetum barbatum* (Lindl.) Lindl. (Orchidaceae). *Acta Amazonica* 31: 365-373.

- Romero, G.A., 1992. Non-functional flowers in *Catasetum* orchids (*Catasetinae*, Orchidaceae). *Botanical Journal of the Linnean Society* 109: 305-313.
- Romero, G.A. & G. Carnevali, 2009. *Catasetum*, in A.M. Pridgeon, P.J. Cribb, M.W. Chase & F.N. & Rasmussen. *Genera Orchidacearum, Epidendroideae – Part II*. New York, Oxford University Press, pp. 13-18.
- Romero, G.A. & R. Jenny, 1993. Contributions toward a monograph of *Catasetum* (*Catasetinae*, Orchidaceae) I: A checklist of species, varieties, and natural hybrids. *Harvard Papers in Botany* 1: 59-84.
- Senghas, K., 1990. Einige neue Arten aus der Subtribus *Catasetinae* I – *Catasetum* sektion *Anisoceras*. *Die Orchidee* 41: 212-218.
- Senghas, K., 1991. Einige neue Arten aus der Subtribus *Catasetinae* I – *Catasetum* sektion *Isoceras*. *Die Orchidee* 42: 19-24.
- Silva, J.B.F. & M.F.F. Silva, 1998. *Orquídeas Nativas da Amazônia Brasileira: gênero Catasetum L. C. Rich. ex Kunth*. Belém, Museu Paraense Emílio Goeldi.
- Thiers, B.M. (ed.), 2021 [continuously updated]. *Index Herbariorum*: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/>, retrieved on 09/06/2021.
- Valsko, J.J., A.H. Krahl, A. Petini-Benelli & G. Chiron, 2019. *Catasetum sophiae*, a new species of Orchidaceae (*Catasetinae*) from northern Brazil. *Phytotaxa* 402: 104-120.
- Walker-Larsen, J. & L.D. Harder, 2000. The evolution of staminodes in Angiosperms: patterns of stamen reduction, loss, and functional re-invention. *American Journal of Botany* 87: 1367-1384.