



Confirmation of the occurrence of four species of Orchidaceae for the State of Amazonas, Brazil

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Abstract

The Brazilian Amazon contains an important number of Orchidaceae species which places it among the most diverse regions in the world as for the orchid richness. However, the actual distribution of many species is imprecise. Thus, the present note aims to report and document the presence of four orchids in the State of Amazonas (Brazil): *Maxillaria desvauxiana*, *Maxillaria obtusa*, *Maxillaria violaceopunctata* and *Sarcoglottis acaulis*, the first one being recorded for the first time for the Region North of the country. The note also provides for each species data such as description, distribution and phenology.

Résumé

L'Amazonie brésilienne renferme un nombre significatif d'espèces d'Orchidaceae, ce qui en fait l'une des régions au monde les plus riches en orchidées. Toutefois la répartition géographique réelle de la plupart d'entre elles est mal connue. Le travail présenté ici a pour objectif de rapporter et

documenter la présence dans l'état d'Amazonas (Brésil) de quatre espèces particulières : *Maxillaria desvauxiana*, *Maxillaria obtusa*, *Maxillaria violaceopunctata* et *Sarcoglottis acaulis*, la première étant ici rapportée pour la Région Nord du pays pour la première fois. Des données sur la description morphologique, la répartition géographique, la phénologie, notamment, sont fournies.

Resumo

A amazônia brasileira expressa uma significativa quantidade de espécies de Orchidaceae o que a torna um dos locais mais diversos de espécies de orquídeas no mundo. Entretanto a real distribuição de muitas delas ainda é desconhecida e desta forma este trabalho tem como objetivo relatar e documentar a distribuição de quatro espécies para o estado do Amazonas (Brasil), sendo que a primeira delas é confirmada para a região norte do País. Assim sendo, são apresentados dados referentes as seguintes espécies: *Maxillaria desvauxiana*, *Maxillaria obtusa*, *Maxillaria violaceopunctata* e *Sarcoglottis acaulis*.

Key words: Amazon Basin, Amazonas, new record, Maxillariinae, taxonomy.

Mots clés : Amazonas, bassin amazonien, nouvel enregistrement, Maxillariinae, taxinomie.

Palavras-chave: Amazonas, bacia amazonica, novo registro, Maxillariinae, taxonomia.

Introduction

Within the Neotropical region, the Amazonian forest shows a great prominence as it is the largest continuous forest in the world (Mittermeier *et al.*, 2003). The biome is made of a mosaic of vegetations (Coronado *et al.*, 2009; Junk *et al.*, 2011) in which orchids are prominently thriving (*e.g.* Braga, 1977; Braga, 1982; Cruz, 1994; Cruz & Braga, 1997; Christenson, 1997; Ribeiro *et al.*, 1999; Leopardi & Cumana, 2008; Leopardi, 2010; Pessoa *et al.*, 2015; Klein & Piedade, 2019). In this way Brazil is one of the most diverse countries in South America according to Dressler (1981); it houses about 792 orchid species distributed into 136 genera, just for the Brazilian Amazon, which represents almost 30% of the total number of species present in the Brazilian territory (Silva & Silva, 2004; Flora do Brasil 2020 – under construction).

In the last decades various works either of taxonomic nature or just providing checklists of Orchidaceae have been carried out within the Brazilian territory. However few of them concern the Amazon, leading to knowledge gaps as highlighted by Hopkins (2007). The region is certainly an extensive biome presenting a large orchid diversity (Silva & Silva, 2004), but occurrence of several species in particular localities is still doubtful as we can observe in the on-line platform Flora do Brasil 2020 (under construction). The present study aims to document the occurrence of four orchid species in the Amazonas State: *Maxillaria desvauxiana* Reichenbach f. (1854: 67), *Maxillaria obtusa* (Lindley 1837: t. 1923) Molinari (2015: 302), *Maxillaria violaceopunctata* Reichenbach f. (1855: 216) and *Sarcoglottis acaulis* (J.E. Smith 1806: 91) Schlechter (1919: 53-54). Hitherto these taxa were only cited as possible and doubtfully present in Amazonas (AM). For this purpose, the nomenclature follows Chase *et al.* (2015), Flora do Brasil (2020 under construction) and Govaerts *et al.* (2021). It does not mean that all the co-authors agree with their classification.

Material and methods

The above species have been observed mostly during the flora inventory for the *Reserva Florestal Adolpho Ducke* (RFAD) and the *Reserva Biológica de Campina* (REBio de Campina), both located in the northern part of the Manaus county (AM), as well as the *Reserva de Desenvolvimento Sustentável do Rio Negro* (RDS do Rio Negro), located in the Iranduba, Manacapuru and Novo Airão counties (AM). These collections are part of a long-term project known as *Flora do Amazonas: Orchidaceae*. Information from collections in other places have also been included.

Specimens were collected and herborized according to usual process described by Mori *et al.* (1989) and later have been included in the collections of the INPA herbarium (acronym according to Thiers, 2021).

The identification of these plants was based on a number of major works on Orchidaceae such as Barbosa Rodrigues (1877; 1882), Cogniaux (1893-1896; 1898-1902; 1904-1906), Hoehne (1940; 1942; 1945; 1949; 1953), Pabst & Dungs (1975; 1977) and Sprunger *et al.* (1996). Publications of Dunsterville & Garay (1959; 1961; 1965; 1966; 1972; 1976), Braga (1977; 1982), Cruz (1994), Cruz & Braga (1997) and Silva & Silva (2004) were also referred to. The proposed descriptions are based on the collected specimens. Terminology follows Harris & Harris (2001).

Results

According to Meneguzzo *et al.* (2020) and Meneguzzo (2020) the Amazonas state is referred to as a possible place of occurrence for these species. Thus the present work documents for the first time their presence in the state. As for *Maxillaria desvauxiana*, we also report for the first time its occurrence in the Northern Region of Brazil.

1. *Maxillaria desvauxiana* Reichenbach f. [Fig. 1A-C]

Plant epiphytic caespitose; pseudobulb 2.9-4 × 1.2-2.3 cm, ovate, slightly flattened, 1-leaved; leaf 21.5-45.1 × 2.6-5.3 cm, lanceolate, conduplicate, acute; inflorescence 3.9-5.3 cm long, basal, 1-flowered; floral bract 1.8-2.5 × 1.5-1.7 cm, deltoid, acute; flower yellow wine-coloured, pedicellate; pedicel and ovary ca. 3-3.7 cm long; dorsal sepal ca. 2.2 × 1 cm, oblong, apically cuspidate; lateral sepals ca. 2.2 × 1 cm, lanceolate, acute; petals ca. 1.8 × 1.1 cm, ovate, obtuse; lip ca. 1.9 × 1.5 cm, trilobed, disc furnished with a longitudinal ca. 0.9 cm long callosity; lateral lobes ca. 1.3 × 0.7 cm, rounded; apical lobe ca. 0.6 × 0.7 cm, oblong, apically truncate; column 1.1-1.3 cm long; pollinia 4; fruit not seen.

Phenology. Flowering between June and September.

Habitat. The species is common in the Manaus county and can be observed in *campinarana* forest as well as in *terra firme* forest. Based on the authors' own observations the species can occur in floodable places (*igapó*) of the Tarumã-Açu river as well.

Distribution. South America in French Guiana, Guyana, Suriname, Venezuela, Colombia, Ecuador, Peru, Bolivia and Brazil (Pernambuco, Espírito Santo, São Paulo and Paraná) (Meneguzzo *et al.*, 2020; Govaerts *et al.*, 2021).

Material examined. Brazil, Amazonas, Manaus, Reserva Biológica de Campina, 23/VII/2018, A.H. Krahl & D.R.P. Krahl 649 (INPA); Reserva Florestal Adolpho Ducke, 12/IX/2018, D.R.P. Krahl & A.H. Krahl 107 (INPA); *ibid.*, D.R.P. Krahl & A.H. Krahl 692 (INPA); *ibid.*, 01/VI/2020, A.H. Krahl & D.R.P. Krahl 1482 (INPA).

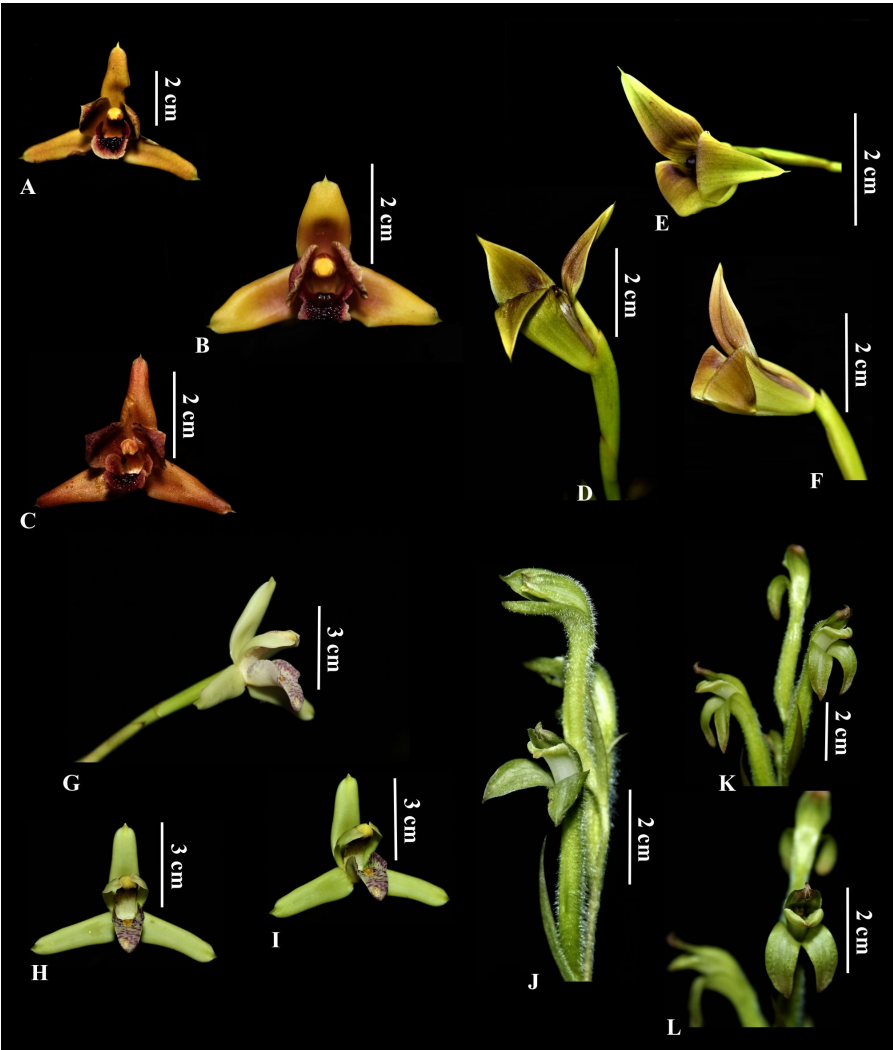


Fig. 1: Species confirmed for the state of Amazonas (Brazil)

Maxillaria desoauxiana (A-C), *Maxillaria obtusa* (D-F), *Maxillaria violaceopunctata* (G-I), *Sarcoglottis acaulis* (J-L).

2. *Maxillaria obtusa* (Lindley) Molinari [Fig. 1D-F]

Plant epiphytic, caespitose; pseudobulb 2.9-4.2 × 1.4-3.2 cm, ovoid, flattened, 2-leaved; leaves 17.9-28.7 × 2.1-3.8 cm, oblong-lanceolate, conduplicate, acute; inflorescence 11.4-15.5 cm long, basal, 1-flowered; floral bract 3.1-

3.9 × 1.1-1.5 cm, elliptic, acute; flower brownish yellow with a line on petals and lip, pedicellate; pedicel and ovary 8.4-12.4 cm long; dorsal sepal ca. 3.3 × 1 cm, obovate, acute; lateral sepals ca. 3.3 × 1.1 cm, obovate, acute; petals ca. 1.6 × 0.5 cm, obovate, obtuse; lip ca. 0.8 × 0.5 cm, trilobed, with a longitudinal ca. 0.4 cm long callus on the disc; lateral lobes ca. 0.5 × 0.2 cm, rounded; apical lobe ca. 0.3 × 0.25 cm, suborbicular; column 0.6-0.8 cm long; pollinia 4; fruit not seen.

Phenology. Flowering between November and May.

Habitat. This species can be treated as common in the northern part of the Manaus county and occurs also in neighboring counties such as Iranduba and Presidente Figueiredo, for example. In the places where it has been observed, it was mostly growing in *campinarana* forest; however, in the RFAD, it has been found (rarely) in *terra firme* forest.

Distribution. French Guiana, Guyana, Suriname, Venezuela, Colombia, Peru, Bolivia and Brazil (Pará, Bahia, Rio de Janeiro, São Paulo, Paraná and Santa Catarina) (Meneguzzo *et al.*, 2020; Govaerts *et al.*, 2021).

Material examined. Brazil, Amazonas, Iranduba, Reserva de Desenvolvimento Sustentável do Rio Negro, 29/XII/2018, D.R.P. Krahl & A.H. Krahl 250 (INPA); Manaus, BR 174, Km 15, Ramal do Canoeiro, 30/V/2015, A.H. Krahl 530 (INPA); Reserva Florestal Adolpho Ducke, 07/XI/2018, D.R.P. Krahl & A.H. Krahl 141 (INPA); *ibid.*, 12/XII/2018, A.H. Krahl & D.R.P. Krahl 843 (INPA); Presidente Figueiredo, AM 240, Km 13, Ramal do Treze, Km 05, Aldeia Mari-Mari, 06/XII/2018, A.H. Krahl 805 (INPA).

3. *Maxillaria violaceopunctata* Reichenbach f. [Fig. 1G-I]

Plant caespitose; pseudobulb 8.2-12.1 × 2.2-3.3 cm, oblong, flattened, 1-leaved; leaf 23.5-52.6 × 3.5-7.5 cm, oblong, conduplicate, apically emarginate; inflorescence 9.9-14.7 cm long, lateral, 1-flowered; floral bract ca. 0.4-0.6 × 0.5-0.9 cm, deltoid, acute; flower yellowish cream with purplish spots on the lip, pedicellate; pedicel and ovary 7.3-10.9 cm long; sepals ca. 3 × 1.1 cm, elliptic, acute; petals ca. 2.6 × 0.6 cm, lanceolate falcate, acute; lip ca. 2.5 × 1.9 cm, trilobed, with a longitudinal 1.2 cm long callosity; lateral lobes ca. 1.5 × 0.7 cm, rounded, acute; apical lobe ca. 1 × 0.9 cm, ovoid, acute; column 1.5-1.8 cm long; pollinia 4; fruit not seen.

Phenology. Flowering between April and September.

Habitat. This species is rather common in the north of Manaus, and also occurs in the Iranduba county. In all the places where it was found it was mainly observed in *campinarana* forest.

Distribution. French Guiana, Guyana, Suriname, Venezuela, Colombia, Ecuador, Peru, Bolivia and Brazil (Acre and Pará) (Meneguzzo *et al.*, 2020; Govaerts *et al.*, 2021).

Material examined. Brazil, Amazonas, Iranduba, Reserva de Desenvolvimento Sustentável do Rio Negro, 19/IX/2019, D.R.P. Krahl & A.H. Krahl 580 (INPA); Manaus, Ramal Vale do Novo Amanhecer, ao lado do Sítio Toca da Onça, 13/VII/2019, A.H. Krahl 1282 (INPA); Reserva Florestal Adolpho Ducke, 19/VII/2019, D.R.P. Krahl & A.H. Krahl 566 (INPA); BR 174, Km 15, Ramal do Canoeiro, 14/IV/2020, A.H. Krahl 1441 (INPA); Reserva Florestal Adolpho Ducke, 12/V/2020, A.H. Krahl & D.R.P. Krahl 1458 (INPA).

4. *Sarcoglottis acaulis* (J.E. Smith) Schlechter [Fig. 1J-L]

Plant terrestrial. Stem not swollen into a pseudobulb, compact, inconspicuous; leaves 2-5 arranged in rosette, 9.4-12.7 × 3.1-5.1 cm, elliptic, pseudopetiolate, obtuse; inflorescence a terminal raceme, 25.6-29.5 cm long, 2-5-flowered; floral bract 2.7-2.9 × 0.4-0.5 cm, narrowly lanceolate, acute; flowers greenish, subsessile; pedicel and ovary 2.9-3.2 cm long; dorsal sepal ca. 2.6 × 0.5 cm, elliptic, pilose outside, obtuse; lateral sepals ca. 2 × 0.7 cm, oblanceolate, pilose outside, falcate, obtuse; petals ca. 2.3 × 0.4 cm, narrowly obovate, apically rounded; lip ca. 4.3 × 1 cm, trilobed, with two appendices at base; lateral lobes ca. 1.3 × 0.5 cm, rounded; apical lobe ca. 0.7 × 0.9 cm, deltoid, apically minutely acute; column 1-1.2 cm long; polinia 2; fruit not seen.

Phenology. Flowering between June and October.

Habitat. The species was observed in *campinarana* forest in the RFAD (Manaus) and in the RDS do Rio Negro (Iranduba). It grows in grouped populations and shows some variation in leaf coloration, from leaf with pale green and dark green stripes, to leaf dark green with light pale green spots.

Distribution. Central America and South America, in French Guiana, Guyana, Suriname, Venezuela, Colombia, Ecuador, Peru, Bolivia, Paraguay and Brazil (Amapá, Pará, Rondônia, Tocantins, Alagoas, Bahia, Ceará, Paraíba, Rio Grande do Norte, Sergipe, Goiás, Espírito Santo, Minas Gerais, São Paulo, Rio de Janeiro, Paraná and Santa Catarina) (Meneguzzo, 2020; Govaerts *et al.*, 2021).

Material examined. Brazil, Amazonas, Iranduba, Reserva de Desenvolvimento Sustentável do Rio Negro, 20/VIII/2019, D.R.P. Krahl & A.H. Krahl 577 (INPA); *ibid.*, A.H. Krahl & D.R.P. Krahl 1311 (INPA); Manaus, Reserva Florestal Adolpho Ducke, 19/VII/2019, A.H. Krahl, D.R.P. Krahl & A.L.V. Toscano-de-Brito 1287 (INPA).

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