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Original Paper

Synopsis of Orchidaceae from Fazenda Sete Irmãos: a fragment of Amazon Forest in northwestern Maranhão, Brazil

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Abstract

This study provides an inventory of the Orchidaceae in one of the most threatened areas of the Brazilian Amazon, situated in the eastern portion of the Belém Endemism Center. A total of 51 species, distributed in 24 genera, are recorded. Epiphytes represent 86% of the species, the remaining are terricolous (6%), hemiepiphytic (6%) or myco-heterotrophic (2%). The most representative genera were *Epidendrum* (6 spp.) and *Maxillaria* (5 spp.). This study cites for the first time five genera (*Coryanthes*, *Sarcoglottis*, *Stelis*, *Trichosalpinx* and *Wullschlaegelia*) and ten species for the flora of Maranhão, of which four are new records to the Brazilian Northeast. An identification key, photographs of the new records, taxonomic and ecological comments, as well as geographic distribution are provided. The data reinforce the importance of the forest fragments of the Amazon Forest in Maranhão for the conservation of Orchidaceae which is constantly threatened by deforestation in the Belém Endemism Center.

Key words: Belém Endemism Center, epiphytes, inventory, taxonomy.

Resumo

Este estudo apresenta um inventário das Orchidaceae em uma das áreas mais ameaçadas da Amazônia Brasileira, localizada na porção mais oriental do Centro de Endemismo Belém. São registradas 51 espécies distribuídas em 24 gêneros. Epífitas representam 86% das espécies, as demais são terrícolas (6%), hemiepífitas (6%) ou micoheterotrófica (2%). Os gêneros mais representativos foram *Epidendrum* (6 spp.) e *Maxillaria* (5 spp.). Este estudo registra pela primeira vez cinco gêneros (*Coryanthes*, *Sarcoglottis*, *Stelis*, *Trichosalpinx e Wullschlaegelia*) e dez espécies para a flora do Maranhão, dos quais, quatro também são novos registros para a Região Nordeste do Brasil. Uma chave de identificação, pranchas fotográficas dos novos registros e comentários taxonômicos, ecológicos e de distribuição geográfica são apresentados. Os dados evidenciam a importância dos fragmentos de Floresta Amazônica do Maranhão para a proteção das Orchidaceae, constantemente ameaçadas pelo desmatamento no Centro de Endemismo Belém.

Palavras-chave: Centro de Endemismo Belém, epífitas, inventário, taxonomia.

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Introduction

Orchidaceae Juss. is widely known as one of the most species-rich plant families (Dressler 1981; Chase *et al.* 2015). It is especially diverse in the Neotropical region where Brazil stands out with about 220 genera and 2,500 species recorded, of which about 65% are endemic (BFG 2015, 2018). In northeastern Brazil inventories of Orchidaceae species have been conducted in areas of the states of Bahia (Bastos & Van den Berg 2012; Marinho & Azevedo 2014; Vieira *et al.* 2014), Maranhão (Silva *et al.* 1999; Oliveira *et al.* 2021), Paraíba (Almeida *et al.* 2007; Moreira *et al.* 2020), Pernambuco (Pessoa & Alves 2012, 2014, 2015) and Sergipe (Pessoa & Alves 2011; Monteiro *et al.* 2012). However, knowledge of the eastern portion of the Amazon forest located in the state of Maranhão is fairly low.

Some recent studies have pointed out new records of Orchidaceae for the state (Ferreira *et al.* 2017, 2019c; Gomes *et al.* 2021; Oliveira *et al.* 2021), indicating that it is still in need of further taxonomic studies, yet it remains neglected by the majority of Brazilian botanists. Currently 115 species and 49 genera of the family are cited to Maranhão (BFG 2015, 2018), however a large portion of its area remains fairly poorly collected, especially the northwest region where it includes part of the Belém Endemism Center, one of the most threatened portions of the Brazilian Amazon (Almeida & Vieira 2010).

Thus, this study aims to provide a synopsis of the Orchidaceae species from a fragment of Amazon Forest located in the northwest part of the state. In addition to the inventory, we provide an identification key, photographs of the new records, taxonomic and ecological comments, as well as the geographic distribution of each species. This study will contribute to expanding the knowledge of the orchid flora along the eastern border of the Amazon domain.

Material and Methods

The state of Maranhão, with an area of 331,983 km², presents vegetation with ecotonal features since it is located in a transition zone among the Amazon Forest, the Cerrado and the Caatinga (Muniz 2006). The northwest portion of the state in dominated by ombrophilous and semi-deciduous forests, while savannahs and palm rich ecosystems locally called "*mata dos cocais*" are more common in the south and east portions (Abreu 1949; Froés 1953; Ribeiro 1971; Muniz 2004; Almeida & Vieira 2010; Celentano *et al.* 2017; Silva *et al.* 2017; Silva-Moraes *et al.* 2019). The study area is in the northwest part of the state, in the municipality of Cândido Mendes, on a private property called Fazenda Sete Irmãos (01º51'37"S, 45º46'10"W) (Fig. 1). The area includes a fragment of about 7,000 ha of Amazon Forest (Almeida & Vieira 2010), considered one of the largest of the state (Koch & Araújo-Silva 2014; Celentano *et*

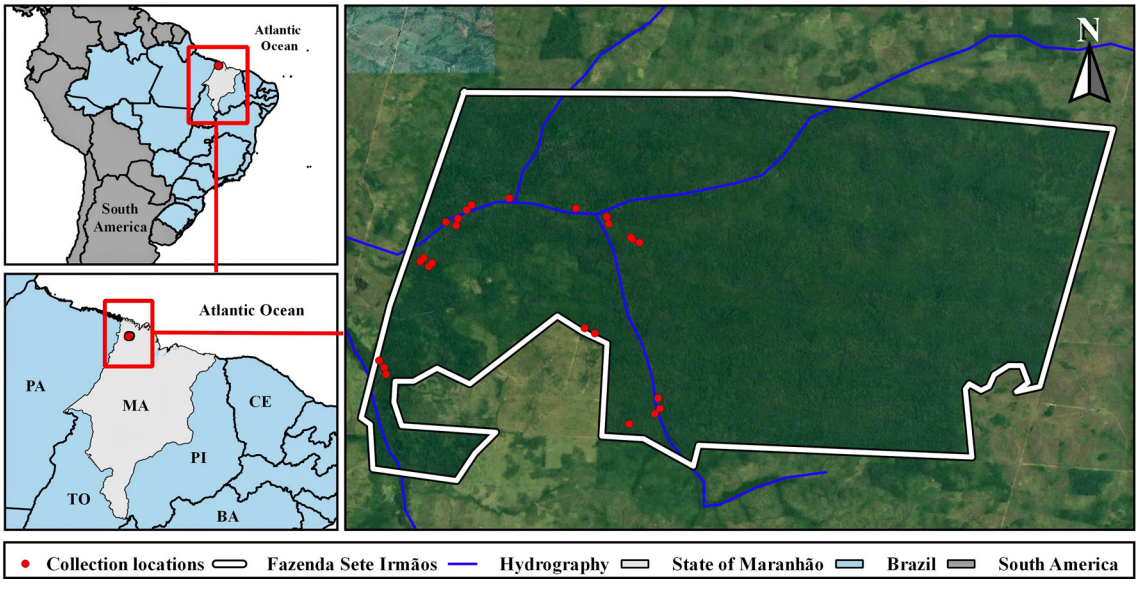

Figure 1 – Geographic position of Fazenda Sete Irmãos. Fieldwork points highlighted.

al. 2017). According to Köppen the climate type is "Am" (Alvares *et al.* 2013) with mean temperatures between 26–27 °C and annual precipitation between 2,300–2,500 mm (NuGeo 2016).

Field expeditions were conducted monthly between August 2017 and February 2020. The fertile specimens were processed following standard procedures (Fidalgo & Bononi 1984) and deposited at SLUI (Thiers, continuously updated). Sterile specimens were kept under cultivation, awaiting flowering. Taxonomic identification was based upon the specialized literature (Pabst & Dungs 1975, 1977; Batista *et al.* 2008; Pessoa & Alves 2011, 2012, 2014, 2015; Pessoa *et al.* 2015; Koch *et al.* 2018; Klein & Piedade 2019) in addition to an analysis of type specimens when available on-line. The circumscription of the genera follows the Flora do Brasil 2020 (continuously updated).

The morphological terminology follows Harris & Harris (2001), the data on geographical distribution of the species follow Flora do Brasil 2020 (continuously updated) and Govaerts *et al.* (2020). The map was produced using QGis® 2.18.12 Essen (QGIS Development Team 2020) under SIRGAS 2000 datum.

Results and Discussion

Orchidaceae is represented in the study area by 51 species distributed in 24 genera. Epiphytes represent 86% of the species (34 spp.), the remaining are terricolous (6%, 3 spp.), hemiepiphytic (6%, 3 spp.), or myco-heterotrophic (2%, one sp.) (Tab. 1; Figs. 2-3). The predominance of epiphytes can be explained by the dense canopy observed in the area which does not allow much light to reach the soil. This result agrees with Dressler (1993) who argued that at least 2/3 of the orchid species in the tropics are epiphytes. *Epidendrum* L. with six species (12%) and *Maxillaria* Ruiz & Pav. with five species (10%) are the most representative genera in the area. These genera have also been found to be representative in other studies conducted in the Amazon domain (Silveira *et al.* 1995; Pessoa *et al.* 2015; Koch *et al.* 2018; Klein & Piedade 2019).

According to BFG (2015, 2018), five genera are cited for the first time for the Maranhão: *Coryanthes* Hook., *Sarcoglottis* C. Presl., *Stelis* Sw., *Trichosalpinx* Luer and *Wullschlaegelia* Rchb.f. Ten species (about 20%) are new records for the state: *Campylocentrum pachyrrhizum* (Rchb.f.) Rolfe, *Coryanthes speciosa* Hook., *Lockhartia imbricata* (Lam.) Hoehne, *Notylia microchila* Cogn., *Ornithocephalus cujeticola* Barb. Rodr., *Sarcoglottis acaulis* (Sm.) Schltr., *Scaphyglottis prolifera* (R.Br.) Cogn., *Stelis paraensis* Barb. Rodr., *Trichosalpinx egleri* Pabst and *Wullschlaegelia calcarata* Benth. Furthermore, four of the species were collected for the first time in northeastern Brazil: *L. imbricata*, *S. paraensis*, *T. egleri* and *W. calcarata*. These four species are restricted to the Amazon dominion (Flora do Brasil 2020, continuously updated), and the presence of *W. calcarata* is even more interesting due to the particular ecology of this species which is highly water-dependent.

Another five species cited by Silva *et al.* (1999) for Maranhão but without testimony vouchers, *Campylocentrum micranthum* Rolfe., *Dichaea picta* Rchb.f., *Laelia gloriosa* (cited as *Schomburgkia gloriosa* Rchb.f.), *Oncidium baueri* Lindl and *Polystachya concreta* (Jacq.) Garay & H.R.Sweet, have their occurrence currently not confirmed to the state in Flora do Brasil 2020 (continuously updated), yet they were collected by us. These do not represent new records, but confirmations of occurrence.

Among the species 30% are widespread in the Neotropics, while 47% are endemic to South America, and only 6% are restricted to Brazil (BFG 2015, 2018; Govaerts *et al.* 2020). The majority of the species (about 75%) were collected along rivers or water courses, these areas work as corridors for epiphytes linking the Cerrado and the Amazon (Pabst & Dungs 1975). In the anthropized portion of the Fazenda Sete Irmãos only three species were observed, *Catasetum macrocarpum* Rich. *ex* Kunth. and *Vanilla palmarum* Lindl. growing in *Attalea speciosa* Mart. (Arecaceae, locally called "*Babaçu*") and *Sacoila lanceolata* (Aubl.) Garay a terricolous species.

The Fazenda Sete Irmãos is one of the last well-preserved localities of Amazon Forest in Maranhão, at least 3,000 ha are primary forest. Our results indicate it is one of the richest areas in Orchidaceae species in northeastern Brazil (Coelho & Amorim 2014; Pessoa & Alves 2015) and it is fundamental for conservation of the Belém Endemism Center (Almeida & Vieira 2010; Celentano *et al.* 2017). The new records of species presented here are just part of several other studies recently undertaken in the Amazon portion of Maranhão that are also expanding distributions of taxa of other families (Guarçoni *et al.* 2018, 2020; Ferreira *et al.* 2019a, 2019b, 2019c; Silva *et al.* 2016; Koch & Araújo Silva 2014; Scatigna *et al.* 2019; Silva-Júnior *et al.* 2020). We highlight the need for a stronger effort of studying this neglected and threatened region of Brazil.

Key for the orchid species from the Fazenda Sete Irmãos

1. Myco-heterotrophic, achlorophyllous herbs ..... 51. *Wullschlaegelia calcarata*
1'. Autotrophic, chlorophyllous herbs 2
2. Leafless plants; roots flat, green ..... 4. *Campylocentrum pachyrrhizum*
2'. Leafy plants; roots cylindrical, grayish or white 3
3. Hemiepiphytes; stem voluble 4
4. Lip with a multi-ridged callus on the disc ..... 50. *Vanilla pompona*
4'. Lip without a callus on the disc 5
5. Sepals and petals undulate at margin, green ..... 48. *Vanilla mexicana*
5'. Sepals and petals flat at margin, yellow ..... 49. *Vanilla palmarum*
3'. Epiphytes or terrestrial herbs; stem erect or pendulous, never voluble 6
6. Inflorescence terminal 7
7. Terrestrial herbs; leaves convolute 8
8. Leaves present during flowering; flowers greenish-white ..... 40. *Sarcoglottis acaulis*
8'. Leaves absent during flowering; flowers magenta ..... 39. *Sacoila lanceolata*
7'. Epiphytes; leaves conduplicate or plicate 9
9. Leaves plicate ..... 44. *Sobralia macrophylla*
9'. Leaves conduplicate 10
10. Pseudobulbs ovoid, clavate or fusiform 11
11. Flowers non-resupinate 12
12. Lip 3-lobed; flowers greenish-yellow ..... 36. *Polystachya concreta*
12'. Lip entire; flowers white with purple stripes ..... 37. *Prosthechea aemula*
11'. Flowers resupinate 13
13. Peduncle at least four times longer than the rachis ..... 18. *Laelia gloriosa*
13'. Peduncle as long as the rachis, to slightly longer or shorter ..... 12. *Epidendrum purpurascens*
10'. Pseudobulbs cylindrical or stem not swollen 14
14. Leaves 1 on each stem 15
15. Dorsal sepal connate with the lateral sepals ..... 45. *Stelis paraensis*
15'. Dorsal sepal free 16
16. Lepanthiform sheaths absent; flowers yellow, lateral sepals free ..... 29. *Octomeria grandiflora*
16'. Lepanthiform sheaths present; flowers dark purple, lateral sepals connate ..... 47. *Trichosalpinx egleri*
14'. Leaves 2-several 17
17. Pseudobulbs superposed; leaves terminal 18
18. Sepals connate at base; perianth < 3.0 mm long ..... 42. *Scaphyglottis sickii*
18'. Sepals free; perianth > 5.0 mm long 19
19. Flowers pink; lip 3-lobed; column with lateral appendixes ..... 43. *Scaphyglottis stellata*
19'. Flowers white or beige; lip entire; column without lateral appendixes ..... 41. *Scaphyglottis prolifera*
17'. Pseudobulbs not superposed; leaves distributed along the stem 20
20. Column free or adnate at base to the lip 21

21. Flowers pink, column adnate at base with the lip ..... 8. *Dimerandra emarginata*
21'. Flowers yellowish-brown, column free..... 32. *Orleanesia amazonica*
20'. Column completely adnate to the lip 22
22. Rachis completely covered by bracts; lip entire 23
23. Flowers green, lip suborbicular..... 13. *Epidendrum rigidum*
23'. Flowers white, lip cordate ..... 14. *Epidendrum strobiliferum*
22'. Rachis exposed; lip obscurely to clearly 3-lobed..... 24
24. Inflorescence short pedunculate (< 1 cm long) ..... 10. *Epidendrum carpophorum*
24'. Inflorescence long pedunculate (at least 1.6 cm long) 25
25. Peduncle completely covered by bracts; lip margin entire..... ..... 9. *Epidendrum anceps*
25'. Peduncle exposed; lip margin denticulate ..... 11. *Epidendrum macrocarpum*
6'. Inflorescence lateral 26
26. Leaves cylindrical 27
27. Inflorescence uniflorous; flowers white ..... 25. *Maxillaria uncata*
27'. Inflorescence multiflorous; flowers yellow with brown spots..... 46. *Trichocentrum cepula*
26'. Leaves flat 28
28. Leaves equitant, unifacial..... 29
29. Leaves much shorter than the stem ..... 19. *Lockhartia imbricata*
29'. Leaves as long as or longer than the stem..... 30
30. Flowers pink; lip clawed ..... 20. *Macroclinium wullschlaegelianum*
30'. Flowers white, green or yellow; lip not clawed 31
31. Flowers yellow with brown dots; petal margins entire; lip apex 2-lobed; column wings developed..... 15. *Erycina pusilla*
31'. Flowers white or greenish; petal margins minutely denticulate; lip apex rounded or cuspidate; column without wings..... 32
32. Sepal apex rounded to obtuse; lip entire .... 33. *Ornithocephalus cujeticola*
32'. Sepal apex acuminate; lip 3-lobed..... 34. *Ornithocephalus gladiatus*
28'. Leaves not equitant, dorso-ventrally flattened 33
33. Flowers with a spur 34
34. Pseudobulb present; leaves 1, terminal ..... 30. *Oeceoclades maculata*
34'. Pseudobulb absent; leaves 3-12, distributed along the stem .... 3. *Campylocentrum micranthum*
33'. Flowers without spur..... 35
35. Pseudobulb absent..... 7. *Dichaea picta*
35'. Pseudobulb present..... 36
36. Pseudobulb homoblastic; flowers unisexual ..... 5.*Catasetum macrocarpum*
36'. Pseudobulb heteroblastic; flowers bisexual..... 37
37. Inflorescences uniflorous..... 38
38. Peduncle > 6.5 cm long; lip < 0.6 cm long..... ..... 24. *Maxillaria subrepens*
38'. Peduncle < 4.5 cm long; lip > 1.0 cm long..... 30
39. Rhizome fully fixed in the substrate; flowers yellow .... 22. *Maxillaria aureoglobula*
39'. Rhizome pendent, fixed in the substrate only at the base; flowers white 4
40. Apical leaves 2; lateral lobes of the lip developed .... 23. *Maxillaria lutescens*
40'. Apical leaf 1; lateral lobes of the lip vestigial .... 21 *Maxillaria alba*
37'. Inflorescences multiflorous..... 41

41. Flowers non-resupinate 42
    42. Inflorescence lax; lip hypochile 0.7–0.9 cm long, pair of callus > 0.2 cm long ..... 16. *Gongora nigrita*
    42'. Inflorescence congested; lip hypochile 0.5–0.7 cm long, pair of callus < 0.1 cm long ..... 17. *Gongora quinquenervis*
41'. Flowers resupinate 43
    43. Leaves plicate, main veins abaxially evident 44
        44. Pseudobulb smooth; lip not divided; column without glands ..... 35. *Peristeria serroniana*
        44'. Pseudobulb ribbed; lip divided into epichile, mesochile and hypochile; column with a pair of glands ..... 6. *Coryanthes speciosa*
    43'. Leaves conduplicate, veins not evidente 45
        45. Lip clawed 46
            46. Lateral sepals completely connate; lip blade ovate ..... 27. *Notylia microchila*
            46'. Lateral sepals free at distal half; lip blade lanceolate 47
                47. Inflorescence 3.0-5.0 cm long; lip blade apex laterally recurved ..... 28. *Notylia yauaperyensis*
                47'. Inflorescence 6.0- 22.0 cm long; lip blade apex plane ..... 26. *Notylia aromatica*
        45'. Lip not clawed 48
            48. Flowers magenta, lateral sepals connate ..... 38. *Rodriguezia lanceolata*
            48'. Flowers yellow or beige with brown dots or lines, lateral sepals free 49
                49. Lip adnate to the base of the column, margin erose ..... 1. *Aspasia variegata*
                49'. Lip free from the column, margin entire 50
                    50. Flowers at least 17; lateral sepal apex acute; lip 3-lobed ..... 31. *Oncidium baueri*
                    50'. Flowers at least 5-8; lateral sepal apex caudate; lip entire ..... 2. *Brassia caudata*

1. *Aspasia variegata* Lindl. Edwards's Bot. Reg. 22: t. 1907. 1836.

Examined material: trail near the Pirarucu lake, 01°50'45.2"S, 45°47'17.5"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 001* (SLUI 5724); Igarapé Reno, 01º51'48"S, 45º46'02"W, 3.XI.2017, fl., *A.W.C. M.J.C. Silva & A.W.C. Ferreira 002* (SLUI 5725).

Widespread in northern South America, in Brazil it is widely distributed in the Amazon domain, but it is also recorded to Cerrado. It is a species that while sterile can be confused in the area with *O. baueri* and *B. caudata* but in flower is recognized by the lip adnate to the base of the column and with an erose margin (*vs.* free and entire). The local flowering period is between November and January.

2. *Brassia caudata* (L.) Lindl., Bot. Reg. 10: t. 832.1825.

Examined material: Igarapé Cumaruzal, 01°50'36"S,45°47'09"W, 3.VII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 005* (SLUI 5726).

Widespread in the Neotropical region, in Brazil it is widely distributed in the Amazon domain. This species is easily recognized by its long caudate sepals, the most similar species in the area is *A. variegata* from which it can be distinguished by having more flowers per inflorescence (5–8 *vs.* 1–3). The local flowering period is between May and July.

3. *Campylocentrum micranthum* (Lindl.) Rolfe, Orchid Rev. 9: 136. 1903. Fig. 2a

Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 3.VII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 006* (SLUI 5727).

Widespread in northern South America and the Caribbean, in Brazil it is found in the Amazon and Atlantic Forest domains. This species was cited by Silva *et al.* (1999) to Maranhão, but without a testimony voucher. As it is not listed to the state in BFG (2015, 2018), here its presence is confirmed. It is easily distinguished from the other species of the genus in the area by the presence of leaves (*vs.* leafless). The local flowering period is between June and July.

4. *Campylocentrum pachyrrhizum* (Rchb.f.) Rolfe, Orch. Rev.11(128): 246. 1903. Fig. 2b

Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 3.VII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 007* (SLUI 5728).

Table 1 – Orchidaceae from Fazenda Sete Irmãos, Cândido Mendes, Maranhão. (Habit: E = Epiphyte; HE = Hemiepiphyte; T = Terricolous; MI = Mycoheterotrophic). ** = first record for Maranhão. ## = first registration for the Northeast region of Brazil. ++ = exsiccate to confirm the report by Silva *et al.* (1999).

Species	Vouchers	Habit(s)	Flowering
Aspasia variegata Lindl.	*M.J.C. Silva & A.W.C. Ferreira 001* (SLUI 5724); *A.W.C. M.J.C. Silva & A.W.C. Ferreira 002* (SLUI 5725).	E	NOV-JAN
Brassia caudata (L.) Lindl.	*M.J.C. Silva & A.W.C. Ferreira 005* (SLUI 5726).	E	MAY-JUL
Campylocentrum micranthum Rolfe ++	*M.J.C. Silva & A.W.C. Ferreira 006* (SLUI 5727).	E	JUN-JUL
Campylocentrum pachyrrhyzum (Rchb. f.) Rolfe **	*M.J.C. Silva & A.W.C. Ferreira 007* (SLUI 5728).	E	JUN-AUG
CataSEPum macrocarpum Rich. *ex* Kunth.	*M.J.C. Silva & A.W.C. Ferreira 009* (SLUI 5730).	E	APR-NOV
Coryanthes speciosa Hook. **	*M.J.C. Silva, W.R. Silva Junior & A.W.C. Ferreira 012* (SLUI 5731); *M.J.C. Silva, W.R. Silva Júnior & A.W.C. Ferreira 013* (SLUI 5732).	E	SEP-NOV
Dichaea picta Rchb.f. ++	*W.R. Silva Junior*, *M.J.C. Silva & A.W.C. Ferreira 014* (SLUI 5733).	E	JUN-JUL
Dimerandra emarginata (G.Mey.) Hoehne	*W.R. Silva Junior*, *M.J.C. Silva & A.W.C. Ferreira 015* (SLUI 5734).	E	MAY-JUL
Epidendrum anceps Jacq.	*M.J.C. Silva & A.W.C. Ferreira 018* (SLUI 5699).	E	OCT-NOV
Epidendrum carpophorum Barb. Rodr.	*M.J.C. Silva & A.W.C. Ferreira 020* (SLUI 5702); *A.W.C. Ferreira 021* (SLUI 5703).	E	FEB-AUG
Epidendrum macrocarpum Rich.	M.J.C. Silva & A.W.C. Ferreira 032 (SLUI 5713).	E	JUL-SEP
Epidendrum purpurascens Focke	*M.J.C. Silva & A.W.C. Ferreira 036* (SLUI 5716).	E	OCT-FEB
Epidendrum rigidum Jacq.	*M.J.C. Silva & A.W.C. Ferreira 038* (SLUI 5719).	E	MAR-APR
Epidendrum strobiliferum Rchb.f.	*M.J.C. Silva & A.W.C. Ferreira 040* (SLUI 5721).	E	MAY-JUL
Erycina pusilla (L.) Williams & M.W. Chase	*A.W.C. Ferreira 042* (SLUI 5735).	E	JUN-AUG
Gongora nigrita Lindl.	*M.J.C. Silva & A.W.C. Ferreira 048* (SLUI 5736); *M.J.C. Silva & A.W.C. Ferreira 049* (SLUI 5737).	E	OCT-NOV

Species	Vouchers	Habit(s)	Flowering
Gongora quinquenervis Ruiz & Pavon.	*M.J.C. Silva & A.W.C. Ferreira 050* (SLUI 5738); *M.J.C. Silva & A.W.C. Ferreira 051* (SLUI 5739).	E	OCT-NOV
Laelia gloriosa (Rchb.f.) L.O. Williams ++	*M.J.C. Silva & A.W.C. Ferreira 055* (SLUI 5740); *A.W.C. Ferreira 056* (SLUI 5741).	E	APR-MAY
Lockhartia imbricata (Lam.) Hoehne **; ##	*M.J.C. Silva & A.W.C. Ferreira 057* (SLUI 5742).	E	MAY-JUL
Macroclinium wullschlaegelianum Focke (Dodson)	*M.J.C. Silva & A.W.C. Ferreira 058* (SLUI 5743).	E	OCT-DEC
Maxillaria alba (Hook.) Lindl.	*W.R. Silva Junior & A.W.C. Ferreira 105* (SLUI 5744).	E	MAY-JUN
Maxillaria aureoglobula Christenson	*A.W.C. Ferreira* 100 (MAR 11538).	E	FEB-APR
Maxillaria lutescens Scheidw.	*M.J.C. Silva & A.W.C. Ferreira 059* (SLUI 5745); *M.J.C. Silva & A.W.C. Ferreira 060* (SLUI 5746).	E	JAN-APR
Maxillaria subrepens (Rolfe) Schuit. & M.W. Chase	*M.J.C. Silva & A.W.C. Ferreira 061* (SLUI 5747); *M.J.C. Silva & A.W.C. Ferreira 062* (SLUI 5748).	E	JUN-NOV
Maxillaria uncata Lindl.	*M.J.C. Silva & A.W.C. Ferreira 063* (SLUI 5749); *M.J.C. Silva & A.W.C. Ferreira 064* (SLUI 5750).	E	NOV-MAY
Notylia aromatica Barker *ex* Lindl.	*M.J.C. Silva & A.W.C. Ferreira 065* (SLUI 5751); *M.J.C. Silva & A.W.C. Ferreira 066* (SLUI 5752).	E	SEP-DEC
Notylia microchila Cogn. **	*M.J.C. Silva & A.W.C. Ferreira 069* (SLUI 5753); *W.R. Silva Junior & A.W.C. Ferreira 070* (SLUI 5754).	E	NOV-DEC
Notylia yauaperiensis Rchb.f.	*W.R. Silva Junior & A.W.C. Ferreira 071* (SLUI 5755).	E	NOV-DEC
Octomeria grandiflora Lindl.	*M.J.C. Silva & A.W.C. Ferreira 072* (SLUI 5756).	E	APR-MAY
Oeceoclades maculata (Lind.) Lindl.	*M.J.C. Silva & A.W.C. Ferreira 073* (SLUI 5757).	T	FEB-MAY
Oncidium baueri Lindl. ++	*A.W.C. Ferreira 075* (SLUI 5758).	E	NOV-APR
Orleanesia amazonica Barb. Rodr.	*A.W.C. Ferreira 076* (SLUI 5759).	E	SEP-FEB
Ornithocephalus cujeticola Barb. Rodr. **	*M.J.C. Silva & A.W.C. Ferreira 077* (SLUI 5760); *M.J.C. Silva & A.W.C. Ferreira 078* (SLUI 5761).	E	JUN-AUG

Species	Vouchers	Habit(s)	Flowering
Ornithocephalus gladiatus Hook.	*M.J.C. Silva & A.W.C. Ferreira 079* (SLUI 5762); *M.J.C. Silva & A.W.C. Ferreira 080* (SLUI 5763).	E	JUN-SEP
Peristeria serroniana Knowles & Westc.	*M.J.C. Silva & A.W.C. Ferreira 081* (SLUI 5764).	E	JAN-FEB
Polystachya concreta (Jacq.) Garay & H.R.Sweet ++	*M.J.C. Silva & A.W.C. Ferreira 082* (SLUI 5765).	E	FEB-MAY
Prosthechea aemula (Lindl.) W.E. Higgins	*M.J.C. Silva & A.W.C. Ferreira 083* (SLUI 5766); *M.J.C. Silva & A.W.C. Ferreira 084* (SLUI 5767).	E	OCT-APR
Rodriguezia lanceolata Ruiz & Pavon	*M.J.C. Silva & A.W.C. Ferreira 085* (SLUI 5768); *M.J.C. Silva & A.W.C. Ferreira 086* (SLUI 5769).	E	JAN-MAR
Sacoila lanceolata (Aubl.) Garay	*M.J.C. Silva & A.W.C. Ferreira 087* (SLUI 5770).	T	OCT-JAN
Sarcoglottis acaulis (Sm.) Schltr. **	*A.W.C. Ferreira 088* (SLUI 5771).	T	AUG-SEP
Scaphyglottis prolifera (R.Br.) Cogn. **	*M.J.C. Silva & A.W.C. Ferreira 089* (SLUI 5772); *M.J.C. Silva & A.W.C. Ferreira 090* (SLUI 5773).	E	JUL-AUG
Scaphyglottis sickii Pabst	*M.J.C. Silva & A.W.C. Ferreira 091* (SLUI 5774); *M.J.C. Silva & A.W.C. Ferreira 092* (SLUI 5775).	E	MAY-JUL
Scaphyglottis stellata Lodd. *ex* Lindl.	*M.J.C. Silva & A.W.C. Ferreira 093* (SLUI 5776).	E	AUG-SEP
Sobralia macrophylla Rchb.f.	*M.J.C. Silva & A.W.C. Ferreira 094* (SLUI 5777).	E	MAR-APR
Stelis paraensis Barb. Rodr. **; ##	*M.J.C. Silva & A.W.C. Ferreira 095* (SLUI 5778); *M.J.C. Silva & A.W.C. Ferreira 096* (SLUI 5779).	E	FEB-APR
Trichocentrum cepula (Hoffmans.) J.M.H. Shaw	*M.J.C. Silva & A.W.C. Ferreira 097* (SLUI 5780).	E	OCT-JAN
Trichosalpinx egleri Pabst **; ##	*M.J.C. Silva & A.W.C. Ferreira 098* (SLUI 5781).	E	JAN-APR
Vanilla mexicana Mill.	*M.J.C. Silva & A.W.C. Ferreira 099* (SLUI 5782).	HE	JUL-AUG
Vanilla palmarum Lindl.	*M.J.C. Silva & A.W.C. Ferreira 101* (SLUI 5783).	E	SEP-JAN
Vanilla pompona Schiede	*A.W.C. Ferreira 102* (SLUI 5784).	HE	AUG-OCT
Wullschlaegelia calcarata Benth **; ##.	*W.R. Silva Junior & A.W.C. Ferreira 103* (SLUI 5785); *W.R. Silva Junior & A.W.C. Ferreira 104* (SLUI 5786).	MI	OCT-NOV

Widespread in the Neotropical region, in Brazil it is found in the Amazon and Atlantic Forest domains. This study presents its first record to Maranhão. It is easily recognized among the species of the area by being leafless and by the flat, green roots. The local flowering period is between June and August.

5. *Catasetum macrocarpum* Richard, L. C. & Kunth, C., Syn. Pl. Aequin., I: 331, 1822.
Examined material: near the border with Zé Pedro's farm, 02°07'47.4"S, 45°48'42.2"W, 15.X.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 009* (SLUI 5730).

Widespread in South America, in Brazil it is widely distributed, except in the South region.

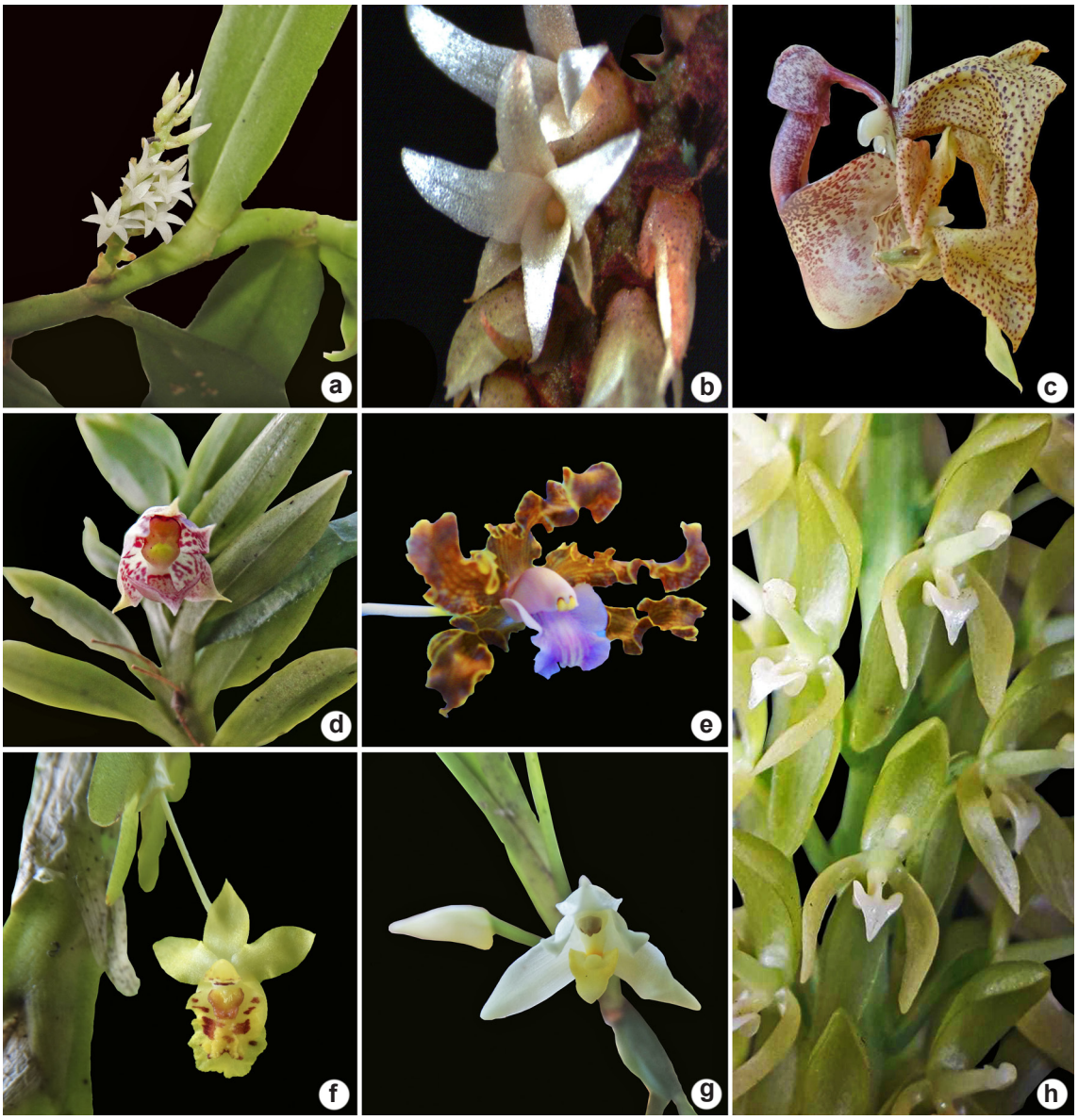

Figure 2 – a-h. Orchidaceae of Fazenda Sete Irmãos – a. *Campylocentrum micranthum*; b. *Campylocentrum pachyrrhizum*; c. *Coryanthes speciosa*; d. *Dichaea picta*; e. *Laelia gloriosa*; f. *Lockhartia imbricata*; g. *Maxillaria alba*; h. *Notylia microchila.* (a. *M.J.C. Silva & A.W.C. Ferreira 006*; b. *M.J.C. Silva & A.W.C. Ferreira 007*; c. *M.J.C. Silva, W.R. Silva Junior & A.W.C. Ferreira 012*; d. *W.R. Silva Junior*, *M.J.C. Silva & A.W.C. Ferreira 014*; e. *M.J.C. Silva & A.W.C. Ferreira 055*; f. *M.J.C. Silva & A.W.C. Ferreira 057*; g. *W.R. Silva Junior & A.W.C. Ferreira 105*; h. *M.J.C. Silva & A.W.C. Ferreira 069*). Photos: a-h. *A.W.C Ferreira*.

It is distinguished in the area by its homoblastic pseudobulbs and it is also the only species with unisexual flowers. The local flowering period is between April and November.

6. *Coryanthes speciosa* Hooker, W.J., Bot. Mag., 58: 3102, 1831. Fig. 2c
Examined material: Igarapé Reno, near the wood bridge, 01°52'35.6"S, 45°45'18.9"W, 13.X.2017, fl., *M.J.C. Silva, W.R. Silva Junior & A.W.C. Ferreira 012* (SLUI 5731); 01°52'35.6"S, 45°45'18.9"W, 13.X.2017, fl., *M.J.C. Silva, W.R. Silva Júnior & A.W.C. Ferreira 013* (SLUI 5732).

Widespread in northern South America, in Brazil it is widely distributed, except in the South region. This study presents its first record to Maranhão. It is characterized by the lip divided into epichile, mesochile and hypochile and column with a pair of glands. The local flowering period is between September and November.

7. *Dichaea picta* Rchb.f. W.W.Saunders, Refug. Bot. (Saunders), 2: t. 84, 1872. Fig. 2d
Examined material: Igarapé Cumaruzal, 01°50'55.0"S, 45°45'35.4"W, 14.VII.2017, fl., *W.R. Silva Junior*, *M.J.C. Silva & A.W.C. Ferreira 014* (SLUI 5733).

Widespread in northern South America, in Brazil it is cited only to the states of Amazonas, Pará and Rondônia. This species was cited by Silva *et al.* (1999) to Maranhão, but without a testimony voucher. As it is not listed to the state in BFG (2015, 2018), here its presence is confirmed. It can be confused in the area with a member of *Epidendrum* due to the cespitose habit and leaves distributed along the stem, but it differs by membranous leaves and 1-flowered inflorescences (*vs.* coriaceous, multiflorous). The local flowering period is between June and July.

8. *Dimerandra emarginata* (G.Mey.) Hoehne, Bol. Agric. Estado São Paulo 34: 618. t. 9. 1934.
Examined material: trail to Igarapé Cumaruzal, 01°50'55.0"S, 45°45'35.4"W, 15.VI.2017, fl., *W.R. Silva Junior*, *M.J.C. Silva & A.W.C. Ferreira 015* (SLUI 5734).

Widespread in the Neotropical region, in Brazil it is found in the Amazon and Atlantic Forest domains. It is a species that can be confused in the area with *Epidendrum*, but is distinguished by the column adnate only at base with the lip (*vs.* fully adnate). The local flowering period is between May and July.

9. *Epidendrum anceps* Jacq., Select. Stirp. Amer. Hist. 224 (t. 138). 1763.
Examined material: trail to Igarapé Cumaruzal, 01°50'47.7"S, 45°45'48.7"W, 14.X.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 018* (SLUI 5699).

Widespread in the Neotropical region, and widely distributed in Brazil. It can be distinguished from the other species of the genus in the area by its pedunculate inflorescence (at least 1.6 cm long) with peduncle completely covered by bracts, whereas in *E. rigidum* and *E. strobiliferum* the rachis is covered by bracts. The local flowering period is between October and November.

10. *Epidendrum carpophorum* Barb.Rodr., Gen. Sp. Orchid. 2: 148. 1882.
Examined material: Igarapé Cumaruzal, 01º50'48"S, 45º46'02"W, 15.VI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 020* (SLUI 5702); Macaxeira river, 01°52'47"S, 45°47'54"W, 20.II.2020, fl., *A.W.C. Ferreira 021* (SLUI 5703).

Widespread in northern South America, in Brazil it is widely distributed, except in the South region. Among the *Epidendrum* species of the area it can be confused with *E. purpurascens* due to the deeply 3-lobed white lip, but in *E. carpophorum* the stem is not swollen (*vs.* swollen). The local flowering period is between February and August.

11. *Epidendrum macrocarpum* Rich., Actes Soc. Hist. Nat. Paris 1(1): 112. 1792.
Examined material: Macaxeira river, near the bridge of the old road, 01°52'43"S, 45°45'37"W, 15.VII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 032* (SLUI 5713).

Widespread in northern South America, in Brazil it is found in the Amazon and Atlantic Forest domains. It is distinguished from the other species of the genus in the area by its long inflorescence and red flowers. The local flowering period is between July and September.

12. *Epidendrum purpurascens* Focke. Tijdschr. Nat. Wetensch. 4: 64-65. 1851.
Examined material: Igarapé Cumaruzal, 01°50'47.7"S, 45°45'48.7"W, 14.X.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 036* (SLUI 5716).

Widespread in northern South America, in Brazil it is widely distributed in the Amazon domain. Among the *Epidendrum* species of the area it is the only one with pseudobulbs. The local flowering period is between October and February.

13. *Epidendrum rigidum* Jacq., Enum. Syst. Pl.: 29. 1760.
Examined material: Macaxeira river, 01°52'44.4"S, 45°45'36.2"W, 15.IV.2019, fl., *M.J.C. Silva & A.W.C. Ferreira 038* (SLUI 5719).

Widespread in the Neotropical region, it is also widely distributed in Brazil. It can be confused with *E. strobiliferum* but the stem of this epiphyte is not branched and the flowers are green (*vs.* branched, white). The local flowering period is between March and Abril.

14. *Epidendrum strobiliferum* Rchb. f., Ned. Kruidk. Arch. 4: 333. 1859.
Examined material: Igarapé Cumaruzal, 01°50'47"S, 45°48'42"W, 15.VII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 040* (SLUI 5721).

Widespread in the Neotropical region, it is also widely distributed in Brazil. Among the *Epidendrum* species of the area it is the only one with ramified, pendent stems. The local flowering period is between May and July.

15. *Erycina pusilla* (L.) N.H.Williams & M.W.Chase. Lindleyana, 16: 136, 2001.
Examined material: Macaxeira, near the border of the Fazenda Sete Irmãos, 01°52'06"S, 45°48'01"W, 29.VI.2019, fl., *A.W.C. Ferreira 042* (SLUI 5735).

Widespread in the Neotropical region, in Brazil it is widely distributed, except in the South region. This twig epiphyte with equitant leaves can be confused in the area, if sterile, with a member of *Ornithocephalus*, but the flowers are fairly distinctive, and it can be recognized by the color (yellow *vs.* white or greenish), margin of the petals (entire *vs.* minutely denticulate), and the presence of wings on the column (*vs.* without wings). The local flowering period is between June and August.

16. *Gongora nigrita* Lindl. Lindley, J., Edwards's Bot. Reg., 25: 59, 1839.
Examined material: Macaxeira river, 01°52'44.4"S, 45°45'36.2"W, 15.X.2017, fl. *M.J.C. Silva & A.W.C. Ferreira 048* (SLUI 5736); trail on Igarapé Reno, 01°50'55"S, 45°45'35.4"W, 3.XI.2017, fl. *M.J.C. Silva & A.W.C. Ferreira 049* (SLUI 5737).

Distributed in Guyana, Suriname and Brazil, where it is found in the Amazon and Atlantic Forest domains, it has been cited only to the states of Amazonas, Maranhão, Pará and Pernambuco. It is similar to *G. quinquenervis* but differs by the perianth length (4–5 cm long *vs*. 2.5–4 cm long). The local flowering period is between October and November.

17. *Gongora quinquenervis* Ruiz & Pav. Syst. Veg. Fl. Peruv. Chil. 1: 227. 1798.
Examined material: Macaxeira river, 01°52'44.4"S, 45°45'36.2"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 050* (SLUI 5738); Fazenda Sete Irmãos, 02°52'44.4"S, 45°45'36.2"W, 3.XI.2018, fl., *M.J.C. Silva & A.W.C. Ferreira 051* (SLUI 5739).

Distributed in Colombia, Ecuador, Peru and Brazil, where it is found in the Amazon and Atlantic Forest domains. As mentioned above, it is similar to *G. nigrita*, but can also be distinguished by the length of lip callus (< 0.1 cm long *vs.* > 0.2 cm long). The local flowering period is between October and November.

18. *Laelia gloriosa* (Rchb.f.) L.O. Williams. Darwiniana 5: 76. 1941. Fig. 2e
Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 055* (SLUI 5740); Macaxeira river, 01°52'44.4"S, 45°45'36.2"W, 5.V.2018, fl., *A.W.C. Ferreira 056* (SLUI 5741).

Widespread in northern South America, in Brazil it is widely distributed. This species was cited by Silva *et al.* (1999) to Maranhão, but without a testimony voucher. As it is not listed to the state in BFG (2015, 2018), here its presence is confirmed. Among the species of the area, young individuals of this species can be confused with *E. purpurascens* due to the heteroblastic fusiform pseudobulbs, but these species are easily distinguished by the length of the peduncle (> 20 cm long *vs.* < 8 cm long) and color of the flowers (sepals and petals brown, lip pale pink *vs.* completely white). The local flowering period is between April and May.

19. *Lockhartia imbricata* (Lam.) Hoehne. Arq. Bot. Estado São Paulo 2: 139. 1952. Fig. 2f
Examined material: reforestation branch, trail of the igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 16.VI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 057* (SLUI 5742).

Widespread in northern South America, in Brazil it is widely distributed in the Amazon domain. This study presents its first record to Maranhão and also to northeastern Brazil. Among the twig epiphytes with unifacial leaves of the area, it is the only one with an elongated stem. The local flowering period is between May and July.

20. *Macroclinium wullschlaegelianum* (Focke) Dodson. Icon. Pl. Trop. 10: t. 939. 1984.
Examined material: Igarapé Cumaruzal, 01°50'40.4"S, 45°46'01"W2, 14.X.2019, fl., *M.J.C. Silva & A.W.C. Ferreira 058* (SLUI 5743).

Widespread in northern South America, the species has also been recorded to Belize, in Brazil it is widely distributed in the Amazon and Cerrado

domains. This twig epiphyte is the only one among the species with unifacial leaves that produces pink flowers with a clawed lip. The local flowering period is between October and December.

21. ***Maxillaria alba*** (Hook.) Lindl. Gen. Sp. Orchid. Pl., 143, 1832. Fig. 2g
Examined material: Igarapé affluent of Macaxeira river, near the border of Fazenda Sete Irmãos, 01°52'08"S, 45°48'03"W, 29.VI.2019, fl., *W.R. Silva Junior & A.W.C. Ferreira 105* (SLUI 5744).

Widespread in the Neotropical region, in Brazil it is widely distributed in the Amazon and Cerrado domains. It can be confused in the area with *M. lutescens* due to the pendent habit, but differs by having 1 apical leaf (*vs*. 2) and vestigial lateral lobes of the lip (*vs*. developed). The local flowering period is between May and June.

22. ***Maxillaria aureoglobula*** Christenson, Orchids (West Palm Beach) 71: 125 (2002).
Examined material: Igarapé Cumaruzal, 01°50'50"S, 45°46'10"W, 9.III.2019, fl., *A.W.C. Ferreira* 100 (MAR 11538).

It is distributed in Costa Rica, Venezuela, Colombia and Brazil, where it is cited only to the states of Maranhão and Mato Grosso. Among the species of *Maxillaria* in the area, it can be confused with young individuals of *M. alba* or *M. lutescens*, but these two species have a pendent habit while *M. aureoglobula* has its rhizome fully fixed in the substrate. The local flowering period is between February and April.

23. ***Maxillaria lutescens*** Scheidw. F Allg. Gartenzeitung, 7: 145, 1839.
Examined material: near the Pirarucu lake and the old headquarter, 01°50'38.1"S, 45°46'07.7"W, 1.IV.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 059* (SLUI 5745); trail to igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 2.IV.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 060* (SLUI 5746).

Widespread in the Neotropical region, and also in Brazil. It is similar to *M. alba*, but the leaves are wider (up to 2.5 cm wider *vs*. < 1 cm wider), other features used to distinguish these two species are in the comments of *M. alba*. The local flowering period is between January and April.

24. ***Maxillaria subrepens*** (Rolfe) Schuit. & M.W.Chase. Phytotaxa, 225: 73, 2015.
Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 6.VII.2018, fl., *M.J.C. Silva & A.W.C. Ferreira 061* (SLUI 5747); 01°49'34.6"S, 45°46'09.8"W, 7.VII.2018, fl., *M.J.C. Silva & A.W.C. Ferreira 062* (SLUI 5748).

Widespread in northern South America, in Brazil it is widely distributed in the Amazon and Atlantic Forest domains. It is easily distinguished among the other *Maxillaria* of the area by its longer peduncle (> 6.5 cm long *vs*. < 2.0 cm long) and shorter lip (< 0.6 cm long *vs*. > 1.0 cm long). This species was formerly included under *Trigonidium*, considered part of *Maxillaria s.l.* today. The local flowering period is between June and November.

25. ***Maxillaria uncata*** Lindl. Edwards's Bot. Reg., 23: t. 1986, 1837.
Examined material: Igarapé Cumaruzal, 01°50'46.3"S, 45°47'17.5"W, 15.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 063* (SLUI 5749); 01°50'46.3"S, 45°47'17.5"W, 3.XI.2018, fl., *M.J.C. Silva & A.W.C. Ferreira 064* (SLUI 5750).

Widespread in northern South America, in Brazil it is widely distributed in the Amazon domain. It can be distinguished from the other *Maxillaria* of the area by its cylindrical leaves. The local flowering period is between November and May.

26. ***Notylia aromatica*** Barker ex Lindl. Edwards's Botanical Register 27: Misc. 40. 1841.
Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 065* (SLUI 5751); 01°50'37"S, 45°47'10"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 066* (SLUI 5752).

Distributed in French Guyana, Guyana, Suriname, Venezuela and Brazil, where it is widely distributed in the Amazon domain. It is similar to *N. yauaperyensis* but differs by its longer inflorescences (6–22 cm long *vs*. 3–5 cm long) and number of flowers (15–70 *vs*. 8–22). The local flowering period is between September and December.

27. ***Notylia microchila*** Cogn., *Fl. Bras.* (Martius) 3(6): 123 (1904). Fig. 2h
Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 069* (SLUI 5753); igarapé affluent do Macaxeira river, near the border of Fazenda Sete Irmãos, 01°52'07.3"S, 45°48'02.2"W, 27.XI.2019, fl., *W.R. Silva Junior & A.W.C. Ferreira 070* (SLUI 5754).

Distributed in Ecuador, Guyana, Peru, Venezuela and Brazil, where it is cited only to the states of Bahia, Espírito Santo, Mato Grosso, Pará and Pernambuco. This study presents its

first record to Maranhão. This species is easily distinguished from the other *Notylia* of the area by its lateral sepals completely connate (*vs*. free at distal half) and lip blade ovate (*vs*. lanceolate). The local flowering period is between November and December.

28. *Notylia yauaperyensis* Barb. Rodr. Vellosia (ed. 2) 1: 131. 1891.
Examined material: Igarapé affluent of Macaxeira river, near the border of Fazenda Sete Irmãos, 01°52'07.3"S, 45°48'02.2"W, 27.XI.2019, fl., *W.R. Silva Junior & A.W.C. Ferreira 071* (SLUI 5755).

Distributed in French Guyana, Peru, Venezuela and Brazil, where it is widely distributed in the Amazon domain. It can be confused in the area with *N. aromatica*, but it differs by the morphological features cited in the comment above. The local flowering period is between November and December.

29. *Octomeria grandiflora* Lindl. Edwards's Bot. Reg. 28 (Misc.): 64. 1842.
Examined material: Igarapé Cumaruzal, 01°50'36"S, 45°47'09"W, 15.IV.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 072* (SLUI 5756).

Distributed in Bolivia, Colombia, Ecuador, Peru, and Brazil, where it is widely distributed. Its most similar species in the area is *T. egleri*, but these species are easily distinguished by the color the flowers (dark purple *vs.* yellow) and the fusion of the lateral sepals (free *vs*. connate). The local flowering period is between January and May.

30. *Oeceoclades maculata* (Lindl.) Lindl., Gen. Sp. Orchid. Pl.: 237. 1833.
Examined material: trail to igarapé Cumaruzal, 01°50'37"S, 45°47'10"W, 15.IV.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 073* (SLUI 5757).

Widely distributed in the Neotropics and tropical Africa, as well as in Brazil. It is the only terrestrial species in the area with lateral inflorescences and flowers with a distinct spur. The local flowering period is between February and May.

31. *Oncidium baueri* Lindl., A.C., *Fl. Bras*. (Martius), 3(6): t. 85, 1906. Fig. 3a
Examined material: Macaxeira river, 01°52'11.0"S, 45°47'59.8"W, 21.XII.2019, *A.W.C. Ferreira 075* (SLUI 5758).

Widespread in northern South America, the species has also been recorded to Costa Rica, in Brazil it is widely distributed in the Amazon and Atlantic Forest domains. This species was cited by Silva *et al.* (1999) to Maranhão, but without a testimony voucher. As it is not listed to the state in BFG (2015, 2018), here its presence is confirmed. Its flowers are somewhat similar to *E. pusilla*, but the presence of pseudobulbs (*vs*. absent) and the bi-facial leaves (*vs*. unifacial) distinguish these two. The local flowering period is between November and April.

32. *Orleanesia amazonica* Barb.Rodr., Genera et Species Orchidearum Novarum, 1, 1877.
Examined material: Macaxeira river, 01°52'15.1"S, 45°47'58.5"W, 20.II.2020, fl., *A.W.C. Ferreira 076* (SLUI 5759).

Widespread in northern South America, in Brazil it is widely distributed in the Amazon domain. It can be confused in the area with a member of *Epidendrum* but differs by its column totally free (*vs*. adnate to the lip claw). The local flowering period is between September and February.

33. *Ornithocephalus cujeticola* Barb. Rodr., Gen. Sp. Orch. Nov. 1:133.1877. Fig. 3b
Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 11.VIII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 077* (SLUI 5760); Macaxeira river, 01°52'37.6"S, 45°47'09"W, 12.VIII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 078* (SLUI 5761).

Endemic to Brazil where it is cited only to the states of Amazonas, Ceará, Mato Grosso, Pará and Rondônia. This study presents its first record to Maranhão. In the area it is similar to *O. gladiatus* Hook. but differs by the sepals rounded to obtuse at apex (*vs*. acuminate) and the lip entire (*vs*. 3-lobed). The local flowering period is between June and August.

34. *Ornithocephalus gladiatus* Hook., Exot. Fl. 2:t. 127. 1824.
Examined material: trail to igarapé Cumaruzal, 01°50'40.4"S, 45°'01"W, 13.IX.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 079* (SLUI 5762); Igarapé Reno, 01°51'47.4"S, 45°45'03"W, 14.IX.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 080* (SLUI 5763).

Widespread in northern South America, in Brazil it is widely distributed, except in the South and Southeast regions. As mentioned before, it is similar to *O. cujeticola*; the features used to distinguish them are described in the comment above. The local flowering period is between June and September.

35. *Peristeria serroniana* (Barb. Rodr) Garay, Arch. Jard. Bot. Rio de Janeiro 13: 47 (1954).
Examined material: Macaxeira river, 01°52'11.0"S, 45°47'59.8"W, 20.II.2019, fl., *M.J.C. Silva & A.W.C. Ferreira 081* (SLUI 5764).

Endemic to Brazil, where it is cited only to the states of Pará and Maranhão, in the Amazon domain. It can be confused with *C. speciosa* due to the heteroblastic pseudobulbs and plicate leaves but is easily distinguished by its smooth pseudobulb (*vs.* ribbed). The local flowering period is between January and February.

36. *Polystachya concreta* (Jacq.) Garay & H.R.Sweet, Orquideología, 9: 206, 1974. Fig. 3c
Examined material: trilha para o igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 4.V.2018, fl., *M.J.C. Silva & A.W.C. Ferreira 082* (SLUI 5765).

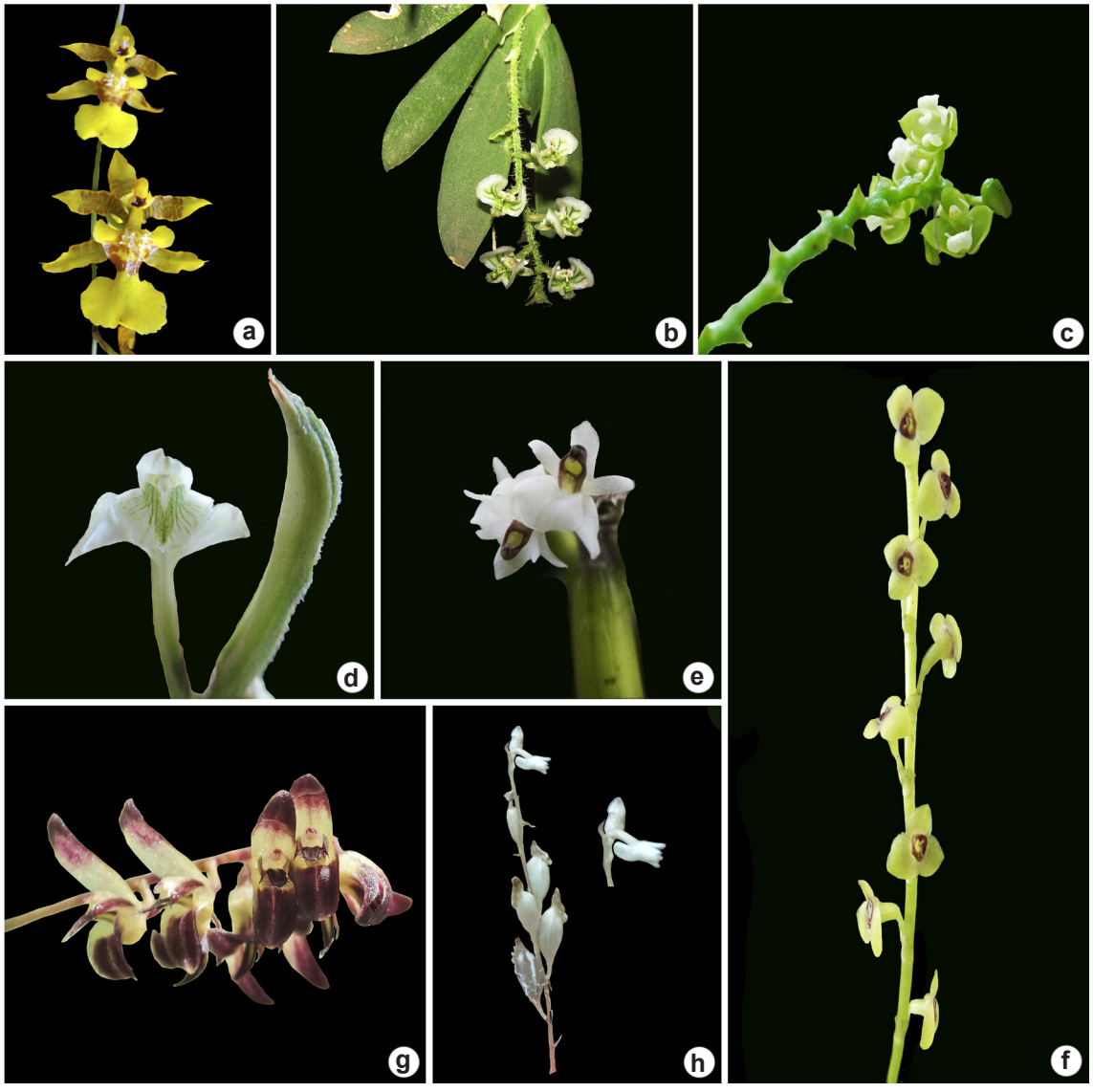

Figure 3 – a-h. Orchidaceae of Fazenda Sete Irmãos – a. *Oncidium baueri*; b. *Ornithocephalus cujeticola*; c. *Polystachya concreta*; d. *Sarcoglottis acaulis*; e. *Scaphyglottis prolifera*; f. *Stelis paraensis*; g. *Trichosalpinx egleri*; h. *Wullschlaegelia calcarata*. (a. *A.W.C. Ferreira 075*; b. *M.J.C. Silva & A.W.C. Ferreira 077*; c. *M.J.C. Silva & A.W.C. Ferreira 082*; d. *A.W.C. Ferreira 088*; e. *M.J.C. Silva & A.W.C. Ferreira 089*; f. *M.J.C. Silva & A.W.C. Ferreira 095*; g. *M.J.C. Silva & A.W.C. Ferreira 098*; h. *W.R. Silva Junior & A.W.C. Ferreira 103*). Photos: a-h. *A.W.C Ferreira*.

Widespread in the Neotropical region, in Brazil it is cited only to the states of Amapá, Goiás, Mato Grosso and Rondônia, in the Amazon and Cerrado domains. This species was cited by Silva *et al.* (1999) to Maranhão, but without a testimony voucher. As it is not listed to the state in BFG (2015, 2018), here its presence is confirmed. In the area, the only other species with swollen stems, terminal inflorescence and non-resupinate flowers is *P. aemula*, but it is easily distinguished by its 3-lobed lip (*vs.* entire). The local flowering period is between February and May.

37. *Prosthechea aemula* (Lindl.) W.E.Higgins, Phytologia 82: 376 (1997 publ. 1998).
Examined material: near the pirarucu lake, 01°50'46.3"S, 45°47'17.5"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 083* (SLUI 5766); 01°48'46.3"S, 45°50'19.5"W, 4.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 084* (SLUI 5767).

Widespread in northern South America, it has also been recorded to Panama, in Brazil it is widely distributed. Young specimens of this species can be confused in the area with *E. purpurascens,* due to the fusiform heteroblastic pseudobulbs, but it is easily distinguished by the entire lip (*vs.* 3-lobed). Specimens of *P. aemula* has been identified as *P. fragrans,* but this second species is not found in the state. The local flowering period is between October and April.

38. *Rodriguezia lanceolata* Ruiz & Pav. Syst. Veg. Fl. Peruv. Chil. 1: 219. 1798.
Examined material: Igarapé Cumaruzal, 01°50'45.2"S, 45°47'17.5"W, 3.II.2018, fl., *M.J.C. Silva & A.W.C. Ferreira 085* (SLUI 5768); 01°48'45.2"S, 45°50'19.5"W, 10.III.2019, fl., *M.J.C. Silva & A.W.C. Ferreira 086* (SLUI 5769).

Widespread in northern South America, it has also been recorded to Panama, in Brazil it is widely distributed in the Amazon domain, but is also cited to surrounding Cerrado. Among the species with heteroblastic pseudobulbs, lateral inflorescences and lip not clawed in the area it is the only one with purple flowers and lateral sepals connate. The local flowering period is between January and March.

39. *Sacoila lanceolata* (Aubl.) Garay, Bot. Mus. Leafl. 28: 352. 1980.
Examined material: campo na trilha para o Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 087* (SLUI 5770).

Widespread in the Neotropical region, and also in Brazil. Before flowering it can be confused with *S. acaulis*, but all the leaves shed before the flowering period (*vs.* leaves present during flowering). The local flowering period is between October and January.

40. *Sarcoglottis acaulis* (Sm.) Schltr. *Fl. Bras.* (Martius), 3(4): t. 50, 1895. Fig. 3d
Examined material: near the Pirarucu lake, 01°51'51.5"S, 45°45'56.5"W, 10.IX.2019, fl., *A.W.C. Ferreira 088* (SLUI 5771).

Widespread in northern South America and Central America, in Brazil it is widely distributed. This study presents its first record to Maranhão. As mentioned before, it can be confused with *S. lanceolata*, but its greenish-white flowers are fairly distinctive for lacking a spur (*vs.* flowers magenta, spur present). The local flowering period is between August and September.

41. *Scaphyglottis prolifera* (R.Br.) Cogn., *Fl. Bras.* 3(5): 15. 1898. Fig. 3e
Examined material: trail to igarapé Cumaruzal, 01°51'11.4"S, 45°47'34.6"W, 11.VIII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 089* (SLUI 5772); 01°51'11.4"S, 45°47'34.6"W, 11.VIII.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 090* (SLUI 5773).

Widespread in the Neotropical region, in Brazil it is widely distributed, except in the South region. This study presents its first record to Maranhão. It is similar to *S. stellata* but differs by the white to beige flowers (*vs.* pink) and column without lateral appendixes (*vs*. with lateral appendixes). The local flowering period is between July and August.

42. *Scaphyglottis sickii* Pabst, Orquídea (Rio de Janeiro) 18: 7. 1956.
Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 15.VI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 091* (SLUI 5774); 01°50'36.6"S, 45°47'09.8"W, 15.VI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 092* (SLUI 5775).

Widespread in northern South America, in Brazil it is found in the Amazon and Atlantic Forest domains. This species differs from the other *Scaphyglottis* of the area by its sepals connate at base (*vs*. free) and shorter perianth (< 3.0 mm long *vs.* > 5.0 mm long). The local flowering period is between May and July.

43. *Scaphyglottis stellata* Lodd. *ex* Lindl., Edwards Bot. Reg. 25: 44. 1839.
Examined material: Igarapé Reno, 01°51'11"S, 45°47'34"W, 17.IX.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 093* (SLUI 5776).

Widespread in northern South America and Central America, in Brazil it is widely distributed in the Amazon domain, but is also cited to surrounding Cerrado. In the area it can be confused with *S. prolifera* but can be distinguished by its 3-lobed lip (*vs*. entire). The local flowering period is between August and September.

44. *Sobralia macrophylla* Rchb. f., Bot. Zeitung (Berlin) 10: 713 (1852).
Examined material: Igarapé Cumaruzal, 01°50'36.6"S, 45°47'09.8"W, 15.IV.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 094* (SLUI 5777).

Widespread in northern South America and Central America, in Brazil it is cited only to the states of Amapá, Amazonas, Maranhão, and Pará in the Amazon Domain. It is the only species of the area with the combination of plicate leaves and stems not swollen. The local flowering period is between March and April.

45. *Stelis paraensis* Barb.Rodr. Gen. Sp. Orchid. ii. 88. 1881. Fig. 3f
Examined material: Igarapé Cumaruzal, 01°50'58.4"S, 45°45'30.7"W, 15.IV.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 095* (SLUI 5778); Macaxeira river, 01°52'58.4"S, 45°47'30.7"W, 16.IV.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 096* (SLUI 5779).

Endemic to Brazil, where it is cited only to the states of Mato Grosso, Pará and Rondônia in the Amazon domain. This study presents its first record to Maranhão and also to northeastern Brazil. It can be confused in the area with *S. egleri* and *O. grandiflora* but differs by its lateral and dorsal sepals fused (*vs*. dorsal sepal free). The local flowering period is between February and April.

46. *Trichocentrum cepula* (Hoffmanns.) J.M.H.Shaw. Orchid Rev. 120(1297, Suppl.): 16 (2012).
Examined material: Igarapé Reno, 01°51'11.4"S, 45°47'34.6"W, 3.XI.2017, fl., *M.J.C. Silva & A.W.C. Ferreira 097* (SLUI 5780).

Distributed in Argentina, Bolivia, Paraguay and Brazil, where it is widely distributed in the Cerrado and Caatinga domains. The other species with cylindrical leaves in the area is *M. uncata* from which it differs by the multiflorous inflorescences (*vs*. 1-flowered). The local flowering period is between October and January.

47. *Trichosalpinx egleri* (Pabst) Luer, Phytologia 54(5): 395. 1983. Fig. 3g
Examined material: Igarapé Reno, 01°51'07.5"S, 45°47'36.9"W, 21.IV.2018, fl., *M.J.C. Silva & A.W.C. Ferreira 098* (SLUI 5781).

Widespread in northern South America, in Brazil it is widely distributed in the Amazon domain. This study presents its first record to Maranhão and also to northeastern Brazil. It can be confused in the area with *O. grandiflora* and *S. paraensis* but can be easily recognized by its lepanthiform sheaths. The local flowering period is between January and April.

48. *Vanilla mexicana* Mill., Gard. Dict. ed. 8: n.º 1 (1768).
Examined material: Macaxeira river, 01°52'59"S, 45°47'31"W, 12.VIII.2017, fr., *M.J.C. Silva & A.W.C. Ferreira 099* (SLUI 5782).

Widespread in the Neotropical region, in Brazil it is also widely distributed, except in the South region. It can be confused in the area with *V. palmarum* but differs by its sepals and petals undulate at margin, green (*vs.* flat, yellow). The local flowering period is between July and August.

49. *Vanilla palmarum* (Salzm. *ex* Lindl.) Lindl., Gen. Sp. Orchid. Pl.: 436. 1832.
Examined material: near the Igarapé Reno, 01°51'11.4"S, 45°47'34.6"W, 3.XI.2017, fr., *M.J.C. Silva & A.W.C. Ferreira 101* (SLUI 5783).

Widespread in northern South America, in Brazil it is widely distributed, except in the South and Southeast regions. In the area it can be confused with *V. mexicana* but it grows exclusively on palm species (*vs*. other phorophytes). The local flowering period is between September and January.

50. *Vanilla pompona* Schiede, C.J.W., Linnaea, 4: 573-574, 1829.
Examined material: branch near to Carvoaria project, 01°51'48"S, 45°46'02"W, 10.IX.2019, *A.W.C. Ferreira 102* (SLUI 5784).

Widespread in the Neotropical region, in Brazil it is widely distributed, except in the South region. It is easily distinguished from the other species of *Vanilla* in the area by its lip with a multi-ridged callus on the disc (*vs.* callus absent). The local flowering period is between August and October.

51. *Wullschlaegelia calcarata* Benth., J. Linn. Soc., Bot. 18: 342 (1881). Fig. 3h
Examined material: trail near to Pirarucu lake, 01°51'51.5"S, 45°45'56.5"W, 26.X.2019, fl. and fr., *W.R. Silva Junior & A.W.C. Ferreira 103* (SLUI 5785); 01°51'51.5"S, 45°45'56.5"W, 26.X.2019, fl. and fr., *W.R. Silva Junior & A.W.C. Ferreira 104* (SLUI 5786).

Widespread in the Neotropical region, in Brazil it is widely distributed in the Amazon domain. This study presents its first record to Maranhão and also to northeastern Brazil. It is the only myco-heterotrophic herb in the area, recognized by achlorophyllous stems and scale-like leaves. The plants arise from the soil in the area between March and July, and local flowering period is between October and November.

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