



## Original Paper

# Orchidaceae of the municipality of Igarapé-Miri, Pará, Brazilian Amazon

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### Abstract

The municipality of Igarapé-Miri is located in the Endemism Center of Belém, which corresponds to the most deforested portion of the Brazilian Amazon with only 38% of its native forest remaining. The family Orchidaceae has several endemic taxa and expressive diversity in the Amazon phytogeographic domain, including in the state of Pará where 97 genera and 395 species have been reported. Considering the advanced state of fragmentation and the loss of diversity in the region, together with the lack of information about the flora of the municipality of Igarapé-Miri (Pará, Brazil), a floristic-taxonomic study was undertaken of the species of Orchidaceae in the municipality, including an identification key, morphological descriptions, taxonomic comments, illustrations and information on habitat, phenology and the geographic distribution of species. Fifty-eight species distributed in 38 genera were recorded for the municipality of Igarapé-Miri. The most diverse genera were *Epidendrum* (7 spp.) and *Catasetum* (4 spp.), followed by *Maxillaria*, *Scaphyglottis* and *Stelis* (3 spp. each). Most species occur as epiphytes and in Terra Firme Forest, with 31 species being exclusive to this type of vegetation. The occurrence of *Anathallis fastigiata*, *Catasetum albobirens*, *Dichaea brachyphylla* and *Palmorchis triquilhada*, species restricted to the Brazilian Amazon, stands out. The distribution of *Stelis palmeiraensis* is expanded to the Amazon phytogeographic domain and *Stelis ciliaris* and *Uleiorchis ulei* are documented in the state of Pará for the first time.

**Key words:** endemic taxa, Neotropical, new records, orchid, taxonomy.

### Resumo

O município de Igarapé-Miri está localizado no Centro de Endemismo de Belém, que corresponde à porção mais desmatada da Amazônia brasileira, com apenas 38% de sua floresta nativa remanescente. A família Orchidaceae possui vários táxons endêmicos e expressiva diversidade no domínio fitogeográfico Amazônia, inclusive no estado do Pará, para o qual são reportados 97 gêneros e 395 espécies. Considerando o estado avançado de fragmentação e a perda de diversidade na região, aliados à carência de informações sobre a flora do município de Igarapé-Miri (Pará, Brasil), realizou-se um estudo florístico-taxonomico das espécies de Orchidaceae no município, incluindo uma chave de identificação, descrições morfológicas, comentários taxonômicos, ilustrações e informações sobre habitat, fenologia e distribuição geográfica das espécies. Cinquenta e oito espécies distribuídas em 38 gêneros foram registradas para o município de Igarapé-Miri. Os gêneros mais diversos foram *Epidendrum* (7 spp.) e *Catasetum* (4 spp.), seguidos por *Maxillaria*, *Scaphyglottis* e *Stelis* (3 spp. cada). A maioria das espécies ocorre como epífita e na Floresta Terra Firme, sendo 31 espécies exclusivas desse tipo de vegetação. Destaca-se a ocorrência de *Anathallis fastigiata*, *Catasetum albobirens*, *Dichaea brachyphylla* e *Palmorchis triquilhada*, espécies restritas à Amazônia brasileira. A distribuição de *Stelis palmeiraensis* é expandida para o domínio fitogeográfico Amazônia e *Stelis ciliaris* e *Uleiorchis ulei* são documentados no estado do Pará pela primeira vez.

**Palavras-chave:** táxons endêmicos, Neotropical, novos registros, orquídea, taxonomia.

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## Introduction

One third of the genera of the family Orchidaceae and approximately 10% of the world's orchid species occur in Brazil, where they are distributed in the most different phytogeographic domains and vegetation types and grow as semi-aquatic, epiphytic, hemiepiphytic, nomadic climber, rupicolous, terrestrial or mycoheterotrophic (Leake 1994; Batista *et al.* 2006; Chase *et al.* 2015; Christenhusz & Byng 2016; Flora do Brasil 2020, continuously updated; Sperotto *et al.* 2020). The Amazon phytogeographic domain is one of the centers of diversity for Orchidaceae in Brazil, housing 787 species and 134 genera, of which 381 species and 97 genera occur in the state of Pará (Flora do Brasil 2020, continuously updated). However, the orchid flora of the Amazon is particularly threatened due to increased deforestation driven by the expansion of the agricultural frontier, increased timber production and illegal fires, as it is estimated that approximately 780,967 km<sup>2</sup> of forest was lost from 1970 to 2018, corresponding to almost 20% of the original coverage (Cruz *et al.* 2021; Mataveli *et al.* 2021; Silva Junior *et al.* 2021). Habitat destruction has strongly affected plant diversity in Amazonian ecosystems, leading to a drastic reduction in herbaceous species richness (Gibson *et al.* 2011; Newbold *et al.* 2014; Haddad *et al.* 2015; Decaëns *et al.* 2018).

In the context of the Amazon, the municipality of Igarapé-Miri is located in the Endemism Center of Belém, which corresponds to the most devastated region in the Brazilian Amazon with only 38% of its native forest remaining (Barlow *et al.* 2016). Approximately 33,5% of the original vegetation of the municipality was cleared to make way for various agricultural crops, particularly açai (Costa *et al.* 2014; Cordeiro *et al.* 2017; Moura *et al.* 2017). The few studies related to plant diversity in Igarapé-Miri have focused on the shrub-arboreal stratum; diversity and use of medicinal plants; and natural population density and management of the açai palm (*Euterpe oleracea* Mart.) (Nogueira 1999; Nogueira & Conceição 2000; Ferreira *et al.* 2014; Santos *et al.* 2019), although a new species of orchid was recently described for the municipality (Ferreira Filho & Barberena 2020).

Considering the advanced state of forest fragmentation and loss in the region, which indicates the vulnerability of this center of endemism (Silva *et al.* 2005), combined with the lack of information on the flora of the municipality, this study aimed

to carry out a floristic-taxonomic treatment of the family Orchidaceae in the municipality of Igarapé-Miri, including an identification key, morphological descriptions, taxonomic comments, illustrations and information on habitat, phenology and the geographic distribution of the species.

## Material & Methods

### Study area

The municipality of Igarapé-Miri is located in the Nordeste Paraense mesoregion, with the geographical limits of the municipalities of Abaetetuba to the north, Moju to the east, Cametá and Moju to the south and Cametá and Limoeiro do Ajuru to the west (Fig. 1). Igarapé-Miri covers an area of 199,679 hectares, with its headquarters located at 01°58'33"S, 48°57'39"W (IBGE 2018). The region's climate is megathermal, having an average annual temperature of 27 °C and average annual rainfall of about 2,500 mm, with greater rainfall from January to June (Köppen 1948; Andrade *et al.* 2017). The municipality has a flat relief, with elevations close to sea level, and three main types of vegetation: Campinarana, Terra Firme Forest and Várzea Forest (Coelho Junior & Silva 2021) (Fig. 2a-c).

### Data collection and analysis

A survey of herbaria HCP, HIFPA, HF, INPA, MFS and MG (acronyms according to Thiers, continuously updated) was initially carried out to locate specimens from the region. Subsequently, between September 2018 and December 2019, 12 excursions were carried out in vegetation remnants in Igarapé-Miri, covering fragments of Campinarana, Várzea Forest, and Terra Firme Forest, in addition to anthropogenic areas (town/city squares and urban roads), to collect fertile botanical material. The visited forest remnants were traversed at random to cover the largest possible area (Filgueiras *et al.* 1994). Specimens were photographed in the field, collected, and had some flowers removed and stored in 70% alcohol for laboratory analysis of floral structure. Sample collection and herborization followed the usual techniques described by Peixoto & Maia (2013). The herborized material was incorporated into herbarium MG, with some duplicates sent to HCP and HIFPA.

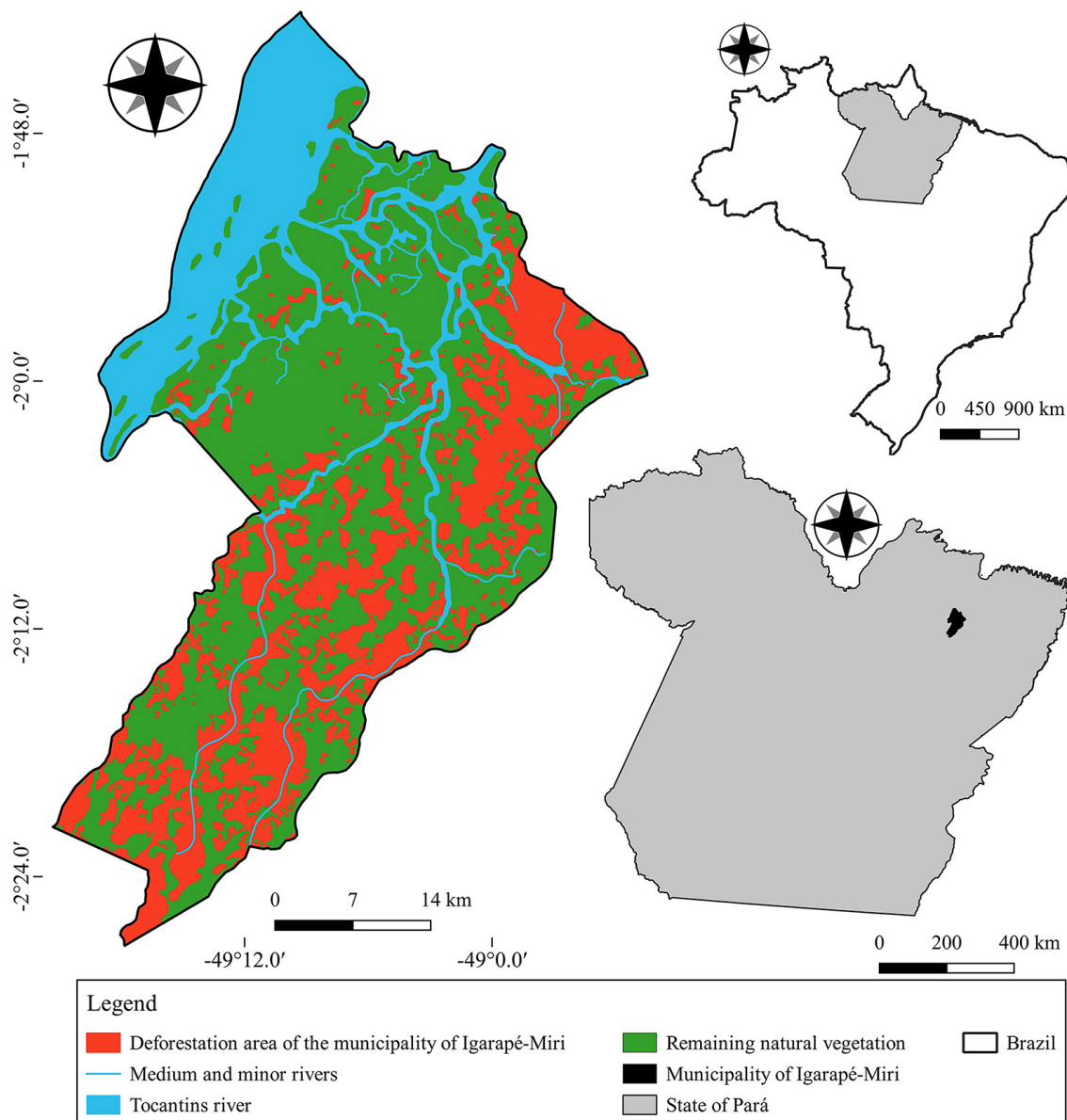
Species descriptions were based on material from the municipality of Igarapé-Miri and, when necessary, additional material from neighboring

municipalities. Measurements and illustrations of vegetative and reproductive structures were made with the aid of a smartphone coupled to a stereomicroscope. Specific literature for the family was used for species identification, such as Hoehne (1949), Dunsterville & Garay (1979), Dressler (1981), Carnevali *et al.* (2003), Silva & Silva (2011), Koch *et al.* (2014), Afonso *et al.* (2016) and Ferreira Filho *et al.* (2021). Data referring to the distribution of epiphytic species in the phorophyte strata were provided when available. The Flora do

Brasil 2020 (continuously updated) and Govaerts *et al.* (2021) were consulted to obtain geographic distribution data.

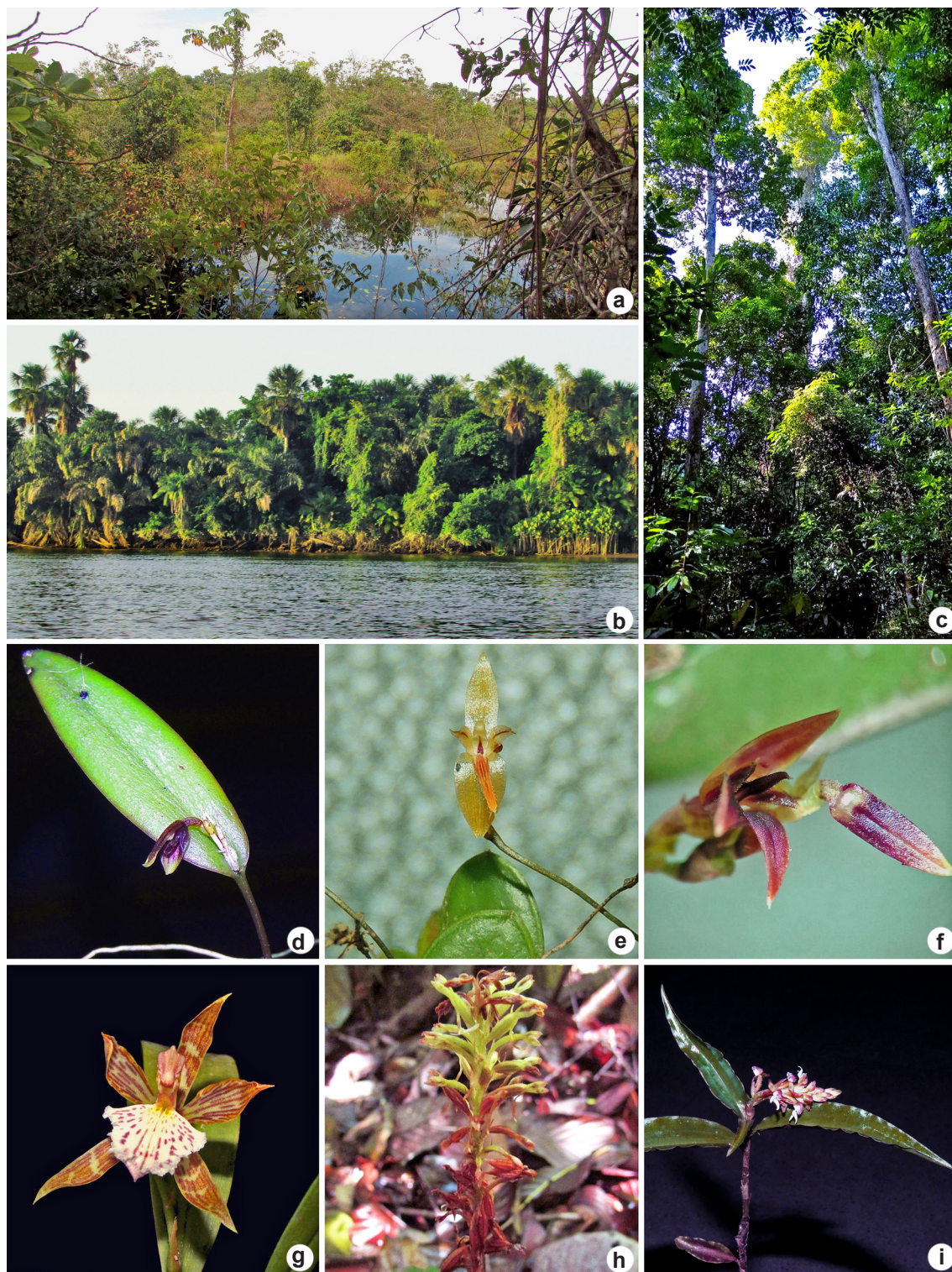
### Results and Discussion

In the municipality of Igarapé-Miri, the family Orchidaceae is represented by 58 species distributed among 38 genera (Figs. 2d-i; 3-13). The most diverse genera are *Epidendrum* L., with seven species, *Catasetum* Rich. ex Kunth, with four species, *Maxillaria* Ruiz & Pav., *Scaphyglottis*



**Figure 1** – a-c. Location of the study area – a. municipality of Igarapé-Miri; b. state of Pará; c. Brazil.





**Figure 2** – a-i. Main types of vegetation and Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. Campinarana; b. Floresta de Várzea; c. Floresta de Terra Firme; d. *Acianthera miqueliana*; e. *Anathallis barbadata*; f. *Anathallis fastigiata*; g. *Aspasia variegata*; h. *Aspidogyne foliosa*; i. *Aspidogyne juruenensis*. Photographs: d,h. Jeferson Miranda Costa; a,b,e-g,i. Ricardo Leite Ferreira Filho; c. Wagner Martins Oliveira.



Poepp. & Endl. and *Stelis* Sw., with three species each, and *Acianthera* Scheidw., *Anathallis* Barb. Rodr., *Aspidogyne* Garay, *Campylocentrum* Benth., *Dichaea* Lindl., *Trichosalpinx* Luer and *Triphora* Nutt., with two species each. As for substrate, 46 species occurred as epiphytic (79.3%), nine as terrestrial (15.5%), two as mycoheterotrophic (*Uleiorchis ulei* (Cogn.) Handro and *Wulfschlaegelia calcarata* Benth.; 3.4%), and one as nomadic climber (*Vanilla mexicana* Mill.) (1.7%).

Among the vegetation types sampled, Terra Firme Forest had the greatest number of recorded species with 42, followed by Várzea Forest and Campinarana with 18 and seven species, respectively. Of the 58 species, 31 were exclusive to Terra Firme Forest (53.5%), six were found only in Campinarana (10.3%) and four (6.7%) were restricted to Várzea Forest. No species was recorded in all three vegetation types. All terrestrial and mycoheterotrophic species were recorded in Terra Firme Forest or Campinarana. In addition, seven species were collected in squares of the city of Igarapé-Miri (*Dimerandra emarginata* (G.Mey.) Hoehne, *Epidendrum rigidum* Jacq., *Epidendrum strobiliferum* Rchb.f., *Laelia gloriosa* (Rchb.f.) L.O.Williams, *Orleanesia amazonica* Barb.Rodr., *Rodriguezia lanceolata* Ruiz & Pav. e *Scaphyglottis prolifera* Cogn.), of which two were collected exclusively in this environment (*E. strobiliferum* e *L. gloriosa*).

Of the 58 species collected in the municipality of Igarapé-Miri, four are endemic to the Brazilian Amazon, namely: *Anathallis fastigiata* (Luer & Toscano) F. Barros & Barberena, *Catasetum albovirens* Barb. Rodr., *Dichaea brachyphylla* Rchb.f and *Palmorchis triquilhada* Ferreira Filho & Barberena, while *A. fastigiata* and *P. triquilhada* are

also restricted to the state of Pará (Flora do Brasil 2020, continuously updated). The distribution of *Stelis palmeiraensis* Barb.Rodr. is extended to the Amazon phytogeographic domain (state of Pará) and *Stelis ciliaris* Lindl and *Uleiorchis ulei* (Cogn.) Handro are documented for the state of Pará for the first time.

*Epidendrum* and *Catasetum* present high numbers of species in the state (31 species each; Flora do Brasil 2020, continuously updated), being also among the most expressive genera in other municipalities and regions of Pará where floristic-taxonomic studies of Orchidaceae have been conducted (Cardoso *et al.* 1995; Silveira *et al.* 1995; Atzingen *et al.* 1996; Koch *et al.* 2014, 2018; Afonso *et al.* 2016; Ferreira Filho *et al.* 2021). Regarding the substrate, epiphytes were predominant in the present study and in the aforementioned studies. This pattern is explained by the high number of epiphytic orchids in the state of Pará (73.2%) (Flora do Brasil 2020, continuously updated). Similarly, the greater number of species recorded exclusively in Terra Firme Forest is most likely related to the predominance of this type of vegetation in the municipality and the recognized high diversity of orchid species in humid tropical forests (Dressler 1993).

Our findings contributed significantly to the increase in knowledge about the regional orchid flora, as we reported the expansion of the geographic distribution of three species and the occurrence of expressive diversity in the municipality of Igarapé-Miri, corresponding to 15.2% of the species and 39.2% of the genera listed to the state of Pará (Flora do Brasil 2020, continuously updated).

#### Taxonomic treatment

#### Key to the species of Orchidaceae of Igarapé-Miri, Pará, Brazil

1. Terrestrial.
  2. Plant achlorophyllous, mycoheterotrophic.
    3. Lip ca. 1.4 × 0.5 cm; gynostemium ca. 0.7 × 0.2 cm; fruits 1.3–2.4 cm long ..... 55. *Uleiorchis ulei*
    - 3'. Lip 0.40–0.45 × 0.1–0.15 cm; gynostemium ca. 0.1 × 0.08 cm; fruits 0.5–0.8 cm long ..... 57. *Wulfschlaegelia calcarata*
  - 2'. Plant chlorophyllous.
    4. Caulomes thickened into pseudobulbs.
      5. Pseudobulbs fusiform; leaf blades immaculate; inflorescence 75–113 cm long, as panicle; sepals and petals greenish-yellow ..... 15. *Cyrtopodium virescens*

- 5'. Pseudobulbs ovoid; leaf blades maculate; inflorescence 16–36 cm long, as raceme; sepals and petals greenish-cream .....35. *Oeceoclades maculata*
- 4'. Caulomes not thickened into pseudobulbs.
6. Flowers not calcarate.
7. Leaf blades 13–25 cm long, coriaceous, elliptic-lanceolate or oblanceolate.
8. Inflorescence ca. 4.5 cm long., pendant, 3-flowers; sepals and petals light green; lip with three calli, keel-like .....37. *Palmorchis triquilhada*
- 8'. Inflorescence ca. 50 cm long, erect, 17-flowers; sepals and petals pink to reddish; lip with two calli, linear ..... 44. *Sacoila lanceolata*
- 7'. Leaf blades 0.6–3.8 cm long, membranaceous, cordiform or widely cordiform.
9. Leaf blades 0.6–0.8 × 0.6–0.8 cm; dorsal sepal ca. 1.1 cm long, narrow-elliptic; petals ca. 1 cm long, not falcate ..... 53. *Triphora amazonica*
- 9'. Leaf blades 2.0–3.8 × 1.3–2.1 cm; dorsal sepal ca. 1.3 cm long, spatulate; petals 1.25–1.3 cm long, falcate .....54. *Triphora surinamensis*
- 6'. Flowers calcarate.
10. Petals bifid, lip trilobed .....27. *Habenaria longipedicellata*
- 10'. Petals entire, lip lobed, divided into hypochile, mesochile and epichile.
11. Leaves elliptic; sepal elliptic, apex acute; lip with rounded apex, devoid of calli.. .....6. *Aspidogyne foliosa*
- 11'. Leaves lanceolate; sepal lanceolate, apex rounded; lip with acute apex, with a basal callus .....7. *Aspidogyne juruenensis*
- 1'. Epiphyte or nomadic climber.
12. Caulomes thickened into pseudobulbs.
13. Pseudobulbs homoblastic.
14. Inflorescence terminal; flower bisexual.
15. Pseudobulbs ovoid; pedicel+ovary 0.1–0.5 cm long .....41. *Polystachya foliosa*
- 15'. Pseudobulbs cylindrical; pedicel+ovary 1.2–3.6 cm long.
16. Sepals and petals pink; lip 1.6–1.8 × 1.2–1.3 cm, pink, with two calli suborbicular, apex acuminate ..... 18. *Dimerandra emarginata*
- 16'. Sepals and petals yellowish; lip 0.8–1.0 × 0.5–0.6 cm, greenish, devoid of calli, apex rounded ..... 36. *Orleanesia amazonica*
- 14'. Inflorescence lateral; flower unisexual.
17. Sepals 1.5–1.8 cm long.; gynostemium 0.5–1.0 cm long.
18. Sepals and petals green with purple stripes, elliptic, apex acuminate ..... 13. *Catasetum roseoalbum*
- 18'. Sepals and petals yellow, devoid of stripes, sepals oblong, apex acute ..... 11. *Catasetum discolor*
- 17'. Sepals 2.3–5.5 cm long; gynostemium 1.5–4.0 cm long.
19. Sepals and petals pinkish-green, petals 2.2–2.4 cm long, ovate; lip pinkish-green, margin dentate ..... 10. *Catasetum albovirens*
- 19'. Sepals and petals greenish-yellow, petals 5.2–5.3 cm long, elliptic; lip greenish-yellow, margin entire .....12. *Catasetum macrocarpum*
- 13'. Pseudobulbs heteroblastic.
20. Pseudobulbs with two apical leaves.
21. Inflorescence pendant.
22. Inflorescence with more than seven flowers, dorsal sepal partially adnate to the dorsum of gynostemium .....26. *Gongora pleiochroma*
- 22'. Inflorescence with up to four flowers, dorsal sepal free, not adnate to the gynostemium.
23. Sepals and petals yellow with reddish-brown spots, without stripes; dorsal sepal ovate, apex acuminate ..... 14. *Coryanthes speciosa*



- 23'. Sepals and petals purple with white stripes, without spots; dorsal sepal narrow-lanceolate, apex acute..... 38. *Paphinia cristata*
- 21'. Inflorescence erect or suberect.
24. Inflorescence 80–95 cm long, erect; floral bracts 4.3–5.0 cm long...29. *Laelia gloriosa*
- 24'. Inflorescence up to 9.5 cm long, suberect; floral bracts 0.2–2.3 cm long.
25. Pseudobulbs cylindrical to fusiform; inflorescence as fascicle, terminal.
26. Leaf blades 1.5–6.5 cm long; pedicel+ovary ca. 0.3 cm long; lip white..... 45. *Scaphyglottis prolifera*
- 26'. Leaf blades 10.5–23.5 cm long; pedicel+ovary 0.4–0.6 cm long; lip purplish .....47. *Scaphyglottis stellata*
- 25'. Pseudobulbs elliptic; inflorescence as raceme, lateral.
27. Leaf blades elliptic-lanceolate, apex acuminate; lip entire ..... 58. *Zygosepalum labiosum*
- 27'. Leaf blades linear or linear-lanceolate, apex acute or emarginate-asymmetrical; lip trilobed.
28. Leaf blades linear-lanceolate; sepals and petals greenish-yellow with vinaceous stripes, lanceolate, apex cuspidate..... 5. *Aspasia variegata*
- 28'. Leaf blades linear; sepals and petals white, elliptic, apex cuneate..... 30. *Maxillaria lutescens*
- 20'. Pseudobulbs with one apical leaf.
29. Flowers calcarate.
30. Lip ca. 2.4 × 1.3 cm, cream with yellow stripes, entire, apex obtuse to rounded ..... 39. *Plectrophora iridifolia*
- 30'. Lip 1.4–1.6 × 0.6–0.7 cm, pinkish, trilobed, apex emarginate.....43. *Rodriguezia lanceolata*
- 29'. Flowers not calcarate.
31. Leaf blades cylindrical or subcylindrical.
32. Leaf blades cylindrical; inflorescence as panicle, lateral; flowers not resupinate; sepals and petals yellow .....42. *Quekettia microscopica*
- 32'. Leaf blades subcylindrical; inflorescence as fascicle, axillary; flowers resupinate; sepals and petals greenish-cream .....46. *Scaphyglottis reflexa*
- 31'. Leaves linear or linear-lanceolate.
33. Inflorescence pendant, 15–30-flowers..... 33. *Notylia microchila*
- 33'. Inflorescence suberect to erect, 1-flower.
34. Pseudobulbs cylindrical, lip cream, oblong-ligulate, entire ..... 32. *Maxillaria uncata*
- 34'. Pseudobulbs ovoid; labellum yellowish-brown, lanceolate, trilobed..... 31. *Maxillaria subrepens*
- 12'. Caulomes vestigial or not thickened into pseudobulbs.
35. Plant aphyllous..... 8. *Campylocentrum fasciola*
- 35'. Plant foliaceous.
36. Plant with monopodial growth.
37. Leaf blades 12–16 × 4.5–6.5 cm; inflorescence 9–18 cm long ..... 56. *Vanilla mexicana*
- 37'. Leaf blades 1.2–5.5 × 0.2–1.5 cm; inflorescence up to 1.4 cm long.
38. Inflorescence with 4–6-flowers; flowers calcarate ..... 9. *Campylocentrum mattogrossense*
- 38'. Inflorescence 1-flower; flower not calcarate.
39. Dorsal sepal lanceolate, apex acute; lip ca. 0.3 cm wide, apex apiculate ..... 16. *Dichaea brachyphylla*
- 39'. Dorsal sepal oblanceolate, apex acute; lip ca. 0.6 cm wide, apex acute . .....17. *Dichaea picta*
- 36'. Plant with sympodial growth.

40. Caulomes modified into ramicaules.
41. Ramicaules flat laterally.....34. *Octomeria grandiflora*
- 41'. Ramicaules cylindrical.
42. Inflorescence 3.5–18 cm long.
43. Dorsal sepal with elongated trichomes at the apex .....48. *Stelis ciliaris*
- 43'. Dorsal sepal glabrous.
44. Inflorescence 9–18 cm long, 18–30-flowers; petals reniform, apex rounded; lip with rounded apex ..... 50. *Stelis papaquerensis*
- 44'. Inflorescence 7.0–7.2 cm long, 14-flowers; petals obovate, apex obtuse; lip with obtuse apex.....49. *Stelis palmeiraensis*
- 42'. Inflorescence up to 3.3 cm long.
45. Ramicaules involved by lepanthiform sheaths.
46. Leaf blades orbicular; lateral sepals 1/2-basally adnate to each other ..... 52. *Trichosalpinx orbicularis*
- 46'. Leaf blades elliptic; lateral sepals adnate to each other up to the apex..... 51. *Trichosalpinx egleri*
- 45'. Ramicaules involved by tubular sheaths.
47. Inflorescence as cincinnus.....3. *Anathallis barbulata*
- 47'. Inflorescence as raceme.
48. Leaf blades with emarginate-mucronate apex; lip devoid of calli ..... 40. *Pleurothallis pruinosa*
- 48'. Leaf blades with acute apex; lip with parallel calli.
49. Petals with ciliate margin; lip with acuminate apex..... 4. *Anathallis fastigiata*
- 49'. Petals with serrate margin; lip with rounded apex.
50. Dorsal sepal lanceolate, lateral sepals basally adnate to each other; petals linear..... 1. *Acianthera fockei*
- 50'. Dorsal sepal linear, lateral sepals adnate to each other up to the apex; petals elliptic..... 2. *Acianthera miqueliana*
- 40'. Caulomes not modified into ramicaules.
51. Leaf blades carnose; lip adnate to base of gynostemium.....28. *Jacquinella globosa*
- 51'. Leaf blades coriaceous; lip adnate to apex of gynostemium.
52. Lip entire.
53. Caulomes branched .....25. *Epidendrum strobiliferum*
- 53'. Caulomes not branched.
54. Inflorescence 7.0–8.0 cm long; sepals 0.40–0.45 cm long; lip ca. 0.27 × 0.28 cm. ....24. *Epidendrum rigidum*
- 54'. Inflorescence 1.0–1.5 cm long; sepals 1.6–1.7 cm long; lip 0.6–0.7 × ca. 0.8 cm.. .... 19. *Epidendrum amapense*
- 52'. Lip trilobed.
55. Inflorescence greater than 6 cm in length.
56. Sepals and petals pink, lip 0.4–0.5 × 0.5–0.6 cm, pink, apex acute, with two calli at the base and one central keel that extends to the apex ..... 21. *Epidendrum flexuosum*
- 56'. Sepals and petals red, lip ca. 1.0 × 2.0 cm, red, apex rounded, with one callus in the form of a keel that extends to the apex.....22. *Epidendrum macrocarpum*
- 55'. Inflorescence up to 6 cm in length.
57. Caulome flattened laterally; pedicel+ovary 6.0–6.5 cm long; sepals and petals brownish-cream, lateral sepals elliptic-lanceolate ..... 20. *Epidendrum carpophorum*
- 57'. Caulome cylindrical; pedicel+ovary ca. 5.5 cm long; sepals and petals greenish-cream, lateral sepals linear .....23. *Epidendrum nocturnum*



**1. *Acianthera fockei*** (Lindl.) Pridgeon & M.W.Chase, Lindleyana 16(4): 243. 2001.

Fig. 7a

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 1.7–2.6 × 0.15 cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical, covered by tubular sheaths. Leaf 1, peciolate, apical; blade 5.2–5.6 × 1.4–1.7 cm, coriaceous, elliptic to obovate, apex acute. Inflorescence ca. 0.8 cm long, raceme, terminal, erect, 1-flower; floral bracts ca. 0.15 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 0.5 cm long; sepals and petals yellow-purplish; dorsal sepal ca. 0.55 × 0.15 cm, lanceolate, apex acute; lateral sepals ca. 0.5 × 0.2 cm, lanceolate, basally adnate to each other, apex acute; petals 0.35–0.4 × ca. 0.05 cm, linear, margin serrulate, apex acute; lip ca. 0.35 × 0.2 cm, purple, obovate, entire, adnate to foot of gynostemium, margin entire, apex rounded; calli 3, basal, parallel, ellipsoid; gynostemium ca. 0.3 × 0.05 cm, purple; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 77, ramal Mocajateua, sítio do Seu Antônio Pimentel, 6.IV.2019, fl. cult., 3.XI.2019, *R.L. Ferreira Filho 231* (MG).

*Acianthera fockei* occurs in Guyana, Suriname, Venezuela and Brazil (in the states of Amazonas, Mato Grosso, Pará and Roraima) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *A. fockei* can be confused with *Acianthera miqueliana* (H. Focke) Pridgeon & M.W. Chase but differs by having a longer inflorescence (ca. 0.8 cm long) and lateral sepals adnate to each other only basally (vs. inflorescence ca. 0.5 cm and lateral sepals completely adnate to each other). The species was collected in Terra Firme Forest and bloomed in November under cultivation.

**2. *Acianthera miqueliana*** (H. Focke) Pridgeon & M.W.Chase, Lindleyana 16(4): 244. 2001.

Figs. 2d; 7b

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 4.2–5.6 × 0.15 cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical, covered by tubular sheaths. Leaf 1, peciolate, apical; blade 4.2–5.4 × 1–1.3 cm, coriaceous, lanceolate, apex acute. Inflorescence ca. 0.5 cm long, raceme, terminal, suberect; floral bracts ca. 0.15 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 0.5 cm long; sepals and petals purple, yellowish at the apex; dorsal sepal ca. 0.65 × 0.17 cm,

linear, apex acute; lateral sepals ca. 0.5 × 0.2 cm, lanceolate, adnate to each other up to the apex, apex acute; petals ca. 0.2 × 0.07–0.08 cm, elliptic, margin serrulate, apex acute; lip ca. 0.25 × 0.15 cm, purple, elliptic, entire, adnate to foot of gynostemium, margin entire, apex rounded; calli 2, basal, parallel, ellipsoid; gynostemium 0.25–0.3 × ca. 0.05 cm, purple; pollinia 2. Fruits not seen.

**Examined material:** Rio Anapú, ilha Anapú, sítio do Isaque, 16.XII.2019, fl., *R.L. Ferreira Filho 291* (MG).

*Acianthera miqueliana* occurs in Ecuador, Guyana, Peru, Suriname, Venezuela and Brazil (in the states of Amazonas, Amapá, Mato Grosso, Pará and Roraima) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *A. miqueliana* can be confused with *Acianthera fockei* but differs by having a shorter inflorescence (ca. 0.5 cm long) and completely adnate lateral sepals (vs. inflorescence ca. 0.8 cm and only basally adnate lateral sepals). The species occurs in Várzea Forest, where it was collected in the middle of an açai (*Euterpe oleracea* Mart.) plantation and with flowers in December.

**3. *Anathallis barbulata*** (Lindl.) Pridgeon & M.W.Chase, Lindleyana 16(4): 247. 2001.

Figs. 2e; 7c

Epiphyte, chlorophyllous, with sympodial growth. Caulomes ca. 1 × 0.1 cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical, covered by tubular sheaths up to the apex. Leaf 1, peciolate, apical; blades 1.5–2 × 0.5–0.7 cm, coriaceous, lanceolate, apex mucronate. Inflorescence 1.4–2 cm long, in cincinnus, terminal, suberect, 1-flower; floral bracts ca. 0.15 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 0.2–0.3 cm long; sepals and petals purple-yellow; dorsal sepal 0.3–0.4 × ca. 0.15 cm, oblanceolate, apex acute; lateral sepals 0.35–0.4 × 0.1–0.2 cm, oblong, adnate to each other up to the apex, apex acute; petals ca. 0.3 × 0.1 cm, oblong, apex acute; lip 0.15–0.2 × ca. 0.05 cm, purple, oblong, entire, adnate to foot of gynostemium, margin ciliate, apex rounded; calli 2, basal, parallel, narrow-ellipsoid; gynostemium 0.1–0.15 cm long, purple, with two wings at the apex; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, sítio Cafarnaum, 22.IX.2018, fl., *R.L. Ferreira Filho 182* (MG); ilha Anapú, sítio do Duca, 20.X.2018, fl., *R.L. Ferreira Filho 184* (MG); ilha Samaúma, sítio do Isaque Gomes Miranda, 16.XII.2019, fl., *R.L. Ferreira Filho 292* (MG).

*Anathallis barbulata* occurs from Mexico to Bolivia, including Brazil, where it is found in the states of Acre, Amazonas, Amapá, Bahia, Maranhão, Pará and Pernambuco) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *A. barbulata* can be confused with *A. fastigiata* but differs in having the inflorescence as cincinnus, lateral sepals adnate to each other up to the apex and rounded lip apex (*vs.* inflorescence as raceme, sepals adnate to each other only 2/3-basally and acuminate labellum apex). The species was found in Várzea Forest and Terra Firme Forest and was collected from the canopy of a fallen phorophyte. It was collected with flowers in September, October and December.

**4. *Anathallis fastigiata*** (Luer & Toscano) F.Barros & Barberena, *Rodriguésia* 61(1): 128. 2010.

Figs. 2f; 7d

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 3–4.2 × ca. 0.1 cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical, covered by tubular sheaths up to the apex. Leaf 1, peciolate, apical; blade 2.5–4.5 × 0.7–1.8 cm, coriaceous, narrow-elliptic, apex acute. Inflorescence 1.3–2 cm long, raceme, terminal, suberect, 1–5-flowers; floral bracts ca. 0.15 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 0.1–0.2 cm long; sepals and petals purple-yellow; dorsal sepal 0.3–0.4 × 0.1–0.15 cm, ovate, apex acute; lateral sepals 0.3–0.4 × ca. 0.1 cm, elliptic-oblong, 2/3-basally adnate to each other, apex acute; petals 0.15–0.2 × 0.08–0.1 cm, ovate, margin ciliate, apex acute; lip ca. 0.2 × 0.05 cm, narrow-ovate, purple, entire, adnate to foot of gynostemium, margin ciliate, apex acuminate; calli 2, basal, parallel, narrow-ellipsoid; gynostemium ca. 0.15 × 0.05 cm, purple, with two wings at the apex, apex denticulate; pollinia 2. Fruits not seen. Petals with ciliate margin; lip with acuminate apex

**Examined material:** PA-151, km 92, sítio Cafarnaum, 15.V.2018, fl., *W.M. Oliveira* 57 (HIFPA); 22.IX.2018, fl., *R.L. Ferreira Filho* 258 (MG); ilha Anapú, sítio do Duca, 20.X.2018, fl., *R.L. Ferreira Filho* 185 (MG).

*Anathallis fastigiata* is restricted to Brazil, occurring only in the state of Pará (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *A. fastigiata* resembles *A. barbulata* but differs by having inflorescence as raceme, lateral sepals adnate to each other only 2/3-basally and acuminate lip apex (*vs.* inflorescence as cincinnus, lateral sepals adnate

up to the apex and rounded labellum apex). The species was collected in Várzea Forest and Terra Firme Forest, being found only in the canopy of phorophytes. It was collected with flowers in May, September and October.

**5. *Aspasia variegata*** Lindl., Edwards's Bot. Reg. 22: t. 1907. 1836. Figs. 2g; 7e

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 5–6 × 1–1.2 cm, thickened into pseudobulbs, heteroblastic, elliptic, laterally compressed. Leaves 2, sessile, apical; blades 16–21 × 1.2–2 cm, membranaceous, linear-lanceolate, apex acute. Inflorescence 6.5–8 cm long, raceme, lateral, suberect, 1–3-flowers; floral bracts 0.8–1 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 1.3–1.8 cm long; sepals and petals greenish-yellow with vinaceous stripes and spots, lanceolate, apex cuspidate; dorsal sepal ca. 2.3 × 0.6 cm; lateral sepals 2.1–2.2 × 0.5–0.6 cm, free from each other; petals 2.0–2.1 × ca. 1.2 cm; lip ca. 1.8 × 1.9 cm, ovate, white with vinaceous stripes, trilobed, 1/2-basally adnate to gynostemium, margin erose, apex emarginate; calli 4, 2 basal, 2 at the middle portion, parallel, linear; gynostemium ca. 2 × 0.4 cm, yellowish-white, with two white-yellowish wings at the apex; pollinia 2. Fruits 4.5–6 × 0.4–0.5 cm, fusiform.

**Examined material:** PA-151, km 92, Vila Castanhalzinho, sítio Cafarnaum, 5.III.2018, fl. cult., XI. 2018, *W.M. Oliveira* 41 (HIFPA); 27.VII.2019, fr., *R.L. Ferreira Filho* 255 (MG).

*Aspasia variegata* occurs in Bolivia, Colombia, French Guiana, Guyana, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Amapá, Amazonas, Goiás, Maranhão, Mato Grosso, Minas Gerais, Pará, Rondônia, Roraima, Tocantins and Distrito Federal) (Santos & Smidt 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *A. variegata* differs from the other orchid species by having sepals and petals with vinaceous stripes and spots and the labellum fused up to the middle of the gynostemium. The species was found in Terra Firme Forest and was collected with fruits in July and, under cultivation, flowered in November.

**6. *Aspidogyne foliosa*** (Poepp. & Endl.) Garay, *Bradea* 2(28): 201. 1977. Figs. 2h; 7f

Terrestrial, chlorophyllous, with monopodial growth. Caulomes ca. 24 × 0.3 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 7, peciolate, distributed



along the caulome; blades 3.3–8 × 1.3–3.3 cm, membranaceous, elliptic, apex acute. Inflorescence ca. 9.5 cm long, raceme, terminal, erect, 25-flowers; floral bracts 1–1.3 cm long. Flowers bisexual, resupinate, calcarate; pedicel+ovary 1–1.1 cm long; sepals and petals whitish-green; dorsal sepal ca. 0.4 × 0.15 cm, elliptic, apex acute; lateral sepals 0.4–0.5 × ca. 0.15 cm, elliptic, free from each other, apex acute; petals ca. 0.4 × 0.1 cm, entire, oblanceolate, apex acute; lip ca. 0.3 × 0.15 cm, white, ovate, lobed, divided into hypochile, mesochile and epichile, adnate to foot of gynostemium, margin entire, apex rounded; callus absent; gynostemium ca. 0.4 × 0.1 cm, white, with a horn-like protuberance at the apex; pollinia 2. Fruits 1–1.1 × ca. 0.3 cm, ellipsoid.

**Examined material:** zona rural, PA-151, km 77, 15.X.2019, fl. and fr., *R.L. Ferreira Filho 282* (MG).

*Aspidogyne foliosa* occurs in Bolivia, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela and Brazil (in the states of Amazonas, Alagoas, Bahia, Ceará, Espírito Santo, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Sul, Rondônia, Roraima, Santa Catarina and São Paulo) (Meneguzzo 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *A. foliosa* can be confused with *Aspidogyne juruenensis* (Hoehne) Meneguzzo but differs by having elliptic leaf blades and rounded lip apex (*vs.* lanceolate leaf blades and acute lip apex). The species was found in Terra Firme Forest where it was collected with flowers and fruits in October.

**7. *Aspidogyne juruenensis*** (Hoehne) Meneguzzo, *Orquidário* 26(3): 89. 2012. Figs. 2i; 7g

Terrestrial, chlorophyllous, with monopodial growth. Caulomes 11.5 × 0.3 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 7, peciolate, distributed along the caulome; blades 5–8.8 × 1.1–1.6 cm, membranaceous, lanceolate, apex acute. Inflorescence ca. 4.6 cm long, raceme, terminal, erect, 10-flowers; floral bracts 0.9–1.1 cm long. Flowers bisexual, resupinate, calcarate; pedicel+ovary 1–1.1 cm long; sepals and petals whitish-green; dorsal sepal ca. 0.5 × 0.3 cm, lanceolate, apex rounded; lateral sepals ca. 0.6 × 0.2 cm, lanceolate, free from each other, apex rounded; petals 0.4–0.5 × ca. 0.2 cm, entire, oblanceolate, apex acute; lip ca. 1.2 × 0.5 cm, white, anchoriform, lobed, divided into hypochile, mesochile and epichile, adnate to foot of gynostemium, margin

entire, apex acute; callus 1, basal, parallel, oblongoid; gynostemium ca. 0.4 × 0.1 cm, white, apex rostrate; pollinia not seen. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 24.VI.2018, fl., *W.M. Oliveira 60* (HIFPA); 17.VII.2019, fl., *R.L. Ferreira Filho 253* (HCP, MG).

*Aspidogyne juruenensis* occurs in Argentina, Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela and Brazil (in the states of Amazonas, Amapá, Mato Grosso, Minas Gerais, Pará, Paraná, Rondônia, São Paulo, Santa Catarina and Distrito Federal) (Meneguzzo 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *A. juruenensis* can be confused with *A. foliosa* but differs by having lanceolate leaves and an acute lip apex (*vs.* elliptic leaf blades and rounded lip apex). The species was found in Terra Firme Forest where it was collected with flowers in June and July.

**8. *Campylocentrum fasciola*** (Lindl.) Cogn. in C.F.P. von Martius & auct. suc. (eds.), *Fl. bras.* 3(6): 520. 1906. Figs. 3a; 7h

Epiphyte, chlorophyllous, with monopodial growth. Caulome vestigial, aphyllous. Inflorescence 3.1–3.6 cm long, raceme, lateral, erect, 12–15-flowers; floral bracts 0.13–0.15 cm long. Flowers bisexual, resupinate, calcarate; pedicel+ovary ca. 0.1 cm long; sepals and petals whitish-green; dorsal sepal ca. 0.15 × 0.05 cm, ovate-elliptic, apex acute; lateral sepals 0.17–0.18 × 0.06–0.07 cm, elliptic, free from each other, apex obtuse; petals 0.1–0.15 × ca. 0.05 cm, elliptic, apex acute; lip ca. 0.15 × 0.1–0.15 cm, white, deltoid, trilobed, adnate to foot of gynostemium, margin entire, apex acute; callus absent; gynostemium ca. 0.05 × 0.04 cm, whitish-green; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 77, ramal Mocajateua, sítio Seu Antônio Pimentel, 6.IV.2019, fl., *R.L. Ferreira Filho 227* (MG).

*Campylocentrum fasciola* occurs from Mexico to Brazil; in Brazil it is found in the states of Amazonas, Pará, Roraima, Pernambuco and Mato Grosso (Pessoa 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *C. fasciola* differs from *C. mattogrossense* Hoehne by having a vestigial caulome and flowers with smaller sepals (0.15–0.18 cm long) and a smaller lip (0.15 cm long) (*vs.* developed caulome, sepals 0.45–0.5 cm long and lip 0.4 cm long). The species is rare in the area, with only one specimen collected in Terra Firme Forest. The species bloomed in a greenhouse in April.



**Figure 3** – a-l. Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Campylocentrum fasciola*; b. *Campylocentrum mattogrossense*; c. *Catasetum albovirens*; d. *Catasetum discolor*; e. *Catasetum macrocarpum*; f. *Catasetum roseoalbum*; g. *Coryanthes speciosa*; h. *Cyrtopodium virescens*; i. *Dichaea brachyphylla*; j. *Dichaea picta*; k. *Dimerandra emarginata*; l. *Epidendrum carpophorum*. Photographs by Ricardo Leite Ferreira Filho.



**9. *Campylocentrum mattogrossense*** Hoehne, Arq. Bot. Estado São Paulo new ser. 1, fasc. 3: 62. 1941. Figs. 3b; 7i

Epiphyte, chlorophyllous, with monopodial growth. Caulomes 2–6.5 × 0.25–3 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 4–8, sessile, distributed along the caulome; blades 3.5–5.5 × 1–1.5 cm, coriaceous, oblong-elliptic, apex rounded, asymmetrical. Inflorescence 0.7–1.2 cm long, raceme, lateral, suberect, 4–6-flowers; floral bracts 0.08–1 cm long. Flowers bisexual, resupinate, calcarate; pedicel+ovary 0.15–0.2 cm long; sepals and petals white, oblong, apex acute; dorsal sepal 0.45–0.5 × 0.1–0.15 cm; lateral sepals 0.45–0.5 × ca. 0.1 cm, free from each other; petals ca. 0.4 × 0.1 cm; lip ca. 0.4 × 0.2 cm, cream, deltoid, trilobed, adnate to foot of gynostemium, margin entire, apex acute; callus absent; gynostemium ca. 0.1 × 0.08 cm, white; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 22.IX.2018, fl., R.L. Ferreira Filho 176 (MG).

*Campylocentrum mattogrossense* occurs in Bolivia, French Guiana, Guyana and Brazil (in the states of Amazonas, Goiás, Maranhão, Mato Grosso, Pará, Rondônia and Tocantins) (Pessoa 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *C. mattogrossense* can be confused with *Campylocentrum fasciola* due to similar floral morphology, however, it differs by having a developed caulome and flowers with larger sepals (0.45–0.5 cm long) and a larger lip (ca. 0.40 cm long) (*vs.* vestigial caulome, sepals 0.15–0.18 cm long and lip 0.15 cm long). The species was found in Terra Firme Forest and bloomed in a greenhouse in February.

**10. *Catasetum albovirens*** Barb.Rodr., Gen. Sp. Orchid. 1: 129. 1877. Figs. 3c; 8a

Epiphyte, chlorophyllous, with sympodial growth. Caulomes ca. 20 × 3 cm, thickened into pseudobulbs, homoblastic, fusiform. Leaves 8, sessile, distributed along the caulome; blades 20–45 × 8.5–11.7 cm, subcoriaceous, elliptic-lanceolate, apex acute. Inflorescence ca. 30 cm long, raceme, basal, suberect, 12-flowers; floral bracts 0.7–0.8 cm long. Flowers unisexual. Staminate flowers non-resupinate, not calcarate; pedicel+ovary 1.4–1.5 × ca. 0.2 cm; sepals and petals pinkish-green, apex acuminate; dorsal sepal 2.3–2.5 × ca. 1.2 cm, elliptic; lateral sepals 2.5–2.7 × 1.2–1.3 cm, elliptic, free from each other; petals

2.2–2.4 × 1.2–1.3 cm, ovate; lip 1.7–1.8 × 1.5–1.6 cm, pinkish-green, elmiform, trilobed, adnate to foot of gynostemium, margin dentate, apex rostrate; callus absent; gynostemium ca. 1.5 × 0.7 cm, greenish-yellow; pollinia 2. Pistillate flowers and fruits not seen.

**Examined material:** PA-151, km 92, Vila Castanhalzinho, sítio Cafarnaum, 15.IX.2018, fl., W.M. Oliveira 141 (HIFPA).

*Catasetum albovirens* is restricted to Brazil, occurring in the states of Amazonas, Maranhão, Mato Grosso and Pará (Petini-Benelli 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *C. albovirens* resembles *Catasetum macrocarpum* Rich. *ex* Kunth, however, it differs in having pinkish-green sepals and petals and a lip with a dentate margin (*vs.* greenish-yellow sepals and petals with brown spots, and a lip with an entire margin). The species was found in Terra Firme Forest on *Apeiba tibourbou* Aubl. (*pente-de-macaco*), on the banks of streams, and was collected with flowers in September.

**11. *Catasetum discolor*** (Lindl.) Lindl., Edwards's Bot. Reg. 30 (Misc.): 34. 1844. Figs. 3d; 8b

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 10–13 × 1–1.5 cm, thickened into pseudobulbs, homoblastic, fusiform. Leaves 4, sessile, distributed along the caulome; blades 24–34 × 2.5–4.3 cm, subcoriaceous, elliptic to oblanceolate, apex acute. Inflorescence ca. 54 cm long, raceme, lateral, suberect, 18-flowers; floral bracts 1–1.4 cm long. Flowers unisexual. Pistillate flowers non-resupinate, not calcarate; pedicel+ovary 3–3.5 cm long; sepals and petals yellow, not striate, apex acute; dorsal sepal 1.5–1.7 × 0.5–0.6 cm, oblong; lateral sepals 1.7–1.8 × 0.5–0.6 cm, oblong, falcate, free from each other; petals 1.5–1.6 × 0.5 cm, elliptic; lip 1.3–1.5 × ca. 1 cm, yellow, elmiform, trilobed, adnate to foot of gynostemium, margin slightly fimbriate to serrulate, apex rostrate; callus absent; gynostemium 0.5–0.7 × 0.35–0.4 cm, yellow; pollinia 2. Pistillate flowers and fruits not seen.

**Examined material:** Campinarana, 25.IV.2015, S.C. Lopes 005917 (MFS).

**Additional examined material:** BRAZIL. PARÁ: Abaetetuba, ramal do Abaetezinho, comunidade Santo Antônio, 16.VII.2018, fl., R.L. Ferreira Filho 167 (HIFPA).

*Catasetum discolor* occurs in Bolivia, Colombia, French Guiana, Guyana, Peru, Suriname, Venezuela and Brazil (in the states of Alagoas, Amazonas, Bahia, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso, Pará, Paraíba,

Pernambuco, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondônia, Roraima and Sergipe) (Petini-Benelli 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *C. discolor* is morphologically very similar to *Catasetum roseoalbum* (Hook.) Lindl., however, it differs by possessing a yellow lip with slightly fimbriated to serrated margin (*vs.* green lip with purple stripes and ciliated margin). The species was found only in Campinarana, and was collected with flowers in June.

**12. *Catasetum macrocarpum*** Rich. ex Kunth, Syn. Pl. 1: 331. 1822. Figs. 3e; 8c

Epiphyte, chlorophyllous, with sympodial growth. Caulomes ca. 14 × 1.9 cm, thickened into pseudobulbs, homoblastic, fusiform. Leaves 4–6, sessile, distributed along the caulome; blades 8.5–43.5 × 3–6 cm, subcoriaceous, elliptic, apex acuminate. Inflorescence 15–17.5 cm long, raceme, suberect, lateral, 3-flowers; floral bracts ca. 1.2 cm long. Flowers unisexual. Staminate flowers non-resupinate, not calcarate; pedicel+ovary 2.1–3.0 × ca. 0.3 cm; sepals and petals greenish-yellow, with brown spots, elliptic, apex acuminate; dorsal sepal 4.6–5.0 × 2.0–2.1 cm; lateral sepals 5.0–5.5 × 2.4–2.7 cm, falcate, free from each other; petals 5.2–5.3 × 2.6–2.7 cm; lip ca. 3.0 × 2.0–2.2 cm, elmiform, greenish-yellow, trilobed, adnate to foot of gynostemium, margin entire, apex acuminate; callus absent; gynostemium ca. 4 × 2.2 cm, greenish-yellow; pollinia 2. Pistillate flowers and fruits not seen.

**Examined material:** km 92, Vila Castanhalzinho, sítio Cafarnaum, 20.IV.2018, fl., *W.M. Oliveira 56* (HIFPA); ilha Anapú, 20.X.2018, fl., *R.L. Ferreira Filho 195* (MG).

*Catasetum macrocarpum* occurs from Trinidad-Tobago to Argentina, including Brazil, where it is found in the states of Acre, Alagoas, Amapá, Amazonas, Bahia, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso, Minas Gerais, Pará, Paraíba, Pernambuco, Roraima, Rio de Janeiro, Rio Grande do Norte, São Paulo and Tocantins (Petini-Benelli 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *C. macrocarpum* is similar to *C. albivirens*, however, it differs by possessing greenish-yellow sepals and petals with brown spots and a lip with an entire margin (*vs.* pinkish-green sepals and petals and lip with dentate margin). In the area, the species was found in Várzea Forest and Terra Firme Forest, growing on angiosperm phorophytes about 10 meters above the ground, and was collected with flowers in April and October.

**13. *Catasetum roseoalbum*** (Hook.) Lindl., Edwards's Bot. Reg. 26(Misc.): 65. 1840. Figs. 3f; 8d

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 6–15 × 1–3 cm, thickened into pseudobulbs, homoblastic, fusiform. Leaves 3–5, sessile, distributed along the caulome; blades 6–25 × 2.3–5 cm, subcoriaceous, elliptic, apex acute. Inflorescence 10–21 cm long, raceme, lateral, suberect, 4–8-flowers; floral bracts ca. 0.6 × 0.4 cm. Flowers unisexual. Staminate flowers non-resupinate, not calcarate; pedicel+ovary 1.7–2.1 × ca. 0.3 cm; sepals and petals green with purple stripes, elliptic, apex acuminate; dorsal sepal ca. 1.5 × 0.6–0.7 cm; lateral sepals 1.7–1.8 × 0.7–0.8 cm, free from each other; petals 1.5–1.7 × 0.7–0.8 cm; lip 2.1–2.3 × 1.2–1.3 cm, ovate, green with purple stripes, trilobed, adnate to foot of gynostemium, margin ciliate, apex acuminate; callus absent; gynostemium 0.8–1 × ca. 0.4 cm, greenish-purple, with two reduced wings at the apex; pollinia 2. Pistillate flowers and fruits not seen.

**Examined material:** PA-151, km 92, Vila Castanhalzinho, sítio Cafarnaum, 15.X.2018, fl., *W.M. Oliveira 76* (HIFPA); PA-151, km 77, 20.X.2018, fl., *R.L. Ferreira Filho 265* (MG).

*Catasetum roseoalbum* occurs in Colombia, French Guiana, Guyana, Peru, Suriname, Venezuela and Brazil (in the states of Amapá, Amazonas, Maranhão, Pará, Rondônia and Roraima) (Petini-Benelli 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *C. roseoalbum* can be confused with *C. discolor*, however, it differs by possessing a green lip with purple stripes and a ciliated margin (*vs.* yellow lip with a slightly fimbriated to serrated margin). The species was found in Terra Firme Forest and Campinarana on angiosperm phorophytes about three meters above the ground. The species was collected with flowers in October.

**14. *Coryanthes speciosa*** (Hook.) Hook., Bot. Mag. 58: sub t. 3102. 1831. Figs. 3g; 8e

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 11–13.5 × 1–1.5 cm, thickened into pseudobulbs, heteroblastic, narrow-lanceolate. Leaves 2, sessile, apical; blades 35–46.5 × 4.2–5.3 cm, coriaceous, linear-lanceolate, apex acute. Inflorescence 16–21 cm long, raceme, basal, pendant, 3–4-flowers; floral bracts 2.8–3.3 cm long. Flowers bisexual, resupinate, not calcarate; sepals and petals yellow, with brown-reddish spots, not striate; pedicel+ovary ca. 6 cm long; dorsal sepal 2.5–2.8 × 2.8–3.5 cm, ovate, free, not adnate to

the gynostemium; apex acuminate; lateral sepals 6–6.5 × 3–3.3 cm, ovate, falcate, free from each other, apex acuminate; petals 3.3–3.5 × 0.7–0.9 cm, oblanceolate, falcate, apex acuminate; lip 5.3–5.7 × 3–3.5 cm, yellow with reddish-brown spots, elmiform, trilobed, base adnate to foot of gynostemium, margin entire, apex acute; calli 2, basal, ovoid; gynostemium ca. 2.5 × 0.9 cm, yellow with brown-reddish spots, with two basal glands; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafamaum, 22.IX.2018, fl., *R.L. Ferreira Filho 173* (MG).

*Coryanthes speciosa* occurs in French Guiana, Guyana, Peru, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Amazonas, Bahia, Espírito Santo, Mato Grosso, Pará, Paraíba, Pernambuco, Rio de Janeiro, Rio Grande do Norte and Roraima) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *Coryanthes speciosa* differs from other species by possessing two fluid glands near the base of the gynostemium. The species was found in Terra Firme Forest on phorophytes of Myrtaceae. Bees of *Euglossa* Latreille, 1802 (Hymenoptera: Apidae: Euglossina) were observed pollinating the species, which was collected with flowers in September.

**15. *Cyrtopodium virescens*** Rchb.f. & Warm., *Otia* Bot. Hamburg. 2: 89. 1881. Figs. 3h; 8f

Terrestrial, chlorophyllous, with sympodial growth. Caulomes ca. 20 × 5 cm, thickened into pseudobulbs, homoblastic, fusiform. Leaves 6, sessile, distributed along the caulome; blades 60–100 × 3.5–4.5 cm, immaculate, subcoriaceous, elliptic-lanceolate, apex acute. Inflorescence 75–113 cm long, panicle, lateral, erect, 23–45-flowers; floral bracts ca. 2.8 cm long. Flowers bisexual, resupinate, not calcarate; sepals and petals greenish-yellow with brownish spots; pedicel+ovary 1.7–2.5 cm long; dorsal sepal ca. 2 × 0.9–1 cm, oblong, apex cuneate; lateral sepals 2–2.3 × 0.9–1 cm, oblong, free from each other, apex cuneate; petals 1.7–2 × 1–1.2 cm, obovate, apex rounded; lip 1.1–1.4 × 1.4–1.7 cm, yellow-greenish with brownish spots, ovate, trilobed, adnate to the foot of the gynostemium, margin undulate, apex rounded; callus 1, basal, convex, verrucous; gynostemium 0.8–1 cm long, yellow-greenish, with brownish spots; pollinia 2. Fruits not seen.

**Examined material:** 15.VI.1989, fl., *J.B.F. da Silva 2* (MG); PA-151, km 92, vila Castanhalzinho, sítio Cafamaum, 12.X.2018, fl., *W.M. Oliveira 78* (HIFPA).

*Cyrtopodium virescens* occurs in Bolivia, Paraguay, Peru and Brazil (in the states of Goiás, Maranhão, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Pará, Tocantins and Distrito Federal) (Batista & Bianchetti 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *C. virescens* differs from other terrestrial species by possessing inflorescence as panicle of over 70 cm in height and greenish-yellow sepals, and petals and lip with brownish spots. *Cyrtopodium virescens* was found in Terra Firme Forest and in areas transformed into manioc fields. It was collected with flowers in June and October.

**16. *Dichaea brachyphylla*** Rchb.f., Ned. Kruidk. Arch. IV. 328. 1859. Figs. 3i; 8g

Epiphyte, chlorophyllous, with monopodial growth. Caulomes 4.0–6.5 × 0.15–0.2 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 11–16, sessile, distributed along the caulome; blades 2–2.2 × 0.25–0.3 cm, membranaceous, elliptic, apex acute. Inflorescence 1.1–1.4 cm long, solitary, axillary, suberect, 1-flower; floral bracts ca. 0.2 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 0.5 cm long; sepals and petals cream with purple spots; dorsal sepal ca. 0.65 × 0.2 cm, lanceolate, apex acute; lateral sepals ca. 0.7 × 0.2 cm, oval-lanceolate, subfalcate, free from each other, apex acute; petals ca. 0.6 × 0.2 cm, elliptic, apex acute; lip ca. 0.6 × 0.3 cm, cream with purple spots, anchoriform, trilobed, base adnate to foot of gynostemium, margin entire, apex apiculate; callus absent; gynostemium ca. 0.25 × 0.2 cm, white; pollinia not seen. Fruits 0.7 × 0.3 cm, ellipsoid.

**Examined material:** PA-151, km 77, 20.VIII.2019, fl. and fr., *R.L. Ferreira Filho 266* (MG).

*Dichaea brachyphylla* is restricted to Brazil, occurring in the states of Amazonas, Mato Grosso and Pará (Meneguzzo & Hall 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *D. brachyphylla* can be confused with *Dichaea picta* Rchb.f., however, it differs by having narrower (ca. 0.2 cm) and elliptic petals (*vs.* petals ca. 0.3 cm and ovate). *Dichaea brachyphylla* was found in Campinarana, growing on *Oenocarpus bacaba* Mart. (bacabeira) about 60 cm above the ground in an area close to a stream. It was collected with flowers and fruits in August.

**17. *Dichaea picta*** Rchb.f., Refug. Bot. [Saunders] t. 84. 1872[1869]. Figs. 3j; 8h

Epiphyte, chlorophyllous, with monopodial growth. Caulomes 4.0–6.5 × ca. 0.2 cm, not thickened into pseudobulbs, not modified into



ramicaules, cylindrical. Leaves 11–19, sessile, distributed along the caulome; blades 1.2–1.9 × 0.2–0.3 cm, membranaceous, elliptic, apex acute. Inflorescence ca. 1.2 cm long, solitary, axillary, suberect, 1-flower; floral bracts 0.2–0.25 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 0.2 cm long; sepals and petals white with irregular purple spots; dorsal sepal ca. 0.5 × 0.3 cm, oblanceolate, apex acute; lateral sepals ca. 0.7 × 0.3 cm, ovate, subfalcate, free from each other, apex acute; petals ca. 0.5 × 0.3 cm, ovate, apex acute; lip ca. 0.6 × 0.6 cm, white with irregular purple spots, anchoriform, trilobed, adnate to foot of gynostemium, margin entire, apex acute; callus absent; gynostemium ca. 0.3 × 0.2 cm, white with purple spots; pollinia 4. Fruits not seen. **Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 26.I.2019, fl., *R.L. Ferreira Filho 216* (MG).

*Dichaea picta* occurs in Bolivia, Colombia, Ecuador, French Guiana, Guyana, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Amazonas, Pará and Mato Grosso) (Silva *et al.* 1995; Meneguzzo & Hall 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *Dichaea picta* can be confused with *Dichaea brachyphylla* due to similar vegetative morphology but differs because it has wider (ca. 0.3 cm) and ovate petals (*vs.* petals ca. 0.2 cm and elliptic). The species was found in Terra Firme Forest on angiosperm phorophytes, about one to six meters above the ground. It was collected with flowers in January.

**18. *Dimerandra emarginata*** (G.Mey.) Hoehne, Bol. Agric. (Sao Paulo) 34: 618. 1934.

Figs. 3k; 8i

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 13–39 × 0.3–0.5 cm, thickened into pseudobulbs, homoblastic, cylindrical. Leaves 6, sessile, distributed along the caulome; blades 5–12.5 × 0.7–1 cm, coriaceous, lanceolate, apex emarginate-asymmetrical. Inflorescence 0.7–1.2 cm long, raceme, terminal, suberect, 1–3-flowers; floral bracts ca. 0.4 long. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary 3.5–3.6 cm long; sepals and petals pink; dorsal sepal 1.6–1.8 × 0.6–0.7 cm, lanceolate, apex acute; lateral sepals 1.5–1.7 × 0.6–0.7 cm, lanceolate, falcate, free from each other, apex acute; petals 1.6–1.8 × 0.8–1 cm, obovate, apex acute; lip 1.6–1.8 × 1.2–1.3 cm, pink, whitish-yellow at the base, obovate, entire, adnate to foot of gynostemium, margin entire, apex acuminate; callus 2, basal, parallel, suborbicular;

gynostemium 0.6–0.7 × ca. 0.3 cm, with two wings at the apex, forming a pink crest; pollinia 4. Fruits 2.5–3 × 0.3–0.85 cm, ellipsoid.

**Examined material:** zona urbana, praça Sarges Barros, 4.VII.2019, fl., *R.L. Ferreira Filho 243* (MG); praça Padre Henrique, 4.VII.2019, fl. and fr., *R.L. Ferreira Filho 249* (HCP, MG); rio Anapú, ilha Samaúma, sítio do Marcelo, 15.XII.2019, fr., *R.L. Ferreira Filho 285* (HCP, MG).

*Dimerandra emarginata* occurs from Mexico to Brazil (in the states of Alagoas, Amapá, Amazonas, Bahia, Ceará, Espírito Santo, Maranhão, Pará, Paraíba, Pernambuco, Roraima and Sergipe) (van den Berg 2020a; Govaerts *et al.* 2021). In Igarapé-Miri, *Dimerandra emarginata* differs from other orchid species in the area by possessing a pinkish, entire, obovate lip with a whitish-yellow base and suborbicular calli close to the base. The species was found in Terra Firme Forest and Várzea Forest on *Mangifera indica* L. (*mangueira*, mango tree), in places close to water courses. It was collected with flowers in July and with fruits in July and December.

**19. *Epidendrum amapense*** Hágsater & L.Sánchez, Icon. Orchid. 2: 105. 1993. Fig. 9a

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 11–14.5 × 0.18–0.2 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical, not branched. Leaves 4–7, sessile, distributed along the caulome; blades 3.3–6.5 × 0.8–1.5 cm, coriaceous, oblong, apex obtuse. Inflorescence 1–1.5 cm long, raceme, terminal, suberect, 1–5-flowers; floral bracts ca. 0.4 cm long. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary ca. 0.7 cm long; dorsal sepal ca. 1.6 × 0.3 cm, oblong-obovate, apex acute; sepals and petals green; lateral sepals 1.6–1.7 × ca. 0.3 cm, oblong-obovate, free from each other, apex acute; petals 1.6–1.7 × 0.1–0.15 cm, linear, apex acute; lip 0.6–0.7 × ca. 0.8 cm, green, ovate, entire, adnate to apex of gynostemium, margin entire, apex rounded; calli 2, basal, parallel, deltoid; gynostemium 1–1.1 × ca. 0.3 cm, green; pollinia not seen. Fruits 2.3–2.5 × 0.5–0.8 cm, ellipsoid.

**Examined material:** zona rural, PA-151, km 77, 18.V.2019, fr., *R.L. Ferreira Filho 233* (MG).

**Additional examined material:** BRAZIL. PARÁ: Castanhal, rio Apeú, 15.V.1993, fl., *M.F. da Silva 39* (MG).

*Epidendrum amapaense* occurs in French Guiana and Brazil, where it is found in the states of Amapá and Pará (Pessoa 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *Epidendrum amapaense*

can be confused with *Epidendrum rigidum* but differs by possessing inflorescences that are up to 1.5 cm long and larger floral pieces (sepals, petals and lip) (*vs.* inflorescence 7–8 cm long and smaller floral pieces). *Epidendrum amapaense* was found in Campinarana on angiosperm phorophytes, at about three meters above the ground. It was collected with fruits in May.

**20. *Epidendrum carpophorum*** Barb.Rodr., Gen. Sp. Orchid. ii. 148. 1882. Figs. 3l; 9b

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 9–10 × 0.2–0.3 cm, not thickened into pseudobulbs, not modified into ramicaules, laterally flattened, not branched. Leaves 2–5, sessile, distributed along the caulome; blades 10–11 × 3.5–3.6 cm, coriaceous, elliptic, apex emarginate. Inflorescence ca. 0.5 cm long, raceme, terminal, suberect, 1-flower; floral bracts 0.2–0.4 cm long. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary 6–6.5 cm long; sepals and petals cream-brownish, apex acute; dorsal sepal 4.3–4.5 × 0.3–0.4 cm, linear-lanceolate; lateral sepals 4.4–4.6 × 0.5–0.6 cm, elliptic-lanceolate, subfalcate, free from each other; petals 4.1–4.3 × 0.2–0.25 cm, linear; lip 4–4.1 × 2–2.4 cm, white, ovate, trilobed, adnate to apex of gynostemium, margin entire, apex obtuse; calli 2, basal, triangular; gynostemium 1.9–2 × 0.4–0.5 cm, white, with two wings at the apex; pollinia 4. Fruits 4–4.7 × 1–1.2 cm, ellipsoid.

**Examined material:** PA-151, km 92, zona rural, vila Castanhalzinho, sítio Cafarnaum, 16.XI.2018, fl., *W.M. Oliveira* 9 (HIFPA); 27.VII.2019, fr., *R.L. Ferreira Filho* 259 (MG).

*Epidendrum carpophorum* occurs in Bolivia, Colombia, Guyana, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Alagoas, Amazonas, Amapá, Bahia, Ceará, Espírito Santo, Mato Grosso, Minas Gerais, Pará, Paraíba, Pernambuco, Rio de Janeiro, Rondônia, Roraima, São Paulo and Sergipe) (Pessoa 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *E. carpophorum* may be confused with *Epidendrum nocturnum* Jacq., from which it differs by possessing a cylindrical caulome, pedicel+ovary 6.0–6.5 long and elliptic-lanceolate lateral sepals (*vs.* laterally flattened caulome, pedicel+ovary ca. 5.5 cm long, and linear lateral sepals). *Epidendrum carpophorum* was found in Terra Firme Forest growing on angiosperms, about 6 to 10 meters above ground level. It was collected with flowers in November and with fruits in July.

**21. *Epidendrum flexuosum*** G.Mey., Prim. Fl. Esseq. 260. 1818. Fig. 9c

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 32–50 × 0.4 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical, not branched. Leaves 6–8, sessile, distributed along the caulome; blades 8.5–16.5 × 0.8–1.4 cm, coriaceous, oblong to linear-lanceolate, apex obtuse. Inflorescence 7–9 cm long, raceme, terminal, erect, 6–8-flowers; floral bracts 0.6–1 cm long. Flowers bisexual, non-resupinate, not calcarate, pedicel+ovary 3–3.4 cm long; sepals and petals pinkish; dorsal sepal 1.4–1.6 × 0.4–0.5 cm, oblanceolate, apex acuminate to long acuminate; lateral sepals 1.5 × 0.6–0.7 cm, elliptic, falcate, free from each other, apex acuminate to long acuminate; petals 1.6–1.7 × ca. 0.4 cm, obovate, apex acute; lip 0.4–0.5 × 0.5–0.6 cm, pinkish, deltoid, trilobed, adnate to apex of gynostemium, margin denticulate, apex acute; calli 2, basal, ovoid, and a central keel extending to the apex; gynostemium 1–1.1 × ca. 0.3 cm, pinkish, with two wings at apex; pollinia 4. Fruits not seen.

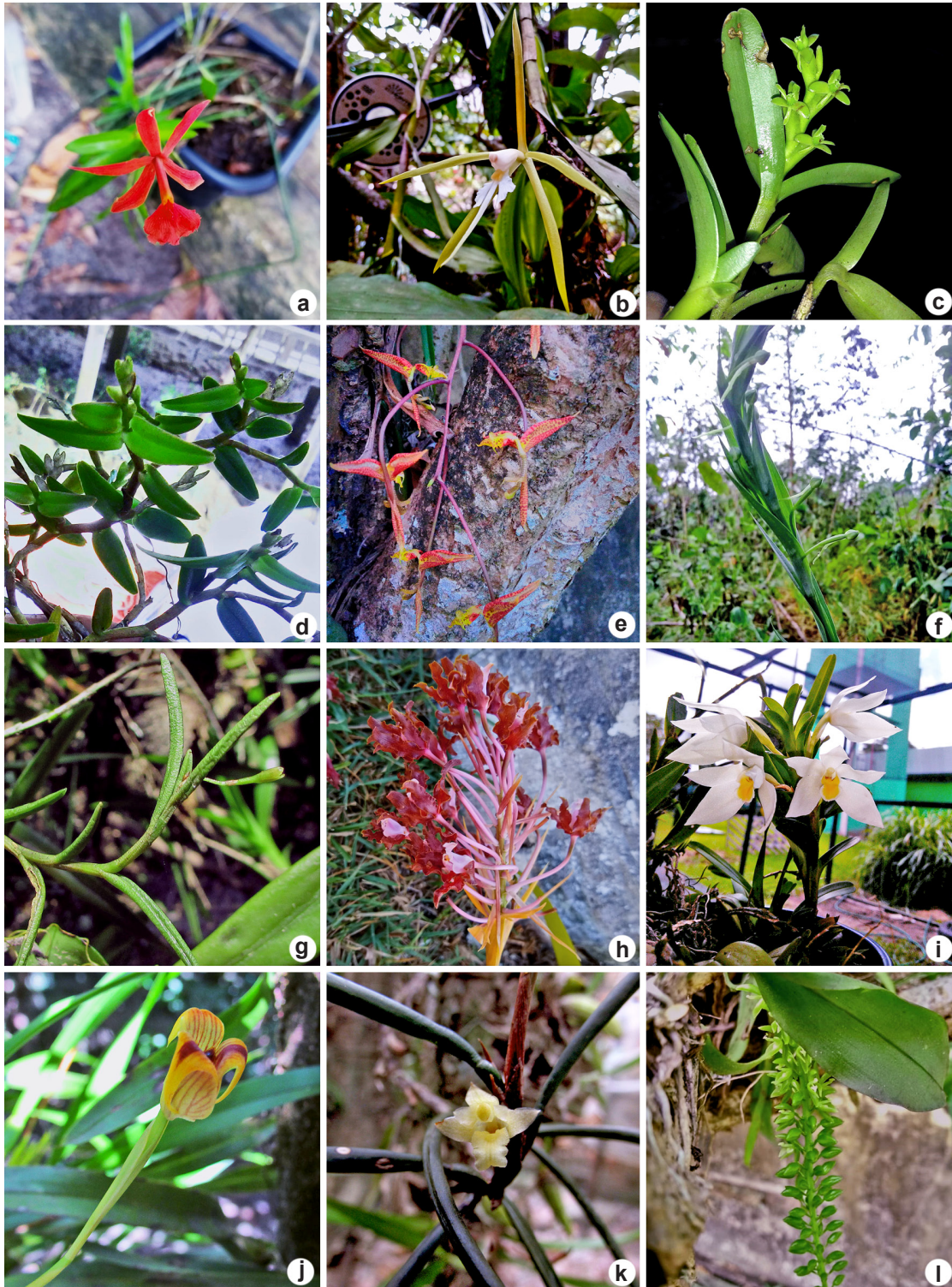
**Examined material:** PA-151, km 92, zona rural, vila Castanhalzinho, sítio Cafarnaum, 11.X.2018, fl., *W.M. Oliveira* 112 (HIFPA).

*Epidendrum flexuosum* is widely distributed throughout the Americas, occurring from Mexico to Bolivia, including Brazil (in the states of Acre, Alagoas, Amapá, Amazonas, Bahia, Espírito Santo, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraíba, Pernambuco, Rio de Janeiro, Rio Grande do Norte, Rondônia, Roraima and Tocantins) (Pessoa 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *E. flexuosum* may be confused with *Epidendrum macrocarpum* Rich. but differs from it by possessing pink sepals and petals and a smaller and narrower lip, measuring 0.4–0.5 × 0.5–0.6 cm (*vs.* red sepals and petals and labellum ca. 1 × 2 cm). The species was found in Terra Firme Forest on *Theobroma cacao* L. (cacaueiro, cacao tree), at about 5 meters above the ground. It was collected with flowers in October.

**22. *Epidendrum macrocarpum*** Rich., Actes Soc. Hist. Nat. Paris 1(1): 112. 1792. Figs. 4a; 9d

Epiphyte, chlorophyllous, with sympodial growth. Caulomes ca. 31 × 0.4 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical, not branched. Leaves 9, sessile, distributed along the caulome; blades 4–10 × 0.6–1.4 cm, coriaceous, long-linear, apex rounded. Inflorescence ca. 6.5 cm long, raceme, terminal,





**Figure 4** – a-l. Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Epidendrum macrocarpum*; b. *Epidendrum nocturnum*; c. *Epidendrum rigidum*; d. *Epidendrum strobiliferum*; e. *Gongora pleiochroma*; f. *Habenaria longipedicellata*; g. *Jacqiniella globosa*; h. *Laelia gloriosa*; i. *Maxillaria lutescens*; j. *Maxillaria subrepens*; k. *Maxillaria uncata*; l. *Notylia microchila*. Photographs: b-d,e,g,i-k. Ricardo Leite Ferreira Filho; a,f,h,l. Wagner Martins Oliveira.



erect, 1-flower; floral bracts ca. 0.2 cm long. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary ca. 3.5 cm long; sepals and petals red; dorsal sepal ca.  $1.8 \times 0.5$  cm, narrow-elliptic, apex acute; lateral sepals ca.  $1.8 \times 0.5$ –0.6 cm, obovate, falcate, free from each other, apex acute; petals  $1.8$ – $1.9 \times$  ca. 0.5 cm, narrow-elliptic, apex acute; lip ca.  $1 \times 2$  cm, red, wide-elliptic, slightly trilobed, adnate to apex of gynostemium, margin dentate, apex rounded; callus 1, keel-like, extending to the apex; gynostemium ca.  $1 \times 0.4$  cm, red, yellowish at the apex. Fruits not seen.

**Examined material:** Sítio Cafarnaum, 25.VIII.2019, fl., *W.M. Oliveira 154* (HIFPA).

*Epidendrum macrocarpum* occurs in Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Alagoas, Amazonas, Amapá, Bahia, Maranhão, Mato Grosso, Pará, Paraíba, Pernambuco, Rio de Janeiro and Roraima) (Pessoa 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *E. macrocarpum* is close to *E. flexuosum*, differing from it by possessing red sepals and petals and a longer and wider lip of ca.  $1 \times 2$  cm (*vs.* pink sepals and petals and lip of  $0.4$ – $0.5 \times 0.5$ – $0.6$  cm). The species was found in Terra Firme Forest and was collected with flowers in August.

**23. *Epidendrum nocturnum*** Jacq., Enum. Syst. Pl. 29. 1760. Figs. 4b; 9e

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $28$ – $41.5 \times 0.3$ – $0.5$  cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical, not branched. Leaves 7, sessile, distributed along the caulome; blades  $8.5$ – $11.5 \times 2$ – $3.5$  cm, coriaceous, elliptic, apex acute. Inflorescence  $4.5$ – $6$  cm long, raceme, terminal, pendant or suberect, 1–2-flowers; floral bracts ca. 0.6 cm long. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary ca.  $5.5 \times 0.3$  cm; sepals and petals cream-greenish, apex acute; dorsal sepal  $4.3$ – $4.5 \times 0.5$ – $0.6$  cm, linear-lanceolate; lateral sepals  $4$ – $4.3 \times 0.5$  cm, linear, free from each other; petals  $4$ – $4.2 \times 0.2$ – $0.3$  cm, linear; lip  $2.7$ – $3 \times 1.1$ – $2$  cm, white, ovate, trilobed, adnate to the apex of the gynostemium, margin entire, apex acute; calli 2, basal, rectangular; gynostemium  $1.7$ – $1.9 \times 0.4$ – $0.6$  cm, white, with two wings at the apex; pollinia 4. Fruits  $4$ – $5 \times 1$ – $1.5$  cm, ellipsoid.

**Examined material:** PA-151, km 77, ramal Mocajateua, sítio do Seu Antônio Pimentel, 6.IV.2018, fl., *R.L. Ferreira Filho 224* (MG); zona urbana, praça Sarges Barros, 4.VII.2019, fl. and fr., *R.L. Ferreira Filho 241* (HCP, MG).

*Epidendrum nocturnum* occurs in South Florida, Mexico and Tropical America, including Brazil, where it is found in almost the entire territory, except in the states of Piauí, Rio Grande do Norte and Rio Grande do Sul (Pessoa 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *E. nocturnum* can be confused with *E. carpophorum* but differs by possessing a smaller pedicel+ovary of ca. 5.5 cm long, and linear lateral sepals (*vs.* pedicel+ovary 6.0–6.5 cm long and elliptic-lanceolate lateral sepals). The species was found in Terra Firme Forest and Várzea Forest and was collected with flowers in April and July and with fruits in July.

**24. *Epidendrum rigidum*** Jacq., Enum. Syst. Pl. 29. 1760. Figs. 4c; 9f

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $10$ – $19.5 \times 0.2$ – $0.3$  cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical, not branched. Leaves 10–12, sessile, distributed along the caulome; blades  $4$ – $7 \times 1$ – $1.6$  cm, coriaceous, oblong to oblong-elliptic, apex emarginate. Inflorescence  $7$ – $8$  cm long, raceme, terminal, erect, 4–6-flowers; floral bracts ca. 1.1 cm long. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary ca. 0.72 cm long; sepals and petals green, apex acute; dorsal sepal ca.  $0.4 \times 0.2$  cm, elliptic; lateral sepals  $0.4$ – $0.45 \times$  ca. 0.3 cm, oblong-ovate, free from each other; petals ca.  $0.4 \times 0.1$  cm, linear; lip ca.  $0.27 \times 0.28$  cm, green, deltoid, entire, adnate to apex of gynostemium, margin entire, apex cuspidate; calli 2, basal, parallel, oblongoid; gynostemium ca.  $0.3 \times 0.2$  cm, green, with two wings at the apex; pollinia 4. Fruits ca.  $1.5 \times 0.5$  cm, obovoid.

**Examined material:** zona urbana, praça Sarges Barros, 4.VII.2019, fl. and fr., *R.L. Ferreira Filho 246* (HCP, HIFPA, MG).

*Epidendrum rigidum* is widely distributed in the Neotropics, including Brazil, where it occurs in almost the entire territory, except in the states of Piauí, Rio Grande do Norte and Distrito Federal (Pessoa 2020b; Govaerts *et al.* 2021). In Igarapé Miri, *E. rigidum* can be confused with *E. amapense* but differs by possessing an inflorescence of 7–8 cm long and smaller floral pieces (sepals, petals and lip) (*vs.* inflorescence up to 1.5 cm long and larger floral pieces). *Epidendrum rigidum* was found in squares and in Várzea Forest, growing on *Mangifera indica* and *Spondias mombin* L. (*taperebazeiro*). It was collected with flowers and fruits in July.

**25. *Epidendrum strobiliferum*** Rchb.f., Ned. Kruidk. Arch. 4: 333. 1859. Figs. 4d; 9g

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 13–29 × 0.15–0.3 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical, branched. Leaves 5–29, sessile, distributed along the caulome; blades 1.2–3 × 0.3–0.7 cm, coriaceous, elliptic, apex retuse. Inflorescence 1–2.5 cm long, raceme, terminal, erect, 2–6-flowers; floral bracts 0.6–0.7 cm long. Flowers non-resupinate, not calcarate, pedicel+ovary ca. 0.2 cm long, ovary with a vesicle; sepals and petals cream-greenish; dorsal sepal ca. 0.3 × 0.2 cm, elliptic, apex acuminate; lateral sepals ca. 0.3 × 0.2 cm, oblanceolate, free from each other, apex acute; petals 0.2–0.3 × ca. 0.1 cm, linear or spatulate, apex truncate; lip ca. 0.3 × 0.2 cm, cream, ovate, entire, adnate to apex of gynostemium, margin entire, apex acute; calli 2, basal, parallel, ovoid; gynostemium ca. 0.1 × 0.08 cm, white; pollinia 4. Fruits 0.2 × 0.1 cm, ovoid. **Examined material:** zona urbana, praça Sarges Barros, 4.VII.2019, fl. and fr., *R.L. Ferreira Filho 242* (HCP, MG); praça Padre Henrique, 4.VII.2019, fl., *R.L. Ferreira Filho 248* (MG).

*Epidendrum strobiliferum* occurs from Florida to Bolivia, including Brazil, where it is found in almost the entire territory, except in the states of Paraíba, Piauí, Rio Grande do Norte, Tocantins and Distrito Federal (Pessoa 2020b; Govaerts *et al.* 2021). *Epidendrum strobiliferum* differs from the other species of *Epidendrum* that occur in Igarapé-Miri by possessing a branched caulome and an inflated ovary forming a vesicle. The species was found occurring on *Mangifera indica* in a square in the center of the city and was collected with flowers and fruits in July.

**26. *Gongora pleiochroma*** Rchb.f., in Hamb. Gartenz. XVI. 421. 1860. Figs. 4e; 9h

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 5–6.5 × 1.6–2 cm, thickened into pseudobulbs, heteroblastic, ovoid. Leaves 2, sessile, apical; blades 27–31 × 4.5–7 cm, subcoriaceous, elliptic, apex acuminate. Inflorescence 45–59 cm long, raceme, lateral, pendant, 8–12-flowers; floral bracts ca. 0.5 cm long. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary 5.5–6 × ca. 0.13 cm; sepals and petals yellow with reddish-brown spots, apex acute; dorsal sepal ca. 2 × 0.8 cm, elliptic to lanceolate, partially adnate to the dorsum of the gynostemium; lateral sepals

2.3–2.4 × 1.3–1.5 cm, ovate, subfalcate, free from each other, articulate with the dorsum of the gynostemium; petals ca. 1.1 × 0.2 cm, elliptic to lanceolate, falcate, partially adnate to dorsum of gynostemium; lip ca. 1.6 × 1–1.1 cm, yellow with brown-reddish spots, lanceolate, trilobed, adnate to foot of gynostemium, margin entire, apex acuminate; callus 1, at the middle portion, trapeziform; gynostemium ca. 2.5 × 0.5 cm, yellow with brown-reddish spots; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, zona rural, vila Castanhalzinho, sítio Cafarnaum, 11.X.2018, fl., *R.L. Ferreira Filho 156* (HCP, MG).

*Gongora pleiochroma* occurs in Colombia, Ecuador, French Guiana, Guyana, Peru, Venezuela and Brazil, where it is restricted to the state of Pará (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *G. pleiochroma* can be easily recognized by possessing flowers with dorsal sepals and petals partially fused to the dorsum of the gynostemium and lateral sepals articulated with the dorsum of the gynostemium. The species was found in Terra Firme Forest growing on angiosperm phorophytes at about 8 meters above ground level. It was collected with flowers in October.

**27. *Habenaria longipedicellata*** Hoehne, Bot. Jahrb. Syst. 68(2-3): 133, pl. 19. 1937.

Figs. 4f; 9i

Terrestrial, chlorophyllous, with monopodial growth. Caulomes 34–64 × 0.3–0.4 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 7–10, sessile, distributed along the caulome; blades 9–6.5 × 0.6–1.3 cm, membranaceous, lanceolate, apex acute. Inflorescence 8–11.5 cm long, raceme, terminal, erect, 9–12-flowers; floral bracts ca. 2 cm long. Flowers bisexual, resupinate, calcarate; pedicel+ovary 2,7–3 × ca. 0.3 cm; sepals and petals green; dorsal sepal ca. 0.5 × 0.4 cm, ovate, apex obtuse; lateral sepals 0.5–0.6 × 0.25–0.3 cm, elliptic, falcate, free from each other, apex cuneate; petals 0.45–0.5 × ca. 0.3 cm, elliptic, falcate, bifid, apex cuneate; lip ca. 0.9 × 0.4 cm, trident form, green, trilobed, adnate to foot of gynostemium, margin entire, apex cuneate; callus absent; gynostemium ca. 0.3 × 0.2 cm, green; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, zona rural, vila Castanhalzinho, sítio Cafarnaum, 21.IV.2019, fl., *W.M. Oliveira 128* (HCP, HIFPA, MG).

*Habenaria longipedicellata* occurs in Colombia, French Guiana, Guyana and Brazil (in the states of Amazonas, Amapá, Bahia, Goiás, Minas Gerais, Pará and Distrito Federal) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *H. longipedicellata* can be easily recognized by possessing flowers with bifid petals and a trident-shaped labellum. The species was found in Terra Firme Forest, in an open area, on the margins of a secondary road, close to a water course. It was collected with flowers in April.

**28. *Jacquinella globosa*** (Jacq.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 124. 1920.

Figs. 4g; 10a

Epiphyte, chlorophyllous, with sympodial growth. Caulomes ca.  $8 \times 0.15$  cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 8, sessile, distributed along the caulome; blades  $1.1\text{--}2 \times 0.12\text{--}0.16$  cm, fleshy, linear to subcylindrical, apex obtuse. Inflorescence ca. 0.5 cm long, raceme, terminal, suberect, 1-flower; floral bracts ca. 0.13 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca.  $0.3 \times 0.1$  cm; sepals and petals green-yellowish; dorsal sepal ca.  $0.25 \times 0.11$  cm, ovate, apex acute; lateral sepals ca.  $0.3 \times 0.11\text{--}0.12$  cm, elliptic, free from each other, apex acute; petals  $0.18\text{--}0.2 \times 0.08\text{--}0.1$  cm, elliptic, apex obtuse; lip ca.  $0.25 \times 0.18$  cm, yellow, obovate, trilobed, adnate to base of gynostemium, margin entire, apex obtuse; callus 1, basal, trapeziform; gynostemium ca.  $0.12 \times 0.08$  cm, light green, purplish at the apex, two-winged; pollinia 4. Fruits not seen.

**Examined material:** PA-151, km 92, zona rural, vila Castanhalzinho, sítio Cafarnaum, 11.X.2018, fl. cult., 14.XI.2019, R.L. Ferreira Filho 178 (MG).

*Jacquinella globosa* occurs from Mexico to América Tropical, including Brazil (in the states of Alagoas, Amazonas, Bahia, Ceará, Espírito Santo, Pará, Paraná, Pernambuco, Rio de Janeiro, Roraima, Santa Catarina, São Paulo and Sergipe) (van den Berg 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *J. globosa* differs from other species in the area by possessing linear to subcylindrical coriaceous leaves. The species was found in Terra Firme Forest on the canopy of angiosperms phorophytes. The species bloomed in November under cultivation.

**29. *Laelia gloriosa*** (Rchb.f.) L.O. Williams, Darwiniana 5: 76. 1941. Figs. 4h; 10b

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $10\text{--}11 \times 3.5\text{--}3.8$  cm, thickened

into pseudobulbs, heteroblastic, fusiform. Leaves 2, sessile, apical; blades  $21.5\text{--}24 \times 5\text{--}6$  cm, coriaceous, elliptic, apex acute. Inflorescence 80–95 cm long, raceme, terminal, erect, 24–35-flowers; floral bracts 4.3–5 cm long, narrow-lanceolate, apex acute. Flowers bisexual, resupinate, not calcarate; pedicel+ovary  $2.5\text{--}6.1 \times$  ca. 0.2 cm; sepals and petals yellowish-brown, elliptic to oblong; dorsal sepal ca.  $2 \times 0.6$  cm, apex rounded; lateral sepals  $1.8\text{--}1.9 \times$  ca. 0.6 cm, free from each other, apex obtuse; petals ca.  $1.8 \times 0.5$  cm, apex acute; lip ca.  $1.5 \times 1.1$  cm, pink-whitish, ovate, trilobed, adnate to foot of gynostemium, margin undulate, apex acute; calli 5, central, parallel, keel-like; gynostemium  $1.1\text{--}1.2 \times$  ca. 0.4 cm, pink-whitish, winged at the lateral; pollinia 8. Fruits not seen.

**Examined material:** zona urbana, praça Sarges Barros, 8.X.2019, fl., R.L. Ferreira Filho 270 (HCP, MG, HIFPA).

*Laelia gloriosa* occurs in Ecuador, Guyana, Suriname, Venezuela and Brazil (in the states of Amazonas, Amapá, Bahia, Ceará, Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Pará, Paraná, Pernambuco, Rondônia, Roraima, Rio de Janeiro, São Paulo, Tocantins and Distrito Federal) (van den Berg 2020c; Govaerts *et al.* 2021). In Igarapé-Miri, *L. gloriosa* differs from the other epiphytic species by possessing an inflorescence of 80–95 cm long, with flowers arranged only at the apex of the inflorescence. *Laelia gloriosa* was found in a square in the center of the city, occurring on *Archontophoenix cunninghamiana* H.Wendl. & Drude (*palmeira real*, royal palm) and *Mangifera indica*. It was seen with flowers in August, September and October.

**30. *Maxillaria lutescens*** Scheidw., Allg. Gartenzeitung 7: 145. 1839. Figs. 4i; 10c

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $5\text{--}7 \times 1\text{--}1.6$  cm, thickened into pseudobulbs, heteroblastic, elliptic, laterally compressed. Leaves 2, sessile, apical; blades  $6\text{--}27 \times 1\text{--}1.6$  cm, membranaceous, linear, apex emarginate-asymmetrical. Inflorescence 7–9.5 cm long, raceme, lateral, suberect, 2–3-flowers; floral bracts 0.8–1 cm long. Flowers bisexual, resupinate, not calcarate, pedicel+ovary ca. 1.2 cm long; sepals and petals white, elliptic, apex cuneate; dorsal sepal ca.  $2.7 \times 1.2$  cm; lateral sepals ca.  $2.6 \times 1.3$  cm, free from each other; petals  $2.3\text{--}2.4 \times$  ca. 0.7 cm; lip ca.  $1.4 \times 1.3$  cm, yellow with brown spots, obovate, trilobed, adnate to foot of gynostemium, margin white, entire, apex rounded; callus absent;



gynostemium ca.  $0.7 \times 0.3$  cm, white; pollinia 2. Fruits  $2.4\text{--}2.7 \times 0.5\text{--}1.1$  cm, obovoid.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 12.X.2018, fr., R.L. Ferreira Filho 271 (MG).

**Additional examined material:** BRAZIL. PARÁ: Abaetetuba, zona urbana, Centro de Formação Profissional Laranjal, 16.II.2012, fl., E.A.L. Afonso 9a (HIFPA); Rio Abaeté, 21.IV.2018, fl., J.B. Cardoso 60 (HIFPA).

*Maxillaria lutescens* is widely distributed in the Neotropics, including Brazil, where it is found in the states of Acre, Amazonas, Amapá, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso, Minas Gerais, Pará, Pernambuco, Rio de Janeiro, Rondônia, Roraima, São Paulo and Distrito Federal (Meneguzzo *et al.* 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *M. lutescens* differs from the other species by possessing white flowers and a yellow labellum with brown spots and a white margin. The species was found in Várzea Forest and Terra Firme Forest, growing on *Spondias mombin* and *Dinizia excelsa* Ducke (*angelim vermelho*). It was collected with fruits in October.

**31. *Maxillaria subrepens*** (Rolfe) Schuit. & M.W.Chase, Phytotaxa 225(1): 73. 2015.

Figs. 4j; 10d

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $2.4\text{--}4 \times 1\text{--}1.5$  cm, thickened into pseudobulbs, heteroblastic, ovoid. Leaf 1, sessile, apical; blade  $13.5\text{--}29.5 \times 0.8\text{--}1.2$  cm, coriaceous, linear, apex acuminate. Inflorescence  $7.3\text{--}10$  cm long, solitary, lateral, suberect to erect, 1-flower; floral bracts  $2.4\text{--}2.6$  cm long. Flowers bisexual, non-resupinate, not calcarate, chalice-shaped; pedicel+ovary  $1.9\text{--}2.5 \times \text{ca. } 0.1$  cm; sepals and petals reddish-orange with brown stripes; dorsal sepal  $2.1\text{--}2.3 \times \text{ca. } 0.5$  cm, lanceolate, apex acuminate; lateral sepals  $2.1\text{--}2.4 \times 0.6\text{--}0.9$  cm, lanceolate, free from each other, apex acuminate; petals  $0.9\text{--}1 \times 0.2\text{--}0.3$  cm, linear, apex cuneate; lip  $0.4\text{--}0.6 \times \text{ca. } 0.2$  cm, yellowish-brown, lanceolate, trilobed, adnate to foot of gynostemium, margin entire, apex acute; callus 1, basal, obovoid; gynostemium ca.  $0.3 \times 0.1$  cm, orange; pollinia 4. Fruits not seen.

**Examined material:** distrito de Anapú, região das ilhas, sítio do Duca, 20.X.2018, fl. cult., V.2019, R.L. Ferreira Filho 197 (MG); PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 17.XI.2018, fl. cult., VI.2019, R.L. Ferreira Filho 212 (MG).

*Maxillaria subrepens* occurs in Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela and Brazil (in the states of

Acre, Amazonas, Amapá, Bahia, Espírito Santo, Minas Gerais, Pará, Rio de Janeiro and Rondônia) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *Maxillaria subrepens* differs from the other orchid species by possessing chalice-shaped flowers with reddish-orange sepals and petals with brown stripes. The species was found in Terra Firme Forest and Várzea Forest on *Dinizia excelsa* and *Spondias mombin*. The species bloomed in May and June under cultivation.

**32. *Maxillaria uncata*** Lindl., Edwards's Bot. Reg. 23: sub t. 1986. 1837. Figs. 4k; 10e

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $0.4\text{--}1 \times 0.1\text{--}0.3$  cm, thickened into pseudobulbs, heteroblastic, cylindrical. Leaf 1, sessile, apical; blade  $2.5\text{--}7 \times 0.2\text{--}0.4$  cm, coriaceous, linear-lanceolate, apex acute. Inflorescence  $0.7\text{--}1$  cm long, fascicle, lateral, suberect, 1-flower; floral bracts  $0.6\text{--}0.7$  cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary  $1.1\text{--}1.3$  cm long; sepals and petals cream; dorsal sepal  $0.7\text{--}0.8 \times \text{ca. } 0.3$  cm, oblong, apex obtuse; lateral sepals  $1.1\text{--}1.2 \times \text{ca. } 0.4$  cm, lanceolate, apex acute; petals  $0.8\text{--}0.9 \times \text{ca. } 0.3$  cm, oblanceolate, apex acute; lip  $1.1\text{--}1.3 \times 0.3\text{--}0.4$  cm, cream, oblong-ligulate, entire, adnate to foot of gynostemium, margin entire, apex subacute; callus 1, at the middle portion, oblongoid; gynostemium  $0.9\text{--}1$  cm long, cream; pollinia 4. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 17.XI.2018, fl., R.L. Ferreira Filho 209 (MG); distrito de Anapú, região das ilhas, ilha Samaúma, sítio do Isaque Gomes Miranda, 16.XII.2019, fl., R.L. Ferreira Filho 290 (MG).

*Maxillaria uncata* occurs in Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela and Brazil (in the states of Amazonas, Amapá, Maranhão, Mato Grosso, Pará and Roraima) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *M. uncata* is easily identified by possessing cylindrical pseudobulbs with a linear-lanceolate leaf. The species was found in Terra Firme Forest and Várzea Forest, growing on *Dinizia excelsa*. It was observed with flowers in November and December.

**33. *Notylia microchila*** Cogn. in C.F.P.von Martius & auct. suc. (eds.), Fl. Bras. 3(6): 123. 1904.

Figs. 4l; 10f

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $1\text{--}1.8 \times 0.3\text{--}0.5$  cm, thickened

into pseudobulbs, heteroblastic, elliptic, laterally compressed. Leaf 1, sessile, apical; blade 5.5–11.2 × 1.8–3 cm, coriaceous, linear, apex obtuse. Inflorescence 6–11.5 cm long, raceme, lateral, pendant, 15–30-flowers; floral bracts 0.2–0.3 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 0.3–0.4 × ca. 0.1 cm; sepals and petals yellow-greenish; dorsal sepal ca. 0.5 × 0.18 cm, elliptic, apex rounded; lateral sepals ca. 0.5 × 0.2 cm, elliptic, adnate up to the apex, apex rounded; petals 0.4–0.45 × 0.08–0.1 cm, oblanceolate, slightly falcate, apex rounded; lip 0.25–0.3 × 0.11–0.15 cm, white, sagittate, entire, adnate to foot of gynostemium, margin entire, apex acute; callus 1, basal, keel-like; gynostemium ca. 0.35 × 0.1 cm, greenish-white, cylindrical; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, Sítio Cafarnaum, 17.IX.2018, fl., *R.L. Ferreira Filho 199* (HCP, HIFPA, MG).

*Notylia microchila* occurs in Ecuador, French Guiana, Guyana, Peru, Venezuela and Brazil (in the states of Bahia, Espírito Santo, Mato Grosso, Pará and Pernambuco) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). It is assessed as Endangered in Brazil (Flora do Brasil 2020, continuously updated). In Igarapé-Miri, *N. microchila* is easily recognized by the distinct morphology of its flowers, as the lateral sepals are adnate up to the apex and the lip is sagittate. The species was found in Terra Firme Forest and was observed vegetating about 8 meters high on an angiosperm phorophyte. It was collected with flowers in September.

**34. *Octomeria grandiflora*** Lindl., Edwards's Bot. Reg. 28(Misc.): 64. 1842. Figs. 5a; 10g

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 3–6.7 × 0.1–0.2 cm, not thickened into pseudobulbs, modified into ramicaules, laterally flattened. Leaf 1, sessile, apical; blade 5.3–10.2 × 0.5–1.5 cm, coriaceous, lanceolate, apex acute. Inflorescence ca. 0.4 cm long, fascicle, terminal, suberect, 1–4-flowers; floral bracts ca. 0.3 cm long, oblong, apex cuneate. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary ca. 0.3 cm long; sepals and petals yellowish-white, apex acute; dorsal sepal ca. 0.6 × 0.2 cm, lanceolate; lateral sepals ca. 0.7 × 0.3 cm, lanceolate; petals ca. 0.7 × 0.2 cm, ovate; lip ca. 0.5 × 0.3 cm, yellow, vinaceous at the base, elliptic, trilobed, adnate to foot of gynostemium, margin undulate, apex retuse; calli 2, at the middle portion,

parallel, keel-like; gynostemium ca. 0.3 × 0.07 cm, yellowish, vinaceous at the base. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 15.IX.2018, fl., *W.M. Oliveira 77* (HIFPA); 17.XI.2018, fl., *R.L. Ferreira Filho 201* (MG); PA-151, km 77, ramal Mocajateua, sítio do Seu Antônio Pimentel, 6.IV.2018, fl., *R.L. Ferreira Filho 225* (MG).

*Octomeria grandiflora* occurs in Bolivia, Colombia, Ecuador, Peru and Brazil (in the states of Acre, Amazonas, Amapá, Bahia, Espírito Santo, Maranhão, Mato Grosso, Minas Gerais, Pará, Paraíba, Paraná, Rio de Janeiro, Rio Grande do Sul, Roraima, Santa Catarina, São Paulo and Distrito Federal) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *Octomeria grandiflora* differs from other species recorded in the area by presenting a laterally flattened ramicaule and inflorescence up to 0.4 cm long and as a fascicle (*vs.* cylindrical ramicaule and inflorescence greater than 0.5 cm long and as a raceme or cincinnus). The species was found in Terra Firme Forest on the canopy of angiosperm phorophytes. It was collected with flowers in April, September, and November.

**35. *Oeceoclades maculata*** (Lindl.) Lindl., Gen. Sp. Orchid. Pl. 237. 1833. Figs. 5b; 10h

Terrestrial, chlorophyllous, with sympodial growth. Caulomes 1–3 × 0.4–0.8 cm, thickened into pseudobulbs, heteroblastic, ovoid. Leaf 1, sessile, apical; blade 14.5–24.5 × 1.5–2.8 cm, maculate, coriaceous, elliptic, apex acute. Inflorescence 16–36 cm long, raceme, lateral, erect, 5-flowers; floral bracts 0.4–0.7 × 0.2–0.3 cm, lanceolate, apex acute. Flowers bisexual, resupinate, calcarate; pedicel+ovary 0.8–1.2 × 0.2–0.3 cm; sepals and petals greenish-cream, apex acute; dorsal sepal ca. 1.3 × 0.3 cm, lanceolate; lateral sepals 1.2–1.3 × ca. 0.25 cm, oblong-ovate, subfalcate, free from each other; petals 1.2–1.3 × ca. 0.3 cm, lanceolate, apex acute; lip 0.6–0.8 × 0.5–0.6 cm, white with vinaceous stripes, obovate, trilobed, adnate to the foot of the gynostemium, margin entire, apex rounded; calli 2, basal, parallel, keel-like; gynostemium 0.35–0.43 × 0.1–0.12 cm, whitish; pollinia 4. Fruits 2.7–3 × ca. 0.5 cm, ellipsoid.

**Examined material:** PA-151, km 77, 24.II.2019, fl. cult., 20.II.2020, *R.L. Ferreira Filho 234* (MG).

*Oeceoclades maculata* occurs throughout Tropical Africa and the Americas, from Florida to Argentina, including Brazil, where it occurs in almost all the territory, except in the states of Acre and Amapá (Machnicki-Reis & Smidt 2020;





**Figure 5** – a-l. Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Octomeria grandiflora*; b. *Oeceoclades maculata*; c. *Orleanesia amazonica*; d. *Palmorchis triquilhada* – figure originally published in Ferreira Filho & Barberena (2020); e. *Paphinia cristata*; f. *Plectrophora iridifolia*; g. *Pleurothallis pruinosa*; h. *Polystachya foliosa*; i. *Quekettia microscopica*; j. *Rodriguezia lanceolata*; k. *Sacoila lanceolata*; l. *Scaphyglottis prolifera*. Photographs: a-j,l. Ricardo Leite Ferreira Filho; k. Wagner Martins Oliveira.



Govaerts *et al.* 2021). In Igarapé-Miri, *O. maculata* differs from the other terrestrial species in the area because of its spotted leaf blades. The species was found in Campinarana and was collected with flowers in February.

**36. *Orleanesia amazonica*** Barb.Rodr., Gen. Sp. Orchid. i. 64. 1877. Figs. 5c; 11a

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 6–77 × 0.51–1 cm, thickened into pseudobulbs, homoblastic, cylindrical. Leaves 5–12, sessile, distributed along the caulome; blades 6–14 × 1–1.5 cm, coriaceous, linear, apex retuse. Inflorescence 0.5–4.5 cm long, subumbel, terminal, suberect, 2–5-flowers; floral bracts ca. 0.6 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 1.2–2.3 × 0.1–0.2 cm; sepals and petals yellowish; dorsal sepal 1–1.3 × 0.4 cm, linear, apex obtuse; lateral sepals 1–1.2 × ca. 0.5 cm, elliptic, free from each other, apex cuneate; petals 1–1.1 × ca. 0.3 cm, linear, apex acuminate; lip 0.8–1 × 0.5–0.6 cm, greenish, oblong, entire, adnate at foot of gynostemium, margin entire, apex rounded; callus absent; gynostemium 0.7–0.8 × ca. 0.4 cm, greenish-yellow with brown stripes; pollinia 4. Fruits not seen.

**Examined material:** zona urbana, praça Sarges Barros, 4.VII.2019, fl., *R.L. Ferreira Filho 244* (MG); distrito de Anapú, região das ilhas, Ilha Samaúma, sítio do Marcelo de Souza, 15.XII.2019, fl., *R.L. Ferreira Filho 286* (HCP, MG).

*Orleanesia amazonica* occurs in Bolivia, French Guiana, Guyana, Suriname, Venezuela and Brazil (in the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins) (Kominami 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *O. amazonica* is easily identified by its subumbel inflorescence with upward-facing flowers. The species was collected in an urban area, on *Tabebuia rosea* (Bertol.) Bertero *ex* A.DC. (*ipê rosa*) and *Hevea brasiliensis* L. (*seringueira*, rubber tree). It was collected with flowers in July and December.

**37. *Palmorchis triquilhada*** Ferreira Filho & Barberena, Nordic J. Bot. 38(8): e02740. 2020. Figs. 5d; 11b

Terrestrial, chlorophyllous, with sympodial growth. Caulomes 25–30 × 0.2 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 6, sessile, distributed along the caulome; blades 13–16.5 × 3–3.6 cm, coriaceous, elliptic-lanceolate, apex acute to acuminate.

Inflorescence ca. 4.5 cm long, raceme, terminal, pendant, 3-flowers; floral bracts ca. 0.9 cm long. Flowers bisexual, not calcarate, pedicel+ovary ca. 0.7 × 0.1 cm; sepals and petals light green, oblanceolate, apex obtuse; dorsal sepal 1.4–1.53 × 0.3–0.35 cm; lateral sepals 1.2–1.48 × 0.3–3.8 cm, falcate, free from each other; petals 1.3–1.4 × 0.15–0.3 cm, falcate; lip ca. 1.2 × 0.75–0.85 cm, white, purple at the apex, obovate, trilobed, adnate to foot of gynostemium, margin entire, apex acute; calli 3, basal, parallel, keel-like, pubescent; gynostemium 1.2–1.3 × 0.1–0.2 cm, white, pubescent at the middle portion. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, Sítio Cafarnaum, 12.X.2018, fl., *R.L. Ferreira Filho 172* (MG); 22.IX.2019, fl., *R.L. Ferreira Filho 272* (HCP, MG); 26.X.2020, fl., *W.M. Oliveira 190* (HIFPA); 26.X.2020, fl., *W.M. Oliveira 191* (HIFPA).

*Palmorchis triquilhada* is restricted to Brazil, occurring only in the state of Pará (Ferreira Filho & Barberena 2020). *Palmorchis triquilhada* is difficult to identify in the study area as it is easily confused with some juvenile species of palm trees. Furthermore, it can be confused with *Palmorchis sobralioides* Barb.Rodr., which also occurs in Pará, but differs from this species because it has a lip with three pubescent keels and no protuberances (*vs.* without keels, and with four small, raised protuberances) (Ferreira Filho & Barberena 2020). The species was found in Terra Firme Forest and was collected with flowers in September and October.

**38. *Paphinia cristata*** (Lindl.) Lindl., Edwards's Bot. Reg. 29: misc. 14. 1843. Figs. 5e; 11c

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 2.9–3 × ca. 1 cm, thickened into pseudobulbs, heteroblastic, elliptic, laterally compressed. Leaves 2, sessile, apical; blades 16.5–20 × 3–3.5 cm, subcoriaceous, elliptic-lanceolate, apex acute. Inflorescence 3–4 cm long, raceme, axillary, pendant, 1-flower; floral bracts ca. 1.5 cm long. Flower bisexual, non-resupinate, not calcarate, pedicel+ovary ca. 1.7 cm long; sepals and petals purple with white stripes, not maculate, apex acute; dorsal sepal ca. 5.0 × 1.5 cm, narrow-lanceolate, free, not adnate to gynostemium; lateral sepals 4.5–4.6 × 1.6–1.7 cm, lanceolate, free from each other; petals 3–3.2 × 1–1.1 cm, elliptic-lanceolate; lip ca. 2.5 × 1.6 cm, red, white at the base and red spotted, unguiculate, trilobed, adnate to foot of gynostemium, margin entire at 2/3-basal, fimbriate to the apex, apex obtuse; calli 5, 4 basal, parallel, longitudinal,

keel-like, 1 at the middle portion, longitudinal, keel-like; gynostemium ca.  $2.5 \times 0.2$  cm, greenish-yellow with purple spots, two wings near the apex; pollinia 2. Fruits  $4.5 \times 0.8$  cm, fusiform.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 17.XI.2018, fl. cult. 7.III.2019, R. L. Ferreira Filho 208 (MG); 27.VII.2018, fr., R. L. Ferreira Filho 254 (MG).

*Paphinia cristata* occurs in Bolivia, Colombia, French Guiana, Guyana, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Amazonas, Mato Grosso and Pará) (Engels *et al.* 2018; Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *P. cristata* is easily recognized due to its pendant inflorescence and flowers with purple sepals and petals with white stripes. The species was found in Terra Firme Forest. It was collected with fruits in July and, under cultivation, flowered in March.

**39. *Plectrophora iridifolia*** H.Focke, in Tijdschr. Nat. Wetensch. i. 212. 1848. Figs. 5f; 11d

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $0.9-1 \times 0.4-0.5$  cm, thickened into pseudobulbs, heteroblastic, elliptic. Leaf 1, sessile, apical; blade  $2.5-6.5 \times 0.6-0.7$  cm, coriaceous, lanceolate, falcate, laterally flattened, knife-like, apex acute. Inflorescence  $0.8-1$  cm long, raceme, lateral, erect, 1-flower; floral bracts  $0.5-0.55 \times 0.2-0.25$  cm, lanceolate, apex acuminate. Flowers bisexual, resupinate, calcarate; pedicel+ovary ca.  $1.8 \times 0.2$  cm; sepals and petals cream; dorsal sepal ca.  $1.6 \times 0.35$  cm, linear-lanceolate, apex acute; lateral sepals  $1.6-1.7 \times 0.3-0.35$  cm, obovate, falcate, free from each other, apex acuminate; petals ca.  $1.8 \times 0.6$  cm, obovate, apex acute; lip ca.  $2.4 \times 1.3$  cm, cream with yellow stripes, ovate, entire, adnate to the foot of the gynostemium, margin entire, apex obtuse to rounded; calli, 2, basal, parallel, linear; gynostemium ca.  $0.35 \times 0.1$  cm, cream, two inconspicuous wings near the apex; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, Vila Castanhalzinho, sítio Cafarnaum, 22.IX.2018, fl., R.L. Ferreira Filho 158 (MG); 26.I.2019, fl., R.L. Ferreira Filho 222 (MG); distrito de Anapú, região das ilhas, ilha Samaúma, sítio do Isaque Gomes Miranda, 16.XII.2019, fl., R.L. Ferreira Filho 295 (MG).

*Plectrophora iridifolia* occurs in French Guiana, Guyana, Suriname, Venezuela and Brazil (in the states of Amazonas, Mato Grosso and Pará) (Meneguzzo 2020b; Govaerts *et al.* 2021). *Plectrophora iridifolia* differs from the other

species of Igarapé-Miri by having laterally flattened leaves, similar to a knife. The species was found in Terra Firme Forest and Várzea Forest and was observed with flowers in December and January.

**40. *Pleurothallis pruinosa*** Lindl., Edwards's Bot. Reg. 28: misc. 75. 1842. Figs. 5g; 11e

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $3-7 \times 0.05-0.1$  cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical, covered basally by tubular sheaths. Leaf 1, sessile, apical; blade  $2-3 \times 0.6-0.9$  cm, coriaceous, linear-lanceolate, apex emarginate-mucronate. Inflorescence  $1.7-3.3$  cm long, raceme, terminal, suberect, 2-4-flowers; floral bracts  $0.1-0.2$  cm long. Flowers resupinate, not calcarate; pedicel+ovary  $0.2-0.4$  cm long; sepals and petals cream-greenish; dorsal sepal ca.  $0.2 \times 0.1$  cm, ovate, apex acute; lateral sepals ca.  $0.2 \times 0.1$  cm, oblong, adnate up to the apex, apex acute; petals ca.  $0.2 \times 0.1$  cm, linear-lanceolate, apex acute; lip ca.  $0.2 \times 0.1$  cm, greenish-cream, ovate, entire, adnate to foot of gynostemium, margin entire, apex obtuse; callus absent; gynostemium ca.  $0.1$  cm long, greenish-cream; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, Sítio Cafarnaum, 26.I.2019, fl. cult., 25.IV.2019, R.L. Ferreira Filho 217 (MG).

*Pleurothallis pruinosa* is widely distributed in Topical America, including Brazil (in the states of Amazonas, Amapá, Bahia, Maranhão, Pará, Pernambuco and Roraima) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *P. pruinosa* can be confused with *A. barbulata* but differs by possessing inflorescence as raceme (*vs.* inflorescence as cincinnus). The species was found in Terra Firme Forest and, under cultivation, flowered in April.

**41. *Polystachya foliosa*** (Hook.) Rchb.f. in Walp., Ann. Bot. Syst. (Walpers) 6: 640. 1863.

Figs. 5h; 11f

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $0.4-1 \times 0.4-0.5$  cm, thickened into pseudobulbs, homoblastic, ovoid. Leaves 3-5, sessile, distributed along the caulome; blades  $4-15 \times 0.3-2$  cm, coriaceous, linear to linear-lanceolate, apex obtuse. Inflorescence  $4-24$  cm long, raceme or panicle, terminal, erect, 15-43-flowers; floral bracts ca.  $0.1-0.2 \times 0.05-0.1$  cm. Flowers bisexual, non-resupinate, not calcarate; pedicel+ovary  $0.1-0.5$  cm long; sepals and petals greenish-yellow; dorsal sepal  $0.2-0.33 \times 0.12-0.22$  cm, ovate, apex acute;

lateral sepals 0.23–0.48 × 0.19–0.31 cm, ovate, free from each other, apex acute; petals 0.15–0.33 × 0.04–0.08 cm, spatulate or lanceolate, apex acute; lip 0.19–0.4 × 0.19–0.3 cm, greenish-yellow, ovate, trilobed, adnate to foot of gynostemium, margin entire, apex apiculate; callus 1, basal, pilose, ovoid; gynostemium 0.15–0.2 cm long, greenish-yellow; pollinia 2. Fruits ca. 0.4–1 × 0.1–0.3 cm, ellipsoid. **Examined material:** distrito de Anapú, região das ilhas, sítio do Duca, 20.IX.2018, fl., *R.L. Ferreira Filho 198* (MG); PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 27.VII.2018, fl. and fr., *R.L. Ferreira Filho 257* (MG).

*Polystachya foliosa* occurs in Mexico, Central and South America, including Brazil (in the states of Acre, Amapá, Amazonas and Pará) (Meneguzzo 2020c; Govaerts *et al.* 2021). *Polystachya foliosa* differs from other epiphytic species in the area by presenting ovoid pseudobulbs, terminal inflorescence and greenish-yellow flowers. The species was found in Terra Firme Forest and Várzea Forest and was collected with flowers in July and September.

**42. *Quekettia microscopica*** Lindl., Edwards's Bot. Reg. 25(Misc.): 3. 1839. Figs. 5i; 11g

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 0.7–0.8 × 0.2–0.3 cm, thickened into pseudobulbs, heteroblastic, cylindrical. Leaf 1, sessile, apical; blade 2–6 × 0.2–0.3 cm, coriaceous, cylindrical, apex acute. Inflorescence 4–10 cm long, panicle, lateral, suberect, 5–7-flowers; floral bracts 0.07–0.08 cm long. Flowers bisexual, non-resupinate, not calcarate, with tubular aspect; pedicel+ovary 0.15–0.2 cm long; sepals and petals yellow; dorsal sepal 0.43–0.47 × ca. 0.1 cm, narrow-elliptic, apex acute; lateral sepals ca. 0.4 × 0.1 cm, narrow-elliptic,  $\frac{4}{5}$ -basally adnate to each other, apex acute; petals 0.4–0.45 × 0.15 cm, obovate, slightly falcate, apex acute; lip 0.35–0.4 × ca. 0.2 cm, yellow, obovate to elliptic, entire, adnate to foot of gynostemium, margin entire, apex acute; callus absent; gynostemium 0.35–0.4 × 0.07–0.08 cm, yellow, with two wings near the apex; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 24.II.2018, fl., *R.L. Ferreira Filho 154* (HIFPA); 27.VII.2018, fl., *R.L. Ferreira Filho 183* (MG).

*Quekettia microscopica* occurs in French Guiana, Guyana, Suriname, Venezuela and Brazil (in the states of Amazonas, Goiás, Mato Grosso, Pará and Roraima) (Santos & Smidt 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *Q.*

*microscopica* differs from other epiphytic species by presenting inflorescence as panicle with yellow flowers and a tubular appearance. The species was found in Terra Firme Forest and was collected with flowers in February and July.

**43. *Rodriguezia lanceolata*** Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 1: 219. 1798. Figs. 5j; 11h

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 1.5–2.5 × 0.7–1 cm, thickened into pseudobulbs, heteroblastic, elliptic-oblong, laterally compressed. Leaf 1, sessile, apical; blade 5.7–12.5 × 1.3–2 cm, coriaceous, lanceolate, apex acute. Inflorescence 16.5–19.5 cm long, raceme, lateral, arched, 12–15-flowers; floral bracts 0.4–0.65 cm long. Flowers bisexual, resupinate, calcarate; pedicel+ovary 1–2 × 0.1–0.2 cm; sepals and petals pink; dorsal sepal 1.1–1.2 × 0.4–0.7 cm, elliptic, apex cuneate; lateral sepals 1.1–1.3 × 0.5–0.7 cm, elliptic, adnate, forming a calcar, apex cuneate; petals 1–1.2 × 0.5–0.75 cm, elliptic, apex cuneate; lip 1.4–1.6 × 0.6–0.7 cm, pink, obovate, trilobed, adnate to foot of gynostemium, margin entire, apex emarginate; callus 1, basal, parallel, oblong; gynostemium ca. 0.6 × 0.25 cm, white, with two wings at the apex; pollinia 2. Fruits not seen.

**Examined material:** zona urbana, praça Padre Henrique, 4.VII.2019, fl. cult., 19.XI.2019, *R.L. Ferreira Filho 251* (MG); distrito de Anapú, região das ilhas, Ilha Samaúma, sítio do Isaque Gomes Miranda, 16.XII.2019, fl., *R.L. Ferreira Filho 293* (HCP, MG).

*Rodriguezia lanceolata* occurs from Saint Vincent and the Grenadines to Bolivia, including Brazil (in the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *R. lanceolata* differs from the other species recorded by possessing pink, arched inflorescences with sepals totally adnate to each other forming a calcar in the shape of a keel. The species was found in Terra Firme Forest, Várzea Forest and in urban areas, on *Mangifera indica* and *Syzygium jambos* (L.) Alston. (*jambeiro*). It was collected with flowers in December but bloomed in November under cultivation.

**44. *Sacoila lanceolata*** (Aubl.) Garay, Bot. Mus. Leaf. 28(4): 352. 1982. Figs. 5k; 11i

Terrestrial, chlorophyllous, with sympodial growth. Caulomes ca. 0.8 × 0.3 cm, not thickened into pseudobulbs, cylindrical. Leaf 1, sessile,



basal rosette; blade ca.  $25 \times 3$  cm, coriaceous, oblanceolate, apex acute. Inflorescence ca. 50 cm long, raceme, terminal, erect, 17-flowers; floral bracts ca. 1.4 cm long. Flowers resupinate, not calcarate, with tubular aspect; pedicel+ovary ca.  $1 \times 0.3$  cm; sepals and petals pink to reddish, lanceolate, apex acute; dorsal sepal ca.  $1.3 \times 0.4$  cm, lateral sepals  $1.6\text{--}1.7 \times$  ca. 0.3 cm, 1/2-basally adnate to each other; petals  $1.2\text{--}1.3 \times$  ca. 0.2 cm, lanceolate, apex acute; lip ca.  $1.6 \times 0.4$  cm, pink, elliptic, trilobed, adnate to foot of gynostemium, margin entire, apex acute; calli 2, basal, parallel, linear; gynostemium ca.  $1 \times 0.15$  cm, pink; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, Vila Castanhalzinho, sítio Cafarnaum, 7.IX.2018, fl., *W.M. Oliveira* 72 (HIFPA).

*Sacoila lanceolata* occurs from Florida to Argentina, including Brazil, where it has a wide distribution, not being found only in the states of Acre, Amazonas and Rondônia (Guimarães 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *S. lanceolata* differs from other terrestrial species by possessing pink to reddish sepals and petals with a tubular appearance. The species was found in Terra Firme Forest and was collected with flowers in September.

**45. *Scaphyglottis prolifera*** Cogn. in C.F.P.von Martius & auct. suc. (eds.), *Fl. bras.* (Martius) 3(5): 15. 1898. Figs. 51; 12a

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $2\text{--}6 \times 0.25\text{--}0.5$  cm, thickened into pseudobulbs, heteroblastic, cylindrical to fusiform. Leaves 2, sessile, apical; blades  $1.5\text{--}6.5 \times 0.3\text{--}0.6$  cm, subcoriaceous, linear-lanceolate, apex emarginate. Inflorescence ca. 0.8 cm long, fascicle, terminal, suberect, 1–4-flowers; floral bracts 0.4–0.5 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 0.3 cm long; sepals and petals white; dorsal sepal  $0.4\text{--}0.5 \times$  ca. 0.2 cm, narrow-elliptic, apex acuminate; lateral sepals  $0.5\text{--}0.6 \times$  ca. 0.2 cm, oblong-ovate, free from each other, apex acuminate; petals  $0.5\text{--}0.55 \times 0.1\text{--}0.15$  cm, oblanceolate, apex acuminate; lip  $0.5\text{--}0.6 \times$  ca. 0.3 cm, whitish, obovate, trilobed, adnate to foot of gynostemium, margin entire, apex obtuse; calli 2, at the middle portion, parallel, ovoid; gynostemium 0.4–0.5 cm long, whitish, with the purple apex, two conspicuous wings near the apex; pollinia 4. Fruits not seen.

**Examined material:** Ilha, sítio do Duca, 20.X.2018, fl., *R.L. Ferreira Filho* 193 (MG); zona urbana, praça Padre Henrique, 4.VII.2019, fl., *R.L. Ferreira Filho* 250 (MG).

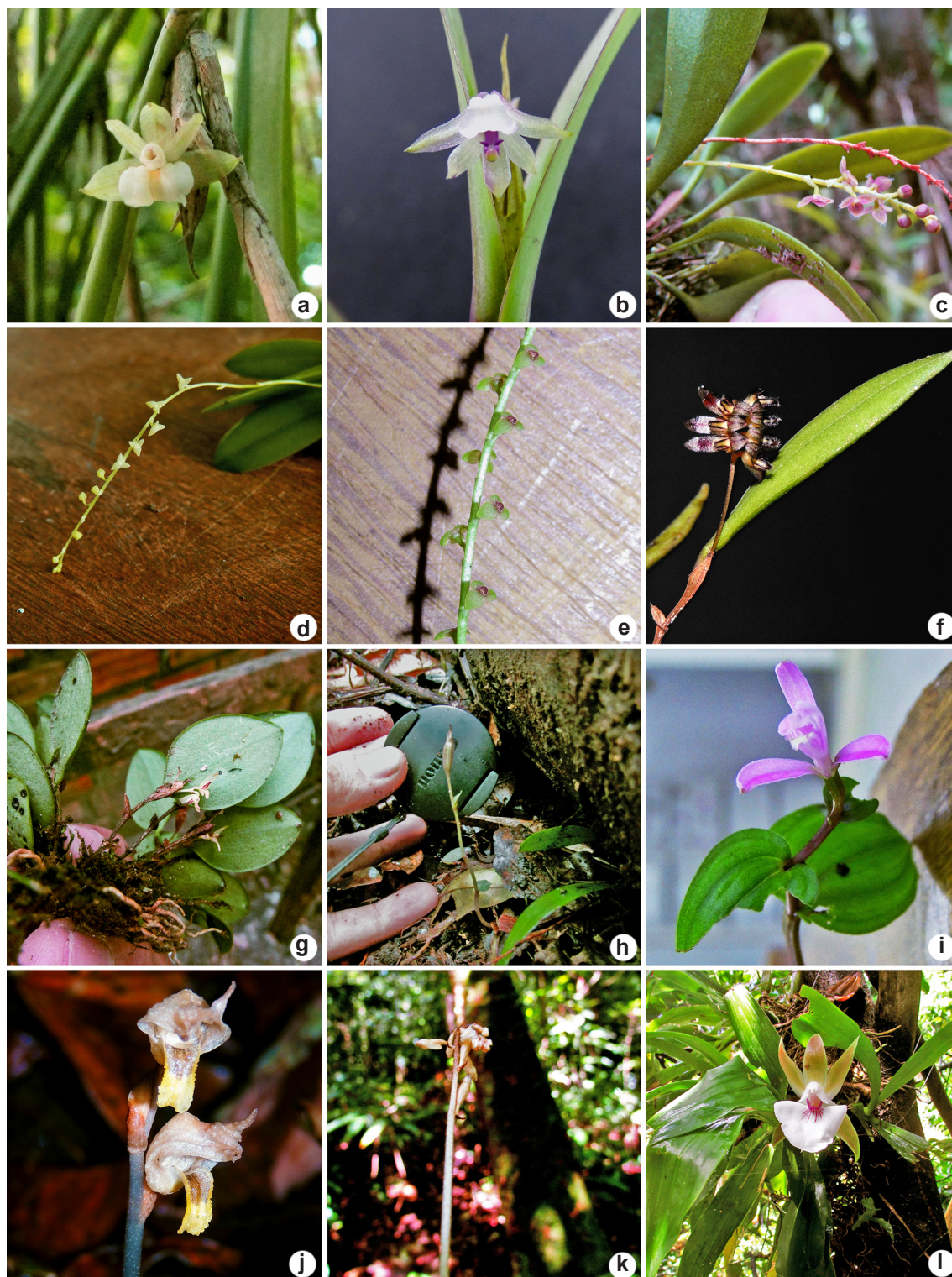
*Scaphyglottis prolifera* occurs from Mexico to Tropical America, including Brazil (states of Amapá, Amazonas, Ceará, Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Pará, Rio de Janeiro, Roraima, Tocantins and Distrito Federal) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *Scaphyglottis prolifera* can be confused with *Scaphyglottis stellata* Lodd. ex Lindl., because they have white sepals and petals, but it differs in that it has larger floral bracts (0.4–0.5 cm long) and lip with ovoid calli (vs. smaller floral bracts, with 0.2 cm long and lip with keel-shaped calli). The species was found in Várzea Forest and urban areas, growing on *Mangifera indica* and *Hevea brasiliensis*. It was collected with flowers in July.

**46. *Scaphyglottis reflexa*** Lindl., Edwards's Bot. Reg. 25: misc. 20. 1839. Figs. 6a; 12b

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $3\text{--}4 \times 0.1\text{--}0.15$  cm, thickened into pseudobulbs, heteroblastic, cylindrical. Leaf 1, sessile, apical; blade  $10\text{--}13.5 \times$  ca. 0.1–0.3 cm, coriaceous, subcylindrical, apex acute. Inflorescence ca. 1 cm long, fascicle, axillary, suberect, 1-flower; floral bracts 0.2–0.4 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary  $0.8\text{--}1 \times$  ca. 0.1 cm; sepals and petals greenish-cream; dorsal sepal  $0.4\text{--}0.6 \times$  ca. 0.3 cm, lanceolate, apex acute; lateral sepals  $0.5\text{--}0.6 \times$  ca. 0.3 cm, lanceolate, free from each other, apex acuminate; petals  $0.5\text{--}0.6 \times$  ca. 0.1 cm, elliptic-lanceolate, apex acute; lip  $0.6\text{--}0.7 \times$  ca. 0.4 cm, greenish-cream, wide-elliptic, 4-lobed, adnate to foot of gynostemium, margin entire, apex rounded; callus 1, basal, longitudinal, keel-like; gynostemium  $0.45\text{--}0.5 \times$  ca. 0.1 cm, greenish-cream, two wings near the apex. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 22.IX.2018, fl. cult., 30.IV.2019, *R.L. Ferreira Filho* 180 (MG).

*Scaphyglottis reflexa* occurs in Bolivia, Colombia, Costa Rica, Ecuador, Granada, French Guiana, Guyana, Panama, Peru, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Amazonas, Amapá, Pará, Maranhão, Rondônia, Roraima and Tocantins) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *S. reflexa* differs from other species of the genus *Scaphyglottis* by possessing unifoliate pseudobulbs and subcylindrical leaf blades (vs. bifoliate pseudobulbs and linear or linear-lanceolate leaf blades). The species was



**Figure 6** – a-l. Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Scaphyglottis reflexa*; b. *Scaphyglottis stellata*; c. *Stelis ciliaris*; d. *Stelis palmeiraensis*; e. *Stelis papaquerensis*; f. *Trichosalpinx eglerti*; g. *Trichosalpinx orbicularis*; h. *Triphora amazonica*; i. *Triphora surinamensis*; j. *Uleiorchis ulaei*; k. *Wulfschlaegelia calcarata*; l. *Zygosepalum labiosum*. Photographs: f,j. Jeferson Miranda Costa; a-e,g-i,k-l. Ricardo Leite Ferreira Filho.



found in Terra Firme Forest and bloomed in April under cultivation.

**47. *Scaphyglottis stellata*** Lodd. ex Lindl., Edwards's Bot. Reg. 25(Misc.): 44. 1839.

Figs. 6b; 12c

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 2–11.5 × 0.2–0.6 cm, thickened into pseudobulbs, heteroblastic, fusiform. Leaves 2, sessile, apical; blades 10.5–23.5 × 0.4–0.7 cm, subcoriaceous, linear, apex emarginate. Inflorescence 0.5–1 cm long, fascicle, terminal, suberect, 1–5-flowers; floral bracts ca. 0.2 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 0.4–0.6 cm long; sepals and petals white, apex acuminate; dorsal sepal 0.5–0.6 × ca. 0.15 cm, narrow-elliptic; lateral sepals 0.6–0.7 × ca. 0.15 cm, oblong-ovate, free from each other; petals 0.5–0.6 × ca. 0.1 cm, oblanceolate; lip 0.5–0.6 × 0.3–0.4 cm, completely purplish, trilobed, margin entire, apex obtuse, adnate to foot of gynostemium; calli 2, at the middle portion, longitudinal, keel-like; gynostemium ca. 0.5 × 0.1 cm, purple, with two lateral wings near the apex. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 17.IX.2019, fl. cult., VI.2018, R.L. Ferreira Filho 181 (MG).

*Scaphyglottis stellata* occurs in Bolivia, Colombia, Costa Rica, Ecuador, French Guiana, Guatemala, Guyana, Honduras, Nicaragua, Panama, Peru, Suriname, Venezuela and Brazil (in the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Mato Grosso do Sul, Pará, Rondônia, Roraima and Tocantins) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). *Scaphyglottis stellata* can be confused with *S. prolifera* but differs by the size of its bracts (0.2 cm long vs. 0.4–0.5 cm long) and by the shape of the calli on the lip (keel-like calli vs. ovoid calli). The species was found in Terra Firme Forest. It flowered in July under cultivation.

**48. *Stelis ciliaris*** Lindl., Companion Bot. Mag. 2: 353. 1837.

Figs. 6c; 12d

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 1.5–2 × ca. 0.2 cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical. Leaf 1, sessile, apical; blade 4–4.5 × 0.8–0.9 cm, coriaceous, oblong, apex tridentate. Inflorescence 3.5–4 cm long, raceme, terminal, suberect, 11-flowers; floral bracts ca. 0.2 cm long. Flowers resupinate, not calcarate; pedicel+ovary ca. 0.2 cm long; sepals and petals pink; dorsal sepal

ca. 0.2 cm, ovate, with elongated trichomes at the apex, apex acute; lateral sepals ca. 0.15 × 0.15 cm, ovate, basally adnate to each other, with elongated trichomes at the apex, apex acute; petals ca. 0.05 × 0.1 cm, widely obovate, apex rounded; lip ca. 0.05 × 0.05 cm, purple, slightly obovate, entire, adnate to foot of gynostemium, margin entire, apex rounded; callus absent; gynostemium ca. 0.05 × 0.05 cm, purple. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 17.XI.2018, fl. cult., 30.X.2019, R.L. Ferreira Filho 211 (MG).

*Stelis ciliaris* occurs in southern Mexico and Tropical America, including Brazil (in the states of Amazonas, Espírito Santo, Mato Grosso, Paraná, Rio de Janeiro, Santa Catarina and São Paulo) (Menini Neto & Furtado 2020; Govaerts *et al.* 2021). The present study expands the distribution of *S. ciliaris* to the state of Pará. In Igarapé-Miri, *S. ciliaris* is vegetatively similar to *S. palmeiraensis*, but differs by possessing pink sepals and petals and sepals with elongated trichomes at the apex (vs. green sepals and petals and sepals without trichomes). The species was found in Terra Firme Forest, growing on *Dinizia excelsa*. The species bloomed in October under cultivation.

**49. *Stelis palmeiraensis*** Barb.Rodr., Gen. Sp. Orchid. ii. 92. 1881.

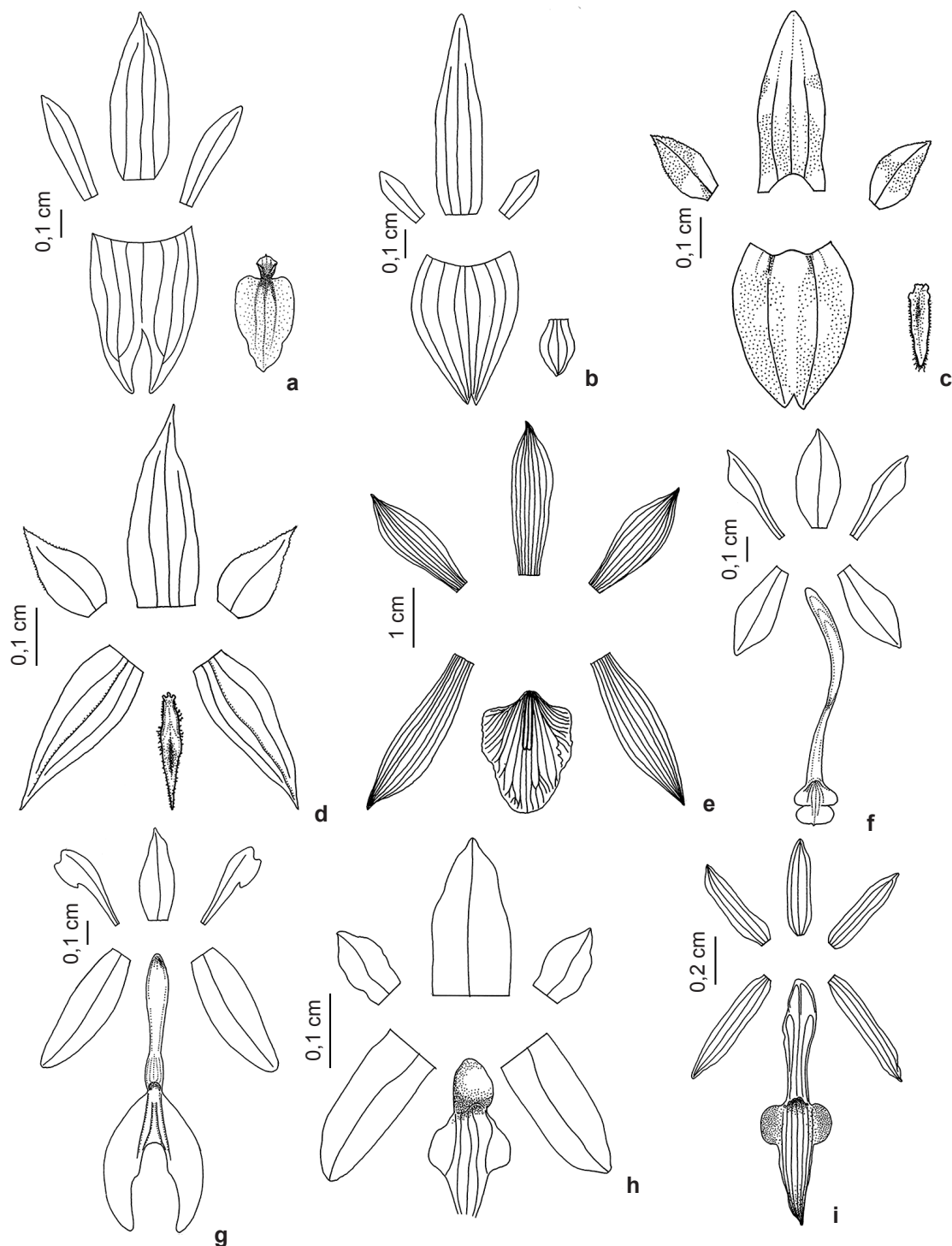
Figs. 6d; 12e

Epiphyte, chlorophyllous, with sympodial growth. Caulomes 0.5–0.8 × ca. 0.1 cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical. Leaf 1, sessile, apical; blade 2.5–3 × 1–1.1 cm, coriaceous, elliptic, apex tridentate. Inflorescence 7–7.2 cm long, raceme, terminal, erect, 14-flowers; floral bracts ca. 0.11 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 0.18–0.2 cm long; sepals and petals green; dorsal sepal 0.15–0.17 × 0.12–0.13 cm, ovate, glabrous, apex acute; lateral sepals 0.12–0.14 × 0.11–0.12 cm, ovate, glabrous, basally adnate to each other, apex acute; petals 0.04–0.05 × 0.04–0.05 cm, obovate, apex obtuse; lip 0.05–0.07 × 0.03–0.04 cm, light green, ovate, entire, adnate to foot of gynostemium, margin entire, apex obtuse; callus absent; gynostemium ca. 0.03 × 0.02 cm, green. Fruits not seen.

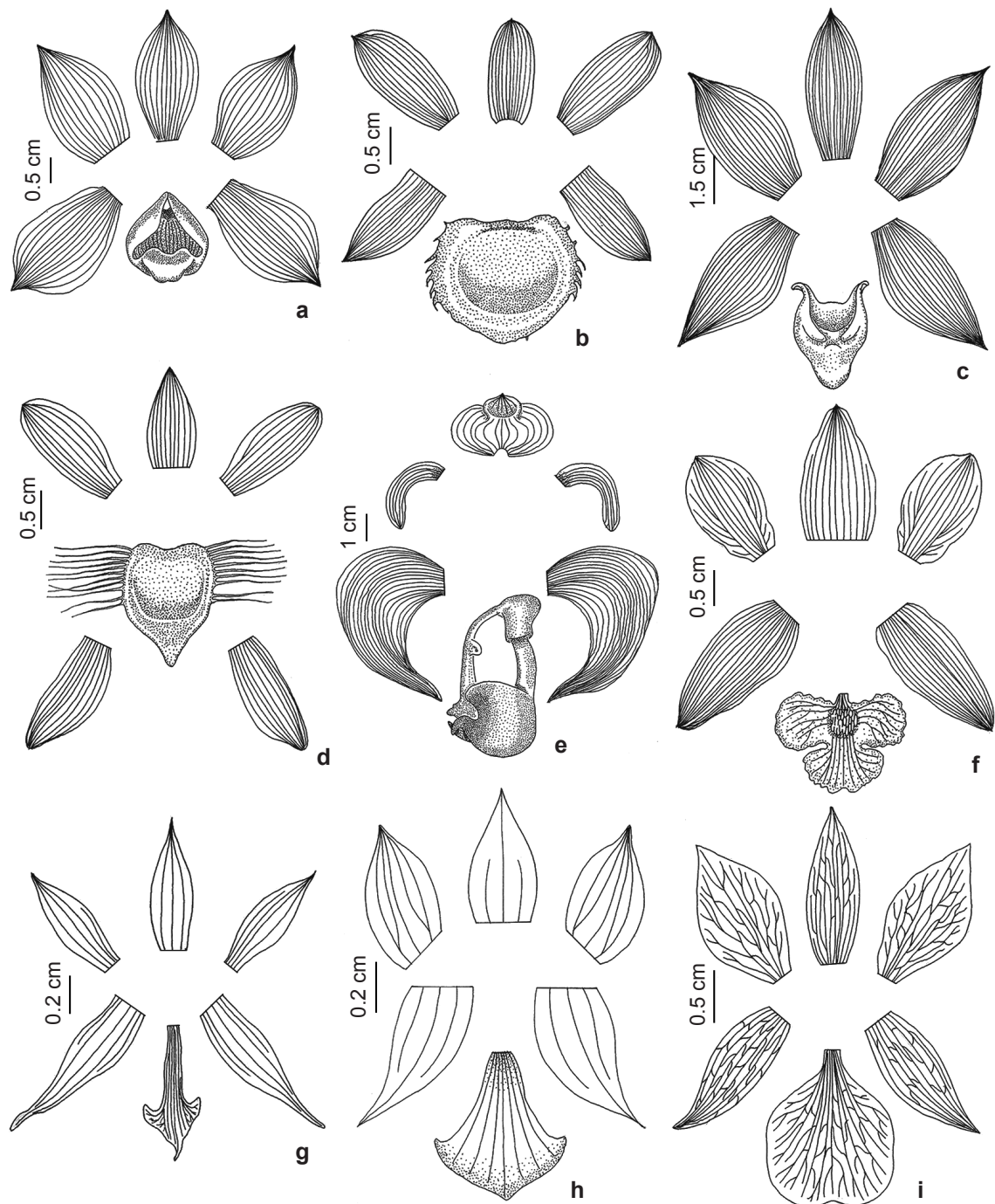
**Examined material:** distrito de Anapú, região das ilhas, Ilha Samaúma, Sítio do Isaque Gomes Miranda, 16.XII.2019, fl., R.L. Ferreira Filho 294 (MG).

*Stelis palmeiraensis* is restricted to Brazil and, until then, only occurred in the Atlantic Forest (in the state of Rio de Janeiro) (Menini Neto &





**Figure 7** – a-i. Floral segments of Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Acianthera fockei*; b. *Acianthera miqueliana*; c. *Anathallis barbulata*; d. *Anathallis fastigiata*; e. *Aspasia variegata*; f. *Aspidogyne foliosa*; g. *Aspidogyne juruenensis*; h. *Campylocentrum fasciola*; i. *Campylocentrum mattogrossense*. (a. Ferreira Filho 231; b. Ferreira Filho 291; c. Ferreira Filho 182; d. Ferreira Filho 258; e. Oliveira 41; f. Ferreira Filho 282; g. Ferreira Filho 253; h. Ferreira Filho 227; i. Ferreira Filho 176). Illustrations by Luan Dias.



**Figure 8** – a-i. Floral segments of Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Catasetum albovirens*; b. *Catasetum discolor*; c. *Catasetum macrocarpum*; d. *Catasetum roseoalbum*; e. *Coryanthes speciosa*; f. *Cyrtopodium virescens*; g. *Dichaea brachyphylla*; h. *Dichaea picta*; i. *Dimerandra emarginata*. (a. Oliveira 141; b. Ferreira Filho 265; c. Ferreira Filho 167; d. Ferreira Filho 195; e. Ferreira Filho 173; f. Oliveira 78; g. Ferreira Filho 266; h. Ferreira Filho 216; i. Ferreira Filho 243). Illustrations by Luan Dias.

Furtado 2020; Govaerts *et al.* 2021). The specimen *R.L. Ferreira Filho* 294 (MG) corresponds to the first record of this species for the Amazon phytogeographic domain (state of Pará). In Igarapé-Miri, *S. palmeiraensis* is similar to *S. ciliaris*, but differs from it by possessing green sepals and petals and sepals without trichomes (*vs.* pink flowers and sepals and sepals with elongated trichomes at the apex). The species was found in Várzea Forest, growing on angiosperm phorophytes in the middle of the plantation of *Euterpe oleracea*, and was collected with flowers in December.

**50. *Stelis papaquerensis*** Rchb.f., *Linnaea* 22(7): 822. 1850. Figs. 6e; 12f

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $1.5\text{--}5.8 \times \text{ca. } 0.2$  cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical. Leaf 1, sessile, apical; blade  $5\text{--}10 \times 0.9\text{--}1.7$  cm, coriaceous, narrow-elliptic to lanceolate, apex tridentate. Inflorescence 9–18 cm long, raceme, terminal, erect, 18–30-flowers; floral bracts ca. 0.2 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary  $0.2\text{--}0.3 \times \text{ca. } 0.05$  cm; sepals and petals greenish-purple, dorsal sepal  $0.18\text{--}0.2 \times 0.2$  cm, ovate, glabrous, apex acute; lateral sepals  $0.15\text{--}0.18 \times 0.15\text{--}0.17$  cm, ovate, basally adnate to each other, trichomes absent, apex acute; petals ca.  $0.05 \times 0.1$  cm, reniform, apex rounded; lip  $0.05\text{--}0.06 \times 0.05\text{--}0.08$  cm, purple, ovate, entire, adnate to foot of gynostemium, margin entire, apex rounded; callus absent; gynostemium  $0.05\text{--}0.1 \times 0.05\text{--}0.08$  cm, greenish-purple, apex with three horn-shaped projections. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 22.IX.2018, fl. cult., 14.XII.2018, *R.L. Ferreira Filho* 175 (HCP, MG); 17.XI.2018, fl. cult., 6.XI.2019, *R.L. Ferreira Filho* 210 (HCP, MG); 26.I.2019, fl. cult., 2.I.2020, *R.L. Ferreira Filho* 218 (MG).

*Stelis papaquerensis* occurs in French Guiana, Peru, Venezuela and Brazil (in the states of Amazonas, Bahia, Espírito Santo, Mato Grosso, Minas Gerais, Pará, Paraná, Pernambuco, Rio Grande do Sul, Rio de Janeiro, Rondônia, Santa Catarina and São Paulo) (Menini Neto & Furtado 2020; Govaerts *et al.* 2021). In Igarapé-Miri, *Stelis papaquerensis* differs from the other species of the genus *Stelis* in that it has larger inflorescences (9–18 cm long) and greenish-purple sepals and petals (*vs.* smaller inflorescences, 3.5–7.2 cm long, and green or pink sepals and petals). The species

was found in Terra Firme Forest vegetating on *Dinizia excelsa*. The species bloomed in November, December and January under cultivation.

**51. *Trichosalpinx egleri*** (Pabst) Luer, *Phytologia* 54: 395. 1983. Figs. 6f; 12g

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $2.5\text{--}3.6 \times 0.1\text{--}0.11$  cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical, covered by lepanthiform sheaths. Leaf 1, sessile, apical; blade  $4.5\text{--}5.1 \times 1\text{--}1.3$  cm, coriaceous, elliptic, apex acute. Inflorescence 1.5–2 cm long, raceme, terminal, suberect, 4–8-flowers; floral bracts ca. 0.1 cm long. Flowers bisexual, resupinate, not calcarate, pedicel+ovary 0.1–0.15 cm long; sepals and petals yellowish-purple; dorsal sepal  $0.5\text{--}0.52 \times 0.18\text{--}0.2$  cm, oblong, apex obtuse; lateral sepals  $0.35\text{--}0.37 \times 0.11\text{--}0.13$  cm, lanceolate, adnate to each other up to the apex, apex acute; petals  $0.21\text{--}0.25 \times 0.07\text{--}0.09$  cm, oblong, falcate, apex acute; lip  $0.33\text{--}0.35 \times 0.1\text{--}0.12$  cm, purple, oblong, entire, adnate to foot of gynostemium, margin ciliate, apex rounded; callus absent; gynostemium  $0.18\text{--}0.2 \times 0.08\text{--}0.1$  cm, white with purple apex; pollinia 2. Fruits not seen.

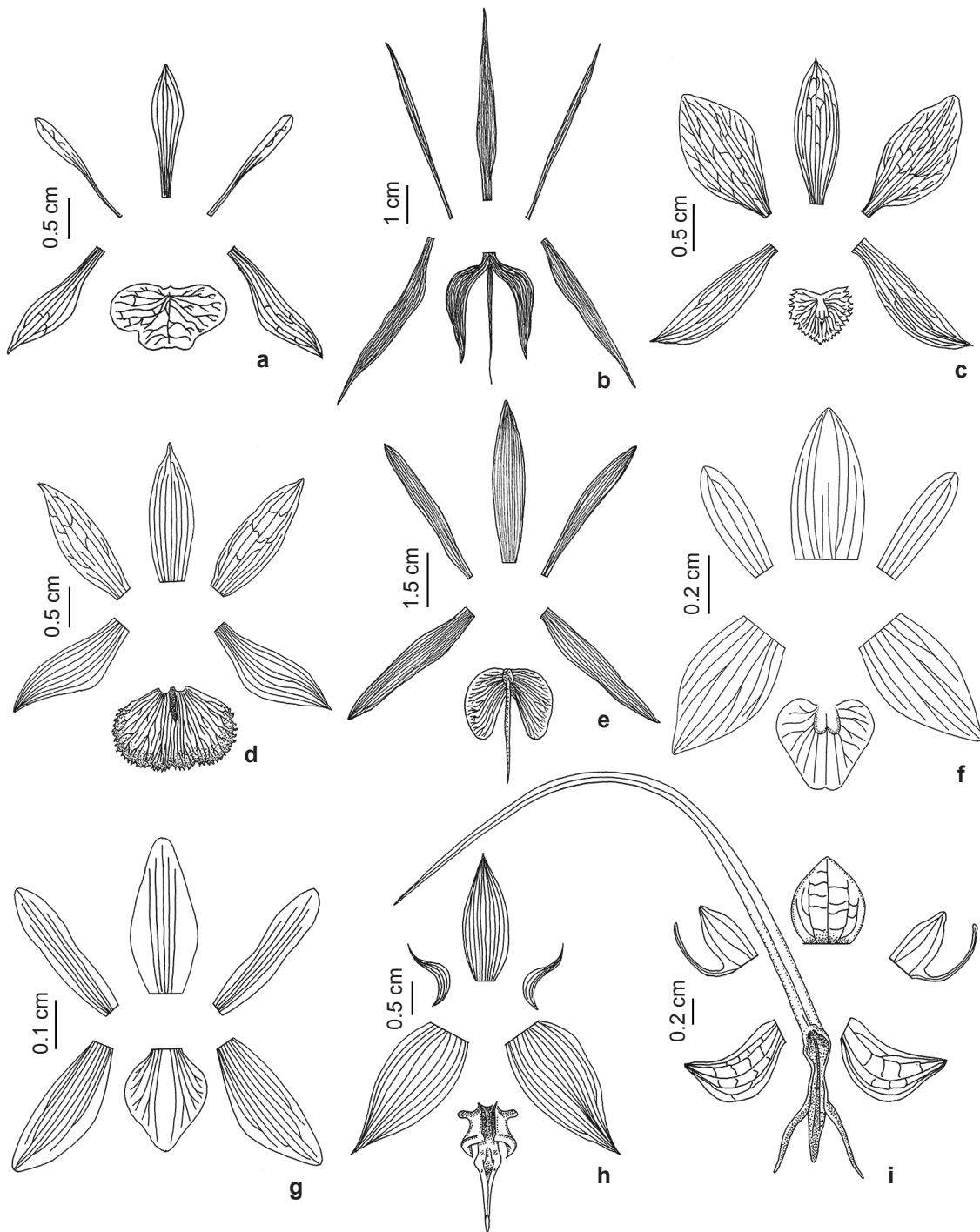
**Examined material:** distrito de Anapú, região das ilhas, ilha Samaúma, sítio do Isaque Gomes Miranda, 16.XII.2019, fl., *R.L. Ferreira Filho* 299 (HCP, HIFPA, MG).

*Trichosalpinx egleri* occurs in Bolivia, French Guiana, Guyana, Suriname, Venezuela and Brazil (in the states of Acre, Amazonas, Mato Grosso, Pará, Rondônia and Roraima) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *T. egleri* may be confused with *Trichosalpinx orbicularis* (Lindl.) Luer, but differs by possessing elliptic leaves, yellowish-purple sepals and petals and sepals completely adnate to each other (*vs.* orbicular leaf blades, sepals and petals purplish-white and lateral sepals adnate to each other up to 1/2-basal). The species was found in Várzea Forest amidst the plantation of *Euterpe oleracea* and was collected with flowers in December.

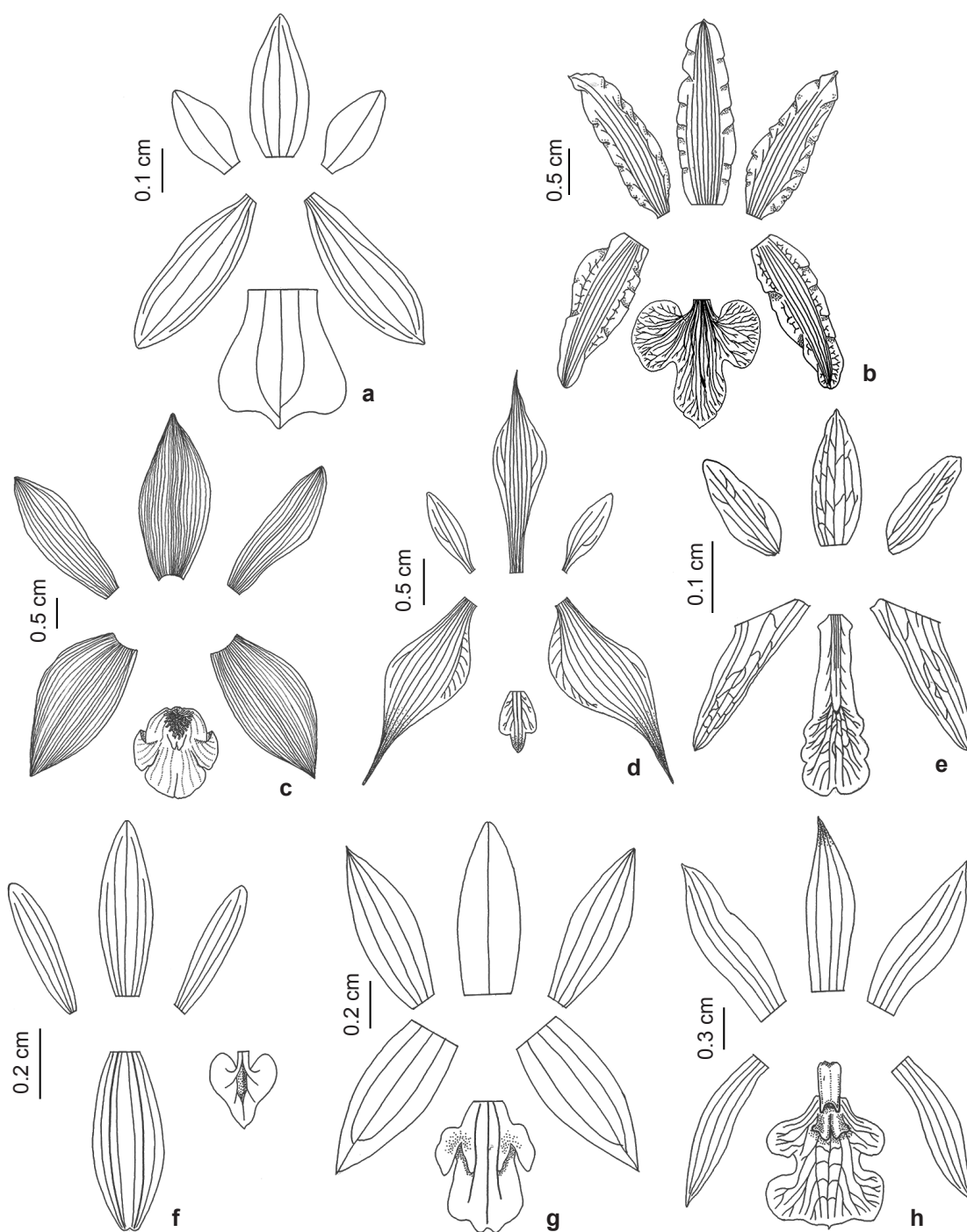
**52. *Trichosalpinx orbicularis*** (Lindl.) Luer, *Phytologia* 54(5): 396. 1983. Figs. 6g; 12h

Epiphyte, chlorophyllous, with sympodial growth. Caulomes  $2\text{--}4.2 \times \text{ca. } 0.1$  cm, not thickened into pseudobulbs, modified into ramicaules, cylindrical, covered by lepanthiform sheaths. Leaf 1, sessile, apical; blade  $2\text{--}2.7 \times 1.4\text{--}2$  cm, orbicular,





**Figure 9** – a-i. Floral segments of Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Epidendrum amapaense*; b. *Epidendrum carpophorum*; c. *Epidendrum flexuosum*; d. *Epidendrum macrocarpum*; e. *Epidendrum nocturnum*; f. *Epidendrum rigidum*; g. *Epidendrum strobiliferum*; h. *Gongora pleiochroma*; i. *Habenaria longipedicellata*. (a. Silva 39; b. Oliveira 9; c. Oliveira 112; d. Oliveira 154; e. Ferreira Filho 241; f. Ferreira Filho 246; g. Ferreira Filho 248; h. Ferreira Filho 156; i. Oliveira 128). Illustrations by Luan Dias.



**Figure 10** – a-h. Floral segments of Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Jacquiiniella globosa*; b. *Laelia gloriosa*; c. *Maxillaria lutescens*; d. *Maxillaria subrepens*; e. *Maxillaria uncatata*; f. *Notylia microchila*; g. *Octomeria grandiflora*; h. *Oeceoclades maculata*. (a. Ferreira Filho 178; b. Ferreira Filho 270; c. Cardoso 60; d. Ferreira Filho 212; e. Ferreira Filho 209; f. Ferreira Filho 199; g. Ferreira Filho 225; h. Ferreira Filho 234). Illustrations by Luan Dias.

coriaceous, apex emarginate. Inflorescence 0.5–0.8 cm long, raceme, terminal, suberect, 2–4-flowers; floral bracts ca. 0.1 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 0.1 cm long; sepals and petals purplish-white; dorsal sepal ca.  $0.3 \times 0.1$ –0.15 cm, lanceolate, apex acute; lateral sepals  $0.3$ – $0.35 \times$  ca. 0.1 cm, lanceolate, 1/2-basally adnate to each other, apex acute; petals  $0.1$ – $0.15 \times$  ca. 0.05 cm, oblong, apex dentate; lip  $0.2$ – $0.25 \times$  ca. 0.05 cm, purple, elliptic-lanceolate, entire, adnate to foot of gynostemium, margin ciliate, apex acute; calli 2, basal, parallel; gynostemium ca.  $0.1 \times 0.05$  cm, white, with purple apex; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, Sítio Cafarnaum, 22.IX.2018, fl., R.L. Ferreira Filho 174 (MG); PA-151, km 77, ramal Mocajateua, sítio do Seu Antônio Pimentel, 6.IV.2019, fl., R.L. Ferreira Filho 223 (MG).

*Trichosalpinx orbicularis* occurs in Colombia, Costa Rica, Ecuador, French Guiana, Guyana, Panama, Peru, Suriname, Trinidad-Tobago, Venezuela and Brazil (in the states of Amapá, Amazonas and Pará) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-miri, *T. orbicularis* can be confused with *T. egleri*, but differs by possessing orbicular leaves, purplish-white sepals and petals, and lateral sepals adnate to the 1/2-basal portion (vs. elliptic leaves, sepals and yellowish-purple petals, and sepals adnate to each other up to the apex). The species was found in Terra Firme Forest, vegetating in the canopy of angiosperms phorophytes. It was collected with flowers in April and September.

**53. *Triphora amazonica*** Schltr., Beih. Bot. Centralbl., Abt. 2. 42(2): 75. 1925. Figs. 6h; 12i

Terrestrial, chlorophyllous, with monopodial growth. Caulomes  $10$ – $13 \times$  ca. 0.1 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 2–3, sessile, distributed along the caulome; blades  $0.6$ – $0.8 \times 0.6$ – $0.8$  cm, membranaceous, cordiform, not striate, apex acuminate. Inflorescence ca. 0.8–1 cm long, raceme, terminal, suberect, 1-flower; floral bracts 0.5–0.6 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary  $1.3$ – $1.5 \times 0.1$ – $0.2$  cm; sepals and petals pinkish-white, dorsal sepal ca.  $1.1 \times 0.2$  cm, narrow-elliptic, apex acute; lateral sepals ca.  $1.1 \times 0.2$  cm, elliptic, falcate, free from each other, apex acute; petals ca.  $1.0 \times 0.18$  cm, oblanceolate, not falcate, apex obtuse; lip ca.  $0.9 \times 0.5$  cm, white, wide-elliptic, trilobed, adnate to

apex of gynostemium, margin entire, apex obtuse; callus absent; gynostemium  $0.45$ – $0.5 \times 0.05$ – $0.08$  cm, white; pollinia 2. Fruits ca.  $1 \times 0.37$ – $0.42$  cm, fusiform.

**Examined material:** PA-151, km 77, 18.V.2019, fl. and fr., R.L. Ferreira Filho 232 (MG).

*Triphora amazonica* occurs from Central Florida to Brazil; in Brazil it is found in the states of Amazonas, Bahia and Pará (Meneguzzo 2020d; Govaerts *et al.* 2021). In Igarapé-Miri, *Triphora amazonica* can be confused with *Triphora surinamensis* Britton, but differs in that it has larger leaves,  $0.6$ – $0.8 \times 0.6$ – $0.8$  cm, without stripes (vs. leaves of  $2$ – $3.8 \times 1.3$ – $2.1$  cm, with white stripes). It was observed growing with *Triphora surinamensis* in Campinarana and was collected with flowers and fruits in May.

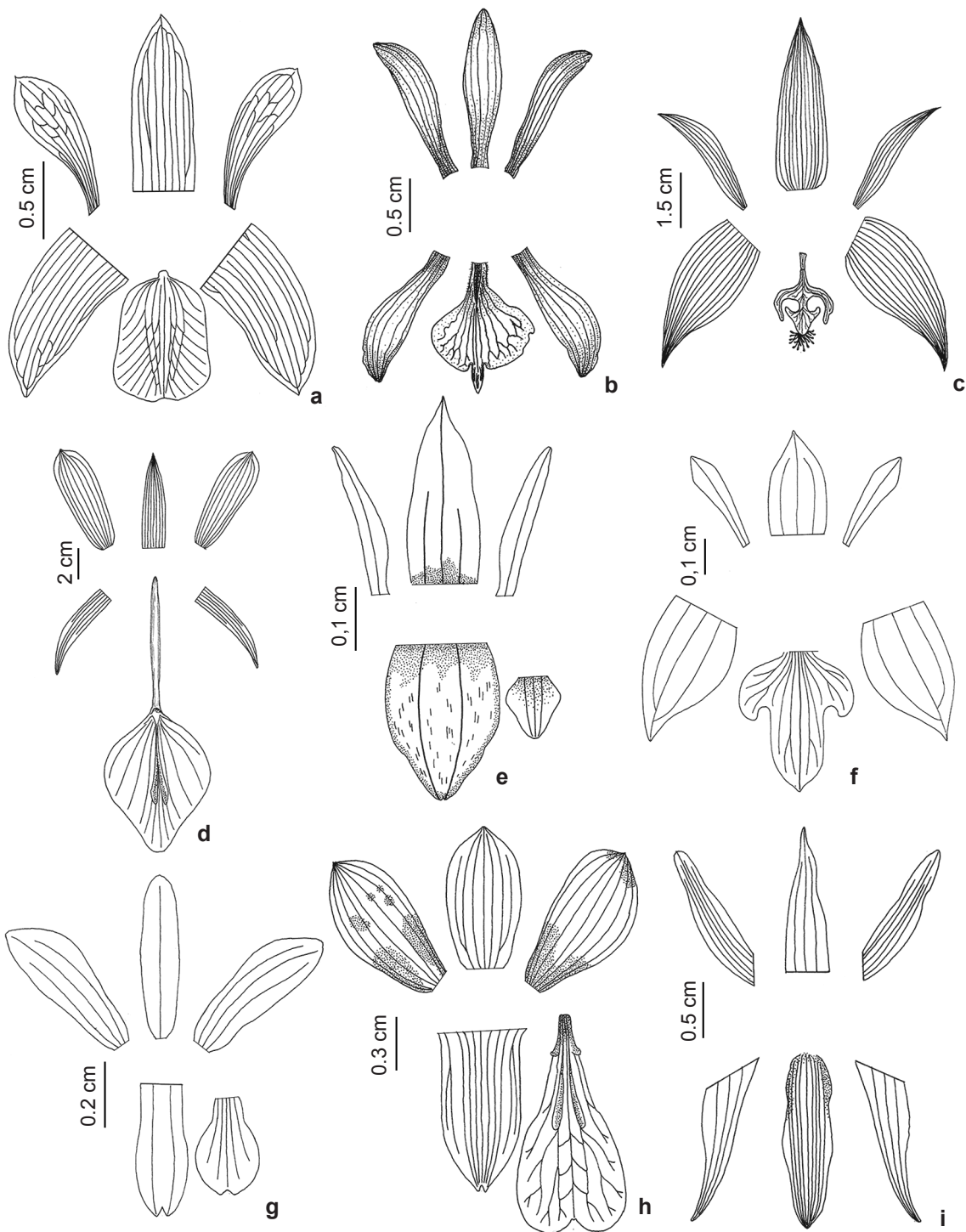
**54. *Triphora surinamensis*** (Lindl.) Britton, Sci. Surv. Porto Rico & Virgin Islands 5(2): 184. 1924. Figs. 6i; 13a

Terrestrial, chlorophyllous, with monopodial growth. Caulomes ca.  $16 \times 0.2$  cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 3, sessile, distributed along the caulome; blades  $2$ – $3.8 \times 1.3$ – $2.1$  cm, membranaceous, widely cordiform, striate, apex acuminate. Inflorescence ca. 1 cm long, raceme, terminal, erect, 1-flower; floral bracts ca. 0.8 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 1.1 cm long; sepals and petals pink light; dorsal sepal ca.  $1.3 \times 0.3$  cm, spatulate, apex rounded; lateral sepals  $1.2$ – $1.3 \times 0.3$ – $0.35$  cm, elliptic, falcate, free from each other, apex acute; petals  $1.25$ – $1.3 \times 0.2$ – $0.23$  cm, oblanceolate, falcate, apex rounded; lip ca.  $1 \times 0.7$  cm, white with pink stripes, obovate, trilobed, adnate to base of gynostemium, margin entire, apex acute; callus absent; gynostemium ca.  $1.1 \times 0.15$  cm, pink light, winged at the lateral; pollinia 2. Fruits not seen.

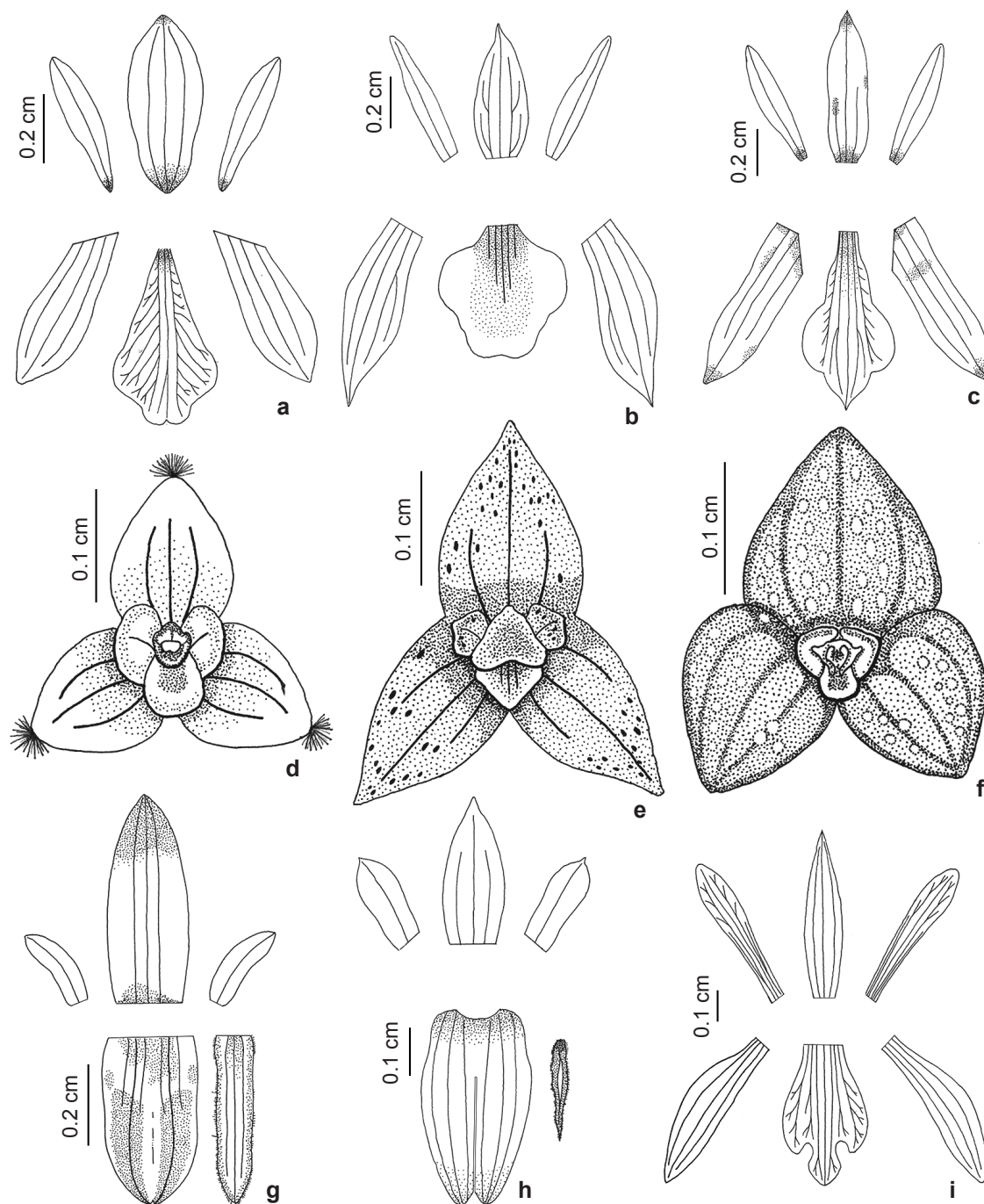
**Examined material:** PA-151, km 77, 18.V.2019, fl. cult., 8.I.2020, R.L. Ferreira Filho 236 (MG).

*Triphora surinamensis* occurs from the Caribbean to the north of Brazil, where it is found in the states of Amazonas and Pará (Meneguzzo 2020d; Govaerts *et al.* 2021). In Igarapé-Miri, *Triphora surinamensis* can be confused with *T. amazonica*, but differs by having larger leaf blades ( $2$ – $3.8 \times 1.3$ – $2.1$  cm) with white stripes (vs. smaller leaf blades,  $0.6$ – $0.8 \times 0.6$ – $0.8$  cm, and no stripes). The species was found in Campinarana and was observed growing with *T. amazonica*. The species bloomed in January under cultivation.





**Figure 11** – a-i. Floral segments of Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Orleanesia amazonica*; b. *Palmorchis triquilhada*; c. *Paphinia cristata*; d. *Plectrophora iridifolia*; e. *Pleurothallis pruinosa*; f. *Polystachya foliosa*; g. *Quekettia microscopica*; h. *Rodriguezia lanceolata*; i. *Sacoila lanceolata*. (a. Ferreira Filho 286; b. Ferreira Filho 172; c. Ferreira Filho 208; d. Ferreira Filho 295; e. Ferreira Filho 217; f. Ferreira Filho 257; g. Ferreira Filho 183; h. Ferreira Filho 251; i. Oliveira 72). Illustrations by Luan Dias.



**Figure 12** – a-i. Floral segments of Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Scaphyglottis prolifera*; b. *Scaphyglottis reflexa*; c. *Scaphyglottis stellata*; d. *Stelis ciliaris*; e. *Stelis palmeiraensis*; f. *Stelis papaquerensis*; g. *Trichosalpinx egleri*; h. *Trichosalpinx orbicularis*; i. *Triphora amazonica*. (a. Ferreira Filho 250; b. Ferreira Filho 180; c. Ferreira Filho 181; d. Ferreira Filho 211; e. Ferreira Filho 294; f. Ferreira Filho 218; g. Ferreira Filho 299; h. Ferreira Filho 223; i. Ferreira Filho 232). Illustrations by Luan Dias.

**55. *Uleiorchis ulei*** (Cogn.) Handro, Arq. Bot. Estado São Paulo, 3: 175. 1958. Figs. 6j; 13b

Terrestrial, achlorophyllous, mycoheterotrophic, with monopodial growth. Caulomes 1–4 × 0.4–0.6 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves absent. Inflorescence ca. 5–8 cm long, raceme, terminal, erect, 1–2-flowers; floral bracts 0.5–0.6 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 0.5 cm long; sepals and petals ca. 1.5 × 1 cm, pale white to pale brown, 2/3-basally adnate to each other, with triangular projections, apex acute; projections of the sepals larger than those of the petals; lip ca. 1.4 × 0.5 cm, yellow at the base, black at the middle portion and white at the apex, ovate-elliptic, entire, adnate to foot of gynostemium, margin entire, apex rounded; callus absent; gynostemium ca. 0.7 × 0.2 cm, white; pollinia not seen. Fruits 1.3–2.4 × 0.4–0.8 cm, ovoid.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 24.II.2017, fr., *W.M. Oliveira* 47 (HIFPA); 26.I.2019, fr., *R.L. Ferreira Filho* 214 (HCP, MG).

**Additional examined material:** BRAZIL. PARÁ: Abaetetuba, zona rural, mata no entorno do balneário do Zico, 19.I.2019, fl., *W.M. Oliveira* 105 (HIFPA).

*Uleiorchis ulei* occurs in Colombia, Costa Rica, French Guiana, Guyana, Honduras, Panama, Peru, Suriname, Venezuela and Brazil (in the states of Amazonas, Paraná, Rondônia, Roraima and Santa Catarina) (Smidt 2020a; Govaerts *et al.* 2021). The present study registers the occurrence of *U. ulei* in the state of Pará, expanding its area of occurrence. In Igarapé-Miri, *U. ulei* can be confused with *Wulschlaegelia calcarata* Benth. as they are mycoheterotrophic, aphyllous and achlorophyllous, but it differs in that it presents flowers with sepals adnate to the petals up to 2/3-base (*vs.* flowers with free sepals and petals). *Uleiorchis ulei* was found in Terra Firme Forest and was observed with fruits in January and February.

**56. *Vanilla mexicana*** Mill., Gard. Dict., ed. 8. n. 1. 1768. Fig. 13c

Nomadic climber, chlorophyllous, with monopodial growth. Caulomes 400–2,000 × 0.5–1 cm, not thickened into pseudobulbs, not modified into ramicaules, cylindrical. Leaves 30–40, sessile, distributed along the caulome; blades 12–16 × 4.5–6.5 cm, subcoriaceous, elliptic, apex cuspidate. Inflorescence 9–18 cm long, raceme, axillary and/or terminal, suberect, 3-flowers; floral bracts 1–1.3

cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary 4.5–5.2 × ca. 0.5 cm; sepals and petals olive green, lanceolate, apex acute; dorsal sepal 6–6.4 × 1.7–1.9 cm; lateral sepals 5.6–6 × 1.4–1.7 cm, free from each other; petals 5.3–5.6 × 0.9–1.4 cm; lip ca. 5 × 5 cm, white, wide-elliptic, trilobed, 3/4-basally adnate to gynostemium, margin entire, apex acute; callus 5, basal, longitudinal, keel-like, extending up to the apex; gynostemium 2.8–3 × 0.4–0.5 cm, white; pollinia 2. Fruits 10–19 × ca. 1 cm, cylindrical.

**Examined material:** rio Anapú, ilha Samaúma, sítio do Marcelo, 15.XII.2019, fr., *R.L. Ferreira Filho* 284 (HCP, MG).

**Additional examined material:** BRAZIL. PARÁ: Abaetetuba, zona rural, região das ilhas, ilha de Campompema, 23.V.2014, fl., *E.A.L. Afonso* & *M.G.S. Pereira* 105 (HIFPA).

*Vanilla mexicana* occurs in south Florida, the Caribbean and northern South America, including Brazil (in the states of Acre, Amazonas, Amapá, Maranhão, Mato Grosso, Minas Gerais, Pará, Rio de Janeiro and Roraima) (Flora do Brasil 2020, continuously updated; Govaerts *et al.* 2021). In Igarapé-Miri, *Vanilla mexicana* differs from the other species in being a nomadic climber and presents monopodial growth, caulomes of 400–2,000 cm long, axillary and/or terminal inflorescence and cylindrical fruits of 10–19 cm long. The species was found in Várzea Forest, in an açai plantation, on *Euterpe oleracea* and *Hevea brasiliensis*, and was observed with fruits in December.

**57. *Wulschlaegelia calcarata*** Benth., J. Linn. Soc., Bot. 18: 342. 1881. Figs. 6k; 13d

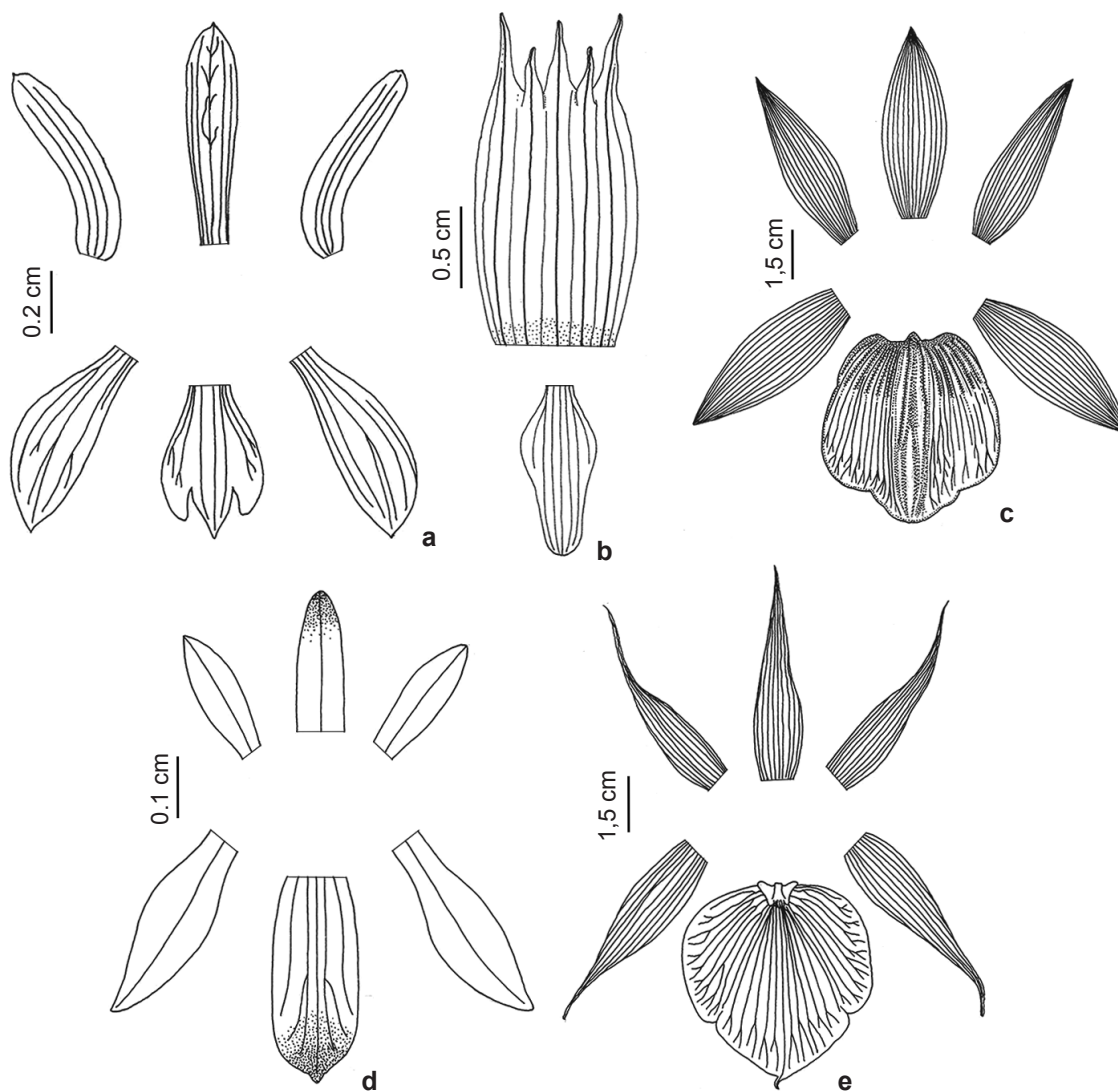
Terrestrial, achlorophyllous, mycoheterotrophic, with monopodial growth. Caulomes not thickened into pseudobulbs, reduced. Leaves absent. Inflorescence 10–15 cm long, raceme, terminal, erect to arched, 10–13-flowers; floral bracts 0.3–0.35 cm long. Flowers bisexual, resupinate, calcarate; pedicel+ovary 0.35–0.4 cm long; sepals and petals pale white to brown, free from each other; dorsal sepal ca. 0.15 × 0.1 cm, oval-oblong, apex acute; lateral sepals 0.3–0.33 × ca. 0.1 cm, oval-oblong, adnate, forming a spur, apex acute; petals 0.15–0.17 × 0.05–0.08 cm, ovate, apex acute; lip 0.4–0.45 × 0.1–0.15 cm, white, oblong-elliptic, entire, adnate to foot of gynostemium, margin entire, apex rounded; callus absent; gynostemium ca. 0.1 × 0.08 cm, white; pollinia not seen. Fruits 0.5–0.8 × 0.3–0.4 cm, ellipsoid.



**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 28.X.2017, fl. and fr., *W.M. Oliveira 31* (HIFPA); 24.II.2018, fl. and fr., *W.M. Oliveira 48* (HIFPA); 26.I.2019, fl. and fr., *R.L. Ferreira Filho 215* (HCP, MG); zona rural, PA-151, km 77, 15.X.2019, fl. and fr., *R.L. Ferreira Filho 280* (MG).

*Wulfschlaegelia calcarata* occurs from the Dominican Republic to Bolivia, including Brazil (in the states of Acre, Amazonas, Mato Grosso and Pará)

(Smidt 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *W. calcarata* can be confused with *U. ulei* because they are mycoheterotrophic, aphyllous and achlorophyllous but differs in that it presents flowers with free sepals and petals (*vs.* flowers with sepals adnate to the petals up to 2/3-base). The species was found in Terra Firme Forest. Flowering and fruiting occur simultaneously, with flowers and fruits being observed in October, January and February.



**Figure 13** – a-e. Floral segments of Orchidaceae species in the municipality of Igarapé-Miri, Pará, Brazil – a. *Triphora surinamensis*; b. *Uleiorchis ulei*; c. *Vanilla mexicana*; d. *Wulfschlaegelia calcarata*; e. *Zygosepalum labiosum*. (a. *Ferreira Filho 236*; b. *Oliveira 105*; c. *Afonso & Pereira 105*; d. *Ferreira Filho 280*; e. *Ferreira Filho 219*). Illustrations by Luan Dias.

**58. *Zygosepalum labiosum*** (Rich.) Garay., *Orquideologia* 1(3): 2. 1967. Figs. 6h; 13e

Epiphyte, chlorophyllous, with sympodial growth. Caulomes ca. 3.5 × 2 cm, thickened into pseudobulbs, heteroblastic, elliptic, compressed laterally. Leaves 2, sessile, apical; blades 24.5–25.3 × 2.5–4 cm, coriaceous, elliptic-lanceolate, apex acuminate. Inflorescence ca. 9.5 cm long, raceme, lateral, suberect, 1-flower; floral bracts ca. 2.3 cm long. Flowers bisexual, resupinate, not calcarate; pedicel+ovary ca. 2 × 0.3 cm; sepals and petals green-brownish; dorsal sepal ca. 4.6 × 1.4 cm, lanceolate, apex acute; lateral sepals 4.6–4.8 × ca. 1.6 cm, lanceolate, subfalcate, free from each other, apex acute; petals 4.2–4.3 × ca. 1 cm, lanceolate, subfalcate, apex acute; lip ca. 3.8 × 4.3 cm, white with purple stripes at the base, entire, adnate to foot of gynostemium, margin entire, apex obtuse; callus 1, basal, horseshoe-shaped; gynostemium ca. 2.7 × 0.64 cm, white; pollinia 2. Fruits not seen.

**Examined material:** PA-151, km 92, vila Castanhalzinho, sítio Cafarnaum, 24.VI.2018, fl., R.L. *Ferreira Filho* 219 (HCP, MG).

*Zygosepalum labiosum* occurs in Colombia, French Guiana, Guyana, Peru, Suriname, Venezuela and Brazil (in the states of Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia and Roraima) (Meneguzzo & Hall 2020b; Govaerts *et al.* 2021). In Igarapé-Miri, *Zygosepalum labiosum* can be easily recognized by possessing purplish-green sepals and petals and a white lip with purple stripes that is entire and with a horseshoe-shaped callus near the base. The species was found in Terra Firme Forest on angiosperm phorophytes at a height of three meters. It was collected with flowers in April.

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