



Original Paper

Subtribe Laeliinae (Orchidaceae) in a large and mature remnant of Brazilian Atlantic Forest

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Abstract

Orchidaceae is a megadiverse botanical family in Brazil, particularly in the Atlantic Forest where it is a priority group for conservation. Parque Nacional do Itatiaia (PARNA Itatiaia) was the first conservation unit established in Brazil, and represents a large and mature remnant of Atlantic Forest. Updated data on richness, distribution and conservation of the Neotropical and ornamental subtribe Laeliinae in the park recently disclosed the occurrence of presumed locally extinct species, but without a taxonomic approach. Thus, we present a comprehensive taxonomic treatment of Laeliinae in the PARNA Itatiaia. The subtribe is represented by six genera and 33 species, which corresponds to about 15% of the orchid flora of PARNA Itatiaia. *Epidendrum* is the richest genus, with 20 species, followed by *Cattleya* (6 spp.) and *Prosthechea* (4 spp.). Species of Laeliinae grow in shady and humid habitats, especially near rivers, at elevations ranging 750-1,200 m, with species richness decreasing with elevation. Several species form small populations (commonly < 10 individuals), which are in need of prompt conservation actions to avoid local extinction. Samples of Laeliinae from PARNA Itatiaia in collections of consulted herbaria were found to be scarce. Variable morphological characteristics, mainly of the lip, distinguish species of Laeliinae.

Key words: Conservation Unit, floristic, orchids, Parque Nacional do Itatiaia.

Resumo

Orchidaceae é uma família botânica megadiversa no Brasil, principalmente na Mata Atlântica, onde constitui um grupo prioritário para a conservação. O Parque Nacional do Itatiaia (PARNA Itatiaia) foi a primeira Unidade de Conservação brasileira e representa um remanescente grande e maduro de Mata Atlântica. Dados atualizados sobre riqueza, distribuição e conservação da subtribo ornamental e neotropical Laeliinae no parque foram recentemente divulgados e revelaram a ocorrência de espécies presumivelmente extintas localmente, mas sem uma abordagem taxonômica. Por isso, apresentamos um tratamento taxonômico abrangente de Laeliinae no PARNA Itatiaia. A subtribo está representada por seis gêneros e 33 espécies, correspondendo a cerca de 15% da flora orquidológica do PARNA Itatiaia. *Epidendrum* é o gênero mais numeroso, com 20 espécies, seguido por *Cattleya* (6 spp.) e *Prosthechea* (4 spp.). As espécies de Laeliinae crescem em habitats sombreados e úmidos, especialmente perto de rios, e a 750-1.200 m de altitude, com a riqueza de espécies diminuindo com a elevação. Várias espécies formam populações pequenas (geralmente < 10 indivíduos) e requerem ações de conservação imediatas para evitar a extinção local. Amostras de Laeliinae do PARNA Itatiaia foram consideradas escassas nos herbários consultados. Características morfológicas variáveis, principalmente do labelo, permitem a distinção das espécies de Laeliinae.

Palavras-chave: Unidade de Conservação, florística, orquídeas, Parque Nacional do Itatiaia.

Introduction

Orchidaceae is a megadiverse botanical family in Brazil with ca. 2,500 species and comprises some genera of horticultural importance

for their ornamental features, such as *Cattleya* Lindl. and *Encyclia* Hook. (Nardy *et al.* 2016; Flora do Brasil 2020). More than 50% of Brazilian orchids occur in the Atlantic Forest (Stehmann *et al.* 2009).

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This phytogeographical domain may include up to 8% of all species of flora and fauna of the world, and is almost completely restricted to Brazil where it occurs in 17 states, most situated along the coast, with it being narrower to the north and wider to the south (Silva & Casteleti 2003; Ribeiro *et al.* 2009). Despite the wide geographical extension of the Atlantic Forest, this global biodiversity hotspot is one of the most threatened on the planet, having been reduced to ca. 15% of its original coverage (Mittermeier *et al.* 2004; Lima *et al.* 2015).

Orchids are a priority group for conservation in tropical forests (Solano-Gómez *et al.* 2016). World-wide, conservation threats to orchids are primarily of anthropogenic origin and are associated with habitat destruction, modification and fragmentation, as well as collecting (Batty *et al.* 2002). Species with reduced populations that are restricted to few areas are more susceptible to local extinction (Batty *et al.* 2002; Cardoso *et al.* 2016; Barberena *et al.* 2019), with maintenance of genetic diversity being a basic point of action plans (Borba *et al.* 2007). Nonetheless, an understanding of the basic biology of species and rigorous taxonomic scrutiny are first needed (Bortolus 2008; Broadhurst & Coates 2017).

Biodiversity of mountainous regions in Brazil must be studied, with emphasis on biological inventories and preservation (Martinelli 2007; Costa *et al.* 2015; Barberena *et al.* 2018). Maintenance of the remaining large mature forest fragments is one of the conservation priorities for the Atlantic Forest (Ribeiro *et al.* 2009). Established in 1937, Parque Nacional do Itatiaia (PARNA Itatiaia) was the first conservation unit in Brazil. It currently encompasses ca. 28,000 hectares and is fully inserted within the Atlantic Forest phytogeographic domain and the Serra do Mar biogeographic sub-region (Ribeiro *et al.* 2009; ICMBio 2014, 2020). PARNA Itatiaia is located between two major metropolitan areas - the cities of Rio de Janeiro and São Paulo - and received about 140,000 visitors in 2017 (ICMBio 2019).

The first studies of Orchidaceae in the region probably date back to 1894 when Ernest Ule explored the higher areas of Serra do Itatiaia and collected specimens of 11 species and six genera (Ule 1895). Further study was performed by Dusén (1905) who documented 14 genera and 19 species, including a few species from the lower areas of the Serra. Porto (1915) was the first to present a detailed survey of Orchidaceae of PARNA Itatiaia, which was the result of intense field efforts to collect exclusively orchids. A total of 102 species and nine varieties belonging to 45 genera were documented.

Subsequently, several naturalists and botanists continued studies on orchids in this region. Brade (1951) presented a taxonomic study for *Habenaria* Willd., and later he listed 84 genera of Orchidaceae for PARNA Itatiaia (Brade 1956). Ribeiro *et al.* (2007) reported four orchid species on rock outcrops on the Itatiaia Plateau, whereas Barberena & Fraga (2012) highlighted the occurrence of 20 species in high-altitude fields. Recently, Barberena (2010) provided a checklist of the orchid species occurring in PARNA Itatiaia, while Medeiros *et al.* (2013) presented photos of some orchids from Itatiaia and surroundings. The 135 years of collecting and studying orchids of the Itatiaia massif produced important results and expanded the knowledge its orchid flora with the description of at least 17 new species belonging to 10 genera (*Anathallis* Barb. Rodr., *Cleistes* Rich. ex Lindl., *Campylocentrum* Benth., *Epidendrum* L., *Habenaria*, *Hapalorchis* Schltr., *Maxillaria* Ruiz & Pav., *Myoxanthus* Poepp. & Endl., *Octomeria* R.Br., *Pelexia* Poit. ex Lindl., *Pleurothallopsis* Porto & Brade, and *Stelis* Sw.), including endemic species (e.g., Pessoa & Alves 2015; Barberena & Gonzaga 2016), whose type specimens are deposited in herbarium RB.

The very ornamental subtribe Laeliinae is Neotropical and characterized mainly by apical leaves, terminal (rarely lateral) inflorescences and compact, ceroid, laterally flattened pollinia (Pridgeon *et al.* 2005). Porto (1915) and Brade (1956) reported incipient data on the diversity of Laeliinae in PARNA Itatiaia (seven genera, 16 species and four varieties). Updated data on richness, distribution and conservation of Laeliinae in PARNA Itatiaia recently revealed the occurrence of 13 presumed locally extinct species and several possibly threatened species, but without a taxonomic approach (Barberena *et al.* 2018).

Accurate and reliable taxonomic studies are always desirable since detailed descriptions are essential for identifying unexpected remnant populations. They also provide information necessary for establishing conservation priority and appropriate actions for conservation and management of these species, particularly in conservation units. Similarly, taxonomic studies can encourage other investigations aimed at reintroducing presumably extinct and threatened species.

Floristic studies focused on a specific geographic area make valuable contributions to knowledge of the diversity, distribution and preferential habitats of taxa (Müller 2006; Heiden

et al. 2009; Jordão *et al.* 2018). This is also true for Orchidaceae, a megadiverse and widely distributed family. Here, we present a comprehensive taxonomic treatment of the subtribe Laeliinae in PARNA Itatiaia, including an identification key, descriptions, illustrations and notes on the taxonomy of its species.

Material and Methods

PARNA Itatiaia is located in southeastern Brazil ($22^{\circ}14' - 22^{\circ}27'S$, $44^{\circ}34' - 44^{\circ}46'W$), within the limits of the states of Rio de Janeiro (municipalities of Resende and Itatiaia), and Minas Gerais (municipalities of Bocaina de Minas and Itamonte) (ICMBio 2014, 2020). A map of the park was produced using ARC-GIS software ver. 10.2. (Fig. 1). The elevation of PARNA Itatiaia ranges from 600 m in the south to 2,791 m at Agulhas Negras Peak of the Itatiaia Plateau (ICMBio 2020). The vegetation of the area is classified as dense ombrophilous forest and is subdivided into two phytophysionomies based mainly on elevational gradient: montane at 500–1,500 m, and upper-montane above 1,500 m, including high-altitude fields mainly above 2,200 m (Fig. 2) (Martinelli *et*

al. 1989; Veloso *et al.* 1991). Data on local climate, relief and soil are available from IBDF (1982) and ICMBio (2014).

Intensive fieldwork was carried out from March 2008 to September 2009, and occasionally in 2011, 2014, 2015 and 2016, by the walking survey method (Filgueiras *et al.* 1994). Specimens were georeferenced and processed according to Guedes-Bruni *et al.* (2002), and deposited in the herbaria RB and SP. Materials (including type specimens) from the herbaria ALCB, GUA, HB, R, RB, RBR, RFA, and SP (acronyms according to Thiers, continuously updated) were also examined, including specimens collected by P.C. Porto and A.C. Brade in the region of Itatiaia before the establishment of PARNA Itatiaia (Barberena *et al.* 2018). Exact collecting locations have been purposely omitted here since management actions have been discussed with the heads of PARNA Itatiaia and other researchers. The material was identified by comparison with specimens previously identified by experts and using the works of Pabst & Dungs (1975, 1977). To standardize descriptions, information from additional material and important

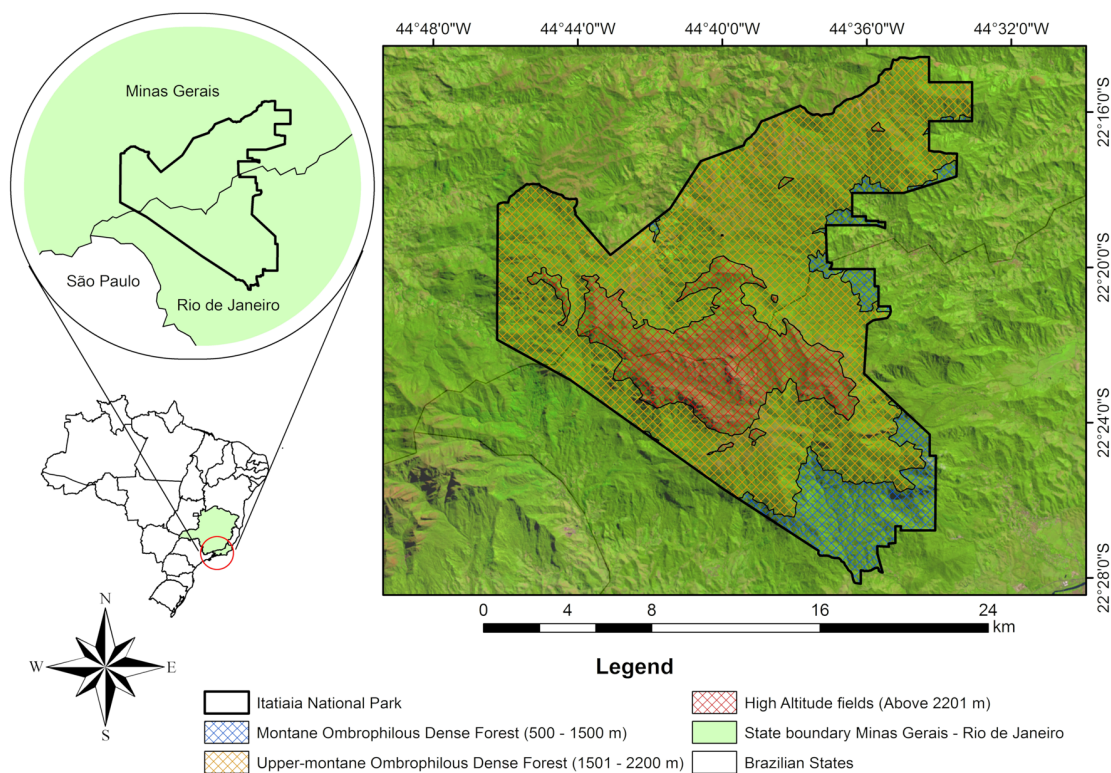


Figure 1 – Map showing the Parque Nacional do Itatiaia in the states of Minas Gerais and Rio de Janeiro, Brazil. Map produced by José Antônio Lima Rocha Junior.

references used for taxonomic identification was included as needed. The classification for Laeliinae followed van den Berg (2014). Morphological terminology for Orchidaceae follows Pridgeon *et al.* (1999). Data on geographical distribution and phytogeographic domains were based on Flora do Brasil (2020), whereas data on substrate were obtained during fieldwork and analysis of labels of specimens collected in PARNA Itatiaia, or sometimes from Flora do Brasil (2020). Data on conservation of Laeliinae in PARNA Itatiaia can be found in Barberena *et al.* (2018). In the key to the species presented below, presumed locally extinct species are marked with an asterisk, while species previously assessed (explicitly or implicitly) as possibly threatened in PARNA Itatiaia are marked with a hashtag, as already pointed out by Barberena *et al.* (2018).

Results and Discussion

The present study deals with 33 species of the subtribe Laeliinae from PARNA Itatiaia, belonging to six genera: *Epidendrum* (20 spp.), *Cattleya* (6 spp.), *Prosthechea* Knowles & Westc. (4 spp.), *Encyclia* Hook. (1 sp.), *Isabelia* Barb.Rodr. (1 sp.), and *Scaphyglottis* Poepp. & Endl. (1 sp.) (Fig. 3). This total represents ca. 15% of the orchid flora of PARNA Itatiaia (Barberena 2010). The species grow in shady and humid habitats, especially near rivers, at elevations ranging from 750–1,200 m. Species richness decreases with altitude. About 80% of the species of Laeliinae in PARNA Itatiaia are found exclusively in montane ombrophilous forest, with only five species occurring in upper montane ombrophilous forest, and none in open vegetation (Tab. 1).

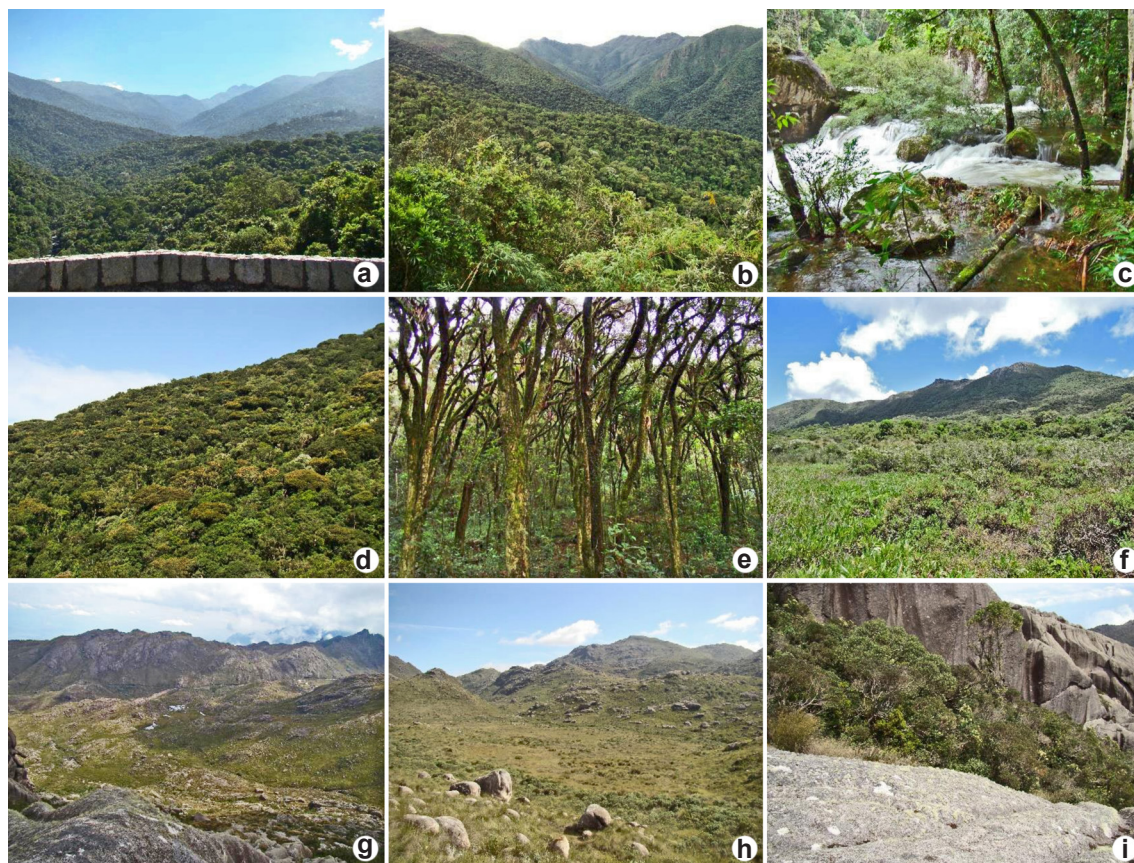


Figure 2 – a-i. Phytophysionomies of the Laeliinae species in the Parque Nacional do Itatiaia, southeastern Brazil – a-b. montane ombrophilous forest; c. river in montane vegetation; d-e. upper montane ombrophilous forest; f. upper montane ombrophilous forest and high-altitude fields; g-h. high-altitude fields; i. forest enclave within high-altitude fields. Photographs by Felipe Fajardo Villela Antolin Barberena.

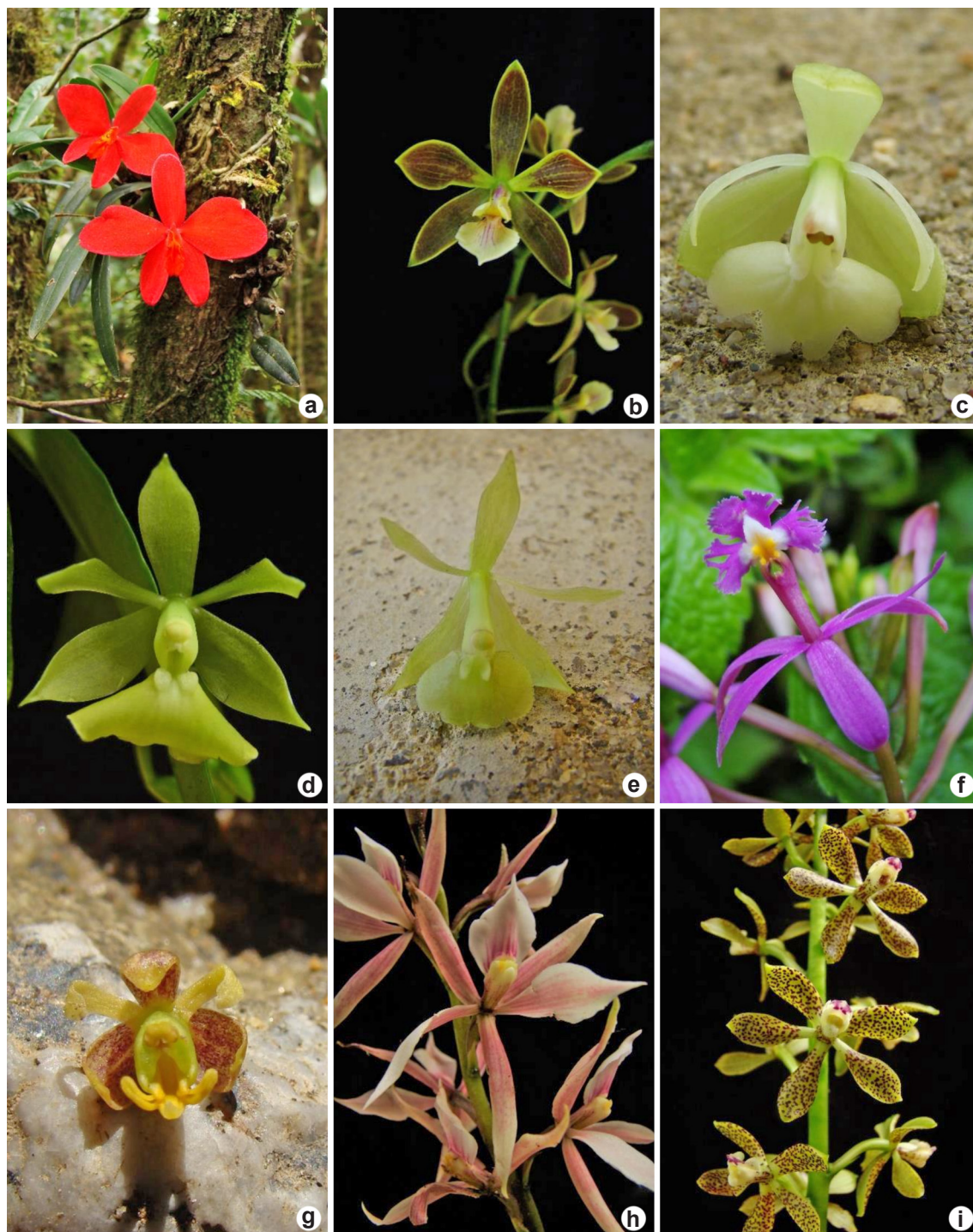


Figure 3 – a-i. Laeliinae species in the Parque Nacional do Itatiaia, southeastern Brazil – a. *Cattleya coccinea*; b. *Encyclia patens*; c. *Epidendrum hesnchenii*; d. *Epidendrum ochrochlorum*; e. *Epidendrum proligerum*; f. *Epidendrum secundum*; g. *Epidendrum tridactylum*; h. *Prosthechea allemanoides*; i. *Prosthechea pachysepala*. Photographs by Felipe Fajardo Villela Antolin Barberena.

Table 1 – Laeliinae species in the Parque Nacional do Itatiaia, southeastern Brazil. Elevation: MD = Missing Data; Phytophysiognomy: HAF = High-Altitude Fields; MD = Missing Data; MF = Montane Forest; UMF = Upper Montane Forest; Substrate: MD = Missing Data; E = Epiphyte; R = Rupicolous; T = Terricolous.

Species	Substrate	Phytophysiognomy	Elevation (m)	Number of specimens (Itatiaia)
<i>Cattleya bicolor</i> Lindl.	MD	MF	600	2
<i>Cattleya coccinea</i> Lindl.	E	UMF	1,700–2,400	23
<i>Cattleya crispa</i> Lindl.	MD	MD	MD	1
<i>Cattleya perrinii</i> Lindl.	MD	MF	600	2
<i>Cattleya purpurata</i> (Lindl. & Paxton) van den Berg	MD	MD	MD	1
<i>Cattleya schofieldiana</i> Rchb.f.	MD	MF	600	1
<i>Encyclia patens</i> Hook.	E / R	MF	750–1,150	6
<i>Epidendrum armeniacum</i> Lindl.	E	MF	800–1,225	9
<i>Epidendrum avicula</i> Lindl.	R	MF	800–1,000	2
<i>Epidendrum campos-portoi</i> Barberena	E	UMF	1,840	2
<i>Epidendrum chlorinum</i> Barb.Rodr.	E	MF / UMF	1,000–2,350	3
<i>Epidendrum cooperianum</i> Bateman	E	MF	MD	2
<i>Epidendrum filicaule</i> Lindl.	E	MF	800–950	3
<i>Epidendrum henschenii</i> Barb.Rodr.	E	MF	750–850	5
<i>Epidendrum latilabrum</i> Lindl.	MD	MF	1,300	1
<i>Epidendrum mantiqueiranum</i> Porto & Brade	E	UMF	1,788–2,200	4
<i>Epidendrum ochrochlorum</i> Barb.Rodr.	E	MF	750	2
<i>Epidendrum paranaense</i> Barb.Rodr.	E / R	MF	750–1,250	8
<i>Epidendrum proligerum</i> Barb.Rodr.	E	MF	800–900	5
<i>Epidendrum pseudodiforme</i> Hoehne & Schltr.	E	MF	815–915	3
<i>Epidendrum ramosum</i> Jacq.	E / R	MF	750–1,100	7
<i>Epidendrum rigidum</i> Jacq.	MD	MF	900	1
<i>Epidendrum saxatile</i> Lindl.	MD	MF	MD	1
<i>Epidendrum secundum</i> Jacq.	E / R / T	MF / UMF	750–2,000	32
<i>Epidendrum strobiliferum</i> Rchb.f.	MD	MF	900	1
<i>Epidendrum tridactylum</i> Lindl.	E	MF	800–1,050	7
<i>Epidendrum vesicatum</i> Lindl.	MD	MF	1,000	3
<i>Isabelia virginalis</i> Barb.Rodr.	MD	MF	1,300	1
<i>Prosthechea allemanoides</i> (Hoehne) W.E.Higgins	E	MF	800–1,100	4
<i>Prosthechea calamaria</i> (Lindl.) W.E.Higgins	MD	MD	MD	2
<i>Prosthechea fragrans</i> (Sw.) W.E.Higgins	MD	MF	850–1,200	3
<i>Prosthechea pachysepala</i> (Klotzsch) Chiron & V.P.Castro	E	MF	800–1,200	6
<i>Scaphyglottis modesta</i> (Rchb.f.) Schltr.	E / R	MF	750–1,200	9

Of the 33 species, 15 are endemic to the Brazilian Atlantic Forest and another eight are endemic to Brazil. Thirteen species (including five Atlantic Forest endemics) were considered locally extinct in PARNA Itatiaia since they have not been collected in the last 50 years. The local extinctions are probably due to the illegal collection of plants over recent decades. The ornamental genus *Cattleya* deserves special mention, because five of the six species have been collected only once or twice 95–105 years ago. Eight other species, all of the genus *Epidendrum* (*E. campos-portoi* Barberena, *E. chlorinum* Barb. Rodr., *E. cooperianum* Bateman, *E. filicaule* Lindl., *E. latilabrum* Lindl., *E. ochrochlorum* Barb. Rodr., *E. proligerum* Barb. Rodr., and *E. tridactylum* Lindl.) have only been found as small populations (commonly < 10 individuals) and thus are in need of prompt conservation action to avoid local extinction (Barberena *et al.* 2018).

Consultation of herbaria revealed a significant scarcity of Laeliinae samples from PARNA Itatiaia, with only 162 specimens, even considering the new collections added to herbaria RB and SP. Only a few species have been systematically collected, such as *Epidendrum secundum* Jacq., the most collected species with 32 specimens, followed by *Cattleya coccinea* Lindl. with 23 specimens; the former is possibly the most common species of Laeliinae in the area, as well as one of the most common in Brazil. The present study resulted in the recollection of 15 species. *Epidendrum ochrochlorum*, *E. ramosum* Jacq. and *E. tridactylum* had not been collected for over 50 years, whereas *E. filicaule* had not been collected in the area for over 95 years. In addition, *E. henschenii* Barb. Rodr. was recorded for the first time in PARNA Itatiaia. Several other species were historically collected once or twice (e.g., *Cattleya bicolor* Lindl., *C. crispa* Lindl., *E. saxatile* Lindl., *Isabelia virginialis* Barb. Rodr.), including *E. campos-portoi*, a newly described endemic species of PARNA Itatiaia (Tab. 1). These data reinforce the importance of the present study and call for urgent conservation efforts. Although the conservation scenario is clearly alarming, it is possible that small subpopulations still exist in inaccessible or unknown restricted areas. Despite

the data gathered so far, visitors and taxonomists are encouraged to share photos and information about the location of orchid species through contacts available on official sites of conservation units (Barberena *et al.* 2019), including PARNA Itatiaia, in order to fill knowledge gaps or even spread floristic news.

Morphological characteristics of caulome, leaves, lip, column and rostellum are especially useful for distinguishing genera of Laeliinae of PARNA Itatiaia. The genera *Isabelia* and *Scaphyglottis* are represented in PARNA Itatiaia by one species each, and are easily distinguished from the others. *Isabelia virginialis* has the caulome covered by lax and fibrous sheaths, similar to thin cotton mesh, and filiform leaves, whereas *Scaphyglottis modesta* (Rehb.f.) Schltr. has the caulomes superposed and a column foot. *Epidendrum* has the column adnate to the lip up to the apex and the rostellum parallel to the axis of the column and split lengthwise. On the other hand, *Cattleya*, *Encyclia* and *Prosthechea* have an entire rostellum that is subperpendicular to the axis of the column. However, while *Prosthechea* is distinguished by having flowers that are not resupinate and the column adnate up to the middle portion, the other two genera have resupinate flowers and a free column or adnate to the lip only at the base. *Encyclia* is represented by only one species, which has remarkable pyriform pseudobulbs and inflorescences without spathaceous bracts, whereas species of *Cattleya* have subcylindrical, cylindrical, clavate, fusiform or ovoid caulomes, and inflorescences usually with spathaceous bracts (except for *C. coccinea*). The number of flowers and morphological characteristics of caulome, leaves, inflorescence, floral bracts, sepals, petals, and mainly of the lip are variable and allow the species of Laeliinae in PARNA Itatiaia to be distinguished.

In order to update the knowledge and census of Laeliinae taxa in PARNA Itatiaia, a large rainforest remnant in southeastern Brazil, a taxonomic treatment for this subtribe in the park is provided, including an identification key, diagnostic morphological descriptions, distribution and habitat data, and comments on taxonomic affinities.

Taxonomic Treatment

Key to the species of subtribe Laeliinae in PARNA Itatiaia

1. Caulomes superposed; column foot present..... 33. *Scaphyglottis modesta*
- 1'. Caulomes not superposed; column foot absent.
 2. Caulome covered by lax and fibrous sheaths similar to thin cotton mesh; leaves filiform, ca. 0.05 cm wide..... 28. *Isabelia virginalis**
 - 2'. Caulome covered by congest sheaths, not fibrous like cotton mesh; leaves usually differently shaped, if linear, 0.2–1.8 cm wide.
 3. Column adnate to the lip up to the apex; rostellum parallel to the axis of the column, split lengthwise.
 4. Caulome thickened into pseudobulb.
 5. Inflorescence tomentose; lip entire 9. *Epidendrum avicula**
 - 5'. Inflorescence glabrous; lip noticeably trilobed..... 26. *Epidendrum tridactylum*#
 - 4'. Caulome not thickened into pseudobulb.
 6. Caulome branched.
 7. Inflorescence a panicle; lip trilobed, central lobe with apex noticeably emarginated 23. *Epidendrum saxatile**
 - 7'. Inflorescence a raceme or subcorymb; lip entire, with apex acute or rounded, or trilobed, with central lobe apex usually acute or rounded, sometimes emarginated.
 8. Leaves with emarginate-mucronate apex 25. *Epidendrum strobiliferum**
 - 8'. Leaves with acuminate, acute and/or obtuse apex, if emarginate, not mucronate.
 9. Leaves with emarginate apex, margin often revolute, sometimes plane 21. *Epidendrum ramosum*
 - 9'. Leaves with acuminate, acute and/or obtuse apex, margin plane.
 10. Graminoid herbs; petals ca. 0.5 × 0.06 cm 13. *Epidendrum filicaule*#
 - 10'. Not graminoid herbs; petals 0.9–1.8 × 0.15–0.5 cm.
 11. Floral bracts completely covering the pedicel+ovary; flowers white; lip entire 18. *Epidendrum paranaense*
 - 11'. Floral bracts partially covering the pedicel+ovary; flowers pale green or green; lip obscurely to noticeably trilobed.
 12. Lip ca. 1.4 × 2 cm, sharply revolute, central lobe ca. 1.1 × 1.2 cm 17. *Epidendrum ochrochlorum*#
 - 12'. Lip 0.7–1.1 × 1–1.4 cm, revolute, central lobe 0.45–0.55 × ca. 0.45 cm..... 19. *Epidendrum proligerum*#
 - 6'. Caulome not branched.
 13. Leaves imbricate, concave 27. *Epidendrum vesicatum**
 - 13'. Leaves not imbricate, plane and/or subplane.
 14. Flowers not resupinate 24. *Epidendrum secundum*
 - 14'. Flores resupinate.
 15. Spathaceous bract present.
 16. Inflorescence more than 50-flowered; central lobe of the lip with acute apex..... 8. *Epidendrum armeniacum*
 - 16'. Inflorescence 2–15-flowered or solitary flower; central lobe of the lip with emarginate apex.
 17. Flowers green; lip with three laminar calli 10. *Epidendrum campos-portoi*#

- 17'. Flowers white; lip with two ovoid calli..... 14. *Epidendrum henschenii*
- 15'. Spathaceous bract absent.
18. Caulome cylindrical, not laterally flattened.
19. Leaves 2–3.8 cm wide; inflorescence lax; flowers pinkish; lip trilobed 12. *Epidendrum cooperianum*[#]
- 19'. Leaves 0.5–1.7 cm wide; inflorescence dense; flowers green; lip entire.
20. Inflorescence a subcorymb; lip cordiform..... 11. *Epidendrum chlorinum*[#]
- 20'. Inflorescence a raceme; lip suborbicular 16. *Epidendrum mantiqueiranum*
- 18'. Caulome subcylindrical, laterally flattened.
21. Inflorescence pedunculate (1.5–2 cm long); lip entire 22. *Epidendrum rigidum*^{*}
- 21'. Inflorescence short-pedunculate (ca. 0.1 cm long), appearing to be sessile; lip trilobed.
22. Caulome narrow at the base and thickened to the apex; leaves longer at the apex of caulome than at the base; lip 1.4–1.7 × 2.6–3.7 cm ... 15. *Epidendrum latilabrum*[#]
- 22'. Caulome uniformly thick from the base to the apex; leaves of similar length along the caulome; lip ca. 0.8 × 1.2 cm 20. *Epidendrum pseudodiforme*
- 3'. Column free or adnate to the lip only at the base or up to the middle portion; rostellum subperpendicular to the axis of the column, entire.
23. Flowers not resupinate; column adnate to the lip up to its middle portion.
24. Caulome 1-foliate; inflorescence 6.2–7 cm long, 2- or 6-flowered.
25. Leaves 0.4–0.5 cm wide, linear; dorsal sepal ca. 1 cm long, oblanceolate 30. *Prosthechea calamaria*^{*}
- 25'. Leaves 1.8–3 cm wide, oblong; dorsal sepal ca. 2.2 cm long, lanceolate 31. *Prosthechea fragrans*^{*}
- 24'. Caulome 2–3-foliate; inflorescence 13.2–17.8 cm long, (7–)8–25-flowered.
26. Caulome 2-foliate; dorsal sepal and petals with apex noticeably acuminate; lip entire, callus absent 29. *Prosthechea allemanoides*
- 26'. Caulome 3-foliate; dorsal sepal and petals with apex acute; lip trilobed, callus present 32. *Prosthechea pachysepala*
- 23'. Flowers resupinate; column free or adnate to the lip only at the base.
27. Caulome pyriform; leaves linear 7. *Encyclia patens*
- 27'. Caulome subcylindrical, cylindrical, clavate or fusiform, rarely ovoid; leaves oblong, oblong-lanceolate or lanceolate, rarely ovate.
28. Caulome 0.6–2.4 cm long; leaves 0.8–6.6 × 0.5–1.8 cm; lateral sepals 0.9–2.1 cm long 2. *Cattleya coccinea*
- 28'. Caulome 14.9–66 cm long; leaves 14–40 × 2.2–8 cm; lateral sepals 3.8–7.4 cm long.
29. Caulome thickened into pseudobulb, 1-foliate.
30. Lateral sepals 0.7–0.9 cm wide, oblong; column noticeably narrower to the apex 4. *Cattleya perrinii*^{*}
- 30'. Lateral sepals 1.9–2.5 cm wide, elliptical or slightly elliptical; column equally thick from the base to the apex.
31. Petals 1–1.1 cm wide, oblong, margin undulate; central lobe of the lip with undulate margin 3. *Cattleya crispa*^{*}
- 31'. Petals 4.9–5.6 cm wide, elliptical, margin slightly undulate to crenulate; central lobe of the lip with entire margin 5. *Cattleya purpurata*^{*}
- 29'. Caulome not thickened into pseudobulb, 2-foliate.
32. Lip obscurely trilobed; lateral lobes reduced, not embracing the column 1. *Cattleya bicolor*^{*}
- 32'. Lip distinctly trilobed, lateral lobes prominent, embracing the column 6. *Cattleya schofieldiana*^{*}

* = Species presumed locally extinct

= Species previously assessed as possibly threatened in PARNA Itatiaia

Laeliinae in PARNA Itatiaia

1. *Cattleya bicolor* Lindl., Edwards's Bot. Reg. 22: sub t. 1919. 1836. Fig. 4a

Epiphyte (Flora do Brasil 2020). Caulome 16.2–66 cm long, not thickened into pseudobulb, cylindrical, covered by congested sheaths not like cotton mesh nor superposed, 2-foliolate. Leaves 14–19.2 × 2.2–3.8 cm, apical, lanceolate to oblong-lanceolate, apex obtuse. Solitary flower or raceme, 11–16.6 cm long, 2–3-flowered; spatheaceous bract 6.2–8.9 cm long; floral bracts 0.45–0.5 × 0.15–0.3 mm. Flowers resupinate; pedicel+ovary 3–4.5 cm long; sepals with acute to acuminate apex, margin entire; dorsal sepal 4.5–5.2 × ca. 1 cm, oblanceolate; lateral sepals 3.8–4 × 0.9–1.3 cm, oblong, falcate; petals 3.9–4.6 × 1.7–1.9 cm, obovate, apex acute, margin undulate; lip obscurely trilobed, lateral lobes reduced, not embracing the column, central lobe 3.4–3.6 × 1.7–2.4 cm, curved, oblong-spathulate, apex emarginate, margin irregularly fimbriate; column 2.4–2.7 cm long, equally thick from the base to the apex, free from the lip, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia ca. 0.12 × 0.09 cm, 4, obovoid. Capsules not seen.

Examined material: 1914, fl., *P.C. Porto* 67 (RB); 1918, fl., *P.C. Porto* (RB 259736).

Cattleya bicolor is endemic to Brazil (Atlantic Forest and Cerrado phytogeographic domains). It has been recorded in montane forest in PARNA Itatiaia but is presumed locally extinct. It is morphologically similar to *C. schofieldiana* Rehb.f. but differs by possessing an obscurely trilobed lip (vs. distinctly trilobed lip) and reduced lateral lobes not embracing the column (vs. prominent lateral lobes embracing the column).

2. *Cattleya coccinea* Lindl., Edwards's Bot. Reg. 22: sub t. 1919. 1836. Fig. 4b-c

Epiphyte. Caulome 0.6–2.4 cm long, thickened in pseudobulb, subcylindrical, fusiform or ovoid, covered by congest sheaths not like a cotton mesh nor superposed, 1-foliolate. Leaf 0.8–6.6 × 0.5–1.8 cm, apical, oblong to oblong-lanceolate or ovate, apex acute to rounded. Solitary flower; spatheaceous bract absent; floral bracts ca. 0.2 × 0.25 cm. Flowers red to red-orangish, resupinate; pedicel+ovary 1.4–5 cm long; sepals with acute apex, margin entire; dorsal sepal 0.9–2.1 × 0.3–0.6 cm, oblong to elliptical; lateral sepals 0.9–2.1 × 0.3–0.7 cm, oblong; petals 1.3–2.7 × 0.7–2 cm, ovate to obovate, apex acute to rounded, margin entire; lip trilobed, lateral lobes 0.8–1 × 0.3–0.6

cm, embracing the column, obliquely elliptical, apex rounded, central lobe 0.3–0.9 × 0.3–0.6 cm, lanceolate to triangular, apex acute, margin entire; column 0.4–0.5 cm long, equally thick from the base to the apex, free from the lip, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia 0.07–0.075 × 0.05–0.065 cm, 8, obovoid. Capsules 1.8–2 × 0.8–1.1 cm, subglobose, 6-ribbed, ribs with crenulate margin.

Examined material: VI.1902, fl., *C. Moreira & A.M. Ferreira* (R 2982); 1913, fl., *F. Tamandaré* (RB 1688); 13.VII.1930, fl., *R.W. Kaempfe* (RB 87280); IX.1934, fl., *A.C. Brade* 14020 (RB); 1935, fl., *A.C. Brade* (RB 150885); 15.I.1936, fl., *L. Lanstyack* (RB 150886); I.1936, fl., *P.C. Porto* (RB 261983); 25.III.1942, fl., *A.C. Brade* (RB 17251); 11.XI.1945, fl., *Altamiro & Walter* 77 (RB); 20.IX.1955, fl., *M.E. Kauffmann-Fidalgo & O. Fidalgo* 9 (RB); 16.VIII.1969, fl., *D. Sucre* 5786 (RB); 12.VII.1977, fl., *C. Pereira* 802 (RFA); 8.X.1981, fl., *G. Martinelli* 7771 (RB); 27.VII.2008, fr., *F.F.V.A. Barberena* 47 (RB); 27.VII.2008, fl., *F.F.V.A. Barberena* 48 (RB); 25.I.2009, fl., *F.F.V.A. Barberena* 127, 128, 129 (RB); 20.X.2009, fl., *F.F.V.A. Barberena et al.* 196 (RB); 21.X.2009, fl., *F.F.V.A. Barberena et al.* 201, 202 (RB); 23.VII.2018, fl., *D.R. Couto et al.* 3956 (RB); fl. (RB 150884).

Cattleya coccinea is endemic to the Brazilian Atlantic Forest and has been found in the upper montane forest and forest enclaves within high-altitude fields in PARNA Itatiaia, where it forms large populations (more than 200 individuals).

Historically, *C. coccinea* has been considered morphologically very similar to *C. mantiqueirae* (Fowlie) Van den Berg. These species were differentiated by subtle features like the shape of pseudobulbs, the shape, size and color of the leaves, the color and size of the flowers, and different flowering periods. Nonetheless, currently both names supposedly represent the same species (revision in Rodrigues *et al.* 2015). Great plasticity in the shape of the pseudobulbs, leaves and floral traits was observed in PARNA Itatiaia. As we did not observe discrete sets of characters that could distinguish the two species, the oldest name *C. coccinea* is adopted here, according to the Shenzhen Code (Turland *et al.* 2018). *Cattleya coccinea* is distinguished from the other species of *Cattleya* at PARNA Itatiaia by its shorter pseudobulbs, leaves and lateral sepals.

3. *Cattleya crisa* Lindl., Bot. Reg. 14: t. 1172. 1828. Fig. 4d

Epiphyte (Flora do Brasil 2020). Caulome 14.9–15.1 cm long, thickened in pseudobulb, subcylindrical, thicker towards the apex, covered

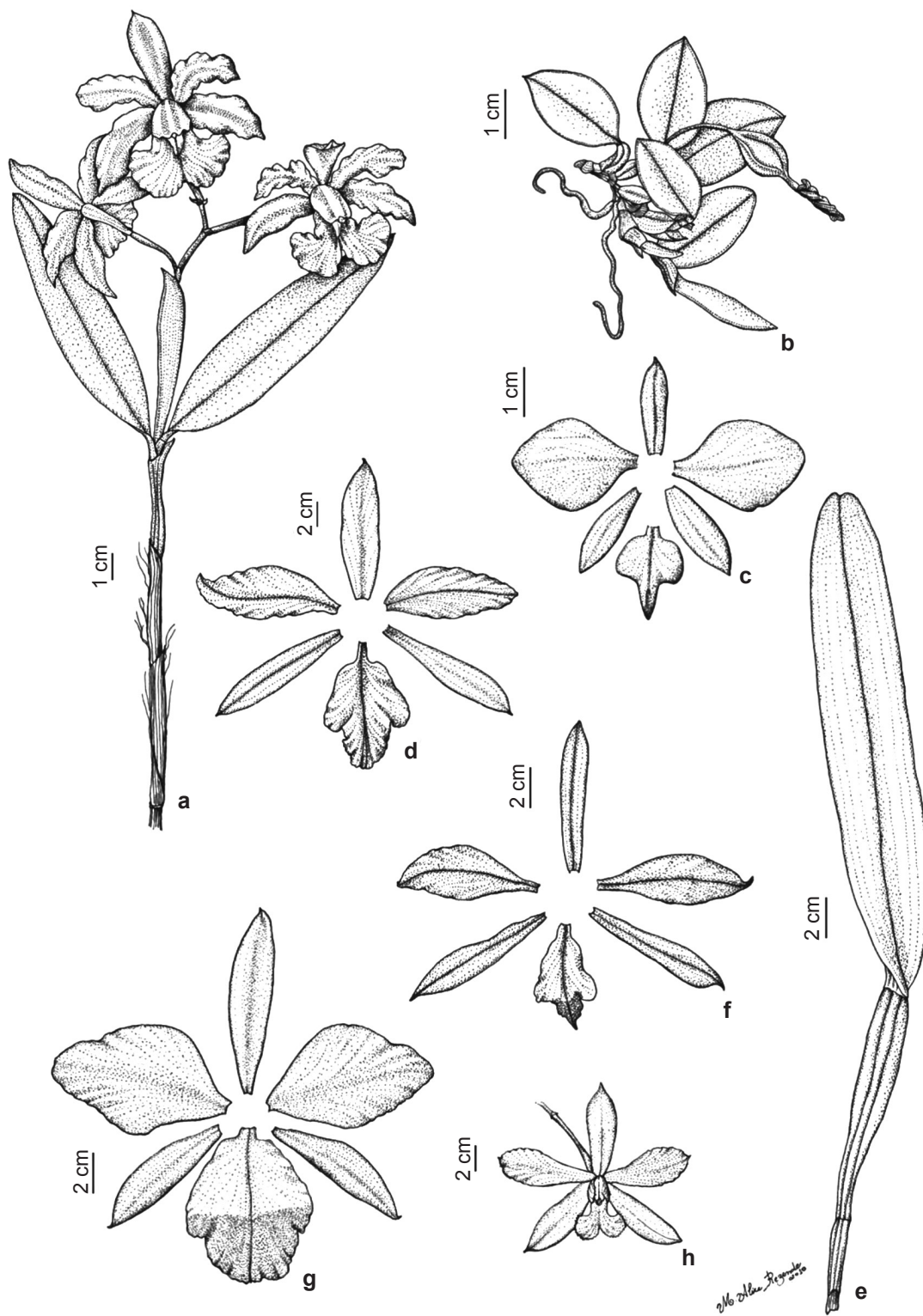


Figure 4 – a-h. *Cattleya* species – a. *C. bicolor* – floriferous branch; b-c. *C. coccinea* – b. habit; c. floral segments; d. *Cattleya crispa* – floral segments; e-f. *Cattleya perrini* – e. pseudobulb and leaf; f. floral segments; g. *Cattleya purpurata* – floral segments; h. *Cattleya schofieldiana* – flower. (a. Porto 67; b. Barberena 47; c. Barberena 127; d. Porto (RB 206766); e-f. Porto (RB 8193); g. Porto (RB 206768); h. Porto 68). Illustrated by Maria Alice Rezende.

by congest sheaths not like a cotton mesh nor superposed, 1-foliated. Leaf 21.6–34.8 × 3.9–4.5 cm, apical, oblong, apex emarginate. Raceme ca. 28.4 cm long, 4-flowered; spatheaceous bract ca. 14.3 cm long; floral bracts ca. 0.47 × 0.25 cm. Flowers resupinate; pedicel+ovary 7–7.3 cm long; dorsal sepal ca. 6.5 × 1.6 cm, oblong, apex slightly acuminate, lateral sepals 6.4–6.6 × 2.4–2.5 cm, elliptical, apex acute, margin entire up to the second 2/3-basal and slightly undulate towards the apex; petals 6.8–7.1 × 1–1.1 cm, oblong, apex acute, margin undulate; lip trilobed, lateral lobes ca. 3.2 × 1.2 cm, embracing the column, oblong, apex rounded, central lobe ca. 5 × 2 cm, oblong, apex rounded, margin undulate; column ca. 2.5 cm long, equally thick from the base to the apex, free from the lip, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia not seen. Capsules not seen.

Examined material: 1918, fl., *P.C. Porto* (RB 206766). **Additional examined material:** BRAZIL. RIO DE JANEIRO: Nova Friburgo, 18.VII.2001, fl., *M. Moraes et al.* (RB 355374). Santa Maria Magdalena, 1941, fl., *J.S. Lima* (RB 48858).

Cattleya crispa is endemic to the Brazilian Atlantic Forest but there are no data yet on its location in PARNA Itatiaia, which corroborates the assumption of Barberena *et al.* (2018) that this species is locally extinct. *Cattleya crispa* can be confused with *C. purpurata* but is distinguished by having petals and central lobe of the lip with noticeably undulate margin (*vs.* petals with a slightly undulate to crenulate margin and central lobe of the lip with an entire margin), and oblong (*vs.* elliptical) and narrower petals (1–1.1 cm *vs.* 4.9–5.6 cm).

4. *Cattleya perrinii* Lindl., Edwards's Bot. Reg. 24: pl. 2. 1838. Fig. 4e-f

Epiphyte (Flora do Brasil 2020). Caulome ca. 15 cm long, thickened in pseudobulb, clavate, covered by congest sheaths not like a cotton mesh nor superposed, 1-foliated. Leaf ca. 24 × 4.1 cm, apical, oblong, apex obtuse. Raceme 16–18.3 cm long, 2-flowered; spatheaceous bract not seen; floral bracts not seen. Flowers resupinate; pedicel+ovary 6.1–7.2 cm long; dorsal sepal 4.5–7.1 × 0.8–1 cm, oblong, apex acute, margin entire to slightly undulate; lateral sepals 5–7.1 × 0.7–0.9 cm, oblong, apex acute, margin entire to undulate; petals 5.1–6.7 × 2.2–2.3 cm, elliptical, apex acute to slightly rounded, margin undulate; lip trilobed, lateral lobes 2.7–3.2 × 0.9–1 cm, embracing the column, oblong,

apex rounded to acute, central lobe 4.7–5 × 1.2–1.3 cm, triangular, apex obtuse, margin crenulate; column 2.8–3.1 cm long, noticeably narrower to the apex, free from the lip, column foot absent; rostellum subperpendicular to the the axis of the column, entire; pollinia not seen. Capsules not seen. **Examined material:** 1914, fl., *P.C. Porto* (RB 8193); fl., *P.C. Porto* (RB 230999).

Additional examined material: BRAZIL. ESPÍRITO SANTO: Guarapari, 13.IV.2006, fl., *A.P. Fontana & F. Bernabe* 2073 (RB).

Cattleya perrinii is endemic to the Brazilian Atlantic Forest and has been recorded in montane vegetation in PARNA Itatiaia, but it is presumed locally extinct. *Cattleya perrinii* is morphologically more similar to *C. crispa* and *C. purpurata* but is distinguished mainly by having oblong and narrower (0.7–0.9 cm wide) lateral sepals (*vs.* elliptical or slightly elliptical, 1.9–2.5 cm wide), and a column narrowing to the apex (*vs.* equally thick from base to the apex).

5. *Cattleya purpurata* (Lindl. & Paxton) Van den Berg, Neodiversity 3: 10. 2008. Fig. 4g

Epiphyte (Flora do Brasil 2020). Caulome 30–40 cm long, thickened in pseudobulb, fusiform, covered by congest sheaths not like a cotton mesh nor superposed, 1-foliated. Leaf 25–40 × 4–8 cm, apical, oblong. Solitary flower; spatheaceous bract 10–17 cm long; floral bracts not seen. Flowers resupinate; pedicel+ovary 4–6 cm long; dorsal sepal ca. 8.5 × 2 cm, elliptical, apex acute, margin entire; lateral sepals 7.3–7.4 × ca. 1.9 cm, slightly elliptical, apex slightly acuminate, margin entire; petals ca. 8.1 × 4.9–5.6 cm, elliptical, apex acute, margin slightly undulate to crenulate; lip trilobed, lateral lobes ca. 5.1 × 1.7 cm, embracing the column, oblong, apex rounded, central lobe ca. 6.9 × 4.3 cm, oblong, apex slightly emarginated, margin entire; column ca. 3 cm long, equally thick from the base to the apex, free from the lip, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia not seen. Capsules not seen.

Examined material: 1918, fl., *P.C. Porto* (RB 206768).

Cattleya purpurata is endemic to the Brazilian Atlantic Forest but there are no data yet on its location in PARNA Itatiaia, which supports the hypothesis of Barberena *et al.* (2018) that it is locally extinct. The description of the vegetative organs was taken from Cogniaux (1898–1902) and complemented with personal observations of individuals under *ex situ* cultivation in orchid

greenhouses at Instituto de Pesquisas Jardim Botânico do Rio de Janeiro. It can be confused with *C. crispa* but differs mainly by having elliptical petals with a slightly undulate to crenulate margin (*vs.* oblong petals with noticeably undulate margin), which are also at least four times larger (4.9–5.6 cm *vs.* 1–1.1 cm), and the central lobe of the lip with an entire margin (*vs.* central lobe of the lip with noticeably undulate margin).

6. *Cattleya schofieldiana* Rchb.f., Gard. Chron. 2: 808.1882. Fig. 4h

Epiphyte (Flora do Brasil 2020). Caulome ca. 24.2 cm long, not thickened in pseudobulb, cylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 2-foliated. Leaves ca. 15 × 2.8–3.2 cm, apical, oblong, apex obtuse. Solitary flower; spatheaceous bract ca. 4 cm long; floral bracts ca. 0.55 × 0.25 cm. Flowers resupinate; pedicel+ovary ca. 4.2 cm long; sepals with acuminate apex, margin entire; dorsal sepal ca. 6.7 × 1.8 cm, oblong; lateral sepals 4.1–4.6 × ca. 1.5 cm, oblong, falcate; petals 5.5–5.7 × 1.9–2.3 cm, oblanceolate, apex acute, margin undulate; lip distinct trilobed, lateral lobes ca. 3.5 × 1.2 cm, prominent, embracing the column, elliptical, apex acute, central lobe ca. 4.6 × 2.8 cm, oblong-spathulate, curved, apex emarginate, margin irregularly fimbriate; column ca. 3.3 cm long, equally thick from the base to the apex, free from the lip, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia not seen. Capsules not seen.

Examined material: 1.1915, fl., *P.C. Porto* 68 (RB).

Cattleya schofieldiana is endemic to the Brazilian Atlantic Forest. It has been recorded in montane vegetation in PARNA Itatiaia but is presumed locally extinct. *Cattleya schofieldiana* is morphologically similar to *C. bicolor* but can be distinguished by having a distinct trilobed lip (*vs.* obscurely trilobed), and prominent lateral lobes embracing the column (*vs.* reduced, not embracing the column).

7. *Encyclia patens* Hook., Bot. Mag. 57: pl. 3013. 1830. Fig. 5a-b

Epiphyte, rarely rupicolous. Caulome 2.5–8 cm long, thickened in pseudobulb, pyriform, covered by congest sheaths not like a cotton mesh nor superposed, 2–3-foliated. Leaves 12–34 × 0.7–1.8 cm, apical, linear, apex obtuse-emarginate. Raceme, sometimes panicle, 11–52 cm long, (3–)8–44-flowered; spatheaceous bract absent;

floral bracts inconspicuous. Flowers resupinate; pedicel+ovary 2.2–2.4 cm long; sepals and petals brownish, margin green; dorsal sepal 1.7–1.75 × ca. 0.5 cm, oblanceolate, apex acute; lateral sepal 1.6–1.7 × ca. 0.5 cm, oblanceolate, apex acute; petals ca. 1.6 × 0.75 cm, obovate, apex acute to slightly rounded; lip white or pale yellow, trilobed, inserted at the base of the column, lateral lobes 0.8–0.85 × ca. 0.3 cm, embracing the column, oblong, apex rounded, central lobe ca. 0.95 × 0.8–0.85 cm, with pinkish lines at the base, broad-elliptical, apex acute, margin entire, callus ca. 0.3 cm long; column ca. 0.8 cm long, white with pinkish lines at the base, adnate to the lip only at the base, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia ca. 0.12 × 0.08 cm, 4, ovoid; Capsules 2.8–3.1 × 0.9–1.3 cm, ellipsoid, 6-ribbed, ribs with crenulate margin, transversely ridged at interribbed areas.

Examined material: 10.IX.1995, fl., *J.M.A. Braga et al.* 2797 (RB); 1.VI.2008, fl., *F.F.V.A. Barberena* 35 (RB); 2.VI.2008, fl., *F.F.V.A. Barberena* 42 (RB); 18.X.2008, fl., *F.F.V.A. Barberena* 73 (RB); 17.IV.2009, fr., *F.F.V.A. Barberena* 159 (RB); 21.VI.2009, fl., *F.F.V.A. Barberena* 187 (RB).

Encyclia patens is endemic to Brazil (Atlantic Forest and Cerrado phytogeographic domains) and although it is restricted to montane forest in PARNA Itatiaia, it is one of the most common species of Laeliinae in the area. Pollination events tend to be rare in many species of the genus, resulting in low fruit formation, but self-pollination for most flowers was observed in some populations of *E. patens* (Pridgeon *et al.* 2005). In PARNA Itatiaia, each inflorescence produces up to 44 showy and odorless (rarely fragrant) flowers. High rates of fruits per inflorescence (up to 19 capsules) can be observed throughout the year. These observations suggest the occurrence of self-pollination or agamospermy, which may also explain the abundance of the species in the area. It is easily recognized by having a pyriform caulome.

8. *Epidendrum armeniacum* Lindl., Edwards's Bot. Reg. 22: pl. 1867. 1836. Fig. 5c-d

Epiphyte. Caulome 5.5–14 cm long, not thickened in pseudobulb, not branched, subcylindrical, laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 2–4-foliated. Leaves 3.2–12.9 × 0.5–1.6 cm, distichous, on the 2/3-superior of the caulome, not imbricate, plane, narrowly elliptical to oblong or linear, rare elliptical, apex acuminate.

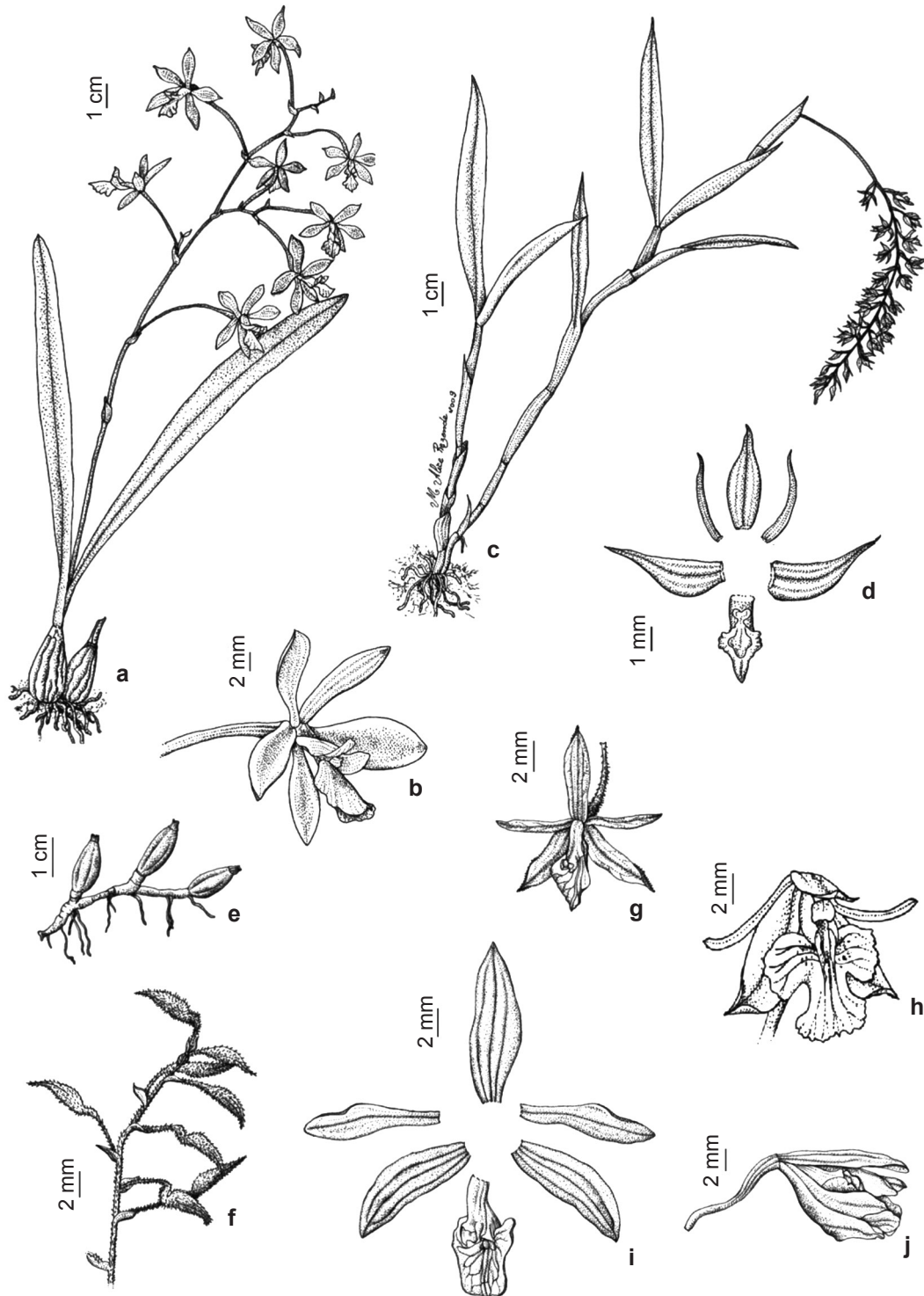


Figure 5 – a-j. *Encyclia* and *Epidendrum* species – a-b. *Encyclia patens* – a. habit; b. flower (lateral view); c-d. *Epidendrum armeniacum* – c. habit; d. floral segments; e-g. *Epidendrum avicula* – e. rizome and pseudobulbs; f. inflorescence with flower buds; g. flower (frontal view); h. *Epidendrum campos-portoi* – flower (frontal view); i-j. *Epidendrum chlorinum* – i. floral segments; j. flower (lateral view). (a-b. Barberena 42; c. Porto 649; d. Barberena 89; e-g. Brade 17199; h. Gonzaga 678; i-j. Brade 17226). Illustrated by Maria Alice Rezende. (h. figure originally published in Barberena & Gonzaga (2016)).

Raceme 7.5–16.5 cm long, more than 50-flowered, pendulous; spatheaceous bract 3.5–5.7 cm long; floral bracts 0.45–0.5 × ca. 0.1 cm, partially or completely covering the pedicel+ovary. Flowers resupinate; pedicel+ovary 0.35–0.5 cm long; sepals yellow-orangish to orange-brownish; dorsal sepal ca. 0.3 × 0.15 cm, elliptical, apex acuminate; lateral sepals 0.35–0.4 × ca. 0.15 cm, ovate, apex long-acuminate; petals 0.25–0.3 × 0.02–0.025 cm, pale green, linear, apex acute; lip yellow-orangish to orange-brownish, trilobed, lateral lobes 0.07–0.1 × ca. 0.1 cm, suborbicular, apex rounded, central lobe ca. 0.15 × 0.1 cm, lanceolate, apex acute, margin entire, callus ca. 0.1 cm long, 1, disciform, basal; column ca. 0.1 cm long, completely adnate to the lip, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia 0.024–0.035 × 0.018–0.02 cm, 4, elliptical. Capsules not seen.

Examined material: 1917, fl., *P.C. Porto 649* (HB, RB); 9.XII.1927, fl., *P.C. Porto 1599* (RB); 3.II.1948, fl., *A.C. Brade 18803* (RB); X.1952, fl., *N. Welter 46* (HB); 7.XII.1995, fl., *J.M.A. Braga et al. 3072* (RB); 19.XI.2008, fl., *F.F.V.A. Barberena 62* (RB); 26.XI.2008, fl., *F.F.V.A. Barberena 89* (RB); fl. (RB 560446).

Epidendrum armeniacum is widely distributed throughout South America, and is relatively common in montane vegetation in PARNA Itatiaia. It differs from other species of *Epidendrum* in the study area mainly by having a pendulous raceme inflorescence, with more than 50 flowers.

9. *Epidendrum avicula* Lindl., *J. Bot. (Hooker)* 3: 85. 1841. Fig. 5e-g

Rupicolous. Caulome 1–3 cm long, thickened in pseudobulb, subcylindrical to narrow-ovate, covered by congest sheaths not like a cotton mesh nor superposed, 2–3-foliated. Leaves 2.4–6.5 × 0.7–1.4 cm, apical, elliptical, apex acute. Raceme or panicle 4.8–11 cm long, 6–17-flowered, tomentose; spatheaceous bract absent; floral bracts 0.15–0.25 × ca. 0.05 cm. Flowers yellowish, not resupinate; pedicel+ovary 0.2–0.85 cm long, tomentose, thicker at the apex; sepals with abaxial surface glabrous, adaxial surface tomentose; dorsal sepal ca. 0.6 × 0.15 cm, elliptical, apex acuminate; lateral sepals 0.6–0.65 × ca. 0.15 cm, lanceolate, apex acuminate; petals 0.55–0.6 × ca. 0.05 cm, linear, concave, glabrous; lip ca. 0.6 × 0.25 cm, entire, elliptical, glabrous, apex acuminate, margin entire; column ca. 0.35 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise;

pollinia 0.05–0.07 × 0.03–0.035 cm, 4, obovoid. Capsules not seen.

Examined material: 11.III.1921, fl., *P.C. Porto 1041* (RB); 5.III.1942, fl., *A.C. Brade 17199* (RB).

Epidendrum avicula is widely distributed throughout South America. It has been recorded in montane forest in PARNA Itatiaia, but is presumed locally extinct. It is easily distinguished from other species of *Epidendrum* by its inflorescence and the adaxial surface of its sepals with tomentose indumentum.

10. *Epidendrum campos-portoi* Barberena, *Phytotaxa* 284(2): 227. 2016. Fig. 5h

Epiphyte. Caulome 11.5–27 cm long, not thickened in pseudobulb, not branched, cylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 3–6-foliated. Leaves 4–8.3 × 0.2–0.4 cm, distichous, distributed on the 1/2-superior of the caulome, not imbricate, plane, linear, apex acuminate. Raceme simple or compound, 2.8–4 cm long, 3–4-flowered; spatheaceous bract ca. 1.5 cm long; floral bracts 0.025–0.04 × 0.005–0.01 cm. Flowers green, resupinate; pedicel+ovary 0.9–1.1 cm long; dorsal sepal ca. 0.09 × 0.01 cm, oblong-linear, apex acute, lateral sepals 0.7–0.8 × 0.2–0.25 cm, oblanceolate, apex apiculate; petals ca. 0.8 × 0.05 cm, linear, apex slightly acute to rounded; lip deeply trilobed, lateral lobes 0.25–0.3 × ca. 0.2 cm, suborbicular, apex rounded, central lobe 0.25–0.35 × 0.3–0.4 cm, subquadrangular, apex emarginate, margin erose, calli ca. 0.15 cm long, 3, laminar, basal; column ca. 0.5 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia 0.045–0.5 × ca. 0.02 cm, 4, obovate. Capsules not seen.

Examined material: 12.V.2016, fl., *D.R. Gonzaga et al. 678* (ALCB, RB).

Epidendrum campos-portoi is endemic to PARNA Itatiaia, where it is restricted to a single location in upper montane forest. *Epidendrum campos-portoi* has been recently listed as a synonym of *E. caldense* Barb.Rodr. (Flora do Brasil 2020). Both species are endemic to the Brazilian Atlantic Forest and have thin (up to 0.2 cm wide) and cylindrical caulomes, linear leaves, mostly green flowers, linear petals with slightly acute to rounded apex, and the deeply trilobed lip. However, *E. campos-portoi* has the central lobe of the lip wider than the lateral lobes, with three basal and laminar calli, whereas *E. caldense* has the central lobe of the lip sharply narrower than the lateral

lobes, with two basal and ovoid calli (Barbosa Rodrigues 1881; Stancik *et al.* 2009; Barberena & Gonzaga 2016). *Epidendrum campos-portoi* is easily distinguished from the other species of *Epidendrum* in the study area by having lateral sepals with an apiculate apex and lip with three laminar calli.

11. *Epidendrum chlorinum* Barb.Rodr., Gen. Sp. Orchid. 2: 139. 1881. Fig. 5i-j

Epiphyte. Caulome 24–62 cm long, not thickened in pseudobulb, not branched, cylindrical, not laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 6-foliated. Leaves 10.2–16.8 × 1–1.7 cm, distichous, on the 1/3-distal of the caulome, not imbricate, plane, narrow-oblong to linear, apex acute to obtuse. Subcorymb 5–6.5 cm long, compound, 6–10-flowered, dense; spatheaceous bract absent; floral bracts ca. 0.1 × 0.25 cm. Flowers green, resupinate; pedicel+ovary 1–1.8 cm long; dorsal sepal 1–1.1 × 0.3–0.4 cm, elliptical to oblanceolate, apex acute; lateral sepals 1.1–1.3 × 0.4–0.5 cm, elliptical to oblong-lanceolate, apex acute to acuminate; petals 1–1.1 × 0.2–0.3 cm, oblanceolate, apex acute to obtuse; lip 0.8–0.9 × 0.7–0.8 cm, entire, concave, cordiform, base cordate, apex acute, margin entire, calli 0.07–0.13 × 0.03–0.05 cm, 2, ovoid to oblong, divergent, basal; column 0.45–0.55 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia 0.07–0.09 × 0.035–0.05 cm, 4, oblong to obovoid. Capsules ca. 2.4 × 1.5 cm, globose, 3-ribbed.

Examined material: 16.III.1942, fl., *A.C. Brade 17226* (RB); 15.III.1975, fl., fr., *P. Occhioni 7051* (RFA); 12.XII.2009, fl., *F.F.V.A. Barberena 197* (RB).

Epidendrum chlorinum is endemic to Brazil (Atlantic Forest and Cerrado phytogeographic domains). It has been recorded in montane and upper montane formations in PARNA Itatiaia, where it forms a small population. Prompt conservation actions are required to avoid local extinction of the species, as already pointed out by Barberena *et al.* (2018). It differs from other species of *Epidendrum* in the study area mainly by having the inflorescence in subcorymb and a concave lip with a cordate base.

12. *Epidendrum cooperianum* Bateman, Bot. Mag. 93: t. 5654. 1867. Fig. 6a-b

Epiphyte. Caulome 50–70 cm long, not thickened in pseudobulb, not branched, cylindrical,

not laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 9–20-foliated. Leaves 7.8–19 × 2–3.8 cm, distichous, distributed along the caulome or restricted to the distal half of the caulome, not imbricate, plane, oblong to narrow-elliptical, apex acute to slightly acuminate. Raceme 11–15 cm long, 7–30-flowered, lax; spatheaceous bract absent; floral bracts ca. 0.45 × 0.2 cm. Flowers pinkish, resupinate; pedicel+ovary 2.3–2.8 cm long; dorsal sepal 1.6–1.75 × 0.6–0.7 cm, slightly obovate to obovate, or elliptical, apex acute; lateral sepals 1.5–1.8 × 0.55–0.65 cm, obovate, apex acute to acuminate; petals 1.5–1.6 × 0.2–0.25 cm, oblong, apex obtuse, margin entire 2/3-basal, undulate to the apex; lip trilobed, lateral lobes 0.85–1.05 × ca. 0.9 cm, suborbicular, apex rounded, central lobe ca. 0.7 × 0.8 cm, suborbicular, apex conspicuously emarginate, margin entire, calli 2, ovoid, divergent, basal; column 1–1.1 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia 0.14–0.15 × 0.05–0.06 cm, 4, oblong to slightly obovoid. Capsules not seen.

Examined material: 1919, fl., *P.C. Porto* (RB 14533); 25.VI.2006, fl., *L.J.T. Cardoso & I. Aximoff 190* (RB).

Epidendrum cooperianum is endemic to the Brazilian Atlantic Forest and has been found in montane vegetation in PARNA Itatiaia. It is easily recognized among the species of *Epidendrum* in the study area by having wide leaves (2–3.8 cm), lax inflorescence and trilobed lip with the apex of the central lobe being conspicuously emarginate.

13. *Epidendrum filicaule* Lindl., Gen. Sp. Orchid. Pl. 101. 1831. Fig. 6c-d

Herbs epiphyte, graminoid. Caulome (4–) 40–70 cm long, not thickened in pseudobulb, branched, extremely thin, cylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 2–13-foliated. Leaves 2.9–15.2 × 0.2–0.5 cm, distichous, distributed on the distal half of the caulome, linear, apex acuminate, margin plane. Raceme 1.5–4 cm long, 2–3(–6)-flowered, rarely solitary flowers, usually at branchings of the caulome; spatheaceous bract absent; floral bracts 0.9–1 × 0.08–0.09 cm. Flowers pale green, resupinate; pedicel+ovary 0.45–0.7 cm long; sepals elliptical, dorsal sepal ca. 0.5 × 0.2 cm, apex acute, lateral sepals ca. 0.5 × 0.2 cm, apex acuminate; petals ca. 0.5 × 0.06 cm, linear to spatulate, apex acute, margin plane to slightly undulate; lip ca. 0.4 × 0.35 cm, entire, cordiform, apex acute, margin entire, calli ca. 0.02 × 0.01 cm, 2, ovoid, divergent,

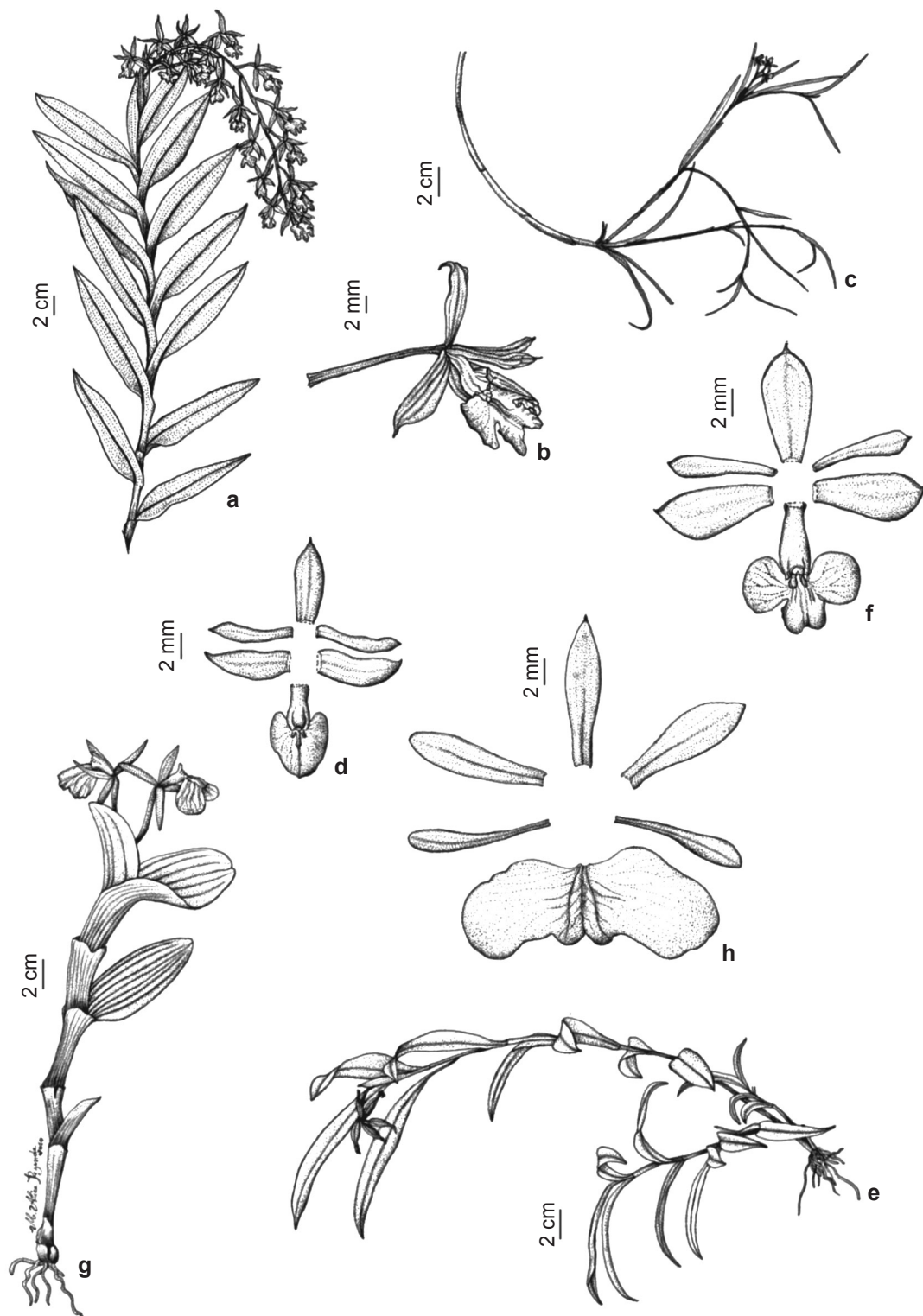


Figure 6 – a-h. *Epidendrum* species – a-b. *E. cooperianum* – a. floriferous branch; b. flower (lateral view); c-d. *E. filicaule* – c. floriferous branch; d. floral segments; e-f. *E. henschenii* – e. habit; f. floral segments; g-h. *E. latilabrum* – g. habit; h. floral segments. (a-b. Cardoso & Aximoff 190; c-d. Barberena 83; e-f. Barberena 148; g-h. Sampaio 4150). Illustrated by Maria Alice Rezende.

basal; column ca. 0.3 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia 0.04–0.05 × 0.02–0.03 cm, 4, ellipsoid. Capsules not seen.

Examined material: 1914, fl., *P.C. Porto 27A* (RB); 25.XI.2008, fl., *F.F.V.A. Barberena 83* (RB); 28.VII.2009, fl., *F.F.V.A. Barberena 189* (RB).

Epidendrum filicaule is endemic to the Brazilian Atlantic Forest. It has been recorded in montane vegetation in PARNA Itatiaia, but conservation actions are required to avoid local extinction, as already pointed out by Barberena *et al.* (2018). It is easily recognized by its graminoid habit, extremely thin caulome, and relatively short and narrow petals (ca. 0.5 × 0.06 cm).

14. *Epidendrum henschenii* Barb.Rodr., Gen. Sp. Orchid. 2: 147. 1881. Fig. 6e-f

Epiphyte. Caulome 10.5–44 cm long, not thickened in pseudobulb, not branched, cylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 4–8-foliated. Leaves 2.9–14.6 × 0.9–2.1 cm, distichous, distributed along the caulome or restricted to the distal half of the caulome, not imbricate, plane, narrow-elliptical to oblong, rare elliptical or lanceolate, apex acute, sometimes rounded. Raceme commonly compound, sometimes simple, 3–6.7 cm long, 1–15-flowered; spathaceous bract 2–4.4 cm long; floral bracts 0.3–0.5 × 0.15–0.25 cm. Flowers white, resupinate; pedicel+ovary ca. 1.4 cm long; dorsal sepal ca. 0.9 × 0.3–0.35 cm, oblong-elliptical, apex acute, lateral sepals 0.95–1 × ca. 0.4 cm, oblanceolate, apex acute; petals ca. 0.85 × 0.2 cm, oblong-oblanceolate, apex acute; lip trilobed, lateral lobes 0.45–0.5 × ca. 0.35 cm, orbicular, apex rounded, central lobe ca. 0.4 × 0.4 cm, subquadrangular, apex emarginate, margin entire, calli ca. 0.08 × 0.08 cm, 2, ovoid, divergent, basal; column ca. 0.65 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia not seen. Capsules 2.4–2.8 × 0.3–0.6 cm, subglobose.

Examined material: 2.VI.2008, fr., *F.F.V.A. Barberena 41* (RB); 2.VI.2008, fl., *F.F.V.A. Barberena 43* (RB); 15.XII.2008, fl., *F.F.V.A. Barberena 148* (RB); 19.IV.2009, fl., *F.F.V.A. Barberena 165* (RB); 21.VI.2009, fl., *F.F.V.A. Barberena 188* (RB).

Epidendrum henschenii is endemic to the Brazilian Atlantic Forest and is restricted to montane vegetation in PARNA Itatiaia, where it

forms a large population (over 100 individuals). It is recognized mainly by having whitish flowers, inflorescence commonly a compound raceme, and trilobed lip with an emarginate apex and two ovoid calli.

15. *Epidendrum latilabrum* Lindl., Edwards's Bot. Reg. 27: misc. 77. 1841. Fig. 6g-h

Epiphyte. Caulome 13–17 cm long, not thickened in pseudobulb, not branched, subcylindrical, laterally flattened, narrow at the base and thickened to the apex, covered by congest sheaths not like a cotton mesh nor superposed, 4-foliated. Leaves 5.2–7.5 × 1.2–3 cm, distichous, distributed along the caulome, longer at the apex of caulome than at the base, not imbricate, plane, elliptical to slightly ovate, apex slightly emarginate to emarginate. Raceme 1.4–1.7 × 2.6–3.7 cm, 2–3-flowered, short-pedunculate (ca. 0.1 cm long), appearing to be sessile; spathaceous and floral bracts absent. Flowers green, resupinate; pedicel+ovary 4.5–5.4 cm; dorsal sepal 2–2.3 × 0.5–0.6 cm, oblong to slightly oblanceolate, apex acute to acuminate, lateral sepals 1.9–2.1 × 0.6–0.7 cm, oblanceolate, apex acute to acuminate; petals 2–2.1 × 0.3–0.4 cm, oblanceolate, apex acute to rounded; lip 1.4–1.7 × 2.6–3.7 cm, trilobed, revolute, lateral lobes 1–1.1 × ca. 0.9 cm, obliquely elliptical, apex rounded, central lobe ca. 0.8 × 0.9–1 cm, suborbicular, apex emarginate, margin entire; column 1.4–1.5 cm long, apex irregularly dentate, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia ca. 0.1 × 0.09–0.1 cm, 4, ovoid to obovoid. Capsules not seen.

Examined material: IV.1926, fl., *A.J. Sampaio 4150* (R).

Epidendrum latilabrum is endemic to Brazil (Atlantic Forest and Amazon phytogeographic domains). It has been recorded in montane vegetation in PARNA Itatiaia but conservation actions are required to avoid local extinction as already pointed out by Barberena *et al.* (2018). The species could be confused with *E. pseudodiforme* Hoehne & Schltr. but differs by having the caulome thickened to the apex (*vs.* uniformly thick from the base to the apex), longer leaves at the apex of the caulome than at the base (*vs.* similar length along the caulome), and the lip measuring 1.4–1.7 × 2.6–3.7 cm (*vs.* ca. 0.8 × 1.2 cm), without calli (*vs.* calli present). The two species also bloom at different times - *E. latilabrum* in April and *E. pseudodiforme* in December and January.

16. *Epidendrum mantiqueiranum* Porto & Brade, Anais Reunião Sul-Amer. Bot. 3: 38. 1940.

Fig. 7a-b

Epiphyte. Caulome 9.7–20.5 cm long, not thickened in pseudobulb, not branched, cylindrical, not laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 2–5-foliated. Leaves 4–8 × 0.5–1.4 cm, distichous, distributed on the distal half of the caulome, not imbricate, plane, oblong-lanceolate to lanceolate, apex acute to acuminate. Raceme 2–4 cm long, 4–12-flowered, dense; spatheaceous bract absent; floral bracts 0.3–0.5 × 0.15–0.25 cm long. Flowers green, resupinate; pedicel+ovary ca. 0.45 cm long; dorsal sepal 0.5–0.55 × ca. 0.25 cm, elliptical-oblong, apex acute; lateral sepals ca. 0.55 × 0.3 cm, oblong to elliptical-oblong, apex acute; petals ca. 0.5 × 0.15 cm, oblanceolate, apex acute; lip ca. 0.35 × 0.35 cm, entire, suborbicular, apex acute, margin entire, disc with a central-longitudinal lamella, calli ca. 0.09 × 0.04 cm, 2, ovoid, divergent, basal; column ca. 0.3 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia ca. 0.05 × 0.02 cm, 4, subobovoid. Capsules not seen.

Examined material: 28.V.1935, fl., *A.C. Brade 14652* (RB, holotype!); VII.1938, fl., *L. Lanstyaack* (RB 44229); 25.VI.2016, fl., *D.R. Gonzaga & M.F.O. Silva 738, 739* (RB).

Epidendrum mantiqueiranum is endemic to the Brazilian Atlantic Forest and is restricted to upper montane forest in PARNA Itatiaia. It is recognized by having the inflorescence in a short, dense raceme, and an entire and suborbicular lip.

17. *Epidendrum ochrochlorum* Barb.Rodr., Gen. Sp. Orchid. 2: 140. 1881.

Fig. 7c

Epiphytic herbs, not graminoid. Caulome 9–17.3 cm long, not thickened in pseudobulb, branched, subcylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 3–5-foliated. Leaves 2.5–13 × 0.8–2.5 cm, distichous, distributed on the distal half of the caulome, narrow-oblong to narrow-elliptical, rare oblanceolate or ovate, apex acute to acuminate, margin plane. Subcorymb 3.1–7.3 cm long, 3–4-flowered; spatheaceous bract 0.7–2.7 cm long; floral bracts 0.8–1.1 × 0.25–0.4 cm long, partially covering the pedicel+ovary; pedicel+ovary 1.2–3 cm long. Flowers pale green, resupinate; sepals elliptical, apex acuminate, dorsal sepal 1.2–2 × 0.35–0.7 cm, lateral sepals 1.2–2.1 × 0.3–0.75 cm;

petals 1.1–1.8 × 0.15–0.5 cm, oblong-oblanceolate, apex acute, margin 2/3-basal entire, 1/3-distal slightly serrulate; lip ca. 1.4 × 2 cm, trilobed, sharply revolute, lateral lobes ca. 1.1 × 0.85 cm, transversely elliptical, apex rounded, central lobe ca. 1.1 × 1.2 cm, transversely elliptical, apex rounded, margin undulate, slightly crenulate, calli ca. 0.25 × 0.15 cm, 2, white, parallel, oblong, basal; column ca. 1 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia ca. 0.11 × 0.07–0.09 cm, 4, obovoid to subovoid. Capsules not seen.

Examined material: 21.II.1942, fl., *A.C. Brade 17184* (RB); 14.II.2009, fl., *F.F.V.A. Barberena & L.A.F. Ferreira Filho 143* (RB).

Epidendrum ochrochlorum is endemic to the Brazilian Atlantic Forest. It is restricted to montane formations in PARNA Itatiaia, but conservation actions are required to avoid local extinction as already pointed out by Barberena *et al.* (2018). It is vegetatively very similar to *E. proligerum*, and has even been recently listed as a synonym of *E. proligerum* (Flora do Brasil 2020). However, *E. ochrochlorum* is distinguished from *E. proligerum* by having larger flowers, particularly the lip (ca. 1.4 × 2 cm, sharply revolute vs. 0.7–1.1 × 1–1.4 cm, revolute), and the central lobe (ca. 1.1 × 1.2 cm vs. 0.45–0.55 × ca. 0.45 cm). The flowers are also large for the genus.

18. *Epidendrum paranaense* Barb.Rodr., Gen. Sp. Orchid. 2: 139. 1881.

Fig. 7d-e

Herbs epiphyte, rare rupicolous, pendulous, not graminoid. Caulome 6.5–26 cm long, not thickened in pseudobulb, branched, subcylindrical, slightly laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 2–8-foliated. Leaves 3.5–14 × 1.1–2.3 cm, alternate on the 2/3-distal of the caulome, oblong, apex obtuse, margin plane. Raceme 5–6.5 cm long, 5–7-flowered; spatheaceous bract absent; floral bracts 1.75–2.1 × 1.35–1.6 cm, distichous, imbricate, completely covering the pedicel+ovary. Flowers white, resupinate; pedicel+ovary 1.6–1.7 cm long, glandulose; sepals oblong, convex, apex acute, dorsal sepal ca. 1.05 × 0.45 cm, lateral sepals 1–1.1 × ca. 0.5 cm; petals ca. 0.9 × 0.3–0.35 cm, oblong, convex, apex rounded; lip ca. 0.7 × 0.8 cm, entire, cordiform, apex rounded, glandulose, margin entire, callus ca. 0.22 × 0.16 cm, 1, suborbicular, basal; column ca. 0.4 cm long, adnate to the lip up to the apex, column foot

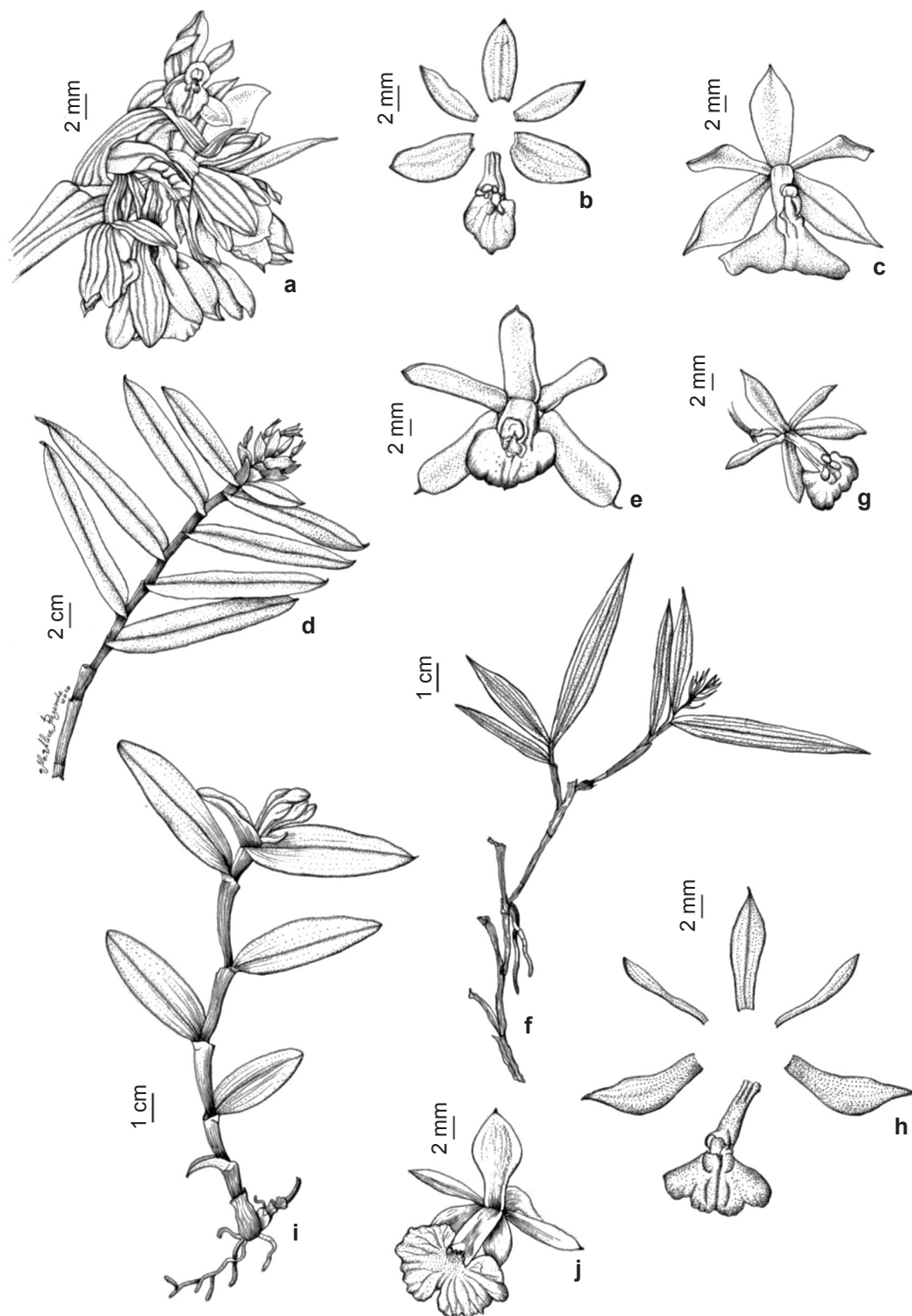


Figure 7 – a-j. *Epidendrum* species – a-b. *E. mantiqueiranum* – a. inflorescence; b. floral segments; c. *E. ochrochlorum* – flower (frontal view); d-e. *E. paranaense* – d. floriferous branch; e. flower (frontal view); f-h. *E. proligerum* – f. floriferous branch; g. flower (lateral view); h. floral segments; i-j. *E. pseudodiforme* – i. habit; j. flower (lateral view). (a-b. Lanstyack (RB 44229); c. Barberena & Ferreira Filho 143; d. Barberena 32; e. Barberena 142; f. Barberena 1; g. Porto 1044; h. Barberena 79; i. Barberena 95; j. Barberena 99). Illustrated by Maria Alice Rezende.

absent; rostellum parallel to the axis of the column, split lengthwise; pollinia ca. $0.09 \times 0.05\text{--}0.055$ cm, 4, oblong. Capsules ca. 2×1.1 cm, subglobose.

Examined material: XII.1918, fl., *P.C. Porto* (RB 7744); 2.II.1945, fl., *F. Segadas-Vianna* (R 712); 13.XI.1954, fr., *G.F.J. Pabst* (HB 2571); 15.II.1958, fl., *M. Emmerich* 43 (R); 3.II.1967, fr., *H. Strang & A. Castellanos* 959 (HB); 21.II.1968, *S.V. Andrade* 1111 (RB); 26.VI.2008, fr., *F.F.V.A. Barberena* 32 (RB); 13.II.2009, fl. and fr., *F.F.V.A. Barberena* 142 (RB).

Epidendrum paranaense is endemic to Brazil (Atlantic Forest and Cerrado phytogeographic domains). In PARNA Itatiaia it has been found in several localities in montane vegetation. It differs from other species of Laeliinae in the park by having large, distichous and imbricate floral bracts that completely cover the pedicel+ovary, white flowers, and an entire and cordiform lip.

19. *Epidendrum proligerum* Barb.Rodr., Gen. Sp. Orchid. 1: 61. 1877. Fig. 7f-h

Epiphytic herbs, not graminoid. Caulome (2.1–)7.5–16.2 cm long, not thickened in pseudobulbs, branched, subcylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 2–5-foliated. Leaves 3–13 \times 0.5–1.9 cm, distichous, distributed on the distal half of the caulome, oblong, or narrow-elliptical to linear-lanceolate, apex acute to acuminate, margin plane. Subcorymb 2.1–6.3 cm long, 3–7-flowered; spathaceous bract absent; floral bracts 0.6–0.7 \times 0.1–0.2 cm, partially covering the pedicel+ovary. Flowers green, resupinate; pedicel+ovary 1.2–2.9 cm long; dorsal sepal 1.2–1.6 \times 0.3–0.4 cm, lateral sepals 1.1–1.7 \times 0.35–0.5 cm, both elliptical to oblanceolate, apex acute to acuminate; petals 1.1–1.4 \times 0.15–0.3 cm, oblanceolate or oblong-lanceolate, apex acute to acuminate, margin entire on the 2/3-basal, obscurely serrate to the apex; lip 0.7–1.1 \times 1–1.4 cm, obscurely to noticeably trilobed, lateral lobes 0.5–0.55 \times ca. 0.3 cm, suborbicular, apex rounded, central lobe 0.45–0.55 \times ca. 0.45 cm, suborbicular to transversally elliptical, revolute, apex emarginate, rare acute, margin entire to crenulate, calli 0.11–0.17 \times 0.04–0.07 cm, 2, ovoid to slightly oblong, divergent, basal; column 0.7–0.8 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia ca. $0.085 \times 0.065\text{--}0.07$ cm, 4, obovoid. Capsules not seen.

Examined material: 11.III.1921, fl., *P.C. Porto* 1044 (RB); 23.I.2008, fl., *F.F.V.A. Barberena et al.* 1 (RB);

13.IV.2008, fl., *F.F.V.A. Barberena* 17 (RB); 25.XI.2008, fl., *F.F.V.A. Barberena* 79 (RB); 15.XII.2008, fl., *F.F.V.A. Barberena* 147 (RB).

Epidendrum proligerum is endemic to the Brazilian Atlantic Forest. It is restricted to montane vegetation in PARNA Itatiaia, where it forms a small population and is in need of conservation actions, as already pointed out by Barberena *et al.* (2018). It has variable floral morphology, mainly the dorsal sepal (elliptical to oblanceolate) and lip (obscurely to noticeably trilobed). Fruit set was not observed *in situ* or in *ex situ* cultivation. This species could be confused with *E. ochrochlorum* because both are vegetatively identical but differs mainly by having a smaller lip (0.7–1.1 \times 1–1.4 cm vs. ca. 1.4×2 cm; see other comments under *E. ochrochlorum*).

20. *Epidendrum pseudodiforme* Hoehne & Schltr., Repert. Spec. Nov. Regni Veg. Beih. 35: 71. 1925. Fig. 7i-j

Epiphyte. Caulome 3–13.5 cm long, not thickened in pseudobulb, not branched, subcylindrical, laterally flattened, uniformly thick from the base to the apex, covered by congest sheaths not like a cotton mesh nor superposed, 3–7-foliated. Leaves 2.8–5 \times 0.7–1.2 cm, distichous, distributed along the caulome, with similar length along the caulome, not imbricate, plane, subcoriaceous to coriaceous, oblong to elliptical, apex obtuse to obtuse-emarginate. Racemes 2–3(–4)-flowered, short-pedunculate (ca. 0.1 cm long), appearing to be sessile; spathaceous and floral bracts absent. Flowers green, resupinate; pedicel+ovary 2.3–2.6 cm long; dorsal sepal ca. 1.2×0.4 cm, elliptical, apex obtuse; lateral sepals ca. 1.2×0.5 cm, oblong-elliptic, apex acuminate; petals ca. 1.1×0.2 cm, oblanceolate, apex acute; lip ca. 0.8×1.2 cm trilobed, revolute, lateral lobes ca. 0.7×0.45 cm, suborbicular, apex rounded, central lobe ca. 0.7×0.65 cm, transversally elliptical, apex emarginate, margin slightly undulate, calli ca. 0.07×0.05 cm, 2, ovoid, divergent, basal; column ca. 0.8 cm long, adnate to the lip up to the apex, apex irregularly dentate, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia $0.05\text{--}0.08 \times 0.06\text{--}0.07$ cm, 4, ovate. Capsules 2–2.2 \times 0.9–1 cm, subglobose to ellipsoid, 6-ribbed, ribs margin crenulate.

Examined material: 15.I.1929, fl., *P.C. Porto* 1864 (RB); 13.IV.2008, fr., *F.F.V.A. Barberena* 20 (RB); 19.XII.2008, fl., *F.F.V.A. Barberena* 95 (RB); 20.XII.2008, fl., *F.F.V.A. Barberena* 99 (RB).

Epidendrum pseudodiforme is endemic to the Brazilian Atlantic Forest. In PARNA Itatiaia it has been found in several localities in montane vegetation. This species could be confused with *E. latilabrum* (see comments under the latter species), but is distinguished by having following set of features: caulome uniformly thick from base to apex (*vs.* narrow at the base and thickening to apex), leaves of similar length along the caulome (*vs.* longer at the apex of the caulome than at the base), and lip measuring ca. 0.8×1.2 cm (*vs.* $1.4\text{--}1.7 \times 2.6\text{--}3.7$ cm) with two calli (*vs.* calli absent).

21. *Epidendrum ramosum* Jacq., Enum. Syst. Pl. 29. 1760. Fig. 8a-d

Epiphyte, rare rupicolous. Caulome 8–41 cm long, not thickened in pseudobulb, branched, subcylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 3–16-foliated. Leaves $1.9\text{--}7.3 \times 0.3\text{--}1.3$ cm, alternate along the caulome or restricted to the distal half, oblong to oblanceolate, rarely lanceolate, apex asymmetrically emarginate, not mucronate, margin often revolute, sometimes plane. Raceme 1–3.2 cm long, 2–3-flowered; spatheaceous bract absent; floral bracts ca. 0.75×0.55 cm, partially covering the pedicel+ovary. Flowers green, resupinate; pedicel+ovary ca. 0.6 cm long; dorsal sepal ca. 6.2×1.4 mm, oblong, apex mucronate; lateral sepals ca. 0.6×0.2 cm, lanceolate, apex acuminate; petals ca. 0.6×0.08 cm, oblanceolate, apex obtuse; lip ca. 0.4×0.2 cm, entire, cordiform, apex acute, margin entire, lamellae ca. 0.08×0.001 cm, 2, linear, longitudinal, basal; column ca. 0.2 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia $0.029\text{--}0.033 \times 0.014\text{--}0.018$ cm, 4, obovoid. Capsules $0.9\text{--}1.1 \times 0.4\text{--}0.65$ cm, globose.

Examined material: 20.VII.1902, fl., *P. Dusén* 769 (R); III.1942, fl., *A.C. Brade* 29 (RB); I.1943, fl., *J.J. Sampaio* 1075 (RB); 24.IV.1954, fl., *N. Welter* 52 (HB); 13.XI.1954, fr., *G.F.J. Pabst* (HB 2570); 25.XI.2008, fl., *F.F.V.A. Barberena* 84 (RB); 4.V.2009, fr., *F.F.V.A. Barberena et al.* 168 (RB).

Epidendrum ramosum is widely distributed in the Americas. In PARNA Itatiaia it has been found in several localities in montane vegetation. It is recognized by having conspicuously branched caulome and leaves with an emarginate apex and usually revolute margin.

22. *Epidendrum rigidum* Jacq., Enum. Syst. Pl. 29. 1760. Fig. 8e-f

Epiphyte or rupicolous (Flora do Brasil 2020). Caulome 3–6.7 cm long, not thickened in pseudobulb, not branched, subcylindrical, laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 2–3-foliated. Leaves $2\text{--}3.7 \times 0.8\text{--}1.1$ cm, distichous, distributed along the caulome or restricted to the distal half, not imbricate, plane, oblong to elliptical-oblong, apex acute or obtuse. Raceme 5.7–6.7 cm long, 4-flowered, pedunculate (1.5–2 cm long); spatheaceous bract absent; floral bracts $0.7\text{--}1.15 \times 0.3\text{--}0.6$ cm, completely covering the pedicel+ovary. Flowers resupinate; pedicel+ovary ca. 1.1 cm long; dorsal sepal $0.5\text{--}0.55 \times 0.2\text{--}0.3$ cm, oblong-lanceolate, apex acute, lateral sepals ca. 0.55×0.3 cm, elliptical, convex, apex acute; petals $0.45\text{--}0.55 \times$ ca. 0.15 cm, oblong, convex, apex acute; lip ca. $0.3 \times 0.35\text{--}0.4$ cm, entire, suborbicular, apex rounded, margin entire, callus ca. 0.1×0.03 cm, 1, oblong, longitudinal; column ca. 0.3 cm long, laterally flattened, adnate to the lip up to the apex, margin dentate at the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia not seen. Capsules not seen.

Examined material: XI.1914, fl., *P.C. Porto* 72 (RB).

Epidendrum rigidum is widely distributed in the Americas. It has been recorded in montane vegetation in PARNA Itatiaia but is presumed locally extinct. It is easily recognized by having a laterally flattened caulome, inflorescence in a pedunculate raceme, and an entire lip.

23. *Epidendrum saxatile* Lindl., J. Bot. Hooker 3: 84. 1841. Fig. 8g-h

Epiphyte (Flora do Brasil 2020). Caulome ca. 7.5 cm long, not thickened in pseudobulb, branched, subcylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 2-foliated. Leaves $11\text{--}11.5 \times 1.4\text{--}1.5$ cm, distichous, distributed on the distal half of the caulome, narrow-elliptic, apex acute. Panicles ca. 35.5 cm long, about 26-flowered; spatheaceous bract absent; floral bracts ca. 0.6×0.3 cm. Flowers purplish, resupinate; pedicel+ovary ca. 0.2 cm long; dorsal sepal ca. 1×0.35 cm, oblanceolate, apex acute; lateral sepals $0.95\text{--}1 \times$ ca. 0.35 cm, oblong-oblanceolate, apex acute; petals ca. 1.1×0.1 cm, linear, apex obtuse, margin entire to slightly undulate; lip trilobed, lateral lobes $0.7\text{--}0.85 \times 0.6\text{--}0.65$ cm, suborbicular, apex rounded, central lobe $0.95\text{--}1 \times$ ca. 1 cm, flabellate, apex noticeably emarginate, margin dentate, calli ca. 0.15×0.03

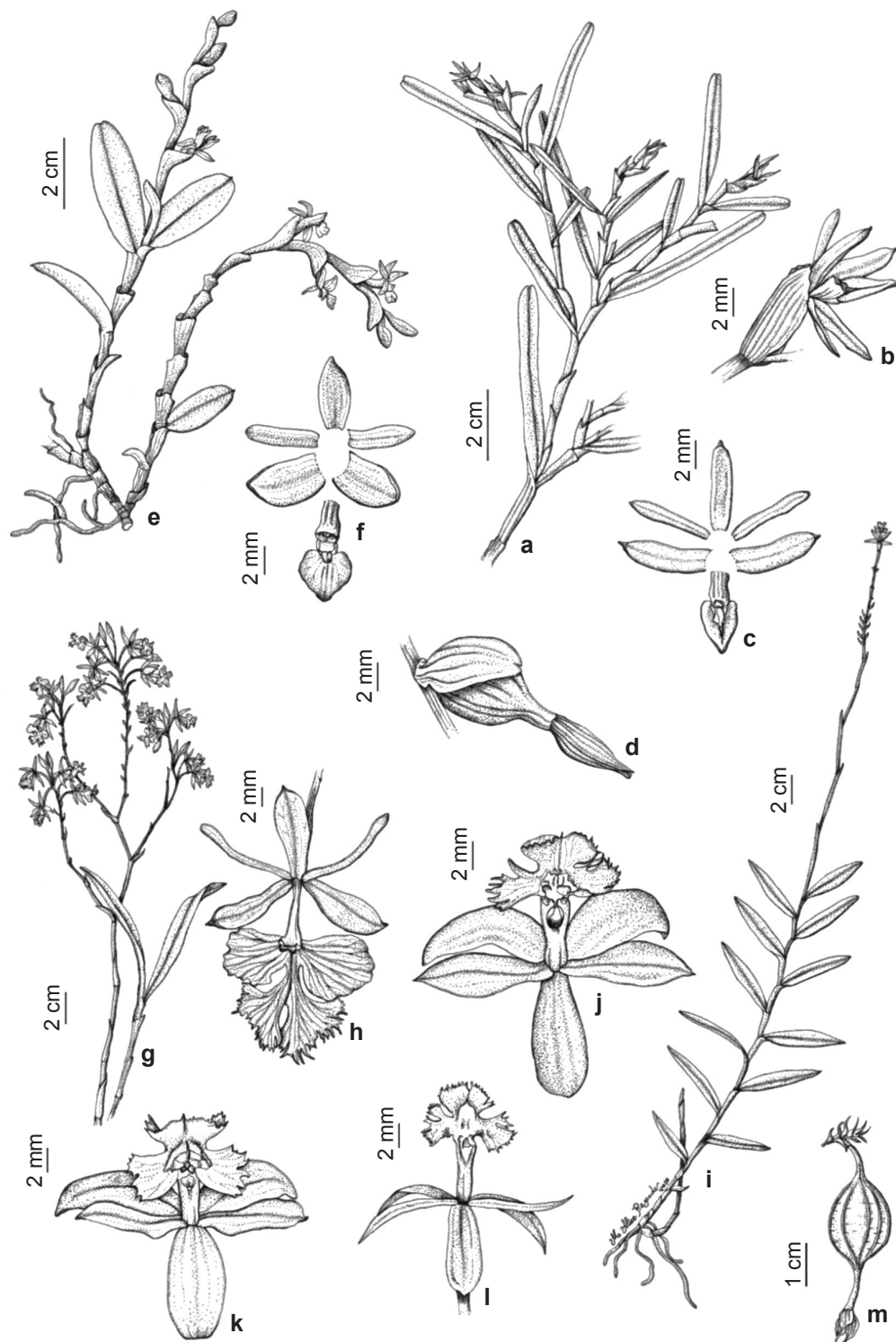


Figure 8 – a-m. *Epidendrum* species – a-d. *E. ramosum* – a. floriferous branch; b. flower (lateral view); c. floral segments; d. fruit; e-f. *E. rigidum* – e. habit; f. floral segments; g-h. *E. saxatile* – g. floriferous branch and caulome with leaves; h. flower; i-m. *E. secundum* – i. habit; j-l. morphological variation of the flower; m. fruit. (a-c. *Barberena* 84; d. *Barberena* 168; e-f. *Porto* 72; g-h. *Lanstyack* 143; i. *Barberena* 171; j. *Barberena* 13; l-m. *Barberena* 171). Illustrated by Maria Alice Rezende.

cm, 2, oblong, parallel, basal; column ca. 0.6 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia 0.1–0.11 × ca. 0.05 cm, 4, obovoid. Fruits not seen.

Examined material: III.1938, fl., *L. Lanstyaack* 143 (RB).

Epidendrum saxatile is endemic to South America. It has been recorded in montane vegetation in PARNA Itatiaia but it is presumed locally extinct. It has purplish flowers and a central lobe with an emarginate apex, as in *E. secundum* Jacq., but differs having a branched caulome, and a panicle with resupinate flowers (vs. not branched caulome, and the subcorymb without resupinate flowers).

24. *Epidendrum secundum* Jacq., Enum. Syst. Pl. 29. 1760. Fig. 8i-m

Terricolous or rupicolous, rarely epiphyte. Caulome 8.8–125 cm long, not thickened in pseudobulb, not branched, subcylindrical to cylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 5–24-foliated. Leaves 3.1–14.5 × 0.8–3.5 cm, distichous, distributed along the caulome or restricted to 2/3-distal, not imbricate, plane to subplane, oblong, ovate or narrow-elliptical, rare elliptical, apex acute to obtuse. Subcorymb simple or compound, 12–100 cm long, 7–23-flowered, rare solitary flowers; spatheaceous bract absent; floral bracts 0.3–1.1 × 0.1–0.15 cm. Flowers pinkish to purplish, not resupinate; pedicel+ovary 2.4–2.5 cm long; sepals elliptical, convex, dorsal sepal 0.9–1.05 × 0.4–0.5 cm, apex acute, lateral sepals 0.95–1.1 cm, apex acuminate; petals 0.95–1 × ca. 0.4 cm, oblanceolate, apex acute; lip trilobed, calli multi-shaped, complex, basal, lateral lobes ca. 0.45 × 0.4 cm, suborbicular, apex emarginate, margin erose, central lobe ca. 0.45 × 0.65 cm, transversally elliptical, apex emarginate, margin erose; column ca. 0.6 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia 0.07–0.08 × 0.014–0.022 cm, 4, oblanceolate. Capsules 4.7–4.9 × ca. 0.6 cm, ellipsoid to subglobose.

Examined material: fl. and fr., *A.J. Sampaio* (R 35853); 22.VII.1901, fl., *E. Huemendorff* 509 (R); 22.I.1902, fl., *P. Dusén* 726 (R); 20.V.1902, fl., *P. Dusén* 752 (R); 1914, *P.C. Porto* (RB 14854); 1917, *P.C. Porto* 652 (RB); 21.I.1921, fl., *P.C. Porto* 1882 (RB); 1926, fl., *A.J. Sampaio* 4074 (R); 21.V.1935, fl. and fr., *A.C. Brade* 14625 (RB); 21.V.1935, *A.C. Brade* 14627 (RB); III.1937, fl., *A.C. Brade* 15685 (RB); 25.II.1940, fl., *S. Mello & P. Occhioni* (RB 507892); 10.IV.1942, *W.D.*

Barros 783 (RB); VI.1943, fl., *F. Segadas-Vianna* (RFA 22817); VI.1945, fl., 2° ano da *Escola Nacional de Agronomia* (RBR 1740); XII.1952, fl., *N. Welter* 49 (HB); 19.II.1954, fl., *H. Monteiro* 104 (RBR); 19.IV.1959, fl. and fr., *C. Peres* 42 (R); VII.1959, *H.E. Strang* 120 (R); 13.I.1961, fl., *J.P. Lanna Sobrinho* 59 (GUA); 14.I.1961, fl., *H.E. Strang* 259 (GUA, RB); 21.IV.1962, fl., *H.E. Strang* 420 (GUA); 9.VIII.1965, *S.V. Andrade* 456 (RB); 3.II.1967, fr., *H.E. Strang & A. Castellanos* 958 (HB); 13.VIII.1977, fl. and fr., *Cézio* 749 (RFA); 10.X.1977, fl., *G. Martinelli* 3200 (RB); IV.1980, *A.L.V. Toscano de Brito* 17 (HB); 22.XI.1994, fl., *J.M.A. Braga et al.* 1574 (RB); 24.I.2008, fl., *F.F.V.A. Barberena et al.* 3 (RB); 15.III.2008, fl. and fr., *F.F.V.A. Barberena* 13 (RB); 5.V.2009, fl. and fr., *F.F.V.A. Barberena et al.* 171 (RB).

Epidendrum secundum is widely distributed throughout the Americas. It has been found in montane and upper montane formations in PARNA Itatiaia. It differs from the other species of Laeliinae in the park by having the inflorescence in subcorymb and non-resupinate flowers. Vegetative and reproductive buds can form on the inflorescence peduncle.

25. *Epidendrum strobiliferum* Rchb.f., Ned. Kruidk. Arch. 4(3): 333. 1858 [1859]. Fig. 9a-b

Epiphyte (Flora do Brasil 2020). Caulome 1.7–4.1 cm long, not thickened in pseudobulb, branched, subcylindrical, slightly laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 4–7-foliated. Leaves 1.1–2.3 × 0.4–0.7 cm, distichous, distributed along the caulome, oblong to elliptical, apex emarginate-mucronate. Raceme 1.7–1.8 cm long, 2-flowered; spatheaceous bract absent; floral bracts ca. 0.9 × 0.35 cm. Flowers white, resupinate; pedicel+ovary ca. 0.75 cm long; dorsal sepal ca. 0.6 × 0.2 cm, oblong, apex acute; lateral sepals ca. 0.6 × 0.2 cm, lanceolate, apex acute; petals ca. 0.6 × 0.1 cm, oblanceolate, apex rounded, margin entire, slightly undulate at the apex; lip ca. 0.4 × 0.25 cm, entire, cordiform, apex rounded, margin entire, lamella 1, longitudinal, basal; column ca. 0.2 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia not seen. Capsules not seen.

Examined material: III.1942, fl., *A.C. Brade* (RB 260802).

Epidendrum strobiliferum occurs throughout the Americas. It has been recorded in montane forest in PARNA Itatiaia but is presumed locally extinct (Barberena *et al.* 2018). The species is recognized mainly by having leaves with emarginate-mucronate apices.

26. *Epidendrum tridactylum* Lindl., Edwards's Bot. Reg. 24: Misc. 46, no. 81. 1838. Fig. 9c-e

Epiphyte. Caulome 12.5–32.5 cm long, thickened in pseudobulb, fusiform, covered by congest sheaths not like a cotton mesh nor

superposed, 4–5-foliated. Leaves 7–19.5 × 0.6–1.1 cm, distichous, distributed on the distal half of the caulome, linear, apex obtuse to emarginate. Panicle, rare raceme, 11.3–26 cm long, more than 50-flowered, glabrous; spathaceous bract

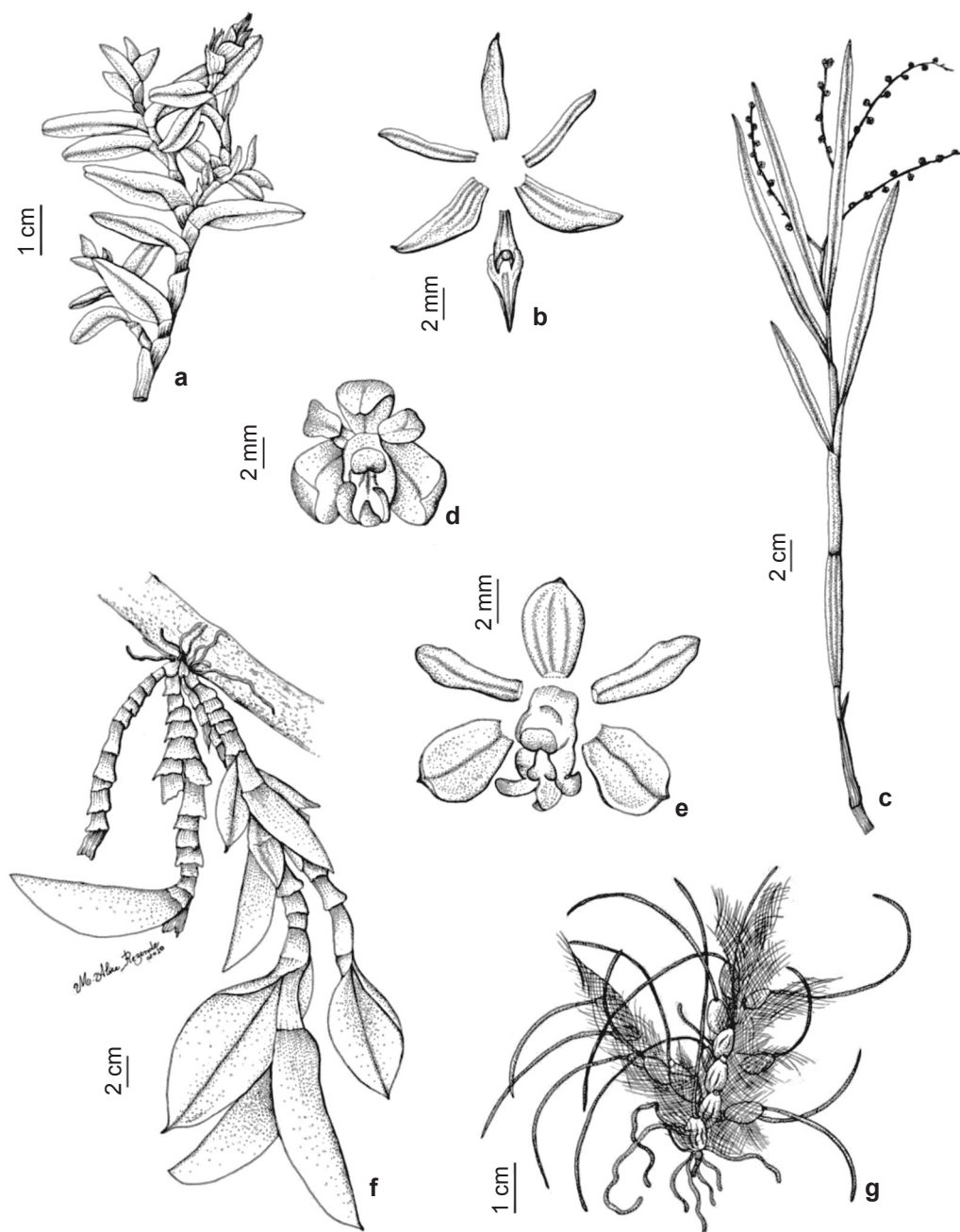


Figure 9 – a-g. *Epidendrum* and *Isabelia* species – a-b. *E. strobiliferum* – a. floriferous branch; b. floral segments; c-e. *E. tridactylum* – c. floriferous branch; d. flower; e. floral segments; f. *E. vesicatum* – habit; g. *I. virginalis* – habit. (a-b. Brade (RB 260802); c. Castellanos 24922; d. Barberena 91; e. Barberena 162; f. Dusén 720; g. Brade 17467). Illustrated by Maria Alice Rezende.

absent; floral bracts $0.2\text{--}0.25 \times \text{ca. } 1$ cm, partially covering the pedicel+ovary. Flowers resupinate; pedicel+ovary ca. 0.4 cm long; dorsal sepal ca. 0.35×0.2 cm, elliptical, apex acute; lateral sepals ca. 0.35×0.25 cm, elliptical to slightly obovate, apex acute; petals $0.35\text{--}0.4 \times \text{ca. } 0.1$ cm, oblong-oblancheolate, apex rounded; lip noticeably trilobed, lateral lobes ca. 0.15×0.06 cm, oblong, apex rounded, central lobe ca. 0.15×0.07 cm, triangular, apex retuse; column ca. 0.2 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia $0.022\text{--}0.024 \times 0.016\text{--}0.017$ cm, 4, obovoid. Capsules not seen.

Examined material: 1919, fl., *P.C. Porto* (RB 8208); 5.III.1942, fl., *W.D. Barros 642* (RB); 5.III.1942, fl., *A.C. Brade 17198* (RB); 20.IV.1962, fl., *A. Castellanos 24922* (GUA); 27.XI.2008, *F.F.V.A. Barberena 91* (RB); 18.IV.2009, fl., *F.F.V.A. Barberena 162* (RB); fl., *W.D. Barros* (RB 580257).

Epidendrum tridactylum occurs in South America. In PARNA Itatiaia it has been found in montane vegetation, but is in need of conservation actions, as already pointed out by Barberena *et al.* (2018). This species is distinguished from other species of *Epidendrum* in the study area mainly by having the caulome thickened into a fusiform pseudobulb, glabrous inflorescence and conspicuously trilobed lip.

27. *Epidendrum vesicatum* Lindl., Edwards's Bot. Reg. 24: Misc. 50. 1838. Fig. 9f

Epiphyte (Flora do Brasil 2020). Caulome 12–37 cm long, not thickened in pseudobulb, not branched, subcylindrical, laterally flattened, pendant, narrow at the base and thickened to the apex, covered by congest sheaths not like a cotton mesh nor superposed, 6–10-foliated. Leaves $6.3\text{--}15.5 \times 2.3\text{--}8$ cm, distichous, distributed along the caulome, imbricate, longer at the apex of the caulome than at the base, noticeably concave, elliptical, apex acuminate. Subcorymb ca. 5 cm long, 2-flowered; spatheaceous bract ca. 4 cm long; floral bracts not seen. Flowers resupinate; pedicel+ovary ca. 3 cm long; dorsal sepal ca. 0.7×0.25 cm, lanceolate, apex acute; lateral sepals ca. 0.7×0.25 cm, lanceolate, apex acute; petals ca. 0.6×0.1 cm, oblong-oblancheolate, apex rounded; lip ca. 0.7×0.3 cm, entire, oblong, apex truncate, margin entire, calli 2, ovoid, basal; column ca. 0.4 cm long, adnate to the lip up to the apex, column foot absent; rostellum parallel to the axis of the column, split lengthwise; pollinia not seen. Capsules ca. 3×0.3 cm, ellipsoid.

Examined material: 18.VII.1902, *P. Dusén 720* (R); 1919, fl., *P.C. Porto* (RB 5521); 9.III.1921, fr., *P.C. Porto 1056* (RB).

Epidendrum vesicatum is endemic to Brazil (Atlantic Forest and Cerrado phytogeographic domains). In PARNA Itatiaia it has been recorded in montane vegetation but is presumed locally extinct. It is easily distinguished from other species of Laeliinae mainly by its pendant habit, and having imbricate and conspicuously concave leaves.

28. *Isabelia virginalis* Barb.Rodr., Gen. Sp. Orchid. 1: 76. 1877. Fig. 9g

Epiphyte or rupicolous (Flora do Brasil 2020). Caulome $0.65\text{--}0.75 \times 0.35\text{--}0.4$ cm, thickened in pseudobulb, subglobose to globose, not superposed, covered by lax and fibrous sheaths similar to thin cotton mesh, 1-foliated. Leaves $3\text{--}18 \times \text{ca. } 0.05$ cm, apical, sessile, filiform (ratio length: width 60:1–360:1), apex acute to acuminate. Solitary flower; spatheaceous bract absent; floral bracts not seen. Flowers resupinate; pedicel+ovary ca. 0.35 cm long; sepals ca. 0.6×0.3 cm, elliptic, apex acute; petals lanceolate ca. 0.5×0.1 cm; lip ca. 0.6×0.5 cm, entire, subspatulate, apex retuse, margin entire; column ca. 0.3 cm long, column foot absent; pollinia not seen. Capsules not seen.

Examined material: 15.II.1945, *A.C. Brade 17467* (RB).

Additional examined material: BRAZIL. RIO DE JANEIRO: Nova Friburgo, 15.V.2003, fl., *M. Bocayuva 134 et al.* (RB).

Isabelia virginalis is endemic to the Brazilian Atlantic Forest. In PARNA Itatiaia it has been recorded in montane vegetation but is presumed locally extinct (Barberena *et al.* 2018). It is easily distinguished by the presence of lax and fibrous sheaths that resemble a thin cotton mesh covering the rizome and pseudobulbs, and by the filiform leaves.

29. *Prosthechea allemanoides* (Hoehne) W.E.Higgins, Phytologia 82(5): 376. 1997 [1998].

Fig. 10a-b

Epiphyte. Caulome 6–11.6 cm long, thickened in pseudobulb, fusiform, covered by congest sheaths not like a cotton mesh nor superposed, 2-foliated. Leaves $12.5\text{--}23.6 \times 1.8\text{--}3.9$ cm, apical, oblong, apex obtuse. Raceme 13.2–17.8 cm long, 8–15-flowered; spatheaceous bract $5.3\text{--}7.3$ cm long; floral bracts $0.75\text{--}0.8 \times \text{ca. } 0.2$ cm. Flowers not resupinate; pedicel+ovary ca. 1 cm long; sepals pale pinkish, dorsal sepal ca. 2.1×0.5 cm, lanceolate,

apex noticeably acuminate, convex, revolute; lateral sepals 2–2.1 × 0.6–0.7 cm, elliptical, convex, apex acuminate to mucronate, margin irregularly undulate, revolute; petals ca. 2.2 × 0.5 cm, white, veins pinkish at abaxial surface, lanceolate, convex, apex noticeably acuminate, margin entire, revolute; lip 1.2–1.3 × 0.8–0.9 cm, white, veins pinkish at the base, entire, suborbicular, apex acuminate, margin slightly undulate, involute at the distal half, callus absent; column ca. 0.8 cm long, adnate to the lip up to the middle portion, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia 0.09–0.12 × 0.064–0.07 cm, 4, obovoid. Capsules not seen.

Examined material: 28.X.1931, fl., *J.F. Zikán* (SP 28414); 10.X.1977, fl., *G. Martinelli* 3210 (RB); 20.IX.2008, fl., *F.F.V.A. Barberena* 64, 69 (RB).

Prosthechea allemanoides is endemic to the Brazilian Atlantic Forest and has been found in several localities in montane vegetation in PARNA Itatiaia. It is distinguished from the other species of *Prosthechea* in the study area mainly by having a 2-foliolate caulome, dorsal sepal and petals with a noticeably acuminate and convex apex, entire lip, and no callus.

30. *Prosthechea calamaria* (Lindley) W.E.Higgins, *Phytologia* 82(5): 377. 1997[1998]. Fig. 10c-d

Epiphyte (Flora do Brasil 2020). Caulome 6.7–6.9 cm long, thickened in pseudobulb, subcylindrical to slightly fusiform, covered by congest sheaths not like a cotton mesh nor superposed, 1-foliolate. Leaves 11–13.3 × 0.4–0.5 cm, apical, linear, apex acute. Raceme 6.5–7 cm long, 6-flowered; spathe bract ca. 2.2 cm long; floral bracts ca. 0.2 × 0.03 cm. Flowers not resupinate; pedicel+ovary 0.9–1.3 cm long; sepals and petals oblanceolate, apex acuminate, dorsal sepal ca. 1 × 0.3 cm, lateral sepals 0.85–0.95 × 0.2–0.3 cm, petals 1–1.05 × 0.3–0.35 cm; lip ca. 0.55 × 0.45 cm, entire, suborbicular, apex acute, margin entire, calli ca. 0.3 × 0.05 cm, 2, oblong, basal; column 0.4–0.5 cm long, adnate to the lip up to the middle portion, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia ca. 0.06 × 0.05 cm, 4, obovoid. Capsules 1.3–1.9 × 1.1–1.3 cm, ovoid.

Examined material: 1914, fl. and fr., *P.C. Porto* 23 (RB); 1918, fl., *P.C. Porto* (RB37300).

Prosthechea calamaria is endemic to Brazil (Atlantic Forest and Cerrado phytogeographic domains). There are no location data for the species in PARNA Itatiaia, which supports the hypothesis of it being locally extinct, as highlighted by

Barberena et al. (2018). It differs from the other species of *Prosthechea* in the area mainly by having linear leaves and an oblanceolate dorsal sepal.

31. *Prosthechea fragrans* (Sw.) W.E.Higgins, *Phytologia* 82(5): 377. 1997[1998]. Fig. 10e-f

Epiphyte (Flora do Brasil 2020). Caulome 3.9–5.2 cm long, thickened in pseudobulb, subcylindrical, covered by congest sheaths not like a cotton mesh nor superposed, 1-foliolate. Leaves 10.3–16 × 1.8–3 cm, apical, oblong, apex obtuse. Raceme ca. 6.2 cm long, 2-flowered. Spathe bract ca. 2.1 cm long; floral bracts 0.35–0.4 × 0.1–0.2 cm. Flowers not resupinate; pedicel+ovary 1.2–2 cm long; dorsal sepal ca. 2.2 × 0.35 cm, lanceolate, apex acuminate, concave; lateral sepals ca. 2.2 × 0.35–0.4 cm, oblong, apex acuminate; petals ca. 1.9 × 0.3–0.35 mm, oblong to oblanceolate, concave, apex acuminate; lip ca. 1.5 × 1 cm, entire, suborbicular, apex acuminate, margin entire; column ca. 0.5 cm long, adnate to the lip up to the middle portion, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia ca. 0.11 × 0.07 cm, 4, obovoid. Capsules not seen.

Examined material: 1914, fl., *P.C. Porto* (RB 8153); 1933, (RB 322772, RB 583685).

Prosthechea fragrans occurs throughout the Americas. In PARNA Itatiaia it has been recorded in montane vegetation but is presumed locally extinct. It is morphologically similar to the other species of *Prosthechea* in the area but differs mainly by having oblong leaves, and lanceolate dorsal sepal.

32. *Prosthechea pachysepala* (Klotzsch) Chiron & V.P.Castro, *Richardiana* 3: 174. 2003.

Fig. 10g-h

Epiphyte. Caulome ca. 23.7 cm long, thickened in pseudobulb, fusiform, laterally flattened, covered by congest sheaths not like a cotton mesh nor superposed, 3-foliolate. Leaves 13.7–20.1 × 2.2–3.1 cm, apical, oblong, apex obtuse. Raceme ca. 16.3 cm long, (7–)15–25-flowered; spathe bract ca. 2.4 cm long; floral bracts 0.7–1.3 × 0.3–0.4 cm. Flowers not resupinate; pedicel+ovary ca. 2 cm long; dorsal sepal ca. 1.2 × 0.4–0.5 cm, oblanceolate, apex acute; lateral sepals 1.2–1.3 × 0.5–0.55 cm, oblanceolate to slightly elliptical, apex acute; petals 1.1–1.3 × 0.35–0.45 cm, oblanceolate, apex acute; lip trilobed, lateral lobes 0.25–0.35 × ca. 0.15 cm, semicircular, reflexed, apex rounded, central lobe ca. 1.5 ×

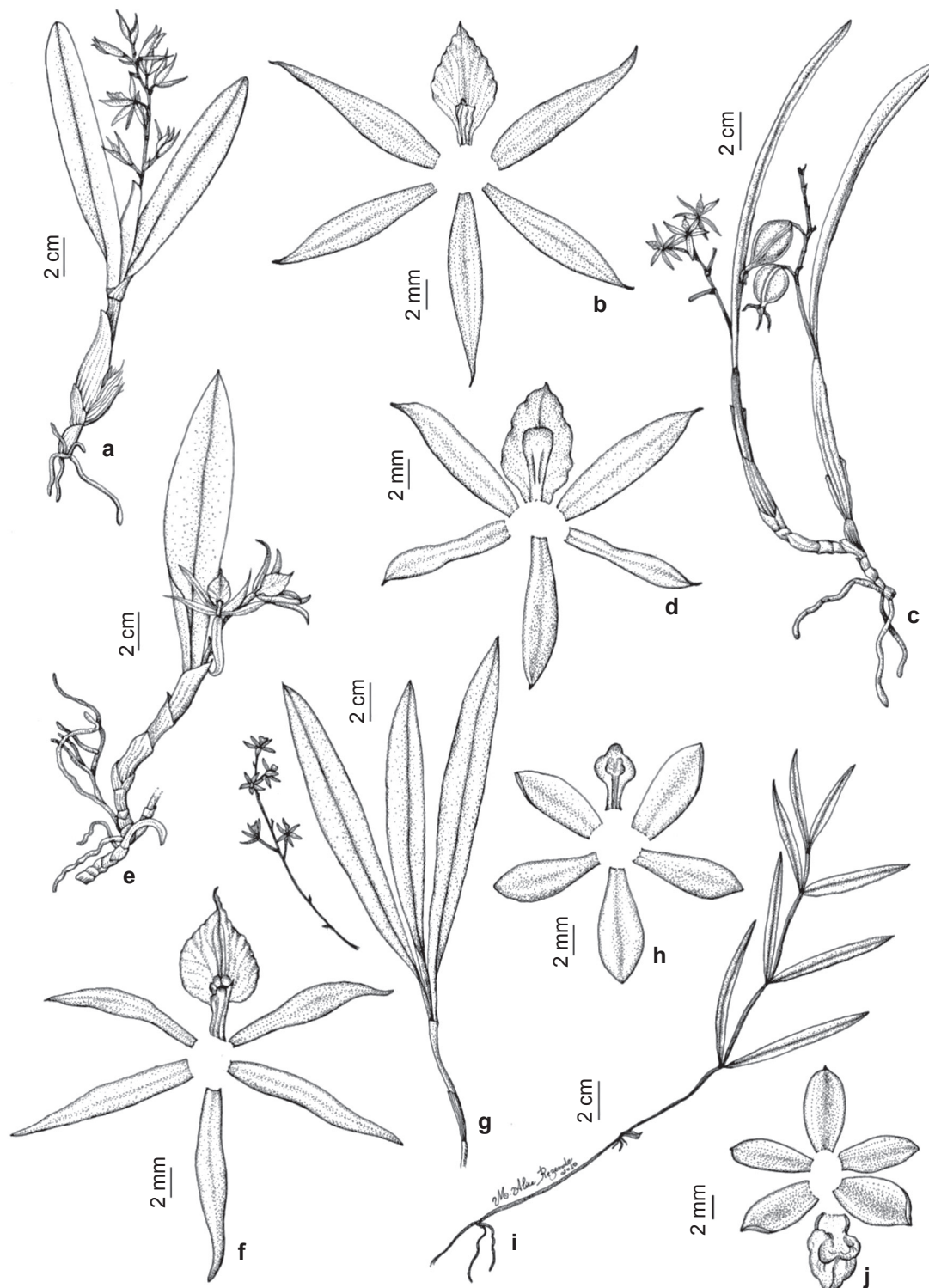


Figure 10 – a-j. *Prosthechea* and *Scaphyglottis* species – a-b. *P. allemanoides* – a. habit; b. floral segments; c-d. *P. calamaria* – c. habit; d. floral segments; e-f. *P. fragrans* – e. habit; f. floral segments; g-h. *P. pachysepala* – g. floriferous branch and caulome with leaves; h. floral segments; i-j. *S. modesta* – i. habit; j. floral segments. (a. Barberena 69; b. Zikán (SP 28414); c-d. Porto 23; e-f. Porto (RB 8153); g-h. Barberena 103; i-j. Barberena 96). Illustrated by Maria Alice Rezende.

0.3 cm, triangular, apex acute, margin entire, calli 0.3–0.4 × 0.08–0.13 cm, 2, oblong, basal; column 0.6–0.8 cm long, adnate to the lip up to the middle portion, column foot absent; rostellum subperpendicular to the axis of the column, entire; pollinia not seen. Capsules 2–3.2 × 1.2–1.9 cm, slightly ellipsoid, subtriquetra, 6-ribbed.

Examined material: 20.XII.1927, fl., *P.C. Porto 1623* (RB); 20.IV.1962, fl., *A. Castellanos 25674* (GUA); 25.XI.2008, fl., *F.F.V.A. Barberena 85* (RB); 26.XI.2008, fl., *F.F.V.A. Barberena 87* (RB); 21.XII.2008, fl., *F.F.V.A. Barberena 103* (RB); 19.XI.2009, fr., *F.F.V.A. Barberena 181* (RB).

Prosthechea pachysepala is endemic to Brazil (Atlantic Forest and Cerrado phytogeographic domains). In PARNA Itatiaia it has been found in several localities in montane vegetation. It is easily distinguished from the other species of *Prosthechea* in the area by having a 3-foliolate caulome, dorsal sepal, and petals with acute apex, trilobed lip and calli.

33. *Scaphyglottis modesta* (Rchb.f.) Schltr., Repert. Spec. Nov. Regni Veg. 23(631/633): 46. 1926.

Fig. 10i-j

Epiphyte or rupicolous. Caulome 2–28.5 cm long, thickened in pseudobulb, cylindrical, covered by congest sheaths not like a cotton mesh, superposed, 2-foliolate. Leaves 2.2–13.9 × 0.4–1.2 cm, apical, linear to slightly oblong, apex obtuse, sometimes mucronate. Solitary flower or fascicule 0.9–1.6 cm long, 2–3-flowered; spathaceous bract absent; floral bracts ca. 0.1 cm long. Flowers resupinate; pedicel+ovary ca. 0.8 cm long; sepals and petals pale green, with purplish macules at the apex on the adaxial surface, apex acute, dorsal sepal 0.6–0.65 × 0.3–0.35 cm, elliptical, lateral sepals 0.55–0.65 × 0.3–0.35 cm, ovate, petals 0.5–0.55 × ca. 0.2 cm, elliptical; lip pale green, margin cream, trilobed, inserted at the apex of the column foot; lateral lobes ca. 0.1 × 0.1 cm, auricular, apex obtuse, central lobe ca. 0.2 × 0.25–0.3 cm, orbicular, apex obtuse, margin entire, calli ca. 0.15 × 0.12 cm, 2, basal; column 0.4–0.5 cm long, purplish, wings ca. 0.15 × 0.1 cm, pale green, auricular, apex obtuse, column foot 0.2–0.25 cm long; pollinia not seen; rostellum transverse, liguliform, curved. Capsules 1–1.2 × 0.4–0.6 cm, subglobose, 6-ribbed.

Examined material: 1914, fl., *P.C. Porto* (RB 8194); 1914, fl., *P.C. Porto 49* (RB); 9.I.1928, fl. and fr., *P.C. Porto 1664* (RB); 12.III.1942, fl., *W.D. Barros 658* (RB); 12.III.1942, fr., *A.C. Brade 17209* (RB); 14.I.1997, fl.,

J.M.A. Braga et al. 3876 (RB); 15.III.2008, fr., *F.F.V.A. Barberena 12* (RB); 19.XII.2008, fl., *F.F.V.A. Barberena 96* (RB); 14.II.2009, fr., *F.F.V.A. Barberena 146* (RB).

Scaphyglottis modesta is widely distributed in Central America and South America. In PARNA Itatiaia it has been found in several localities in montane vegetation. It is easily distinguished from the other species of Orchidaceae in the park by having an extremely branched habit due to the superposed pseudobulbs, presence of column foot and winged column.

Doubtful name

1. *Cattleya* × *itatiayae* Campos Porto (= *C. guttata* Lindl. × *C. loddigesii* Lindl.). Arq. J. Bot. Rio Janeiro 2: 63-67, fig. 27. 1918. (non *Cattleya* × *hybrida* H.J. Veitch, Gard. Chron. 1863: 602).

According to Porto (1918) and Brade (1956), *Cattleya* × *itatiayae* is most likely a hybrid between *C. loddigesii* and *C. guttata*. Porto (1918) reported that the shape and color of the sepals and petals of a single specimen resemble *C. loddigesii*, whereas the consistency of floral parts, shape of the lip and macules of the sepals and petals are similar to *C. guttata*. Both authors also pointed out that both species were very common in the Itatiaia region, which corroborates the presumed origin.

The holotype (*P. Campos Porto 201*), collected in 1916 and comprising just one flower, was the only herbarium specimen found, and was identified by the collector himself as *C. itatiayae* (apparently not as a hybrid). Porto (1918) described the new taxon as having one to two maculate flowers. The number of flowers is congruent with the circumscription of *C. loddigesii*, whereas the presence of maculate sepals and petals is frequently observed in *C. guttata*.

The specimen belongs to *Cattleya* because the flower has a column free from the lip and the lateral lobes of the lip embrace the column. The possibility of *Cattleya* × *itatiayae* being a hybrid can not be ruled out because the specimen has distinct floral characteristics that are present in both parental species. However, Porto (1918) did not cite any examined collection, and based the description on a cultivated specimen at Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, Brazil, where it flowered.

Cattleya guttata occurs in the central region of the Brazilian coast (southern Bahia state to Rio de Janeiro state), from sea level to 300 m in elevation, and usually not far from the Atlantic Ocean (Zaslowski 2008). In this work, the author

also stated that some orchid growers reported the occurrence of the species in the southern part of Brazil, in Santa Catarina state, and in the inland of the continent, in Minas Gerais state, where the plants occur at low altitudes and near water courses. This suggests the possibility that *C. guttata* occurs near PARNA Itatiaia, mainly in the area within Minas Gerais. *Cattleya loddigesii* occurs in the states of Rio de Janeiro and Minas Gerais (Flora do Brasil 2020) and has been observed in the buffer zone around the border of PARNA Itatiaia.

However, the occurrence of these two supposed parental species within PARNA Itatiaia remains unknown, and the supposed hybrid has not been collected in the area for almost 100 years. According to Porto (1918) and Brade (1956), *Cattleya* × *itatiayae* was collected at 600 m, at a locality that was greatly altered throughout over the 20th century.

Cattleya × *itatiayae* has been mistakenly considered synonymous with *Cattleya* × *hybrida* H.J.Veitch (IPNI 2020), but the species author himself listed *C. loddigesii* and *Cattleya aclandiae* Lindl. as parentals (Veitch 1863).

In PARNA Itatiaia, *Cattleya* × *itatiayae* differs from other species of Laeliinae by having maculate sepals and petals. However, it is considered a doubtful name based on the previous discussion, the absence of data in the literature and the lack of recent collections.

Author participation

FFVA provided all photos and collected, identified and described the specimens. JFAB and FB guided the work and provided significant suggestions during the study. All the authors contributed to preparation and critical revision of the manuscript and added intellectual content.

Acknowledgements

We thank the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) and the administration of PARNA Itatiaia, for the license to collect and technical and logistical support; the curators of the herbaria consulted, for access to the collections; José Antônio Lima Rocha Junior, for drawing the map; Erik Wild, for reviewing the English language; and Maria Alice Rezende, for the botanical illustrations. FFVAB received a scholarship from FAPERJ, and JFAB and FB received production grants from CNPq.

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