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Original article

Synopsis of Orchidaceae Juss. in the northern lowland Atlantic Forest

Luiz Henrique Liberato Moreira[1*], Cássio van den Berg[2] and Maria Regina de Vasconcellos Barbosa[3]

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ABSTRACT

Lowland forests, also known as *tabuleiro* forests, are the predominant phytophysiognomy in the Atlantic Coastal Forest in northeastern Brazil. We inventoried the Orchidaceae present in the northern section of those forests, from the state of Rio Grande do Norte until the southern region of the state of Pernambuco. We examined specimens from seven regional herbaria and undertook field expeditions to four conservation units in the region. A total of 65 species belonging to 36 genera and to subfamilies Epidendroideae (44 species), Orchidoideae (16), and Vanilloideae (5) were identified. The most diverse genera are *Epidendrum* e *Habenaria*, with eight and seven species, respectively. Native species represented 96 % of the total observed, with 27 % being endemic to Brazil. Epiphytic (35) and terrestrial (27) species predominated; only three species are hemiepiphytic. We registered 14 new records of species for Rio Grande do Norte, two for Paraíba, and one for Pernambuco. Diagnoses of genera and species, as well as an identification key, data on geographic distribution, taxonomic and ecological comments, conservation status, and photos of the species are provided.

Keywords: Northeastern Brazil, orchids, *tabuleiro* forest, taxonomy.

Introduction

Orchidaceae Juss. are among the richest and more diverse plant families, consisting of approximately 28,000 species and 736 genera, which are distributed in five subfamilies: Apostasioideae Horan., Vanilloideae Kostel, Cypripedioideae Lindl. *ex* Endl., Orchidoideae A.A.Eaton and Epidendroideae Szlach. (Chase *et al.* 2015; Christenhusz & Byng 2016). It is estimated that more than 2,684 orchid species are native to Brazil, of which approximately 51% are within the Atlantic Forest domain (Flora do Brasil 2020).

The Atlantic Forest, the second largest tropical forest on the American continent, originally covered ca. 1.5 million km^2 and extended along the entire Brazilian coast to eastern Paraguay and northeastern Argentina, with 87 % of its extension in Brazilian territory (Tabarelli *et al.* 2005; Costa 2012). Despite its long history of exploitation, the Brazilian Atlantic Forest hosts more than 15,000 species of vascular plants, of which 45 % are endemic (Stehmann *et al.* 2009). As a result of its high levels of endemism, and the destruction suffered in the past, the Atlantic Forest is now considered a global hotspot of biodiversity, with a high priority for

1 Programa de Pós-Graduação em Biologia vegetal, Universidade Federal de Pernambuco, 50670-901, Recife, PE, Brazil
2 Laboratório de Sistemática Molecular de Plantas, Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, 44036-900, Feira de Santana, BA, Brazil
3 Departamento Sistemática e Ecologia, Universidade Federal da Paraíba, 58051-970, João Pessoa, PB, Brazil

* Corresponding author: henrique_lmoreira@hotmail.com

conservation (Morellato & Haddad 2000; Myers *et al.* 2000; Mittermeier *et al.* 2004; Ribeiro *et al.* 2009).

The northern extent of the Atlantic Forest, in northeastern Brazil, experiences wide climate and rainfall variations, resulting in diverse landscapes and floristic associations. The predominant vegetation type in that region is lowland semi-deciduous seasonal forest, also known as *tabuleiro* forest (Thomas & Barbosa 2008). According to Rizzini (1979), the *tabuleiro* forest, growing along the Atlantic coast at elevations between 20 and 200 m above sea level, on Tertiary sediments of the Barreiras Formation, is the third major forest area in Brazil. The Barreiras formation extends from southern Amazon to northern Rio de Janeiro, being more extensive from northern Espírito Santo to southern Bahia, from Sergipe to Alagoas, and from Pernambuco to Rio Grande do Norte (Thomas & Barbosa 2008).

Previous floristic studies undertaken in *tabuleiro* forests in the states of Rio Grande do Norte, Paraíba, and Pernambuco, have indicated the presence of ca. 41 species and 26 genera of Orchidaceae there (Alves-Araújo *et al.* 2008; Souza *et al.* 2009; Barbosa *et al.* 2011; Amazonas & Barbosa 2011; Melo *et al.* 2011; Oliveira *et al.* 2012). Few other studies, focusing on Orchidaceae in the same region, not restricted to *tabuleiro* forests, enlarged the regional species list to more than 80 (Félix 1996; Siqueira-Filho & Félix 2006; Almeida *et al.* 2007; Brito *et al.* 2008; Pessoa & Alves 2012, 2015; Silva *et al.* 2015; Moreira *et al.* 2020).

Carrying out work on flora contributes to the understanding of the biodiversity of an area, as well as to the articulation of conservation strategies (Funk 2006). Considering that Orchidaceae diversity in the Atlantic Forest is threatened by forest fragmentation, especially in its northern portion, we conducted a survey of the family species in lowland forests located between the states of Rio Grande do Norte and Pernambuco.

Materials and methods

Our survey covered lowland semi-deciduous seasonal forests (IBGE 2012), known as *tabuleiro* forest (Thomas & Barbosa 2008), along the coast of the states of Rio Grande do Norte (RN), Paraíba (PB), and Pernambuco (PE). The soils there are nutrient-poor and sandy, being composed of poorly consolidated sand-clay sediments of the Barreiras Group, with occasional occurrences of sandy sites covered by a savanna-like vegetation, locally known as "open tabuleiro" or "tabuleiro" (Oliveira-Filho & Carvalho 1993; Barbosa 1996, Thomas & Barbosa 2008). The region has a hot and humid climate, corresponding to the Köppen As category (Alvares *et al.* 2014).

We examined all Orchidaceae specimens previously collected in the Atlantic coastal forest in the states of RN, PB and PE and deposited in EAN, IPA, JPB, PEURF, UFP and UFRN herbaria (acronyms following Thiers 2020, continuously updated) and in HST (Herbário Sérgio Tavares, not indexed), totaling 601 specimens. Morphological analyses were performed with the help of a stereoscope and some structures were rehydrated for better handling and observation. Floral diagrams, when allowed, were assembled and incorporated to the exsiccates.

Field expeditions to observe orchid populations *in situ* and collect additional fertile botanical material were carried out between September and November/2019 in four remnant forest sites (Fig. 1): Reserva Particular de Patrimônio Natural (RPPN – private reserve) Mata Estrela (35º01'15"W – 6º22'28"S), with 2,039.93 ha in the municipality of Baía Formosa, RN; Reserva Biológica (REBIO – federal biological reserve) Guaribas (35°08'33"W - 6°44'33"S), with 4,051.62 ha in the municipalities of Mamanguape and Rio Tinto, PB; RPPN Fazenda Pacatuba (35°09'11"W - 7°02'28"S), with 266.53 ha in the municipality of Sapé, PB; and RPPN Engenho Gargaú (34°57'21"W - 6°59'29"S), with 1,058.62 ha in the municipality of Santa Rita, PB.

The specimens collected were herborized following the standard techniques of floristic-taxonomic studies (Mori *et al.* 1985) and subsequently deposited in JPB and UFP herbaria. The specimens were identified by consulting the specialized literature (Pabst & Dungs 1975, 1977; Siegerist 1986; Chase 1986; Salazar *et al.* 1990; Hágsater *et al.* 1993; Carnevali & Romero 1996; Pupulin 2007; Romero-González *et al.* 2008; Hágsater *et al.* 2008; Hágsater *et al.* 2010; Arenas & Cribb 2010; Peraza-Flores 2012; Romero-González *et al.* 2013; Azevedo *et al.* 2014; Carvalho *et al.* 2016; Royer *et al.* 2017; Bastos *et al.* 2018; Pessoa & Alves 2016a,b, 2018, 2019; Santos & Silva 2020) and by comparisons with photographs or digital images of type specimens accessed using the online databases Tropicos (http://www.tropicos.org/), JSTOR Global Plants (https://plants.jstor.org/), Virtual Herbarium Reflora (http://reflora.jbrj.gov.br) and speciesLink (https://specieslink.net/) .

For each species, a diagnostic description and the basionym of the accepted name, if there is one, are provided. The characterization of morphological structures was based on Radford (1974), Dressler (1981, 1993) and Gonçalves & Lorenzi (2010). Specimens in vegetative state were indicated in the examined material as "veg", floral bud as "bf", and the absence of morphological structures as "not observed". The classification system adopted was that by Chase *et al.* (2015). Data concerning phenology of the plants were based only on specimens recorded in lowland forests or savanna pockets in the study region.

Geographic data distribution of the species were obtained from published studies and taxonomic reviews [especially Pabst & Dungs (1975, 1977); Pupulin (2007); Romero-González *et al.* (2008); Ormerod (2009); Batista *et al.* (2011a,b); Azevedo *et al.* (2014); Batista *et al.* (2018)

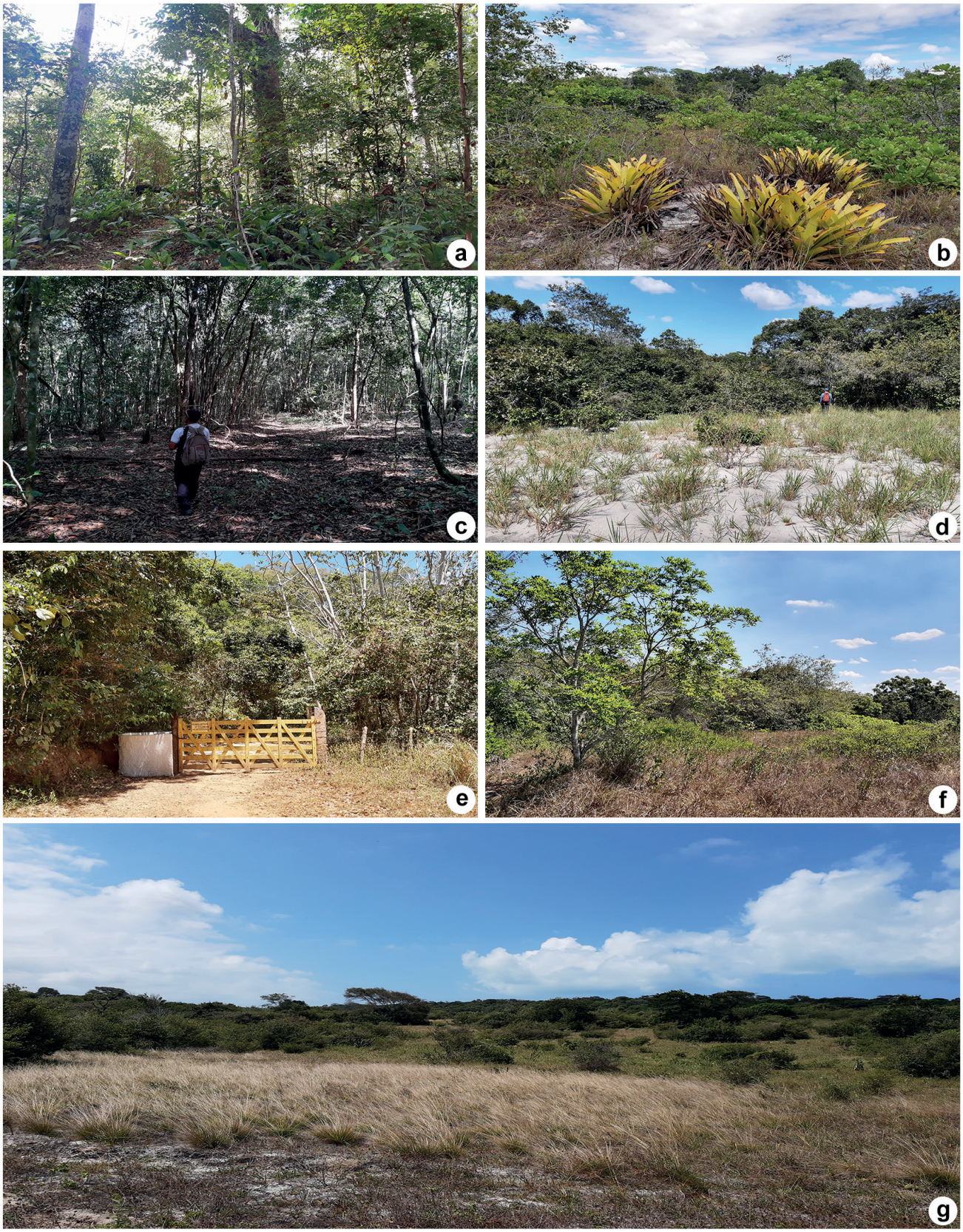

Figure 1. a-g. Forest and savanna - **a-b.** Reserva Biológica Guaribas (REBIO); **c-d.** RPPN Usina Gargaú; **e-f.** RPPN Fazenda Pacatuba; **g.** RPPN Mata Estrela.

and Karremans *et al.* (2020)], information provided on the herbarium labels, and information available online at Flora do Brasil 2020 (2020).

Phytogeographic domains and vegetation types are according to Flora do Brasil 2020 (2020). The inclusion of a municipality in the Atlantic Forest domain was verified in "Atlas dos Remanescentes Florestais da Mata Atlântica" (Fundação SOS Mata Atlântica & INPE 2014). The concept of lowland forest (*tabuleiro* forest) in the Atlantic Coastal Forest of Northeastern Brazil follows Thomas & Barbosa (2008). Conservation status are according to CNCFlora (Centro Nacional de Conservação da Flora - http://cncflora.jbrj.gov.br/portal), which follows the system of categories established by the IUCN (International Union for Conservation of Nature's)

Results and discussion

We identified 65 species and 36 genera of Orchidaceae in the study area, belonging to subfamilies Epidendroideae (44 spp.), Orchidoideae (16), and Vanilloideae (5). In terms of life forms, 35 species were epiphytic, 27 terrestrial, and three hemiepiphytic. Compared with Flora do Brasil 2020 (2020), we registered 14 new records for the state of Rio Grande do Norte, two for Paraíba, and one for Pernambuco.

The most diverse genera were *Epidendrum* L. and *Habenaria* Willd., with eight and seven species respectively. According to Stehmann *et al.* (2009) these two genera are among those with greater richness and high number of endemic species of Orchidaceae in the Atlantic Forest. Native species from Brazil represented more than 96 % of the total observed (63 spp.). *Oeceoclades maculata* (Lindl.) Lindl. and *Eulophia alta* (L.) Fawc. & Rendle, are the only species considered naturalized, both presenting amphi-atlantic distribution (Govaerts *et al.* 2020).

Approximately 27 % of the species are endemic to Brazil. Of those, *Cattleya granulosa* Lindl. is considered vulnerable (CNCFlora 2012). According to Carnevali & Ramírez-Morillo (2003a), many *Cattleya* species are under extinction risk due to overcollecting for horticultural purposes and habitat perturbation. Regarding the conservation status of the species, a total of 44 spp. were listed into the category not evaluated (NE); 18 least concern (LC); 2 near threatened; and 1 vulnerable (VU).

Almost 66 % (43 spp.) of the species registered in the study area were restricted to lowland forests (*tabuleiro* forest). Of these, 30 % (19) were observed only in savanna pockets (open *tabuleiro*), and 5 % (3) in both types. Comparing our species list with that of Pessoa & Alves (2015) for a montane forest remanent in Pernambuco, we observed only 27 species in common, reinforcing the differences in the local flora due to elevation and humidity (Andrade-Lima 1966; 1982)

Taxonomic Treatment

Key to the identification of genera and species of Orchidaceae from lowland forests in the northern Atlantic forest

1. Scandent hemiepiphytic plants; internodes voluble ..... ***Vanilla***

2. Plants inhabiting the trunks of palms; leaves ovate to elliptic; lip without a penicillate callus ..... ***V. palmarum***

2'. Plants inhabiting shrubs and the canopy; leaves narrow-elliptic or oblong; lip with a penicillate callus

3. Stem ≤ 0.4 cm wide; leaves narrow-elliptic; flowers greenish-white ..... ***V. phaeantha***

3'. Stem ≥ 0.8 cm wide; leaves oblong; flowers yellow ..... ***V. pompona***

1'. Epiphytic or terrestrial plants; internodes not voluble

4. Growth monopodial or pseudomonopodial

5. Growth monopodial; stem cylindrical; flowers spurred ..... ***Campylocentrum***

6. Roots greenish; leaves reduced to achlorophyllous scale

7. Roots cylindrical; flowers greenish-white to cream; spur straight ..... ***C. fasciola***

7'. Roots dorsi-ventrally compressed; flowers yellowish-white; spur curved ..... ***C. pachyrrhizum***

6'. Roots achlorophyllous, not green; leaves elliptic, oblanceolate or oblong

8. Leaves oblong; flowers cream to pale orange; spur slightly curved ..... ***C. crassirhizum***

8'. Leaves elliptic to oblanceolate; flowers white-greenish; spur inflexed ..... ***C. micranthum***

5'. Growth pseudomonopodial; stem dorsi-ventrally compressed; flowers not spurred ..... ***Dichaea panamensis***

4'. Growth sympodial

9. Plants without leaves when flowering

10. Racemes multiflowered; flowers tubular, pink or reddish; lip deltoid, apex acute ..... ***Sacoila lanceolata***

10'. Racemes few-flowered; flowers not-tubular, greenish-dark; lip rhomboid-elliptic, apex obtuse ..... ***Sarcoglottis curvisepala***

9'. Plants with leaves when flowering

11. Leaves pseudopetiolate, spiralled

12. Plants creeping; roots emerging from the internodes

13. Leaves ≤ 5 cm long; rostellum deeply bifid, emarginate ..... ***Microchilus lamprophyllys***

13'. Leaves > 5 cm long; rostellum entire, truncate ..... ***Aspidogyne***

14. Leaves 3-4, lanceolate, variegate with silvery tones; flowers with a brown central spot; petals sub-falcate; lip elliptic-subcordate ..... ***A. decora***

14'. Leaves 7-12, elliptic or ovate, not variegate; flowers without spot; petals oblanceolate; lip wide-elliptical ..... ***A. foliosa***

12'. Plants caespitose; roots at the base of the stem

15. Inflorescence congested; lip cucullate ..... ***Prescottia***

16. Leaves silver-green; inner surface of the lip glabrous ..... ***P. leptostachya***

16'. Leaves green; inner surface of the lip pubescent

17. Leaves elliptic to ovate, pseudopetiole ≤ 3 cm long; sepals ovate with a pink spot near the apex ..... ***P. oligantha***

17'. Leaves elliptic to lanceolate, pseudopetiole ≥ 8 cm long; sepals lanceolate without spots ..... ***P. stachyodes***

15'. Inflorescence lax; lip ligulate-anchoriform ..... ***Sarcoglottis acaulis***

11'. Leaves sessile, distichous

18. Roots generally with tuber

19. Flowers persistent, with a developed spur ..... ***Habenaria***

20. Petals bipartite

21. Lip with mid-lobe lanceolate or oblong, margin flat

22. Leaves linear; flowers ≤ 0.5 cm long, short-pedicellate, green to greenish-brown; lip with mid-lobe oblong; spur ≤ 1 cm long ..... ***H. cruegerii***

22'. Leaves lanceolate; flowers ≥ 2 cm long, long-pedicellate, greenish-white; lip with mid-lobe lanceolate; spur ≥ 7 cm long ..... ***H. trifida***

21'. Lip with mid-lobe trapeziform, margin sinuous ..... ***H. pratensis***

20'. Petals entire

23. Lip entire

24. Bracts imbricate, covering the rachis; petals oblong-falcate, apex obtuse; lip with apex rounded .... ***H. obtusa***

24'. Bracts not imbricate, not covering the rachis; petals obovate, apex truncate-sinuous; lip with apex truncate ..... ***H. petalodes***

23'. Lip tripartite

25. Flowers yellowish-green; petals elliptic-falcate; lip with lateral lobes inconspicuous, mid-lobe oblong ..... ***H. hexaptera***

25'. Flowers greenish; petals oval-lanceolate; lip with lateral lobes conspicuous, mid-lobe filiform ..... ***H. rotundiloba***

19'. Flowers ephemeral, not spurred ..... ***Cleistes tenuis***

18'. Roots without tuber

26. Stem ± woody; leaf venation reticulate; flowers with a conspicuous entire to dentate epicalyx beneath the perianth ..... ***Epistephium williamsii***

26'. Stem herbaceous; leaf venation parallel; flowers without epicalyx

27. Stem swollen, modified into a pseudobulb

28. Leaves terete

29. Pseudobulb cylindrical; pedicel ≥ 6 cm long; flowers white with purple spots; lip entire ..... ***Brassavola tuberculata***

29'. Pseudobulb conical; pedicel ≤ 2 cm long; flowers yellow with brown spots; lip trilobate ..... ***Trichocentrum cepula***

28'. Leaves plicate or conduplicate

30. Leaves plicate, semi-erect

31. Leaves caducous after flowering; flowers unisexual (female or male); staminodia antennae-like 2 ..... ***Catasetum***

32. Plants epiphytic; flowers yellowish-green, with red spots; lip semi-involved by sepals and petals, margins flat, entire ..... ***C. macrocarpum***

32'. Plants terrestrial; flowers yellow, usually with vinaceous spots; lip not involved by sepals and petals, margins reflexed, ciliate ..... ***C. gardneri***

31'. Leaves persistent; flowers bisexual; staminodia absent

33. Column with a pair of secretory glands (pleuridia) at base ..... ***Coryanthes speciosa***

33'. Column without secretory glands

34. Flowers sub-pendent; spur descendent ..... ***Galeandra montana***

34'. Flowers erect; without spur

35. Pseudobulb cylindrical or pyriform; inflorescence racemose

36. Plants ≤ 40 cm long; pseudobulb conical or piriform; leaves elliptic-ovate, shiny when fresh; lip flat ..... ***Liparis nervosa***

36'. Plants ≥ 90 cm long; pseudobulb cylindrical; leaves linear, not shiny; lip concave ..... ***Eulophia alta***

35'. Pseudobulb fusiform; inflorescence paniculate ..... ***Cyrtopodium***

37. Pseudobulb subterranean; lip with mid-lobe spatulate ..... ***C. blanchetii***

37'. Pseudobulb aerial; lip with mid-lobe suborbicular or subreniform

38. Floral bracts ondulate; flowers greenish-yellow with reddish-brown spots; lip with mid-lobe sub-reniform, the margins fringed; callus yellow; fruit oblanceolate ..... ***C. holstii***

38'. Floral bracts flat; flowers yellow without spots; lip with mid-lobe suborbicular, the margins entire; callus orangish or reddish; fruit obovoid ..... ***C. flavum***

30'. Leaves conduplicate, erect

39. Pseudobulb elongate, > 15 cm long; inflorescence emerging from a rigid, erect, oblique, spathaceous bract; flowers ≥ 10 cm long ..... ***Cattleya granulosa***

39'. Pseudobulb short, < 15 cm long; inflorescence not emerging from a spathaceous bract; flowers < 10 cm long

40. Racemes 1-flowered ..... ***Maxillaria subrepens***

40'. Racemes 2-∞-flowered

41. Stem articulate, ± zigzag (fractiflexuous), striate to sulcate ..... ***Dimerandra emarginata***

41'. Stem not articulate, straight, smooth

42. Leaves with spots

43. Leaves with greenish spots ..... ***Oeceoclades maculata***

43'. Leaves with purple or red spots ..... ***Leochilus labiatus***

42'. Leaves without spots

44. Pseudobulbs superposed ..... ***Scaphyglottis***

45. Apical leaves 2

46. Leaves linear; flowers greenish; lip oblong, apex bilobate ..... ***S. livida***

46'. Leaves oblong, flowers white; lip elliptic, apex acute ..... ***S. sickii***

45'. Apical leaf 1

47. Leaf terete; lip oblanceolate, apex emarginate ..... ***S. emarginata***

47'. Leaf oblong; lip obovate, apex cuspidate ..... ***S. fusiformis***

44'. Pseudobulbs not superposed

48. Lateral sepals fused

49. Lip trilobate

50. Plant subcaespitose; pseudobulb heteroblastic (one internode); flowers resupinate; lip with fimbriate isthmus ..... ***Gomesa barbata***

50'. Plant caespitose; pseudobulb homoblastic (several internodes); flowers not resupinate; lip without fimbriate isthmus ..... ***Polystachya concreta***

49'. Lip entire

51. Raceme erect; flowers asymmetric; lip with a glandular trichotomous callus ..... ***Zygostates bradei***

51'. Raceme pendent; flowers symmetric; lip without a glandular trichotomous callus

52. Pseudobulb dorsi-ventrally compressed; leaves narrow-elliptic or linear

53. Flowers white; petals elliptic; lip oblanceolate ..... ***Rodriguezia bahiensis***

53'. Flowers lilac-colored; petals oblong; lip obcordate ..... ***Ionopsis utricularioides***

52'. Pseudobulb not compressed; leaves obovate ..... ***Notylia lyrata***

48'. Lateral sepals free

54. Pseudobulb conic

55. Pseudobulb with an internode in the lower third; flowers greenish yellow with purple spots; callus with a suture along the center of lip; column enfolded by lip with prominent arms in the third apical ..... ***Encyclia oncidioides***

55'. Pseudobulb without an internode in the lower third; flowers white without spots; callus without suture; column not enfolded by lip ..... ***Warmingia eugenii***

54'. Pseudobulb claviform or cylindrical ..... ***Prosthechea***

56. Pseudobulb cylindrical; leaves oblong; sepals and petals with longitudinal vinaceous stripes; lip oval ..... ***P. alagoensis***

56'. Pseudobulb claviform; leaves narrow-elliptic; sepals and petals without vinaceous stripes; lip sub-orbicular ..... ***P. aemula***

27'. Stem not swollen, not modified into a pseudobulb.

57. Leaves canaliculate; flowers tubular; column fused to the lip for half its length ..... ***Jacquiniella globosa***

57'. Leaves flat; flowers not tubular; column completely fused to the lip ..... ***Epidendrum***

58. Flowers greenish; lip entire

59. Plants terrestrial; lip suborbicular, apex 4-lobate ..... ***E. orchidiflorum***

59'. Plants epiphytic; lip sub-square, reniform, or cordiform, apex acute, obtuse or emarginate

60. Leaves narrow-elliptic or elliptic-lanceolate; lip sub-square or reniform, apex obtuse or emarginate

61. Leaves narrow-elliptic; lip sub-square, apex obtuse..... ***E. rigidum***

61'. Leaves elliptic-lanceolate; lip reniform, apex emarginate ..... ***E. pessoae***

60'. Leaves lanceolate; lip cordiform, apex acute ..... ***E. strobiliferum***

58'. Flowers greenish-white, pink, orangish, or orangish-red; lip trilobed

62. Leaves oblong, oblong-elliptic or oblong-lanceolate; flowers pink, orangish or orangish-red; lip mid-lobe deltoid, obovate or oblanceolate, apex emarginate, truncate or cuspidate

63. Flowers pink or orangish-red; lip with lateral lobes eroded or fringed, mid-lobe deltoid or obovate, apex emarginate or truncate

64. Leaves oblong-lanceolate; flowers orangish-red; sepals oblanceolate, petals not unguiculate; lip mid-lobe deltoid, apex emarginate ..... ***E. cinnabarinum***

64'. Leaves oblong; flowers pink; sepals sub-falcate, petals unguiculate; lip mid-lobe obovate, apex truncate ..... ***E. flexuosum***

63'. Flowers orangish; lip with lateral lobes serrate, mid-lobe oblanceolate, apex cuspidate ..... ***E. macrocarpum***

62'. Leaves narrow-elliptic; flowers greenish-white; lip mid-lobe oblanceolate, apex acute ..... ***E. micronocturnum***

Aspidogyne Garay, Bradea 2: 200. 1977.

Plants terrestrial, sympodial, creeping, shade-loving. Roots cylindrical, puberulous, emerging from the internodes. Stem not swollen in pseudobulb, cylindrical, conspicuous. Leaves along the stem, spiralled, pseudopetiolate, semi-erect, amplexicaulous, flat, variegate or not, membranaceous. Raceme terminal, multiflowered, congested, erect. Flowers not showy, short-pedicellate, resupinate, bisexual, with one spur, white to greenish-white, spotted or not; sepals and petals free, pubescent abaxially; lip trilobed; column fused to the lip; rostellum entire, truncate; pollinia 2, cartilaginous. Fruit fusiform.

Aspidogyne (Orchidoideae) in a broadly defined sense includes *Ligeophila* Garay, *Platythelys* Garay, *Rhamphorhynchus* Garay and *Stephanothelys* Garay (Meneguzzo 2012) and comprises 71 neotropical species (Chase *et al.* 2015; Ormerod 2016), of wich 22 occur in Brazil, and five in the northeast (Ormerod 2016; Meneguzzo 2020a). In the study area, two species were identified.

1. *Aspidogyne decora* (Rchb.f.) Garay & G.A.Romero, Harvard Pap. Bot. 3: 53. 1998. (Figs. 2A-B)

Plants with 3-4 lanceolate leaves, variegate with silvery tones; flowers white with brown spots; lateral sepals narrow-ovate; petals sub-falcate; lip elliptic-subcordate, apex obtuse.

Distribution, ecology and conservation status: *Aspidogyne decora* occurs in Brazil and Paraguay (Govaerts *et al.* 2020). In Brazil, it occurs in the Atlantic Forest, in the southeast and south regions (Meneguzzo 2020a). It is being registered here as occurring in the northeast region and in the study area, for the first time, in *tabuleiro* forest in Paraíba, where it was observed growing in the leaf litter with some individuals occurring close together. The conservation status of *A. decora* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in September.

Material examined: BRAZIL. PARAÍBA: Santa Rita, RPPN Engenho Gargaú, 24/IX/2019, fl., L.H.L. Moreira *et al*. 2022 (JPB).

2. *Aspidogyne foliosa* (Poepp. & Endl.) Garay, Bradea 2: 201. 1977. (Fig. 2C)

Plants with 7-12 elliptic to ovoid leaves, not variegate; flowers greenish-white, without spots; lateral sepals obovate; petals oblanceolate; lip wide-elliptical, apex rounded.

Distribution, ecology and conservation status: *Aspidogyne foliosa* is one of the most commonly collected and widely distributed species of the genus in South America, occurring in Bolivia, Brazil, Colombia, Equador, French Guyana, Guyana, Surinam, and Venezuela (Ormerod 2009). In Brazil, it occurs in the Amazon, Atlantic Forest and in the Cerrado (Meneguzzo 2020a). In the study area it was found in *tabuleiro* forests in Pernambuco, with individuals occurring close together and with synchronous flowering (Pessoa & Alves 2012). The conservation status of *A. foliosa* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from September to November.

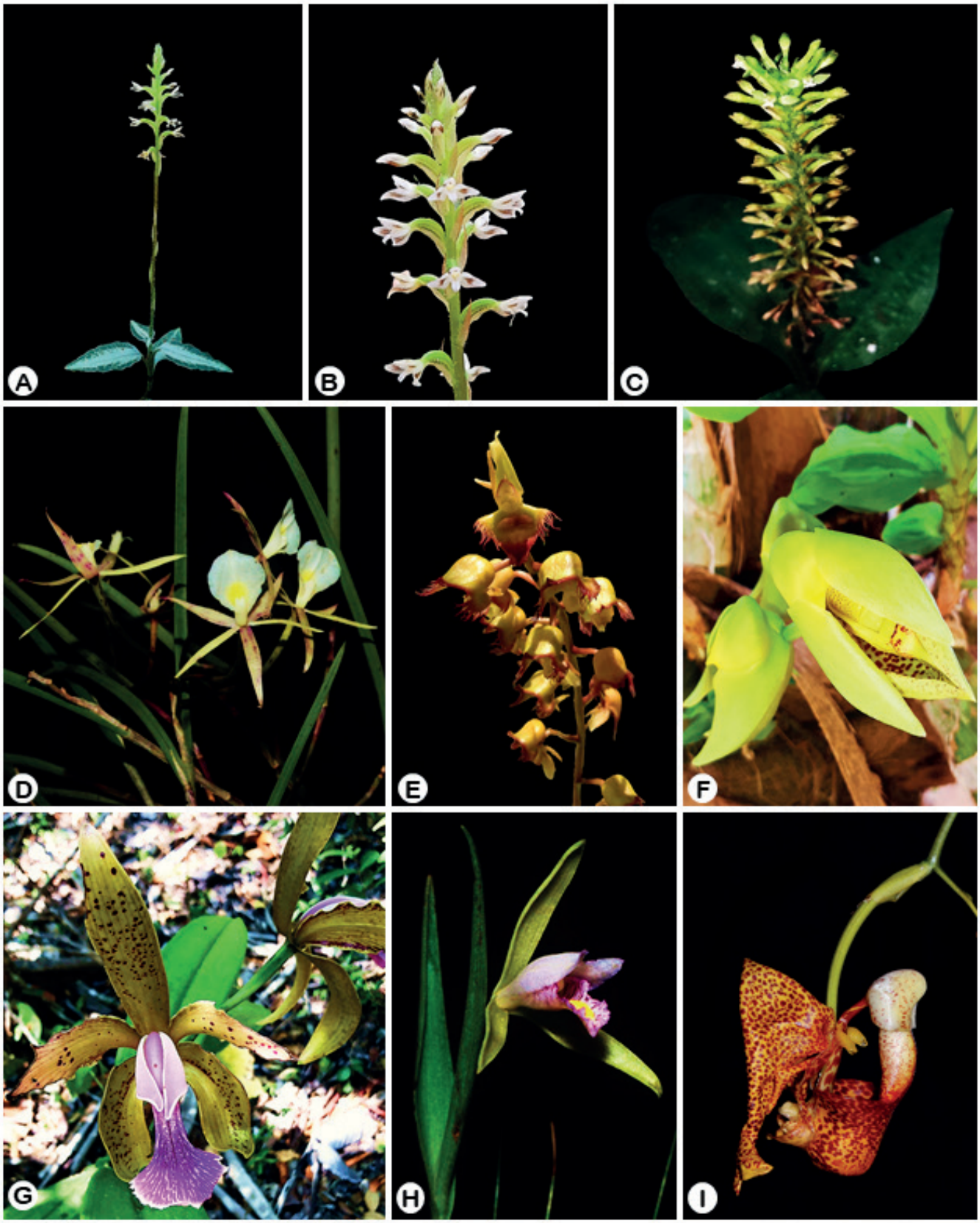

Figure 2. a-b. *Aspidogyne decora* – **a.** habit; **b.** inflorescence. **c.** *Aspidogyne foliosa* – inflorescence (Photo: Engels ME). **d.** *Brassavola tuberculata* – flower (Photo: Figueira M). **e.** *Catasetum gardneri* – inflorescence (Photo: Coutinho TS). **f.** *Catasetum macrocarpum* – flower. **g.** *Cattleya granulosa* – flower (Photo: van den Berg C). **h.** *Cleistes tenuis* – flower (Photo: Pansarin ER). **i.** *Coryanthes speciosa* – flower (Photo: Engels ME).

Material examined: BRAZIL. PERNAMBUCO: Cabo de Santo Agostinho, Complexo Gurjaú, Mata do São Braz, 13/IX/2003, fl. fr., *M. Oliveira & A.A. Grillo 1466* (IPA, UFP, UFRN); Igarassu, Usina São José, 2/IX/2003, fl., *K.D. Rocha & S.G. Freire 18* (PEURF); Mata de Piedade, 16/X/2002, fl., *G.J. Bezerra & M.J. Silva 75* (PEURF); 29/X/2009, fl., *J.D.G. Garcia 1253* (UFP, IPA); 21/XI/2009, fl., *E. Pessoa & J.A.N. Souza 105* (EAN, HST, IPA, JPB, UFP).

Brassavola R.Br., Hortus Kew. 5: 126. 1813.

Brassavola (Epidendroideae) comprises 22 species with neotropical distribution (Chase *et al.* 2015), of which nine occur in Brazil, and four in the northeast (van den Berg 2020a). In the study area, a single species was identified.

3. *Brassavola tuberculata* Hook., Bot. Mag. 56: t. 2878. 1829. (Fig. 2D)

Plants epiphytic, sympodial, caespitose or creeping, sun-loving. Roots cylindrical, at the base of pseudobulb. Pseudobulb heteroblastic, cylindrical. Leaf sessile, 1 per pseudobulb, apical, terete, canaliculate adaxially. Racemes terminal, few-flowered, erect. Flowers showy, long-pedicellate, resupinate, bisexual, white with purple spots; lateral sepals falcate; petals narrow-elliptic; lip entire, obovate, with a yellow spot at the base, apex acuminate; column fused to the lip up to half its length; pollinia 8, waxy.

Distribution, ecology and conservation status: *Brassavola tuberculata* occurs in Argentina, Bolivia, Brazil, and Paraguay (Noguera-Savelli 2020). In Brazil, it occurs in the Atlantic Forest, Caatinga, Cerrado and Pampa, being the most common species along the Brazilian coast (van den Berg 2020a). In the study area it was found in open *tabuleiro* (savanna) pockets in Rio Grande do Norte, where it was observed on shrubs. The conservation status of *B. tuberculata* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in April.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Rio do Fogo, Área Militar, 2/IV/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 157* (UFRN).

Campylocentrum Benth., J. Linn. Soc., Bot. 18: 337. 1881.

Plants epiphytic, monopodial, erect to pendent, shade-loving. Roots cylindrical or dorsi-ventrally compressed, chlorophyllous or not, at stem nodes. Stem not swollen in pseudobulb, cylindrical. Leaves reduced to achlorophyllous scales or laminar, along the stem, distichous, sessile, erect, amplexicaulous, conduplicate, coriaceous. Raceme lateral, opposite to the leaves, multiflowered, usually congested, erect. Flowers inconspicuous, short-pedicellate, resupinate, bisexual, white, yellowish-white or cream, with a spur; sepals and petals free; lip trilobed; column not fused to the lip; pollinia 2, cartilaginous. Fruit ellipsoid or fusiform.

Campylocentrum (Epidendroideae) comprises 73 species with neotropical distribution (Chase *et al.* 2015; Pessoa & Alves 2016a, b, 2018, 2019), of which 38 occur in Brazil, and 13 in the northeast (Pessoa 2020a). In the study area, four species were identified.

4. *Campylocentrum crassirhizum* Hoehne, Arq. Bot. Estado São Paulo 1: 44. 1939.

Plants with achlorophyllous roots; leaves oblong, asymmetrically 2-lobed at the apex, lobes rounded; flowers cream to pale orange; lateral sepals sub-falcate; petals oblong to elliptic; lip with lateral lobes oblong, apex rounded, mid-lobe narrow-lanceolate, apex acute; spur slightly curved.

Distribution, ecology and conservation status: It is endemic to Brazil, being one of the most common species of the genus, widespread along the Brazilian coast, in the Atlantic Forest, but also occurring in the Caatinga and Cerrado, in the northeast, southeast and south regions (Pessoa & Alves 2019). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, where it was observed as an epiphyte on trees. The conservation status of *C. crassirhizum* was evaluated by Pessoa & Alves (2019) as least concern (LC).

Phenology: Flowers and fruits in February, July, August and December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, Fazenda Diamante, 20/VII/2014, fl., *E.O. Moura et al. 196* (UFRN); 8/II/2014, fl. fr., *J. Jardim et al. 6511* (UFRN); 11/VII/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 257* (UFRN); Goianinha, APA Piquirí-Una, 23/XII/2016, fr., *G.S. Garcia & L.M.G. Gonçalves* 448 (UFRN); Timbal do Sul, Trilha L do polígono do parque, 2/VIII/2012, fr., *J.G. Jardim et al. 6352* (UFRN).

5. *Campylocentrum fasciola* (Lindl.) Cogn., Fl. Bras. 3: 520. 1906.

Plants with cylindrical roots; leaves reduced to achlorophyllous scales; flowers white-greenish to cream; lateral sepals oblong to elliptic; petals obovate; lip with lateral lobes oblanceolate, apex obtuse to rounded, mid-lobe deltoid, apex acute to obtuse; spur straight.

Distribution, ecology and conservation status: It is widely distributed in Neotropics, occurring in Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guyana, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Peru, Puerto Rico, Surinam, Trinidad & Tobago, and Venezuela (Pessoa & Alves 2016b). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north, northeast and central-west regions (Pessoa & Alves 2016b). In the study area it was found in *tabuleiro* forest in Pernambuco. The conservation status of *C. fasciola* was evaluated by Pessoa & Alves (2016b) as least concern (LC).

Phenology: Flowers in January.

Material examined: BRAZIL: PERNAMBUCO: São Lourenço da Mata, Tapacurá, Mata do Toró, 27/I/1955, fl., *Moraes s.n.* (EAN).

6. *Campylocentrum micranthum* (Lindl.) Rolfe, Orchid Rev. 9: 136. 1901.

Plants with achlorophyllous roots; leaves elliptical to oblanceolate, asymmetrically 2-lobed at the apex, lobes obtuse; flowers white-greenish; lateral sepals oblong to sub-falcate; petals oblong; lip with lateral lobes deltoid, apex acute to obtuse, mid-lobe lanceolate, apex acute; spur inflexed.

Distribution, ecology and conservation status: It is widely distributed in Brazil, Cuba, Dominican Republic, French Guyana, Guadaloupe, Guyana, Haiti, Jamaica, Martinique, Puerto Rico, Surinam, Trinidad & Tobago, and Venezuela (Pessoa & Alves 2018). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north and northeast regions (Pessoa & Alves 2018). In the study area it was found in Pernambuco, where it is occasional in riparian sites and *tabuleiro* forest, in the understory (Pessoa & Alves 2012). The conservation status of *C. micranthum* was evaluated by Pessoa & Alves (2018) as least concern (LC).

Phenology: Flowers and fruits in January, March and December.

Material examined: BRAZIL. PERNAMBUCO: Igarassu, Usina São José, Mata de Piedade, 16/XII/2009, fl. fr., *E. Pessoa & J.A.N. Souza 212* (UFP); 18/XII/2009, fl. fr., *J.A.N. Souza & E. Pessoa 581* (UFP); 1/III/2010, fl. fr., *E. Pessoa & J.D. Garcia 257* (UFRN); 21/I/2014, fr., *E. Pessoa & N.K. Luna 1217* (UFP); Olinda, 30/V/1925, fl., *B. Pickel 970* (IPA).

7. *Campylocentrum pachyrrhizum* (Rchb.f.) Rolfe, Orchid. Ver. 11: 246. 1903.

Plants with dorsi-ventrally compressed roots; leaves reduced to achlorophyllous scales; flowers yellowish-white; lateral sepals and petals oblong to lanceolate; lip with lateral lobes oblanceolate, apex truncate to rounded, mid-lobe deltoid, apex acute; spur curved.

Distribution, ecology and conservation status: *Campylocentrum pachyrrhizum* is widespread in the Neotropics, occurring in Brazil, Cuba, Dominican Republic, Ecuador, French Guyana, Guyana, Jamaica, Mexico, Panama, Puerto Rico, Surinam, Trinidad & Tobago, Venezuela, and United States of America (Pessoa & Alves 2016b). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north, northeast and central-west regions (Pessoa & Alves 2016b). In the study area it was found in *tabuleiro* forest in Pernambuco where it is a rare species and with only few individuals observed in the field (Pessoa & Alves 2012). The conservation status of *C. pachyrrhizum* was evaluated by Pessoa & Alves (2016) as least concern (LC).

Phenology: Flowers and fruits in January and February.

Material examined: BRAZIL. PERNAMBUCO: Igarassu, Usina São José, Mata de Piedade, 16/XII/2009, fr., *E. Pessoa & J.A.N. Souza 209* (UFP); 4/II/2010, fr., *J.D. Garcia 1430* (UFP); 21/I/2014, fl. fr., *E. Pessoa & N.K. Luna 1218* (UFP).

Catasetum Rich. *ex* Kunth, Syn. Pl. (Kunth) 1: 330. 1822.

Plants epiphytic or terrestrial, sympodial, caespitose, sun-loving. Roots cylindrical, at the base of the stem. Pseudobulb homoblastic, fusiform, conspicuous, enveloped by scarious sheaths at base. Leaves along the stem, distichous, sessile, semi-erect, amplexicaulous, plicate, coriaceous. Racemes lateral, emerging from the base of pseudobulbs, few-flowered, erect or pendent. Flowers long-pedicellate, unisexual, sexually dimorphic, yellow or greenish-yellow, spotted; sepals and petals free; lip bilobed or trilobed, saccate, stiff; column not fused to the lip; staminodia antennae-like 2; pollinia 2, waxy. Fruit ellipsoid or fusiform.

Catasetum (Epidendroideae) comprises 176 neotropical species (Chase *et al.* 2015; Petini-Benelli & Izzo 2017), of which 121 occur in Brazil, and 27 in the northeast (Petini-Benelli 2020). In the study area, two species were identified.

8. *Catasetum gardneri* Schltr., Orchis 8: 84. 1914. (Fig. 2E)

Plants terrestrial, arenicolous; flowers yellow, frequently with vinaceous spots; lateral sepals oblanceolate; petals linear; lip trilobed, lateral lobes with margins reflexed, ciliate, mid-lobe with apex obtuse.

Distribution, ecology and conservation status: It is endemic to Brazil, occurring in the Atlantic Forest, in the northeast and southeast regions (Petini-Benelli 2020). In the study area it was found in open *tabuleiro* (savanna) pockets in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed growing near wet areas. It is being registered as occurring in Paraíba and Rio Grande do Norte for the first time. The conservation status of *C. gardneri* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits between the months of February and November.

Note: *Catasetum gardneri* has been misidentified as *C. discolor* (Lindl.) Lindl., which can be recognized by the rose-cream flowers and lip with flat lateral lobes with toothed or entire margins. Futhermore, according to Holst (1999) and Bastos & van den Berg (2012), *C. discolor* occurs in the north of South America, as a rupicolous or epiphytic plant.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Canguaretama, APA Piquirí-Una, 10/X/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 34* (UFRN); Ceará-Mirim, alagado próx. BR 101, 24/IV/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 140* (UFRN); Goianinha, APA Piquirí-Una, 2/IV/2017, fl., *G.S. Garcia & L.M.G. Gonçalves 508* (UFRN); Rio do Fogo, Área Militar de Rio do Fogo, 24/IV/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 156* (UFRN). PARAÍBA: Mamanguape, 17/VII/1988, fl., *L.P. Félix & G.V. Dornelas 1474* (JPB); 20/XI/1999, fl., *A.J.C. Aguiar 12* (JPB); Reserva Biológica Guaribas, tabuleiros arenosos, 2004, fl., *R.N.A. Brasil s.n* (JPB *46715*); 2004, fl., *R.N.A. Brasil s.n* (JPB *46717*); 2004, fr., *R.N.A. Brasil s.n* (JPB *46718*); Capim Azul, 22/V/1990, fl., *L.P. Félix & E. S. Santana 3003* (JPB);

28/II/2013, fl. fr., *E. Pessoa et al. 1069* (UFP); Cabeceira do Rio dos Patos, 1/IX/1989, fl., *L.P. Félix & E.S. Santana 2267* (EAN, JPB); Tabuleiro, em fontainha, 29/VIII/2002, fl., *R N.A. Brasil et al. 140* (JPB); 29/VIII/2002, fl., *R.N.A. Brasil et al. 139* (JPB); 9/XI/2002, fl., *R.N.A. Brasil et al. 168* (JPB). PERNAMBUCO: Goiana, Engenho Itapirema do Meio, 12/X/1966, fl., *A. Lima 66-4727* (IPA); Igarassu, granja São Luiz, 27/XI/1969, fl., *A. Lima 69-5598* (IPA).

9. *Catasetum macrocarpum* Rich. *ex* Kunth, Syn. Pl. 1: 331. 1822. (Fig. 2F)

Plants epiphytic; flowers greenish-yellow, with red spots; lateral sepals and petals elliptic; lip semi-involved by sepals and petals, bilobed, lateral lobes with margins flat, not ciliolate, mid-lobe with apex rostrate.

Distribution, ecology and conservation status: *Catasetum macrocarpum* occurs in Brazil, Colombia, Guyana, Peru, Suriname, Trinidad & Tobago, and Venezuela (Bastos & van den Berg 2012). In Brazil, it occurs in the Amazon, Atlantic Forests, and in the Cerrado, in the north, northeast, central-west, and southeast regions (Petini-Benelli 2020). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed living close to water mirrors (Pessoa & Alves 2012). The conservation status of *C. macrocarpum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers between the months of December and May. Fruits in March and November.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Canguaretama, APA Piquirí-Una, próx. nascente do Rio Catu, 14/II/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 124* (UFRN); Timbal do Sul, Parque Estadual de Pipa, 2/VIII/2012, fl., *J.G. Jardim et al. 6334* (UFRN). PARAÍBA: Mamanguape, 1/I/1984, fl., *L.P. Félix & G.V. Dornelas 106* (JPB); 1/I/1984, fl., *L.P. Félix & G.V. Dornelas 109* (EAN); Santa Rita, Usina Miriri, 11/V/2010, fl., *A.S.A. Albuquerque 3* (EAN). PERNAMBUCO: Igarassu, Usina São José, Mata de Piedade, 25/XI/2009, fr., *E. Pessoa & J.A.N. Souza 192* (UFP); 16/XII/2009, fl., *E. Pessoa & J.A.N. Souza 213* (UFP); 26/III/2008, fl. fr., *A. Melo & T. Arruda 240* (UFP); 4/III/2010, fl., *E. Pessoa & J.D. Garcia 297* (UFP, IPA); São Lourenço da Mata, Tapera, São Bento, IX/1921, fl., *B. Pickel 164* (IPA); Mata do córrego da bexiga, V/1927, fl., *B. Pickel 1283* (IPA).

Cattleya Lindl., Coll. Bot. t. 33. 1824.

Cattleya (Epidendroideae) comprises 113 neotropical species (van den Berg *et al.* 2009; Chase *et al.* 2015), of which 104 occur in Brazil, and 21 in the northeast (van den Berg 2020b). In the study area only a single species, *C. granulosa*, was identified. The occurrence of *C. labiata* in *tabuleiro* forests in Paraíba, reported by Sousa *et al.* (2019) was not confirmed, and the specimen possibly originates from cultivation.

10. *Cattleya granulosa* Lindl., Edwards's Bot. Reg. 28: t. 1. 1842. (Fig. 2G)

Plants epiphytic, sympodial, caespitose or creeping, sun-loving. Roots cylindrical, at the base of pseudobulb. Pseudobulb homoblastic, cylindrical. Leaves sessile, 2 apical, oblong, conduplicate, thick. Raceme emerging from a spathaceous bract, few-flowered, erect. Flowers showy, long-pedicellate, resupinate, bisexual, yellowish-brown with a pink spot; lateral sepals falcate; petals spatulate; lip trilobed, lateral lobes involving the column, mid-lobe obcordate, apex retuse, pink; column not fused to the lip; pollinia 4, waxy.

Distribution, ecology and conservation status: It is endemic to the Brazilian coast, occurring in the Atlantic Forest, in the northeast and southeast regions (van den Berg 2020b). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, Paraíba and Pernambuco, where it is rare and suffers from excessive exploitation due to its showy flowers (Pessoa & Alves 2012). The conservation status of *C. granulosa* was evaluated by CNCFlora as vulnerable (VU).

Phenology: Flowers between August and November.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, Área do empreendimento Dunas de Muriú, 11/II/2016, veg., *E.O. Moura 511* (UFRN); Espírito Santo, APA Piquirí-Una, Trilha da Nascente, 29/VIII/2015, fl., *G.S. Garcia & L.M.G. Gonçalves* 7 (UFRN); Macaíba, Mata do Bebo, margem da estrada que corta a floresta, 29/XI/2017, fl., *V.P. Moreira 145* (UFRN). PARAÍBA: Mamanguape, Cachoeirinha Pindobal, 30/IX/2011, fl., *L.P. Félix 13665* (EAN). PERNAMBUCO: Igarassu, mata, 4/II/2010, veg., *J.D. Garcia 1432* (UFP); Mata de Piedade, interior do fragmento, 1/III/2010, veg., *E. Pessoa & J.D. Garcia* 259 (UFP); São Lourenço da Mata, Tapera, São Bento, 17/XI/1924, fl., *B. Pickel 895* (IPA).

Cleistes Rich. *ex* Lindl., Gen. Sp. Orchid. Pl. 409. 1840.

Cleistes (Vanilloideae) comprises 64 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 15 occur in Brazil, and 6 in the northeast (Meneguzzo 2020b). In the study area, a single species was identified.

11. *Cleistes tenuis* (Rchb.f. *ex* Griseb.) Schltr., Arch. Bot. São Paulo 1: 180. 1926. (Fig. 2H)

Plants terrestrial, sympodial, erect, sun-loving. Roots at the base of the stem, bearing tubers. Stem not swollen in pseudobulb, cylindrical. Leaves sessile, distichous, along the stem, linear-lanceolate, flat. Racemes axial, 1 or few-flowered, erect. Flowers showy, long-pedicellate, resupinate, bisexual, not spurred, cream or white, ephemeral, subtended by leaf-like bracts; lateral sepals sub-falcate; petals elliptic; lip entire, oblanceolate, apex rounded, white with purple veins; callus "v" shaped at the base and verrucose at the apex; column fused to the lip; pollen farinaceous.

Distribution, ecology and conservation status: It is largely distributed, occurring in Brazil, Colombia, Guyanas, Trinidad & Tobago, and Venezuela (Pansarin 2005; Romero-González *et al.* 2013). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado (Meneguzzo 2020b). In the study area it was found in open *tabuleiro* (savanna) pockets in Paraíba, where it was observed among grasses, sometimes being difficult to distinguish it from other savanna herbs. According to Pansarin (2005), the flowers of *C. tenuis* are ephemeral and have an unpleasant smell, opening at sunrise and withering between noon and 2 PM. The conservation status of *C. tenuis* was evaluated by CNCFlora as least concern (LC).

Phenology: Flowers and fruits in June.

Material examined: BRAZIL. PARAÍBA: Mamanguape, Reserva Biológica Guaribas, Capim Azul, Sema I, 13/VI/1991, fl. fr., *L.P. Félix et al. 3957* (EAN, JPB).

Coryanthes Hook., Bot. Mag. 58: t. 3102. 1831.

Coryanthes (Epidendroideae) comprises ca. 60 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 20 occur in Brazil, and five in the northeast (Marçal & Chiron 2013; BFG 2015; Engels *et al.* 2017). In the study area, a single species was identified.

12. *Coryanthes speciosa* (Hook.) Hook., Bot. Mag. 58: t. 3102. 1831. (Fig. 2I)

Plants epiphytic, sympodial, caespitose, shade-loving. Roots cylindrical, at the base of pseudobulb. Pseudobulb heteroblastic, fusiform. Leaves sessile, 2-3 per pseudobulbs, apical, oblanceolate, plicate, semi-erect. Racemes lateral, at the base of pseudobulbs, few-flowered, pendent. Flowers showy, long-pedicellate, resupinate, bisexual, yellow, with a reddish-brown spot, ephemeral; lateral sepals and petals falcate; lip mesochile with one callus at the base; column fused to the lip, with a pair of glands (pleuridia) at the base; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: *Coryanthes speciosa* occurs in Brazil, French Guyana, Guyana, Peru, Surinam, Trinidad & Tobago, and Venezuela (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon and Atlantic Forest (BFG 2015; Engels *et al.* 2017). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte and Paraíba, where it was observed growing in association with ants. Individuals of *C. speciosa* present considerable variation in density and size of the spots of the flowers (Engels *et al.* 2017). The conservation status of *C. speciosa* was evaluated by CNCFlora as LC (least concern).

Phenology: Flowers in February and December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Canguaretama, 27/XII/2012, veg., *J.G. Jardim et al. 6442* (UFRN); Espírito Santo, APA Piquirí-Una, 14/II/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 122* (UFRN). PARAÍBA: Rio Tinto, Reserva Biológica Guaribas, Mata do Maracujá, 19/XII/1991, fl., *L.P. Félix 4611* (EAN).

Cyrtopodium R.Br., Hortus Kew. 5: 216. 1813.

Plants terrestrial, sympodial, caespitose, sun-loving. Roots cylindrical, at the base of the stem. Pseudobulb homoblastic, fusiform, conspicuous or inconspicuous, enveloped by a scarious sheath at base. Leaves along the ste, distichous, sessile, semi-erect, amplexicaulous, plicate, chartaceous. Panicle lateral, emerging from the base of pseudobulb, multiflowered, lax, erect or deflexed. Flowers showy, long-pedicellate, resupinate, bisexual, yellow, greenish-yellow or greenish, spotted or not; sepals and petals free; lip trilobed, with a callus lamelar or warty at the base, white, greenish-yellow or red; column not fused to the lip; pollinia 2, cartilaginous. Fruit ellipsoid, oblanceolated or obovoid.

Cyrtopodium (Epidendroideae) comprises 47 neotropical species (Romero-González *et al.* 2008; Chase *et al.* 2015), of which 37 occur in Brazil, and 15 in the northeast (Batista & Bianchetti 2020). Three species were identified in the study area.

13. *Cyrtopodium blanchetii* Rchb. f., Linnaea 22: 852. 1849. (Fig. 3A)

Plants with pseudobulb 4-6 cm long, subterraneous; flowers greenish with brown spots; lateral sepals lanceolate; petals ovate; lip with mid-lobe spatulate, apex rounded, yellow; callus lamellate, white.

Distribution, ecology and conservation status: *Cyrtopodium blanchetii* occurs only in Bolivia and Brazil (Romero-González *et al.* 2008). In Brazil, it occurs in the Atlantic Forest, Caatinga and Cerrado, in the northeast, central-west and southeast regions (Romero-González *et al.* 2008; Batista & Bianchetti 2020). It is being registered here as occurring in open *tabuleiro* (savanna) pockets in Rio Grande do Norte and Paraíba, where it was observed among grasses, with the pseudobulb completely buried in white sandy soil. The conservation status of *C. blanchetii* was evaluated by CNCFlora as least concern (LC).

Phenology: Flowers and fruits in April and May.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Pedro Velho, APA Piquirí-Una, 24/IV/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 189* (UFRN); Mata do Pilão, 2/IV/2017, fl., *G.S. Garcia & L.M.G. Gonçalves 498* (UFRN). PARAÍBA: Mamanguape, 4/IV/1994, fl., *L.P. Félix et al. 6485* (PEURF); Sema II, 24/V/1990, fl. fr., *L.P. Félix & E.S. Santana 3062* (EAN, JPB); 26/IV/1990, fl., *L.P. Félix & E.S. Santana 5642* (EAN).

14. *Cyrtopodium flavum* Link & Otto *ex* Rchb., Iconogr. Bot. Exot. 3: 7. 1830. (Fig. 3B)

Plants with pseudobulb 2,5-46,5 cm long, aerial; flowers yellow, without spots; sepals elliptic; petals obovate; lip with mid-lobe sub-orbicular, apex emarginate; callus warty, orangish.

Distribution, ecology and conservation status: It is endemic to Brazil and naturalized in the United States, in

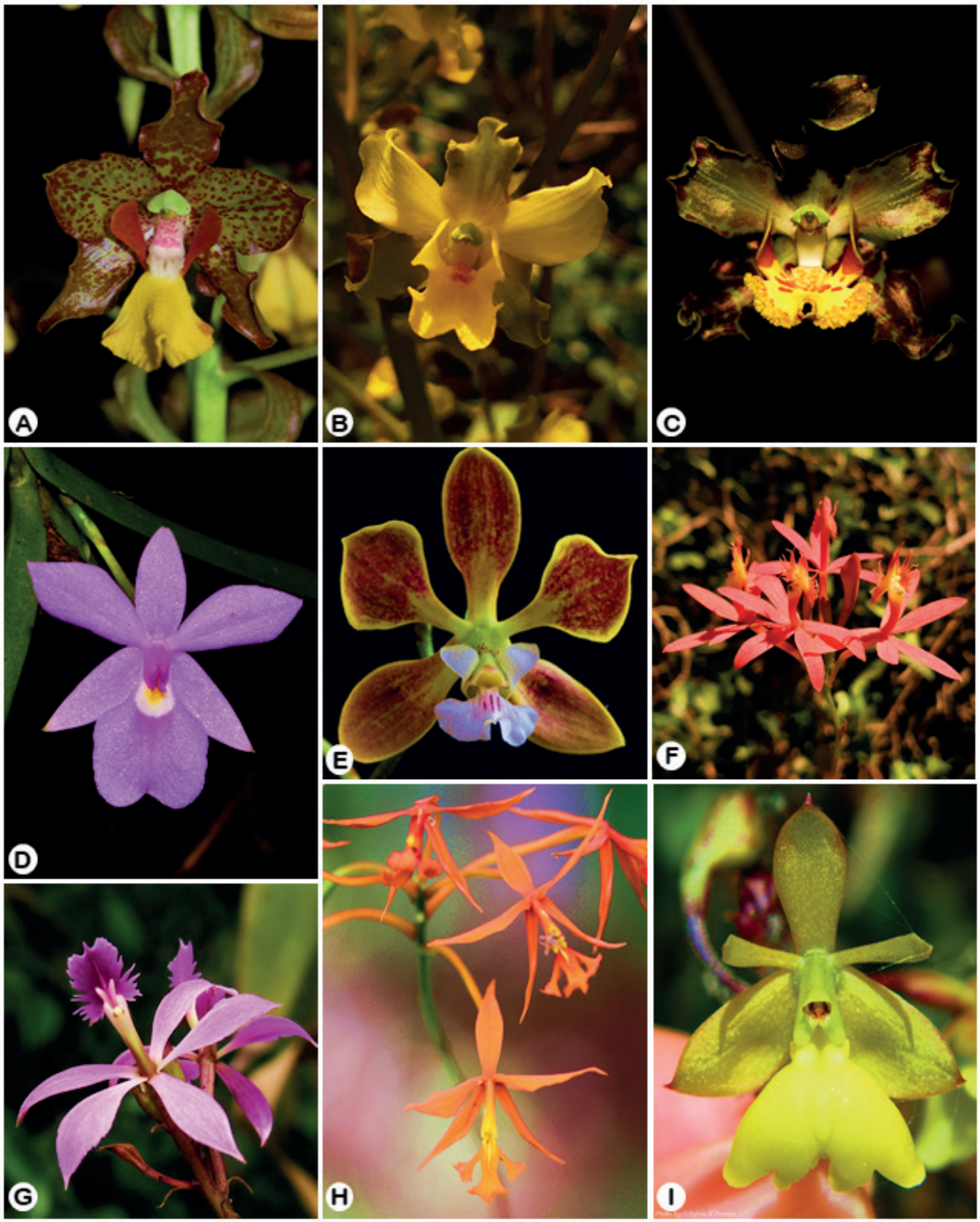

Figure 3. a. *Cyrtopodium blanchetii* – flower (Photo: Bianchetti LB). **b.** *Cyrtopodium flavum* - flower. **c.** *Cytopodium holstii* – flower (Photo: Oliveira G). **d.** *Dimerandra emarginata* – flower (Photo: Moreno S). **e.** *Encyclia oncidioides* – flower (Photo: Varella LF). **f.** *Epidendrum cinnabarinum* – flower. **g.** *Epidendrum flexuosum* – flower (Photo: McClarem D). **h.** *Epidendrum macrocarpum* – flower (Photo: Cardoso A). **i.** *Epidendrum orchidiflorum* – flower (Pereira SR).

Florida (Romero-González *et al.* 2008). In Brazil, it occurs only in the Atlantic Forest, in the northeast, southeast and south regions (Romero-González *et al.* 2008; Batista & Bianchetti 2020). In the study area it was found in open *tabuleiro* (savanna) pockets in Rio Grande do Norte, Paraíba and Pernambuco, where it usually grows in white sandy soil, close to terrestrial bromeliads or shrubs. The conservation status of *C. flavum* was evaluated by CNCFlora as least concern (LC).

Phenology: Flowers from November to April. Fruits between the months of May and November.

Note: Romero-González *et al.* (2008) considered *C. polyphyllum* (Vell.) Pabst *ex* F.Barros and *C. paranaense* Schltr synonymous of *C. flavum*. They also mentioned that *C. flavum* is similar to *C. andersonii* (Lamb. *ex* Andrews) R.Br., but can be distinguished by the smaller flowers and wider sepals.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Baía Formosa, 1/XI/1992, fl., *L.P. Félix 5477* (EAN); Espírito Santo, 15/V/2015, fr., *J.L. Costa-Lima et al. 2137* (UFRN); APA Piquirí-Una, 21/XI/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 81* (UFRN); Nísia Floresta, Floresta Nacional de Nísia Floresta, 17/X/2015, fl, *G.S. Garcia et al. 71* (UFRN); Pedro Velho, APA Piquirí-Una, 5/XI/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 407* (UFRN). PARAÍBA: Caaporã, Sítio Brejo de Lima, 23/XI/2014, fr., *P.C. Gadelha Neto & J. R. Lima 3885* (JPB); João Pessoa, Jardim Botânico, 13/IX/2002, fr., *P.C. Gadelha Neto 768* (JPB); Mata da Penha, 17/I/1997, fl., *O.T. Moura 1524* (JPB); Mamanguape, Km 57, 29/XI/2006, fl., *L.P. Félix 11374* (EAN); Reserva Biológica Guaribas, 2004, fr., *R.N.A. Brasil s.n* (JPB *46719*); 13/XII/2012, fl., *L.A. Pereira & F.O. Silva 499* (JPB); Sema I, Capim Azul, 26/XI/2014, fl., *L.P. Félix et al. 15227* (EAN); 1/X/1962, fl., *S. Tavares 1073* (HST, PEURF); Área II, 29/VI/2002, fr., *R.N.A. Brasil et al. 124* (JPB); 22/XI/1991, fl., *L.P. Félix 4593* (EAN); 20/XII/1989, fl., *L.P. Félix & E.S. Santana 2594* (EAN); Pedras de Fogo, tabuleiro, 16/XI/1933, fl., *B. Pickel 3425* (IPA); 26/XI/1965, fl., *A. Lima 65-4323* (IPA); Rio Tinto, Reserva Biológica Guaribas, Mata do Maracujá, 20/XII/1989, fl., *L.P. Félix & E.S. Santana 2594* (JPB); Santa Rita, Usina São João, Lagoa do Paturi, próximo a Tibirizinho, 10/XI/2011, fl. fr., *C.M.L.R. Araujo & R.A. Pontes 325* (JPB). PERNAMBUCO: Cabo de Santo Agostinho, entre os Engenhos Megahype e Cayango, 20/IV/2009, fr., *M. Sobral-Leite & A. M. Wanderley 899a* (IPA, UFP); 14/XI/2013, fl., *M. Sobral-Leite 1352* (IPA); Goiana, Itapirema do Meio, 26/X/1966, fl., *A. Lima 66-4731* (IPA); São Lourenço da Mata, Reserva do Tapacurá, VII/1995, fl., *M. Alves 10095* (UFP).

15. *Cyrtopodium holstii* L.C.Menezes, Schlechteriana 4: 149. 1993. (Fig. 3C)

Plants with pseudobulb 3-38 cm long, aerial; flowers greenish-yellow, with brown spots; sepals lanceolate; petals ovate; lip with mid-lobe sub-reniform, margins fringed, apex rounded; callus warty, yellow.

Distribution, ecology and conservation status: It is endemic to Brazil, occurring in the Atlantic Forest, Caatinga and Cerrado, in the northeast and southeast regions (Romero-González *et al.* 2008; Carregosa 2013; Batista & Bianchetti 2020). In the study area it was found in open *tabuleiro* (savanna) pockets in Rio Grande Norte and Paraíba, usually growing in white sandy soils close to terrestrial Bromeliads or shrubs. The conservation status of *C. holstii* was evaluated by CNCFlora as least concern (LC).

Phenology: Flowers between the months of February and November.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Goianinha, APA Piquirí-Uma, 10/II/2016, fl., *G.S. Gonçalves & L.M.G. Goncalves 109* (UFRN); Natal, Parque da Cidade Dom Nivaldo Monte, trilha Pau Brasil, 16/V/2015, fr., *A.A. Roque et al. 1625* (UFRN); Parnamirim, estação rádio guararapes da mariniha, 18/II/1999, fl., *L.A. Cestaro 99-0062* (UFRN); Rio do Fogo, Punaú, 18/II/2009, fl., *A.C.P. Oliveira 1292* (UFRN). PARAÍBA: Conde, Praia de Coqueirinho, 4/III/1990, fl., *L.P. Félix & G.B. Trigo 2751* (EAN); Mamanguape, 2/VII/2014, fl., *E.M. Almeida & L.P. Félix 1231* (EAN); Reserva Biológica Guaribas, 2004, fr., *R.N.A. Brasil s.n* (JPB *46714*); 2004, fl., *R.N.A. Brasil s.n* (JPB *46716*); Capim Azul, Sema I, 1/II/1989, fl., *L.P. Félix & E.S. Santana 6328* (EAN); 9/XI/2002, fl., *R.N.A. Brasil et al. 170* (JPB); Pitimbu, APA de Tambaba, 31/X/2008, fl., *I.B. Lima et al. 1020* (JPB).

Dichaea Lindl., Gen. Sp. Orchid. Pl. 208. 1833.

Dichaea (Epidendroideae) comprises 118 neotropical species (Pupulin 2007; Chase *et al.* 2015), of which 25 occur in Brazil, and four in the northeast (Meneguzzo & Hall 2020c). In the study area, a single species was identified.

16. *Dichaea panamensis* Lindl., Gen. Sp. Orchid. Pl. 209. 1833.

Plants epiphytic, pseudomonopodial, caespitose, spreading to pendent, shade-loving. Roots cylindrical at the base of pseudobulb. Stem compressed dorsi ventrally. Leaves sessile, widely spaced along the stem, linear-elliptic to lanceolate, articulate, deciduous. Racemes axial, 1-flowered. Flower not showy, long-pedicellate, resupinate, bisexual, greenish-white with purple spots; lateral sepals sub-falcate; petals elliptic; lip trilobed, anchoriform, apex obtuse; column not fused to the lip; pollinia 4, cartilaginous.

Distribution, ecology and conservation status: *Dichaea panamensis* is a common species that occurs from Mexico to Venezuela, Ecuador, and Brazil (Pupulin 2007). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north, northeast and central-west regions (Meneguzzo & Hall 2020c). In the study area it was found in *tabuleiro* forests in Pernambuco, where it was observed living in wet areas (Pessoa & Alves 2012). According to Pupulin (2007) individuals of *D. panamensis* are largely variable in size and color of the flowers, however they are unmistakable. The

conservation status of *D. panamensis* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in August, November and December.

Material examined: BRAZIL. PERNAMBUCO: Cabo, Xangô, Gurjão, 6/II/2003, veg., *L.P. Félix & A.Viana 9802* (EAN); Igarassu, Mata de Piedade, 20/XII/2007, fl. fr., *D. Araújo & A. Alves-Araújo 534* (UFP); 23/XI/2009, fl. fr., *E. Pessoa & J.A.N. Souza 114* (EAN); 16/XII/2009, fl., *E. Pessoa & J.A.N. Souza* 198 (UFP); 17/VIII/2011, fl., *B.S. Amorim et al. 993* (UFP); Recife, Mata de Dois Irmãos, 26/XI/1954, fl., *Andrade-Lima 54-1954* (IPA); Córrego da Mamajuda, 10/XI/1962, fl., *S. Tavares 1134* (IPA); Guarabira, Santuário dos Três Reinos, 24/IX/2013, fl., *M. Sobra-Leite et al. 1293* (UFP); São Lourenço da Mata, Engenho São Bento, 26/XII/1963, fl., *Andrade-Lima 63-4196* (IPA); Tapera, São Bento, 2/IX/1934, fl., *B. Pickel 3617* (IPA).

Dimerandra Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 43. 1922.

Dimerandra (Epidendroideae) comprises eight neotropical species (Siegerist 1986). These species, however, have been described based on tiny differences in the lips and correspond to extra-Brazilian materials. Only one species is recognized in Brazil (van den Berg 2020c).

17. *Dimerandra emarginata* (G.Mey.) Hoehne, Bol. Agric. (São Paulo) 34: 618. 1934. (Fig. 3D)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at base of the stem; pseudobulb homoblastic, cylindrical. Stem articulate, ± zigzag, striate to sulcate. Leaves sessile, distichous, along the stem, oblong, apex asymmetric, erect, conduplicate. Racemes terminal, few-flowered, erect. Flowers showy, long-pedicellate, resupinate, bisexual, pink; sepals elliptic; petals obovate; lip entire, orbicular, apex emarginate; column fused to the lip up to half its length; pollinia 4, cartilaginous.

Distribution, ecology and conservation status: It is widely distributed in Belize, Brazil, Colombia, Costa Rica, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Suriname, Trinidad & Tobago, and Venezuela (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north, northeast and southeast regions (van den Berg 2020c). In the study area it was found in *tabuleiro* forests in Paraíba and Pernambuco, in different extracts of the forest (Pessoa & Alves 2012). The conservation status of *D. emarginata* was evaluated by CNCFlora as LC (least concern).

Phenology: Flowers and fruits between the months of June and December.

Material examined: BRAZIL. PARAÍBA: Sapé, Fazenda Pacatuba, 3/VI/1998, veg., *A.C.A. Moura 165* (JPB). PERNAMBUCO: Cabo de Santo Agostinho, Engenho Guajú, 26/IV/1998, veg., *L.P. Félix 8320* (HST); Mata do Cuxio, 12/IX/2003, fl. fr., *M. Oliveira & A.A. Grilo 1462* (UFP); Igarassu, Usina São José, Mata de Piedade, 17/VI/2003, fl., *A. Melquíades & G.J. Bezerra 239* (PEURF); 17/VI/2003, fl., *A. Melquíades & G.J. Bezerra 244* (PEURF); 17/VI/2003, fl., *A. Melquíades & G.J. Bezerra 245* (PEURF); 17/VI/2003, fl., *A. Melquíades & G. J. Bezerra 246* (PEURF); 17/VI/2003, fl., *A. Melquíades & G.J. Bezerra 247* (PEURF); 17/VI/2003, fl., *A. Melquíades & G.J. Bezerra 248* (PEURF); 17/VI/2003, fl., *A. Melquíades & G.J. Bezerra 249* (PEURF); 20/XII/2007, fr., *D. Araújo & A. Alves-Araújo 545* (HST, UFP); 16/XII/2009, fr., *E. Pessoa & J.A.N. Souza 201* (UFP); 23/XI/2009, fr., *E. Pessoa & J.A.N. Souza 112* (UFP, IPA); Paudalho, Rodovia em frente ao quartel de polícia, 25/VIII/1995, fl. fr., *M. Alves 16795* (UFP); Recife, Açude do Prata, 9/VI/1994, fl., *I.M. Andrade 9881* (UFP); São Lourenço da Mata, Tapera, São Bento, VIII/1926, fl., *B. Pickel 1044* (IPA).

Encyclia Hook., Bot. Mag. 55: t. 2831. 1828.

Encyclia (Epidendroideae) comprises ca. 150 neotropical species (Chase *et al.* 2015; Bastos *et al.* 2018), of which 48 occur in Brazil, and 17 in the northeast (Bastos *et al.* 2020). In the study area, a single species was identified.

18. *Encyclia oncidioides* (Lindl.) Schltr., Orchideen: 210. 1914. (Fig. 3E)

Plants epiphytic, sympodial, erect, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb heteroblastic, conic, with an internode in the lower third. Leaves sessile, 2-3 per pseudobulb, apical, lanceolate, conduplicate, coriaceous. Panicle terminal, multiflowered. Flowers showy, long-pedicellate, resupinate, bisexual, greenish yellow with purple spots; sepals lanceolate, the lateral free; petals spatulate, apex mucronate; lip trilobed, mid-lobe obcordate, apex uncinate; callus 1 with longitudinal suture; column fused to the lip, enfolded apically; pollinia 4, waxy.

Distribution, ecology and conservation status: It is endemic to Brazil where it is widely distributed in the Amazon, Atlantic Forest, Caatinga and Cerrado (Bastos *et al.* 2018). It is being registered as occurring in open *tabuleiro* (savanna) pockets in Rio Grande do Norte for the first time, where it was observed on shrubs. According to Bastos *et al.* (2018) specimens of *E. oncidioides* from inland and from the coast vary in color and morphology of the flowers. The conservation status of *E. oncidioides* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in January and February.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Macaíba, próximo à Mata do Bebo, 20/II/2016, fl., *E.C. Tomaz et al. 100* (UFRN); Natal, Parque da cidade Dom Nivaldo Monte, 19/I/2016, fl., *A.A. Roque 1686* (UFRN).

Epidendrum L., Sp. Pl. ed. 2: 1347. 1763.

Plants epiphytic or terrestrial, sympodial, caespitose, sun or shade-loving. Roots cylindrical, at the base of the stem. Stem not swollen in pseudobulb, cylindrical or dorsi-

ventrally compressed, conspicuous. Leaves along the stem, distichous, sessile, erect, amplexicaulous, conduplicate, coriaceous. Raceme terminal, one, few or multiflowered, congested or lax, erect. Flowers showy, short or long-pedicellate, resupinate or not, bisexual, white, greenish, greenish-white, orangish-red, pink and yellowish-red, spotted or not, fragrant or not; sepals and petals free; lip entire or trilobed, unguiculate, callus 1 or 2, white, yellow or greenish, keel 1 or 3, longitudinal, yellow or pink; column totally fused to the lip; pollinia 4, waxy. Fruit ellipsoid, fusiform, globose-ellipsoid and ovoid, floral receptacle persistent at the apex.

Epidendrum (Epidendroideae) comprises 1,413 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 130 occur in Brazil, and 50 in the northeast (Pessoa 2020b). In the study area, eight species were identified.

19. *Epidendrum cinnabarinum* Salzm. *ex* Lindl., Gen. Sp. Orchid. Pl. 106. 1831. (Fig. 3F)

Plants epiphytic; leaves oblong-lanceolate; flowers orangish-red; sepals oblanceolate; petals lanceolate, apex revolute; lip with lateral lobes eroded or fringed, mid-lobe deltoid, apex emarginate, callus 2 at the base, yellow, keel 1 from the middle up to the apex.

Distribution, ecology and conservation status: It is endemic to Brazil, occurring in the Atlantic Forest, Caatinga and Cerrado, in the northeast region (Pessoa 2020b). In the study area it was found in open *tabuleiro* (savanna) pockets in Rio Grande do Norte, Paraíba and Pernambuco. *E. cinnabarinum* is one of the most common species in the *tabuleiro*, being observed as epiphyte on sun-loving shrubs. The conservation status of *E. cinnabarinum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from September to May.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Baía Formosa, RPPN Mata Estrela, 29/III/2006, fl., *A.R. Lourenço 175* (JPB); Ceará-Mirim, área do empreendimento Dunas de Mariú, 11/II/2016, fl., *E.O. Moura & P.B.C.S. Moura 510* (UFRN); Distrito de Estivas, 2/XI/2016, fl., *E.A. Silva 4* (UFRN); Goianinha, Fazenda Nossa Senhora do Carmo, 12/II/2011, fl. fr., *J.L. Costa-Lima et al. 374* (JPB); Macaíba, Escola Agrícola de Jundiaí, 10/II/2012, fl., *J.L. Costa-Lima et al. 631* (UFRN); Próximo à Mata do Bebo, 20/II/2016, fl., *E.C. Tomaz 102* (UFRN); 7/XI/2017, fl., *V.P. Moreira 144* (UFRN); Natal, Parque da Cidade Dom Nivaldo Monte, 28/XII/2015, fl., *C.P.C. Gomes 29* (UFRN); Nísia Floresta, 20/IV/2008, fl., *F.S.R. Sousa 35* (UFRN); APA Bonfim-Guaraíras, Dunas do Lago Azul, 4/X/2017, fl., *G.S. Garcia 601* (UFRN); Parnamirim, 20/XI/2008, fl., *G. Souto 13* (UFRN); Parque Industrial, 10/I/2010, fl., *J.L. Costa-Lima 276* (UFRN); Estrada Lagoa Seca, 2/X/2016, fl., *D.L.F. Santos 2* (UFRN); Pedro Velho, APA Piquirí-Una, Mata do Pilão, 10/I/2018, fl., *G.S. Garcia 607* (UFRN); Rio do Fogo, X/2003, fl., *A. Ribeiro 22* (JPB); Punaú, 14/I/2018, fl., *G.S. Garcia 609* (UFRN); Taipu, 22/I/2016, fl., *E. O. Moura & A.R.V. Nunes 475* (UFRN). PARAÍBA: Bayeux, Mata do Xém-Xém, XII/2000, fl., *G. Freitas et al. 69* (JPB); Caaporã, Sítio Brejo de Lima, 13/I/2014, fl., *P.C. Gadelha Neto et al. 3711* (JPB); 20/II/2014, fl. fr., *P.C. Gadelha Neto et al. 3780* (JPB); João Pessoa, Jardim Botânico Benjamim Maranhão, 17/II/2004, fl., *P.C. Gadelha Neto 1099* (JPB); 10/I/2017, fl., *L.H.L. Moreira 163* (JPB); Tabuleiro de Itambé, 18/XI/1933, fl., *B. Pickel 3417* (IPA); Mangabeira, 9/I/1986, veg., *O.T. Moura 237* (JPB); Mata Ciliar do Rio Cabelo, 12/V/2011, fr., *L.A. Pereira & E.C.O. Chagas 225* (JPB); Mamanguape, Reserva Biológica Guaribas, 26/X/1982, fl., *C.A.B. Miranda et al. 176* (JPB); 15/XI/2000, fl., *C. Schlindwein 1107* (UFP); 3/XII/2009, fl., *S.R. Nóbrega 37* (JPB); 25/XI/2014, fl., *J.M.P. Cordeiro et al. 573* (EAN); Capim Azul, Sema I, 7/III/1990, fl., *L.P. Félix & E.S. Santana 2815* (EAN); 12/IV/2002, fl., *R.N.A. Brasil et al. 12* (JPB); 15/XII/2009, fl., *W.W. Thomas et al. 15037* (JPB); 21/X/2010, fl., *R.A. Pontes & L.A. Pereira 617* (JPB); 28/II/2013, fl., *E. Pessoa et al. 1070* (UFP); 9/IX/2015, fl., *L.H.L. Moreira et al. 106* (JPB); Campo Grande, Sema 2, 19/XII/1988, fl., *L.P. Félix & E.S. Santana 2537* (EAN); 5/IV/1989, veg., *L.P. Félix 9353-A* (JPB); 1/XI/1989, fl., *L.P. Félix & E.S. Santana 8073* (JPB); 9/III/2002, fl., *M.R. Barbosa et al. 2266* (JPB); 30/IV/2002, fl. fr., *M.R. Barbosa et al. 2449* (JPB); 27/V/2002, fl., *R.N.A. Brasil et al. 47* (JPB); 29/XI/2002, fl., *R.N.A. Brasil et al. 200* (JPB); Pedras de Fogo, BR-101, IV/2018, fl., *R.L. Soares-Neto & L.H.L. Moreira 147* (JPB); Rio Tinto, Fragmento Pb 163, 29/III/2012, fl. fr., *P.C. Gadelha Neto 3263* (JPB); Santa Rita, 25/I/2014, fl., *P.C. Gadelha Neto & R.A. Pontes 3762* (JPB); Usina São João, Lagoa do Paturi, 10/XI/2011, fl., *C.M.L. R. Araújo & R. A. Pontes 321* (JPB). PERNAMBUCO: Cabo de Santo Agostinho, entre os Engenhos Megahype e Cayango "Pedra do Cayango", 12/IV/2008, fl. fr., *M. Sobral-Leite & A.M. Wanderlev 742* (IPA, UFP); Goiana, Estação Experimental de Itapirema, 19/IV/1995, fl., *R. Pereira 3* (IPA); Usina Matarí, 25/III/1966, fl., *G. Teixeira 2938* (HST); Igarassu, Granja São Luiz, 27/XI/1967, fl., *A. Lima 69-5597* (IPA); Recife, Dois Irmãos, 30/III/1973, fl., *M. Ataide et al. 62* (IPA).

20. *Epidendrum flexuosum* G.Mey., Prim. Fl. Esseq. 260. 1818. (Fig. 3G)

Plants epiphytic; leaves oblong; flowers pink; lateral sepals sub-falcate; petals unguiculate, margin dentate; lip with lateral lobes eroded, mid-lobe obovate, apex truncate, callus 2 at the base, keel 1from the middle up to the apex.

Distribution, ecology and conservation status: *Epidendrum flexuosum* is widely distributed and common in Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, French Guyana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panamá, Peru, Trinidad & Tobago, Surinam, and Venezuela (Hágsater *et al.* 2008). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado (Pessoa 2020b). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte and Paraíba, where it was observed as a sun-loving epiphyte on shrubs or trees. According to Hágsater *et al.*

(2008) *E. flexuosum* is always associated with ant gardens, which frequently form nests in the mass of roots, often in association with *Coryanthes* species. The conservation status of *E. flexuosum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers from May to December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Canguaretama, 27/XII/2012, fl., *J.G. Jardim et al. 6433* (UFRN); Pedro Velho, APA Piquirí-Una, Mata do Pilão, 5/IX/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 12* (UFRN). PARAÍBA: Mamanguape, Área II, 29/XI/2002, fl., *R.N.A. Brasil et al. 203* (JPB); Rio Tinto, Mata do Maracujá, 20/XII/1989, fl., *L.P. Félix & E. S. Santana 2597* (EAN, JPB); Sema III, 23/V/1990, fl., *L.P. Félix & E. S. Santana 3022* (EAN); Sapé, RPPN Fazenda Pacatuba, 20/VI/2000, fl., *E.A. César 29* (JPB).

21. *Epidendrum macrocarpum* Rich., Actes Soc. Hist. Nat. Paris 1: 112. 1792. (Fig. 3H)

Plants epiphytic; leaves oblong-elliptic; flowers orangish; sepals and petals elliptic-lanceolate; lip with lateral lobes serrate, mid-lobe oblanceolate, apex cuspidate, callus 2 at the base, keel 1 from the base up to the middle, semi-involved by sepals and petals.

Distribution, ecology and conservation status: *Epidendrum macrocarpum* occurs in Brazil, Colombia, Ecuador, French Guyana, Guyana, Peru, Suriname, Trinidad & Tobago, and Venezuela (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north, northeast, central-west and southeast regions (Pessoa 2020b). In the study area it was found in open *tabuleiro* (savanna) pockets in Rio Grande do Norte and in *tabuleiro* forests in Pernambuco, where it was observed as a sun-loving epiphyte on the canopy of trees. It is being registered as occurring in Rio Grande do Norte for the first time. According to Engels & Rocha (2017) individuals of *E. macrocarpum* can be found on ant nests. The conservation status of *E. macrocarpum* was evaluated by CNCFlora as LC (least concern).

Phenology: Flowers and fruits from December to April.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Espírito Santo, APA Piquirí-Una, 5/XII/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 84* (UFRN); Pedro Velho, APA Piquirí-Una, 7/XII/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 88* (UFRN); Mata do Pilão, 2/IV/2017, fl. fr., *G.S. Garcia & L.M.G. Gonçalves 504* (UFRN). PERNAMBUCO: Igarassu, Mata de Piedade, 16/XII/2009, fr., *E. Pessoa & J.A.N. Souza 214* (UFP); 21/I/2014, fl., *E. Pessoa & N.K. Luna 1216* (UFP); 21/XI/2009, fl., *E. Pessoa & J.A.N. Souza 104* (HST, IPA, UFP); 2/XII/2010, fl., *E. Pessoa et al. 410* (UFP).

22. *Epidendrum micronocturnum* Carnevali & G.A.Romero-Gonzal, Lindleyana 11: 241. 1996.

Plants epiphytic, caespitose; leaves narrow-elliptic, the apex with a tiny fleshy mucro in the sinus; flower greenish-white; sepals elliptic; petals oblanceolate; lip with lateral lobes entire, falcate, mid-lobe oblanceolate, apex acute, callus 2 at the base.

Distribution, ecology and conservation status: It is widely distributed in the upper Amazon Basin, in Brazil, Equador, Colombia, Guyana, Venezuela, and Peru (Carnevali & Romero 1996; Hágsater *et al.* 2010). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north, northeast and central-west regions (Pessoa 2020b; Moreira *et al.* 2020). In the study area it was found in *tabuleiro* forests in Paraíba and Pernambuco, where it was observed growing on decaying wood, in low density populations, with apparently cleistogamous flowers. It is being registered as occurring in Pernambuco for the first time. The conservation status of *E. micronocturnum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in February, May and December.

Note: This is the smallest species in the *Epidendrum nocturnum* alliance and looks like a depauperate miniature of *E. nocturnum* Jacq. (Carnevali & Romero 1996; Carnevali & Ramírez-Morilo, 2003b). *E. micronocturnum* can be confused with *E. carpophorum* Barb.Rodr. and *E. bahiense* Rchb.f., both occurring in northeastern Brazil. However, *E. carpophorum* presents elliptical fleshy leaves, ovoid floral bracts, long pedicellate flowers, with longer sepals and petals. *E. bahiense* presents 4-11 leaves (vs. 2-4 in *E. micronocturnum*) and longer racemes with up to 3 flowers.

Material examined: BRAZIL. PARAÍBA: João Pessoa, Jardim Botânico Benjamim Maranhão, 10/II/2017, fl. fr., *L.H.L. Moreira 164* (JPB). PERNAMBUCO: Cabo de Santo Agostinho, Engenho Santo Estevão, 1973, veg., *G. Ferreira 343* (UFP); Igarassu, Mata de Piedade, 16/XII/2009, fr., *E. Pessoa & J.A.N. Souza 211* (IPA, UFP); 9/III/2010, veg., *E. Pessoa & J.D. Garcia 311* (UFP).

23. *Epidendrum orchidiflorum* Salzm. *ex* Lindl., Gen. Sp. Orchid. Pl. 103. 1831. (Fig. 3I)

Plants terrestrial, arenicolous; leaves lanceolate, apex obtuse; flowers greenish, usually with vinaceous spots; lateral sepals sub-falcate; petals elliptic; lip suborbicular, apex 4-lobed; callus 2 at the base; keel 1 from the base up to the apex.

Distribution, ecology and conservation status: *Epidendrum orchidiflorum* occurs in Brazil, Colombia, Guyana, Peru, and Venezuela (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in the north, northeast, central-west and southeast regions (Pessoa 2020b). It is being registered as occurring in savanna pockets in Rio Grande do Norte for the first time, where it was observed growing in open sites in white sandy soils. The conservation status of *E. orchidiflorum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in November.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Espírito Santo, APA Piquirí-Una, 21/XI/2015, fl.,

G.S. Garcia & L.M.G. Gonçalves 238 (UFRN); Pedro Velho, APA Piquirí-Una, 7/XII/2015, fl., *G.S. Garcia 89* (UFRN).

24. *Epidendrum pessoae* Hágsater & L.Sánchez, Icon. Orchid. 14: t. 1473. 2013.

Plants epiphytic; leaves elliptic-lanceolate, apex retuse or asymmetrically bilobed; flowers greenish, fragrant, opening in succession; sepals narrow elliptic; petals linear; lip reniform, apex emarginate, callus 2 at the base.

Distribution, ecology and conservation status: Endemic to the Atlantic Forest, in the northeast Brazil (Hágsater *et al.* 2013; Pessoa *et al.* 2021). In the study area it was found in *tabuleiro* forest in Pernambuco, where it was observed as a sun-loving epiphyte, growing on *Terminalia catappa* L. The conservation status of *E. pessoae* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in April.

Note: According to Hágsater *et al.* (2013) *E. pessoae* is similar to *E. latilabrum* Lindl., however, the latter can be distinguished by its 3-4 smaller narrowly elliptic-lanceolate leaves, 1-2 smaller flowers, and the lip with an emarginate mid-lobe and sinus apiculate.

Material examined: BRAZIL. PERNAMBUCO: Cabo de Santo Agostinho, Engenho Gurjaú, 26/IV/1998, fl., *L.P. Félix 8324* (HST).

25. *Epidendrum rigidum* Jacq., Enum. Syst. Pl. 29. 1760. (Fig. 4A)

Plants epiphytic; leaves narrow-elliptic, clustered on the apical half of the stem; flowers greenish; sepals and petals oblong; lip sub-square, apex obtuse; callus 2 at the base; keel 3 at base.

Distribution, ecology and conservation status: It is widely distributed and common in the Neotropics, from Florida to Peru and Brazil, and throughout the Caribbean islands (Salazar *et al.* 1990). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in all regions (Pessoa 2020b). In the study area it was found in *tabuleiro* forests in Paraíba and Pernambuco, where it was observed as a shade-loving epiphyte growing in different extracts of the forest. The conservation status of *E. rigidum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from August to November.

Note: This is probably the most common *Epidendrum* species, and one with more specimens in herbarium collections (Salazar *et al.* 1990). *E. rigidum* can be confused with *E. strobiliferum* Rchb.f., but differs by the sympodial non-branched stem (vs. branched in *E. strobiliferum*) (Pessoa & Alves 2012).

Material examined: BRAZIL. PARAÍBA: Sapé, RPPN Fazenda Pacatuba, 10/IX/1998, fl. fr., *A.C.A. Moura 221* (JPB). PERNAMBUCO: Igarassu, Usina São José, 18/X/2007, fl., *N.A. Albuquerque et al. 637* (IPA); Mata dos Macacos, 15/VIII/2007, fl., *A. Alves-Araújo et al. 520* (UFP); 22/XI/2009, fr., *E. Pessoa & J.A.N. Souza 109* (UFP); 23/XI/2009, fr., *E. Pessoa & J.A.N. Souza 111* (IPA, UFP); 16/XII/2009, veg., *E. Pessoa & J.A.N. Sousa 205* (UFP); Recife, Dois Irmãos, IX/1981, fl., *M. Guerra 131* (UFP); 7/VIII/1995, fl., *M. Alves 795* (UFP); Guabiraba, Santuário dos Três Reinos, 10/VII/2013, veg., *M. Sobra-Leite et al. 1282* (UFP); São Lourenço da Mata, Tapera, São Bento, VII/1928, fl., *B. Pickel 1692* (IPA).

26. *Epidendrum strobiliferum* Rchb.f., Ned. Kruidk. Arch. 4: 333. 1859. (Fig. 4B)

Plants epiphytic with branched stems; leaves lanceolate, the apex asymmetrically bilobed; flowers greenish-white or cream; lateral sepals sub-falcate; petals linear; lip cordiform, apex acute; callus 2, "y" shaped, in middle of the lip.

Distribution, ecology and conservation status: It is widely distributed in the Neotropics, from Florida, Eastern Mexico, Central America, and West Indies to Peru and Brazil in South America (Hágsater *et al.* 2010). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado, in all regions (Pessoa 2020b). In the study area, *E. strobiliferum* is rare in the *tabuleiro* forest in Pernambuco and is usually associated with wet sites (Pessoa & Alves 2012). The conservation status of *E. strobiliferum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in November and December.

Material examined: BRAZIL. PERNAMBUCO: Igarassu, Mata de Piedade, 23/XI/2009, fl. fr., *E. Pessoa & J.A.N. Souza 113* (UFP); 16/XII/2009, fr., *E. Pessoa & J.A.N. Souza 199* (UFP).

Epistephium Kunth, Syn. Pl. 1: 340. 1822.

Epistephium (Vanilloideae) comprises 21 neotropical species (Szlachetko *et al.* 2013; Chase *et al.* 2015), of which 6 occur in Brazil, and three in the northeast (Carvalho *et al.* 2016; Meneguzzo 2020d). In the study area, a single species was identified.

27. *Epistephium williamsii* Hook.f., Bot.Mag. 90: t. 5485. 1864. (Fig. 4C)

Plant terrestrial, sympodial. Roots filiform, at base of the stem; Stem ± woody. Leaves sessile, erect, along the stem, oval-lanceolate, amplexicaul, lustrous, veins reticulate. Racemes terminal, few-flowered, erect. Flowers showy, long-pedicellate, resupinate, bisexual, with a conspicuous epicalyx; sepals and petals lanceolate; lip entire, white with purple veins internally, pilose, apex retuse; column fused to the lip; pollen farinaceous.

Distribution, ecology and conservation status: It is widely distributed in Brazil, Guyana, Venezuela, and Paraguay (Carvalho *et al.* 2016). In Brazil, it occurs in the Atlantic Forest, Caatinga and Cerrado, in the northeast, central-west and southeast regions (Carvalho *et al.* 2016). In the study area it was found in savanna pockets in Rio

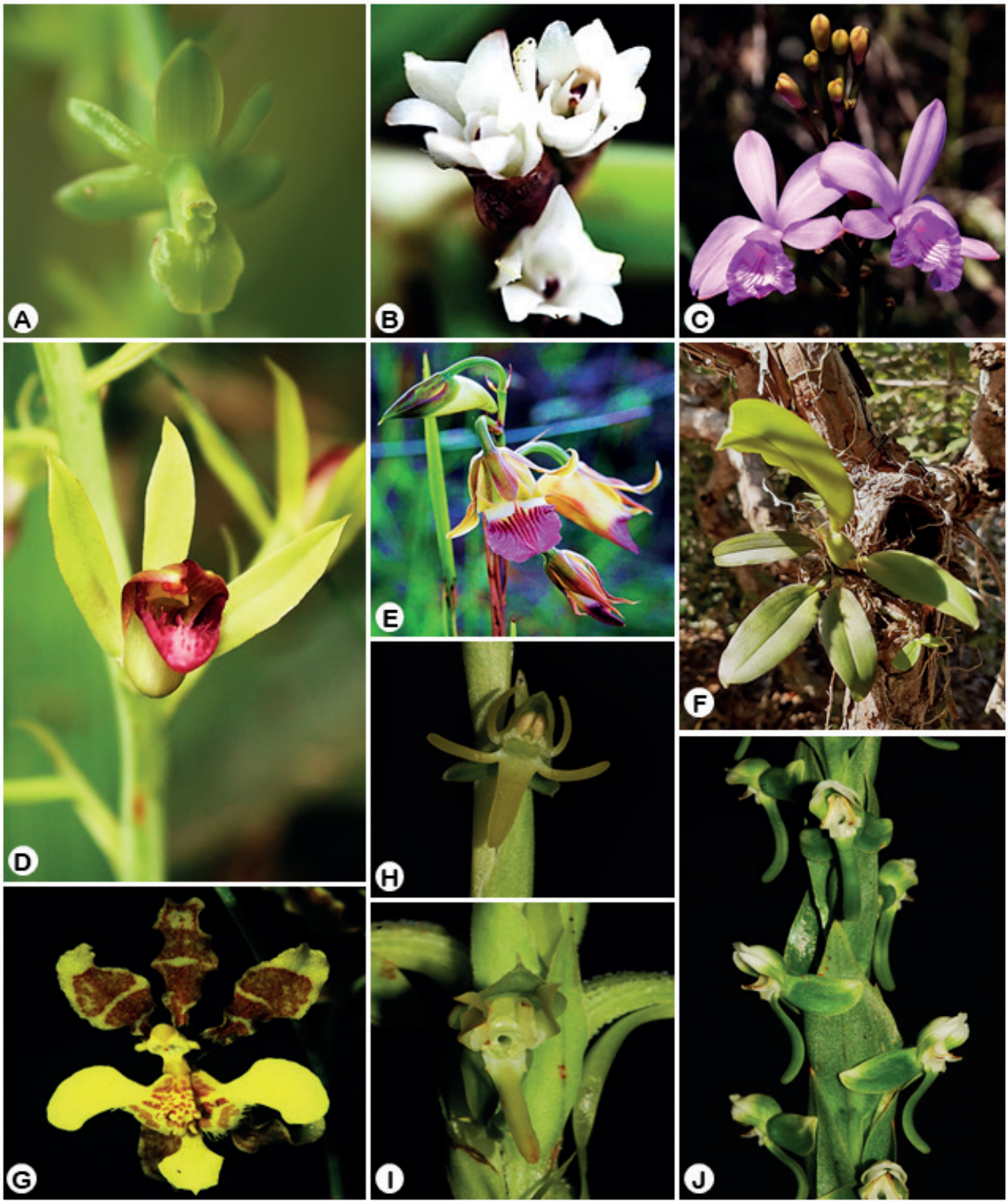

Figure 4. a. *Epidendrum rigidum* – flower (Photo: Ogrzewalska M). **b.** *Epidendrum strobiliferum* – flower (Photo: Varella LF). **c.** *Epistephium williamsii* – flower (Photo: Rodrigues M). **d.** *Eulophia alta* – flower (Photo: Miranda Z). **e.** *Galeandra montana* – flower (Photo: Mercadante M). **f-g.** *Gomesa barbata* – **f.** habit. **g.** flower. **h.** *Habenaria cruegeri* – flower (Photo: Batista JAN). **i.** *Habenaria hexaptera* – flower (Photo: Batista JAN). **j.** *Habenaria obtusa* – flower (Batista JAN).

Grande do Norte and Paraíba, where it was observed growing among grasses in high density populations in open sites with white sandy soils. The conservation status of *E. williamsii* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from January to December.

Note: Carvalho *et al.* (2016) concluded that *E. williamsii* is the correct name for *E. lucidum* Schltr., adopted by previous authors.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Pedro Velho, APA Piquirí-Una, 23/XII/2016, fl. fr., *G.S. Garcia & L.M.G. Gonçalves 417* (UFRN). PARAÍBA: Mamanguape, BR 101 a 5Km do acesso a Mataraca, 16/VII/1988, fl., *L.P. Félix & G.V. Dornelas 1507* (EAN); Água Fria, 22/V/1994, fl., *S.M. Rodrigues & L.P. Félix 82* (HST); Reserva Biológica Guaribas, Cabeceira do Rio dos Patos, Sema I, 1/II/1989, fr., *L.P. Félix 8072* (JPB); 1/IX/1989, bf., *L.P. Félix & E. Santana 2231* (EAN, JPB); 27/III/1990, bf., *L.P. Félix & E.S. Santana 2826* (JPB); Tabuleiro, em Fontainha, 25/I/2004, fl., *R. N. A. Brasil et al. 225* (JPB); 29/IV/2002, fl., *M.R. Barbosa et al. 2438* (JPB); 28/V/2002, bf., *R.N.A. Brasil et al. 95* (JPB); 9/XI/2002, bf., *R.N. A. Brasil et al.* 175 (JPB); 9/XI/2002, fl., *R.N.A. Brasil et al. 176* (JPB); 23/IX/2009, fl., *W.W. Thomas et al.* 14836 (JPB); 24/III/2010, fr., *M.C. Pessoa & J.R. Lima 611* (JPB); 28/II/2013, bf., *E. Pessoa et al. 1071* (UFP); Maripitanga, Sema II, 30/VIII/1989, fl. fr., *L.P. Félix & E.S. Santana 2139* (EAN, JPB); 13/VI/1991, fl., *L.P. Félix et al.* 3988 (JPB); Rio Tinto, 11/X/1959, fl., J.C.M. Vasconcelos Fragmento 2285 (EAN); Fragmento Pb 163, 29/III/2012, fr., *P.C. Gadelha Neto 3269* (JPB).

Eulophia R.Br., Bot. Reg. 7: t. 573. 1821. *nom. cons.*

Eulophia (Epidendroideae) comprises ca. 200 pantropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), with only one recognized in Brazil (Machnicki-Reis & Smidt 2020).

28. *Eulophia alta* (L.) Fawc. & Rendle, Fl. Jamaica 1: 112. 1910. (Fig. 4D)

Plants terrestrial, sympodial, caespitose, shade-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb homoblastic, cylindrical, enveloped by a scarious sheath. Leaves sessile, semi-erect, along the stem, linear, plicate; racemes lateral, multiflowered, erect. Flowers showy, long-pedicellate, resupinate, bisexual, vinaceous-green; sepals and petals oblong; lip trilobed, concave, 4-carenate internally, apex rounded; column not fused to the lip; keel papillose; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: *Eulophia alta* presents an amphi-atlantic distribution (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado, in all regions (Machnicki-Reis & Smidt 2020). In the study area it was found in *tabuleiro* forest in Pernambuco. The conservation status of *E. alta* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in May.

Material examined: BRAZIL. PERNAMBUCO: Cabo, próximo à divisa com Ipojuca, 10/VI/1967, fl. fr., *A. Lima 67-5021* (IPA).

Galeandra Lindl., III. Orch. Pl. t. 8. 1832.

Galeandra (Epidendroideae) comprises 18 neotropical species (Monteiro *et al.* 2010; Chase *et al.* 2015), of which 14 occur in Brazil, and five in the northeast (Monteiro 2020). In the study area, a single species was identified.

29. *Galeandra montana* Barb.Rodr., Gen. Sp. Orchid. 2: 175. 1881. (Fig. 4E)

Plants terrestrial, sympodial, caespitose, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb homoblastic, ovoid. Leaves sessile, erect, along the stem, lanceolate, plicate. Racemes terminal, few-flowered, erect. Flowers showy, long-pedicellate, sub-pendent, resupinate, bisexual, funnel-shaped (in natural position), brownish green, spotted, spur descendent; lateral sepals sub-falcate, apex reflex; petals elliptic; lip trilobed, rombic to obovate (when distended), apex obtuse, yellowish-white, mid-lobe violaceous, margin crenate; column not fused to the lip; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: It is endemic to Brazil, occurring in the Amazon, Atlantic Forest and Cerrado, in all regions (Bochorny *et al.* 2015; Monteiro 2020). In the study area it was found in savanna pockets in Rio Grande do Norte and Paraíba, where it was observed growing among grasses in open sites with white sandy soils. The conservation status of *G. montana* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in June and July.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Espírito Santo, APA Piquirí-Una, 24/VII/2016, fr., *G.S. Garcia et al. 307* (UFRN). PARAÍBA: Mamanguape, Campo Grande, Sema II, 14/VI/1991, fl., *L.P. Félix & M.A. Sousa 4014* (JPB).

Gomesa R. Br., Bot. Mag. 42: t. 1748. 1815.

Based on molecular studies (Chase *et al.* 2009), most Brazilian species originally in *Oncidium* Sw. were transferred to *Gomesa*. *Gomesa* (Epidendroideae) now comprises 119 species from South America (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 71 occur in Brazil, and 24 in the northeast (Meneguzzo 2020e). In the study area, a single species was identified.

30. *Gomesa barbata* (Lindl.) M.W.Chase & N.H.Williams, Ann. Bot. (Oxford) 104: 395. 2009. (Fig. 4F-G)

Plants epiphytic, sympodial, subcaespitose, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb heteroblastic, ovoid, angulous. Leaves 3, sessile, 1 apical semi-erect, 2 basal amplexicaulous, oblong-elliptic, conduplicate. Racemes axillary, multiflowered, pendents.

Flowers showy, long-pedicellate, resupinate, bisexual, yellow with brown spots; sepals and petals spatulate; lateral sepals fused at the base; petals free; lip trilobed, unguiculate, istme fimbriate, lateral lobes obovate, apex rounded, mid-lobe orbicular, apex acute, callus 2 at the middle; column not fused to the lip; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: Endemic to Brazil, occurring in the Atlantic Forest, Caatinga and Cerrado, in the northeast and south regions (Meneguzzo 2020e). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed in the canopy of trees or on twigs of shrubs. The conservation status of *G. barbata* was not evaluated (NE) by CNCFlora.

Phenology: Flowers from April to December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, rod. RN 064 entrando na rodovia para o distrito de Castelo, Faz. Diamante, 2km da sede da fazenda, 18/VIII/2011, fl., *J.G. Jardim et al. 6076* (UFRN); Fragmento à beira da BR-406, 25/XI/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 415* (UFRN); Espírito Santo, APA Piquirí-Una, Mata do Pilão, no dossel, próx. Trilha da Gameleira, 6/VI/2017, *G.S. Garcia 569* (UFRN); Rio do Fogo, Área Militar de Rio do Fogo, 28/VIII/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 5* (UFRN); 11/VII/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 261* (UFRN). PARAÍBA: Mamanguape, Cabeça de Boi, Sema II, 25/IV/1990, fl., *L.P. Félix & E.S. Santana 2911* (JPB); Sapé, RPPN Fazenda Pacatuba, 3/VI/1998, veg., *A.C.A. Moura 172* (JPB); Santa Rita, Patrocínio, 11/V/2010, fl., *A.S.A. Albuquerque 2* (EAN). PERNAMBUCO: Goiana, Engenho Miranda, 23/IX/1966, fl., *J.T. Costa 13* (IPA); Igarassu, Mata de Piedade, 16/XII/2009, veg., *E. Pessoa & J.A.N. Souza 206* (IPA); São Lourenço da Mata, Tapera, São Bento, IX/1921, fl., *B. Pickel 163* (IPA); 17/IX/1934, fl., *B. Pickel 3618* (IPA).

Habenaria Willd., Sp. Pl. 4: 44. 1805.

Plants terrestrial, sympodial, erect, sun-loving. Roots filiform, at the base of the stem, usually with fleshy tubers. Stem not swollen in pseudobulb, cylindrical, conspicuous. Leaves along the stem, alternate-distichous, sessile, erect, amplexicaulous, flat, coriaceous or membranaceous. Raceme terminal, multi or few-flowered, congested or lax, erect. Flowers showy or not, short or long-pedicellate, resupinate, bisexual, with one spur, white, yellowish-white, greenish-white, greenish, yellowish-green; sepals and petals free; petals entire or bipartite; lip entire or tripartite; column not fused to lip; pollinia 2, cartilaginous. Fruit fusiform.

Habenaria (Orchidoideae) comprises ca. 835 pantropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 174 occur in Brazil, and 70 in the northeast (BFG 2015; Batista *et al.* 2011a, b, 2012, 2016, 2017, 2018). Seven species were identified in the study area.

31. *Habenaria cruegeri* Cogn., Symb. Antill. 6: 302. 1909. (Fig. 4H)

Plants with tubers; leaves linear, membranaceous; inflorescence bracts ovate; flowers not showy, green to greenish-brown, short pedicellate; lateral sepals subfalcate; petals bipartite; lip tripartite, lateral lobes linear-spatuliform, mid-lobe oblong; spur ≤ 1 cm long.

Distribution, ecology and conservation status: *Habenaria cruegeri* is widely distributed in Brazil, French Guyana, Guyana, Surinam, Trinidad & Tobago, and Venezuela (Batista *et al.* 2018). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado, in the north, northeast, central-west and southeast regions (Batista *et al.* 2018). In the study area it was found in savanna pockets in Rio Grande do Norte and Paraíba. According to Batista *et al.* (2018) this species grows on surfaces that accumulate water during the rainy season when it flowers. The conservation status of *H. cruegeri* was evaluated by Batista *et al.* (2018) as least concern (LC).

Phenology: Flowers and fruits from June to September.

Note: Batista *et al.* (2018) established that *H. cruegerii* is the correct name of some specimens misidentified as *H. leprieurii* by Reichenbach.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Rio do Fogo, Área Militar do Rio do Fogo, 28/IV/2015, fl., *G.S. Garcia 4* (UFRN); 24/IV/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 155* (UFRN). PARAÍBA: Mamanguape, 14/VII/2013, fl., *L.P. Félix 14273* (EAN); Cabeceira do Rio dos Patos, Sema I, 1/IX/1989, fl. fr., *L.P. Félix & E.S. Santana 2243* (EAN, JPB); 13/VI/1991, fl. fr., *L.P. Félix et al. 3941* (JPB); 18/VIII/1988, fl. fr., *L.P. Félix & C.A.B. Miranda 1658* (EAN); 18/VIII/1988, fl. fr., *L.P. Félix & C.A.B. de Miranda 8441* (JPB).

32. *Habenaria hexaptera* Lindl., Gen. Sp. Orchid. Pl. 316. 1835. (Fig. 4I)

Plants without tuber; leaves lanceolate, membranaceous; inflorescence bracts lanceolate; flowers yellowish-green; short pedicellate; lateral sepals lanceolate; petals elliptic-falcate, anterior segment very small; lip tripartite, lateral lobes very short, linear, mid-lobe oblong; spur ≤ 9 cm long.

Distribution, ecology and conservation status: *Habenaria hexaptera* occurs mainly in Brazil and neighbor countries as Argentina, Bolivia, Colombia, Peru, and Venezuela (Batista *et al.* 2011a). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in the north, northeast, central-west and southeast regions (Batista *et al.* 2011a; BFG 2015). In the study area it was found in open *tabuleiro* (savanna pockets) in Paraíba. This species is rare in the area, growing on surfaces that accumulate water during the rainy season. The conservation status of *H. hexaptera* was evaluated by CNCFlora as least concern (LC).

Phenology: Flowers and fruits in August.

Material examined: BRAZIL. PARAÍBA: Mamanguape, Capim Azul, Est. Ecol., 18/VIII/1988, fl. fr., *L.P. Félix & C.A.B. de Miranda 8440* (JPB).

33. *Habenaria obtusa* Lindl., Gen. Sp. Orchid. Pl. 315. 1835. (Fig. 4J)

Plants without tuber; leaves oblong-lanceolate, coriaceous; inflorescence bracts imbricate, covering the rachis and the spur; flowers greenish-white, short pedicellate; lateral sepals elliptic to falcate; petals oblong-falcate, apex obtuse; lip linear-liguliform, apex rounded; spur ≤ 1 cm long.

Distribution, ecology and conservation status: *Habenaria obtusa* is widely distributed in Brazil, Colombia, Equador, Guyana, Paraguay, Peru, Suriname, and Venezuela (Batista *et al.* 2011b; Carvalho *et al.* 2013). In Brazil, it occurs in the Amazon, Atlantic Forest and Caatinga, in all regions (Batista *et al.* 2011b; BFG 2015). In the study area it was found in open *tabuleiro* (savanna pockets) in Paraíba during the rainy season. *H. obtusa* is highly variable in its vegetative characters, but floral morphology and proportions between the parts are fairly constant (Batista *et al.* 2011b). The conservation status of *H. obtusa* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in May, July and August.

Material examined: BRAZIL. PARAÍBA: Mamanguape, 14/VII/2013, fl., *L.P. Félix 14274* (EAN); 13/VII/2013, fl., *L.P. Félix 14288* (EAN); Reserva Biológica Guaribas, 10/V/2011, fl., *L.P. Félix 13590* (EAN); Capim Azul, 14/VIII/2002, fl., *L.P. Félix & S.M.C. Barbeiro 9764* (EAN).

34. *Habenaria petalodes* Lindl., Gen. Sp. Orchid. Pl. 316. 1835. (Fig. 5A)

Plants without tuber; leaves linear-lanceolate, membranaceous; inflorescence bracts lanceolate; flowers greenish-yellow, short pedicellate; lateral sepals obovate to falcate; petals obovate, apex truncate-sinuous; lip linear-oblong, apex truncate; spur ≤ 2 cm long.

Distribution, ecology and conservation status: *Habenaria petalodes* occurs in Brazil and Paraguay (Batista *et al.* 2011b). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in the north, northeast, central-west and southeast regions (Batista *et al.* 2011b; Santos & Matos 2013; BFG 2015). In the study area it was found, during the rainy season, in open *tabuleiro* (savanna pockets) in Rio Grande do Norte and Paraíba. It is being registered as occurring in Rio Grande do Norte for the first time. According to Carvalho *et al.* (2013), *H. petalodes* is one of the few species of *Habenaria* that benefits from anthropic modifications in natural environments and is often found at the side of roads and occasionally in pastures and other man-made areas. The conservation status of *H. petalodes* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in July, August and September.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Espírito Santo, APA Piquirí-Una, 7/VII/2016, fl., *G.S. Gonçalves & L.M.G. Gonçalves 241* (UFRN). PARAÍBA: Mamanguape, Reserva Biológica Guaribas, Área I, 29/VII/2001, fl., *M.S. Pereira 534* (JPB); Sema II, 30/VIII/1989, fl., *L.P. Félix & E.S. Santana 2101* (EAN, JPB); 31/VIII/1989, fl. fr., *L.P. Félix & E. Santana 2186* (EAN, JPB); Lagoa do Bacurau, 30/VIII/1989, fl., *L.P. Félix & E.S. Santana 2107* (EAN, JPB); Pedras de Fogo, Fontainha, entre Aurora e Mamuabas, 10/IX/1962, fl., *S. Tavares 1039* (HST, IPA).

35. *Habenaria pratensis* (Lindl.) Rchb.f., Linnaea 22: 813. 1850. (Fig. 5B)

Plants without tuber; leaves linear-lanceolate, apex acuminate, coriaceous; inflorescence bracts lanceolate; flowers yellowish-white, long pedicellate; lateral sepals lanceolate; petals bipartite with anterior segment linear; lip tripartite with lateral lobes linear-oblanceolate to oblanceolate, mid-lobe trapeziform, margin sinuous; spur ≤ 4 cm long.

Distribution, ecology and conservation status: *Habenaria pratensis* is endemic to Brazil, occurring in the Amazon, Atlantic Forest, Caatinga and Cerrado, in the northeast region (Batista *et al.* 2011b; BFG 2015). It was found in open *tabuleiro* (savanna pockets) in Rio Grande do Norte; *tabuleiro* forest and savanna pockets in Paraíba; and *tabuleiro* forest in Pernambuco. *H. pratensis* is a common species, flowering after the rainy season. According to Santos & Matos (2013) it has one of the biggest flowers of its kind, with up to 5 cm in length. The conservation status of *H. pratensis* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from March to November.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, 18/VIII/2011, fl., *J.G. Jardim et al. 6056* (UFRN); 9/VIII/2014, fl., *J. Jardim & J.C. Sousa Jr. 6698* (UFRN); Alagado prox. BR 101, 24/IV/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 141* (UFRN); Goianinha, APA Piquirí-Una, 2/IV/2017, fl., *G.S. Garcia & L.M.G. Gonçalves 507* (UFRN); Macaíba, 15/V/2009, fl., *A.M. Marinho 70* (UFRN); 15/V/2009, fl., *A.M. Marinho 111* (UFRN); Escola Agrícola de Jundiaí, 15/III/2018, fl., *V.P. Moreira 182* (UFRN); Mata do Bebo, 24/V/2018, fl., *M.B. Nascimento & V.P. Moreira 163* (UFRN). PARAÍBA: Mamanguape, Reserva de Guaribas, Sema I, Água Fria, 22/V/1994, fl. fr., *S.M. Rodrigues & L.P. Félix 72* (HST); Rio Tinto, Mata do Maracujá, Sema III, 27/IV/1990, fl., *L.P. Félix & E.S. Santana 2957* (EAN, JPB); 11/VI/1991, fl., *L.P. Félix et al. 3452* (EAN, JPB); Margem da Estrada Goiana-João Pessoa, 1/V/1967, fl., *A. Lima 67-4999* (IPA); Mataraca, Próximo a Br 101, 31/V/1987, fl., *L.P. Félix & G.V. Dornelas 730* (EAN); Pedras de Fogo, XI/1995, fl., *L.P. Félix 7161* (EAN); Águas Lindas, 13/X/1994, fl. fr., *L.P. Félix 6741* (PEURF). PERNAMBUCO: Goiana, RPPN Fazenda Tabatinga, 15/XI/2011, fl., *J.D. Mendonça et al. 4* (UFP); Igarassu, Margem da Estrada para Usina São José, 26/VI/1955, fl., *A. Lima 55-2087* (IPA); Recife, 30/V/1971, fl., *E.P. Heringer et al. 1002* (IPA).

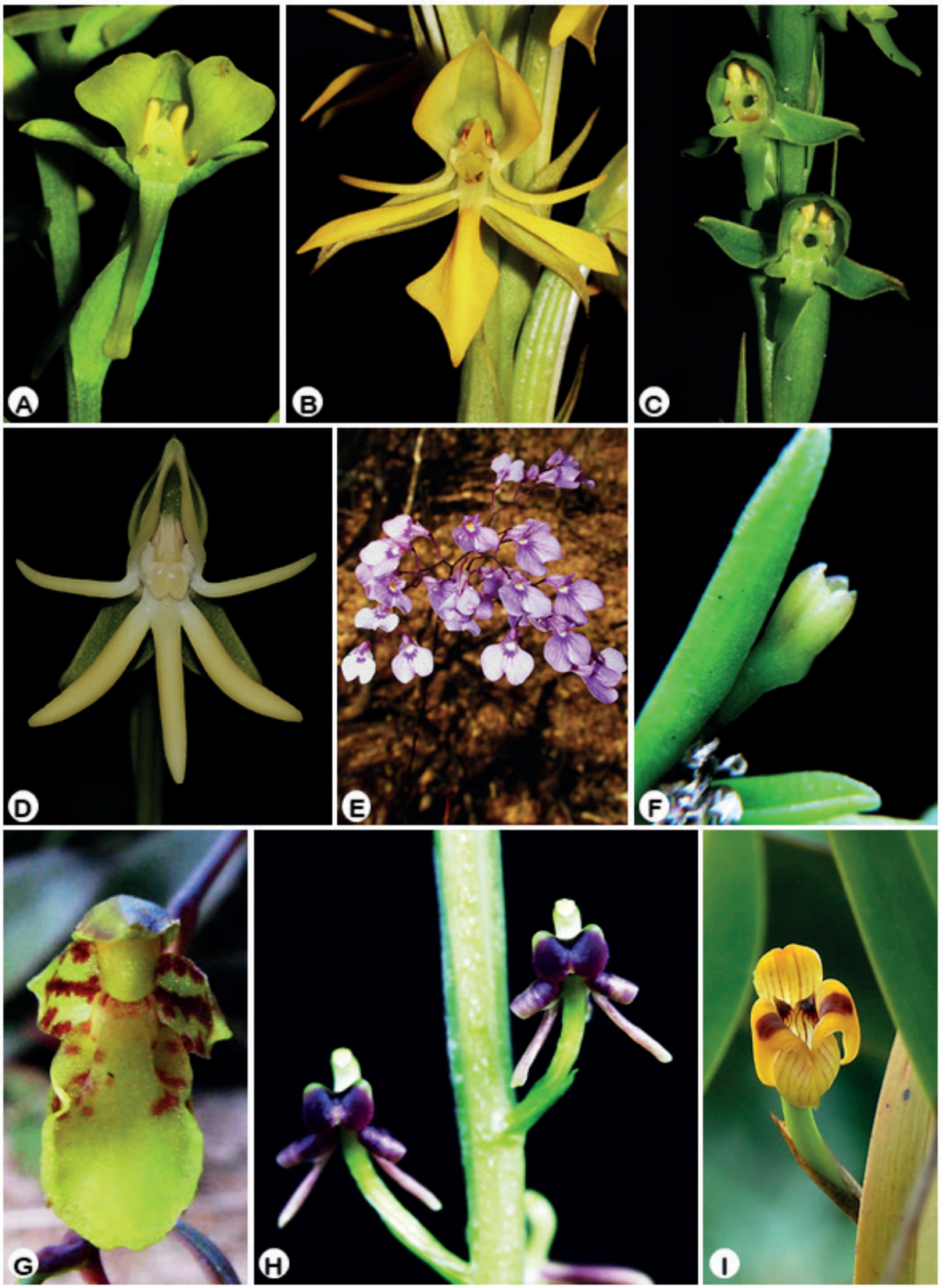

Figure 5. a. *Habenaria petalodes* – flower (Photo: Batista JAN). **b.** *Habenaria pratensis* – flower (Photo: Batista JAN). **c.** *Habenaria rotundiloba* – flower (Photo: Batista JAN). **d.** *Habenaria trifida* – flower (Photo: Batista JAN). **e.** *Ionospsis utricularioides* – flower (Photo: Völtz RR). **f.** *Jacqniella globosa* – flower (Photo: Varella LF). **g.** *Leochilus labiatus* – flower (Photo: Popvikim A). **h.** *Liparis nervosa* – flower (Photo: varella LF). **i.** *Maxillaria subrepens* – flower (Photo: Oak R).

36. *Habenaria rotundiloba* Pabst, Anais Congr. Soc. Bot. Brasil 14: 12. 1964. (Fig. 5C)

Plant with tuber; leaves lanceolate; inflorescence bracts oval-lanceolate; flowers greenish, short pedicellate; lateral sepals falcate; dorsal sepal deltoid; petals oval-lanceolate, apex cuspidate; lip tripartite with lateral lobes rounded, apex rounded, mid-lobe filiform, apex obtuse; spur ≤ 1 cm long.

Distribution, ecology and conservation status: *Habenaria rotundiloba* is a rare species, restricted to the Atlantic Forest of Northeast Brazil (Batista *et al.* 2011b; Santos & Matos 2013). In the study area it was found in Rio Grande do Norte and Paraíba in open *tabuleiro* sites (savanna pockets), on surfaces that accumulate water. It is being registered here as occurring in Rio Grande do Norte for the first time. The conservation status of *H. rotundiloba* was not evalueted (NE) by CNCFlora.

Phenology: Flowers in May and December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Espírito Santo, APA Piquirí-Una, 26/XII/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 91* (UFRN); Rio do Fogo, Ambiente alagado próx. BR 101, 1/V/2017, fl., *G.S. Garcia 513* (UFRN). PARAÍBA: Mamanguape, Reserva Biológica Guaribas, Sema I, 22/V/1990, fl., *L.P. Félix & E.S. Santana 3001* (EAN); 24/V/1994, fl., *S.M. Rodrigues & L.P. Félix 119* (HST).

37. *Habenaria trifida* Kunth, Nov. Gen. Sp. 1:330. 1816. (Fig. 5D)

Plants with tuber; leaves lanceolate, coriaceous; inflorescence bracts lanceolate; flowers showy, greenish-white, long pedicellate; lateral sepals falcate; dorsal sepal ovate; petals bipartite with anterior segment falcate; lip tripartite with lobes lanceolate, apex obtuse; spur ≥ 7 cm long.

Distribution, ecology and conservation status: *Habenaria trifida* is widely distributed in the Neotropics (Batista *et al.* 2011b). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in the north, northeast, central-west and southeast regions (BFG 2015). In the study area it was found in open *tabuleiro* sites (savanna pockets) in Rio Grande do Norte, Paraíba and Pernambuco, growing among grasses, and flowering during the rainy season. It is being registered here as occurring in Rio Grande do Norte for the first time. According to Batista *et al.* (2008), *H. trifida* can colonize anthropized habitats and is sometimes frequent on the margin of roads, pastures and other areas. The conservation status of *H. trifida* was evaluated by CNCFlora as least concern (LC).

Phenology: Flowers and fruits from May to September.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, RN 064, 18/VIII/2011, fl. fr., *J.G. Jardim et al. 6056* (JPB); Pedro Velho, APA Piquirí-Una, Mata do Pilão, 23/IX/2015, fl., *G.S. Garcia & L.M.G. Gonçalves 188* (UFRN); 7/V/2017, fl., *G.S. Garcia & L.M.G. Gonçalves 523* (UFRN). PARAÍBA: João Pessoa, Jardim Botânico, 22/VIII/2006, fr., *P.C. Gadelha Neto et al. 1574* (JPB); 24/V/2007, fl., *P.C. Gadelha Neto et al. 1737* (JPB); Marcação, Aldeia Grupiuna, 20/IX/2006, fl., *R.B. Lima et al. 2048* (JPB); Mamanguape, Capim Azul I, 13/VI/1991, fl. fr., *L.P. Félix et al. 3956* (EAN, JPB); Margem da Estrada Goiana-João Pessoa, 1/V/1967, fl., *A. Lima 67-4999-B* (IPA); Pedras de Fogo, Águas Lindas, 09/VI/1995, fl., *L.P. Félix 7160* (EAN); 13/V/1995, fl., *L.P. Félix 7111* (EAN). PERNAMBUCO: Goiana, RPPN Fazenda Tabatinga, 15/VII/2011, fl., *E.D. Mendonça et al. 4* (JPB).

Ionopsis Kunth, Nov. Gen. Sp. 1: 348. 1816.

Ionopsis (Epidendroideae) comprises six neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which three occur in Brazil, and only a single species in the northeast (Smidt 2020).

38. *Ionopsis utricularioides* (Sw.) Lindl., Coll. Bot. 8: t. 39. 1826. (Fig. 5E)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb heteroblastic, ellipsoid, compressed dorsi ventrally. Leaf sessile, 1 per pseudobulb, apical, linear, coriaceous, conduplicate. Racemes lateral, few-flowered, pendulous. Flowers showy, short-pedicellate, resupinate, bisexual, lilac with spots, spured; sepals oblanceolate; petals oblong; lip entire, two times longer than the sepals, obcordate, apex emarginate, with violaceous veins; column not fused to the lip; pollinia 2, waxy.

Distribution, ecology and conservation status: *Ionopsis utricularioides* is widely distributed throughout the Neotropics, from Florida to South America (Salazar *et al.* 1990). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado, in all regions of the country (Smidt 2020). It is being registered here as occurring on the canopy of trees in *tabuleiro* forest in Rio Grande do Norte for the first time. The conservation status of *I. utricularioides* was evaluated by CNCFlora as LC (least concern).

Phenology: Flowers in November.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, Fragmento próx. Capela, 9/I/2016, fl., *G.S. Garcia 99* (UFRN); 25/XI/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 412* (UFRN); São Lourenço da Mata, Tapera, São Bento, 12/XI/1923, fl., *D. Giovanetti s.n* (IPA); 30/XII/1929, fl., *B. Pickel 2237* (IPA).

Jacquiniella Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 123. 1920.

Jacquiniella (Epidendroideae) comprises 12 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which three occur in Brazil, two in the northeast (van den Berg 2020d). In the study area only one species was identified.

39. *Jacquiniella globosa* (Jacq.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 124. 1920. (Fig. 5F)

Plants epiphytic, sympodial, caespitose, with stem striate, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb cylindrical. Leaves sessile, along the stem, subterete, canaliculate adaxially. Racemes terminal, few-flowered, erect. Flowers tubular inconspicuous, short-pedicellate, resupinate, bisexual, not fully opening, greenish yellow; lateral sepals fused forming a gibbous nectary; petals elliptic; lip entire, obovate, apex rounded; collumn fused to the lip up to half its lenght; pollinia 4, waxy.

Distribution, ecology and conservation status: It is widely distributed in South America, reaching Central America, and Mexico (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north, northeast, southeast and south regions (van den Berg 2020d). In the study area it was found in *tabuleiro* forests in Pernambuco. *E. globosa* usually occurs in the forest understory and the flowers usually are cleistogamous (Romanini 2006; Pessoa & Alves 2012). The conservation status of *J. globosa* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in February.

Material examined: BRAZIL. PERNAMBUCO: Igarassu, Mata de Piedade, 16/II/2009, fl. fr., *E. Pessoa & J.A.N. Souza 203* (HST, UFP); 23/XI/2009, fl., *E. Pessoa & J.A.N. Souza 115* (UFP); 4/III/2010, veg., *E. Pessoa & J.D. Garcia 295* (UFP).

Leochilus Knowles & Westc., Fl. Cab. 2: 143. 1838.

Leochilus (Epidendroideae) comprises 12 neotropical species (Chase 1986; Chase *et al.* 2015), of which *Leochilus labiatus*, is the only species that occurs in Brazil (van den Berg 2020e).

40. *Leochilus labiatus* (Sw.) Kuntze, Revis. Gen. Pl. 2: 656. 1891. (Fig. 5G)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb ovoid, angled. Leaves sessile, 1 apical, 2 basal, elliptic, variegate with purple or red spots, amplexicaul. Racemes lateral, few-flowered, pendent. Flowers not showy, short-pedicellate, resupinate, bisexual, greenish-yellow, with red-brown spots; lateral sepals fused, dorsal sepal obovate; petals free, oblong; lip entire, obovate, apex emarginate; callus 1, trapezoidal, at the base of the lip; column fused to the lip; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: *Leochilus labiatus* is the most widespread species in the genus, occurring from South Florida to Tropical South America (Chase 1986). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north and northeast regions (van den Berg 2020e). In the study area it was found in a remnant of *tabuleiro* forest in Pernambuco, where it was observed on *Terminalia catappa* L. The conservation status of *L. labiatus* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in December.

Material examined: BRAZIL. PERNAMBUCO: Recife, Dois Irmãos, 28/XII/1966, fl e fr., *P. Ferreira 66-18* (IPA).

Liparis Rich., De Orchid. Eur. 30. 1817. *nom. cons.*

Liparis (Epidendroideae) comprises 426 cosmopolitan species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which three occur in Brazil, and two in the northeast (Santos & Smidt 2020). In the study area, a single species was identified.

41. *Liparis nervosa* (Thumb.) Lindl., Gen. Sp. Orchid. Pl. 26. 1830. (Fig. 5H)

Plants terrestrial, sympodial, caespitose, shade-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb homoblastic, piriform. Leaves sessile, along the stem length, elliptic-ovoid, plicate, shiny when fresh Racemes terminal, multiflowered, erect. Flowers short-pedicellate, resupinate, bisexual, green to purple, spotted; sepals oblong and petals spatulate with margin revolute, both free; lip entire, obovoid, geniculate, apex obcordate, purple with greenish spots; column not fused to the lip; pollinia 4, waxy.

Distribution, ecology and conservation status: *Liparis nervosa* is widely distributed in Africa, Tropical Asia, and Tropical America (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in all regions (Santos & Smidt 2020). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed in the litter, with individuals occurring close together. The conservation status of *L. nervosa* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from May to September.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Goianinha, APA Piquirí-Una, 24/VI/2016, fl., *G.S. Garcia 211* (UFRN). PARAÍBA: Caaporã, 10/VI/2014, fl., *I.B. Lima et al. 1401* (JPB); Beira da Estrada BR-101, 1980, fl., *A. Caldasso 5601* (IPA); Mamanguape, Reserva Biológica Guaribas, trilha cabeça de boi, 24/V/1990, fl., *L.P. Félix & E.S. Santana 3067* (EAN); 12/V/1991, fl., *C.A.B. Miranda et al. 3918* (JPB); 12/VI/1991, fl., *C.A.B. Miranda et al. 3918* (EAN, JPB); 12/VI/1991, fl., *L.P. Félix et al. 3934* (EAN, JPB); 14/VI/1991, fl., *L.P. Félix & M.A. Sousa 3999* (EAN, JPB); 21/VIII/2013, fr., *A. Melo et al. 1192* (UFP); Pedras de Fogo, BR-101, IV/2018, *R.L. Soares-Neto & L.H.L. Moreira 145* (UFP). PERNAMBUCO: Igarassu, Usina São José, 1971, fl., *A. Lima 71-6458* (IPA).

Maxillaria Ruiz & Pav., Fl. Peruv. Prodr. 116, t. 25. 1794.

Maxillaria (Epidendroideae) broadly defined encompasses *Cryptocentrum*, *Cyrtidiorchis*, *Mormolyca*, *Pityphyllum* and *Trigonidium* (Schuiteman & Chase 2015) and comprises 658 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 115 occur in Brazil, 30 in the northeast region (Meneguzzo *et al.* 2020). In the study area, a single species was identified.

42. *Maxillaria subrepens* (Rolfe) Schuit. & M.W.Chase, Phytotaxa 225: 73. 2015. (Fig. 5I)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb heteroblastic, ovoid, dorsi ventrally compressed. Leaf sessile, 1 per pseudobulb, apical, oblong, conduplicate. Raceme lateral, 1-flowered; flowers showy, long-pedicellate, resupinate, bisexual, yellowish with brownish lines; sepals and petals free, elliptic; lip trilobed, lateral lobes deltoid, apex obtuse, midlobe ovate, apex acute; column not fused to the lip; pollinia 4, cartilaginous.

Distribution, ecology and conservation status: *Maxillaria subrepens* occurs in Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, and Venezuela (Schuiteman & Chase 2015). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado, in the north, northeast and southeast regions (Meneguzzo *et al.* 2020). In the study area it was found in a *tabuleiro* forest in PE, where it was observed on trees. The conservation status of *M. subrepens* was not evaluated (NE) by CNCFlora.

Note: The first record for *M. subrepens* in the state of Pernambuco was reported by the German naturalist George Marcgrave in 1648, as *Trigonidium acuminatum* Bateman. According to Ossenbach (2017), that specimen is, probably, the first Orchidaceae prepared in Tropical America. Later, another specimen was collected by A. Caldasso (1978), in the municipality of Cabo de Santo Agostinho, having been identified as *M. rufescens* Lindl. However, *M. rufescens* can be recognized by its narrow-elliptical leaves (v.s oblong in *M. subrepens*), fleshy, yellowish flowers (v.s membranaceous, yellowish with brown lines), sepals and petals patent (v.s sepals and petals reflex to the apex). Probably *M. subrepens* was not recollected in Pernambuco due to the continuous process of metropolitan expansion, and constant growth of industrial complexes.

Material examined: BRAZIL. PERNAMBUCO: Cabo de Santo Agostinho, 1978, fl., *A. Caldasso 2602* (IPA).

Microchilus C.Presl, Reliq. Haenk. 1: 94. 1827.

Microchilus (Orchidoideae), including the New World species of *Erythrodes* Blume (Ormerod 2002), comprises 142 neotropical species (Chase *et al.* 2015; Ormerod 2016), of which four occur in Brazil, two in the northeast (Engels *et al.* 2016; Meneguzzo 2020f). In the study area, a single species was identified.

43. *Microchilus lamprophyllus* (Linden & Rchb.f.) Ormerod, Lindleyana 17: 217. 2002.

Plants terrestrial, sympodial, creeping, shade-loving. Roots cylindrical, puberulous, emerging from the internodes. Stem cylindrical, not swollen in pseudobulb. Leaves pseudopetiolate, along the stem length, lanceolate, amplexicaul. Raceme terminal, multiflowered, erect. Flowers not showy, short-pedicellate, resupinate, bisexual, spurred, white; sepals linear-oblanceolate; petals oblanceolate; lip entire, wide-elliptic, apex rounded; column fused to the lip; rostellum profoundly bifid, emarginate; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: *Microchilus lamprophyllus* is endemic to Brazil, occurring in the Atlantic Forest and Caatinga, in the northeast and southeast regions (Meneguzzo 2020f). In the study area it was found in a *tabuleiro* forest in Igarassu, Pernambuco, with only one known population of about a dozen specimens at the border of a small stream. The conservation status of *M. lamprophyllus* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in March and December.

Material examined: BRAZIL. PERNAMBUCO: Igarassu, Mata de Piedade, interior do fragmento, 15/XII/2009, fl., *J.N.A. Sousa 580* (IPA, UFP); 02/III/2010, fl. fr., *E. Pessoa* & *J.D. Garcia* 260 (HST, UFP).

Notylia Lindl., Bot. Reg. 11: t. 930. 1825.

Notylia (Epidendroideae) comprises 56 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 26 occur in Brazil, 11 in the northeast (BFG 2015). In the study area only *N. lyrata* was identified. Pessoa & Alves (2012) indicated the occurrence, in the same region, of another species, *N. barkeri* Lindl., based on sterile material. As we were not able to collect fertile specimens to confirm its identity, we did not include it here.

44. *Notylia lyrata* S.Moore, Trans. Linn. Soc. London, Bot. 4: 477. 1895. (Fig. 6A-B)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb heteroblastic, oblong to cylindrical. Leaf sessile, 1 per pseudobulb, apical, obovoid, conduplicate. Racemes multiflowered, pendent. Flowers not showy, short-pedicellate, resupinate, bisexual, greenish-yellow, with 2 orangish spots at the base of each petal; sepals lanceolate; petals linear; lip entire, unguiculate, ligulate, apex obtuse; callus with 3 longitudinal keels; column not fused to the lip; pollinia 2, waxy.

Distribution, ecology and conservation status: *Notylia lyrata* occurs in Brazil and Paraguay (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado, in all regions (BFG 2015). In the study area it was found in tabuleiro forests in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed growing on shrubs and trees. It is being registered here as occurring in Rio Grande do Norte for the first time. The conservation status of *N. lyrata* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in January, February and December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, Fazenda Diamante, 8/II/2014, fl., *J. Jardim et al. 6515* (UFRN); Fragmento próx. Capela, 9/I/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 100* (UFRN). PARAÍBA: Itapororoca, Fazenda Macacos, 28/III/1995, fl., *L.P. Félix 7096* (HST); Mamanguape, Reserva Biológica

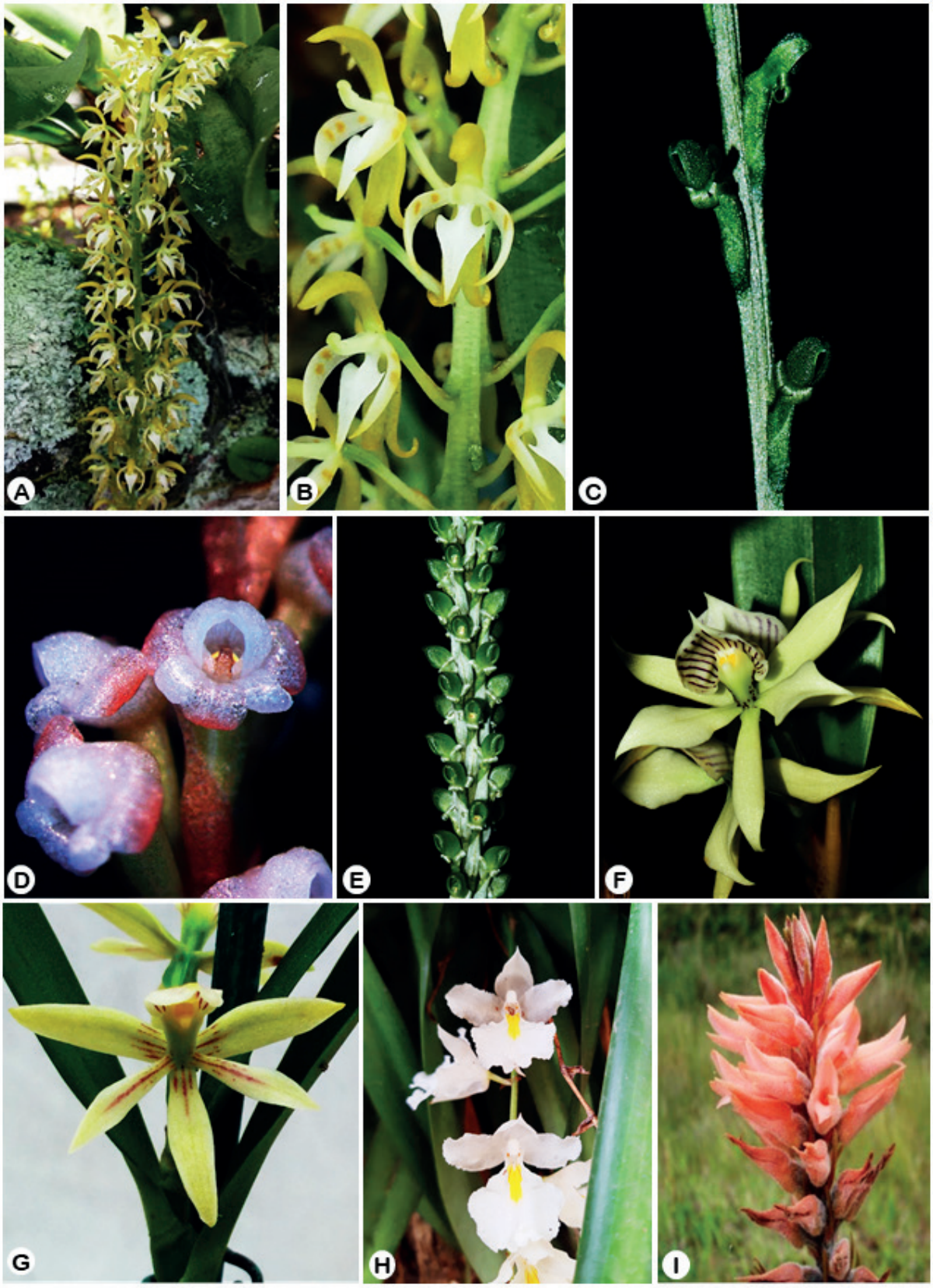

Figure 6. a-b. *Notylia lyrata* – **a.** habit; **b.** flower (Photos: Carvalho S). **c.** *Prescottia leptostachya* – flower (Photo: Azevedo CO). **d.** *Prescottia oligantha* – flower (Photo: Azevedo CO). **e.** *Prescottia stachyodes* – flower (Photo: Azevedo CO). **f.** *Prosthechea aemula* – flower (Photo: Vieira TL). **g.** *Prosthechea alagoensis* – flower (Photo: HOTSU). **h.** *Rodriguezia bahiensis* – flower. **i.** *Sacoila lanceolata* – flower (Photo: Guimarães LRS).

Guaribas, Cabeça de Boi, 28 / II / 2013, fl. fr., *E. Pessoa et al. 1075* (UFP); 19/XII/1989, fl., *L.P. Félix & E. S. Santana 2531* (EAN, JPB); 1989, fl., *L.P. Félix 8257* (EAN). PERNAMBUCO: Nazaré da Mata, Mata da Alcaparra, 15/III/2002, fl., *Costa et al. 2860* (IPA).

Oeceoclades Lindl., Edwards's Bot. Reg. 18: 1522. 1832.

Oeceoclades (Epidendroideae) comprises 38 pantropical species (Chase *et al.* 2015), of which only one occur in Brazil (Machnicki-Reis & Smidt EC 2020.

45. *Oeceoclades maculata* (Lindl.) Lindl., Gen. Sp. Orchid. Pl. 237. 1833.

Plants terrestrial, sympodial, caespitose, shade-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb heteroblastic, ovoid. Leaf sessile, 1 per pseudobulb, apical, oblong to elliptic, conduplicate, with greenish spots on the adaxial surface. Racemes terminal, multiflowered, erect. Flowers not showy, short-pedicellate, resupinate, bisexual, greenish-white; dorsal sepal oblanceolate; petals rombic to trulate; lip trilobed, white, with a pink spot on the middle; spur ≤ 0,4 cm long; column not fused to the lip; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: *Oceoclades maculata* has an amphi-atlantic distribution (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in all regions (Cantuária 2017; Machnicki-Reis 2020). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed growing in the litter. It appears to be somewhat related to anthropized areas (Pessoa & Alves 2012; Moreira *et al.* 2020). The conservation status of *O. maculata* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from March to December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Canguaretama, Piquirí, 22/VII/2016, fl. fr., *G.S. Garcia et al. 280* (UFRN); Natal, Parque da Cidade Dom Nivaldo Monte, 2/V/2015, fl., *A.A. Roque et al. 1611* (UFRN); 21/IX/2015, fr., *C.P.C. Gomes 19* (UFRN); 23/XI/2015, fr., *C.P.C. Gomes 6* (UFRN); Matinha dos Saguis, UFRN, 24/IV/2017, fl., *V.P. Moreira 2* (UFRN); Parnamirim, Campo experimental do Jiqui, 14/VI/1999, fl., *L.A. Cestaro 128* (UFRN); Hidrominas Santa Maria, 13/X/2005, fl. fr., *A. Ribeiro & J. Silva 30* (UFRN); São José do Mipibu, 12/IV/2012, fl. fr., *V.H.M. Sousa 3* (UFRN). PARAÍBA: Conde, APA de Tambaba, Fazenda Malhada do Alto, 17/X/2008, fr., *C.M.L.R. Araújo et al. 150* (JPB); João Pessoa, Bacia Hidrográfica do Rio Timbó, 13/XII/2005, fr., *N.T. Amazonas 127* (JPB); Cabo Branco, Falésia do Cabo Branco, 17/III/2008, fl., *A.A.M. Araújo & G.B. Freitas 96* (JPB); Campus da UFPB, 21/IX/1989, fr., *O.T. de Moura 4794* (JPB); Jardim Botânico Benjamim Maranhão, 1/X/2003, fr., *P.C. Gadelha Neto et al. 983* (JPB); 23/VIII/2004, fr., *P.C. Gadelha Neto & N.T. Lima 1234* (JPB); 29/VII/2002, fr., *P.C. Gadelha Neto et al. 721* (JPB); Trilha do Buriti, 6/IX/2016, fr., *L.H.L. Moreira 161* (JPB); 7/IX/2016, fr., *L.H.L. Moreira 162* (JPB); Trilha da Ilha, 12/VII/2016, fr., *L.H.L. Moreira 142* (JPB); 22/V/2017, fl., *L.H.L. Moreira 187* (JPB); 22/V/2017, fl., *L.H.L. Moreira 188* (JPB); Mamanguape, Reserva Biológica Guaribas, Área II, 14/IV/2004, fr., *R.N.A. Brasil et al. 229* (JPB); 2004, fl., *R.N.A. Brasil s.n* (JPB *46708*); 2004, fr., *R.N.A. Brasil s.n* (JPB *46710*); 24/III/2010, fl., *M.C. Pessoa & J.R. Lima 593* (JPB); 25/IV/2014, fl., *P.C. Gadelha Neto et al. 3289* (JPB); Rio Tinto, APA da Barra do Rio Mamanguape, 22/XI/2011, fl., *F. V. Rocha 181* (JPB); Mata do Maracujá, Sema III, 18/V/1989, veg., *C.A.B. Miranda et al. 3546* (EAN); Sítio Alagamar, Fragmento Pb 114, 18/IV/2012, fl. fr., *L.A. Pereira et al. 367* (JPB); 2004, fr., *R.N.A. Brasil s.n* (JPB *46710*); Sapé, RPPN Fazenda Pacatuba, 20/VI/2000, fr., *E.A. César 27* (JPB); 27/IV/2007, fr., *E.A. César 175* (JPB); Santa Rita, Usina São João, 18/IV/2010, fl., *A.S. Albuquerque 1* (EAN). PERNAMBUCO: Cabo de Santo Agostinho, Engenho Gurjaú, 26/IV/1998, fl., *L.P. Félix 8325* (HST); Goiana, 30/VIII/1998, fl., *L.P. Félix & A. Vanzela 8896* (EAN); RPPN Fazenda Tabatinga, 22/VIII/2010, fr., *D. Cavalcanti et al. 261* (JPB); Usina Santa Teresa, 27/VI/2013, fl., *A.M. Miranda et al. 6558* (HST); Igarassu, Usina São José, 6/IV/1983, fl., *R. Barreto & A. Chiappeta 479* (IPA, PEURF); Mata dos Macacos, 19/XII/2007, fr., *D. Araújo & A. Alves-Araújo 506* (UFP); Mata de Piedade, 16/IX/2009, fr., *T.A. Pontes & J.D. Garcia 216* (IPA, UFP); 9/III/2010, fl., *E. Pessoa & J.D. Garcia 309* (UFP).

Polystachya Hook., Exot. Fl. 2: t. 103. 1824. *nom. cons.*

Polystachya (Epidendroideae) comprises 232 pantropical species (Peraza-Flores 2012), of which eight occur in Brazil, and only one in the northeast (Meneguzzo 2020g).

46. *Polystachya concreta* (Jacq.) Garay & H.R.Sweet, Orquideologia 9: 206. 1974.

Plants epiphytic, sympodial, caespitose, shade-loving. Roots cylindrical, at base of the pseudobulb. Pseudobulb homoblastic, ovoid, aggregate. Leaves sessile, along the stem lenght, narrow-elliptic, conduplicate. Racemes terminal, multiflowered, bracts papyraceous. Flowers not showy, short-pedicellate, not resupinate, bisexual; lateral sepals deltoid; petals oblanceolate; lip trilobed, subsquare, apex truncate, pubescent in the central portion; callus 2 in the middle of the lip, yellowish green; column not fused to the lip; pollinia 4, cartilaginous.

Distribution, ecology and conservation status: It is widely distributed in South Florida (U.S.A), part of the Antilles and South America (Peraza-Flores 2012). In Brazil, it occurs in all phytogeographic (Pessoa & Alves; Peraza-Flores 2012; Moreira *et al.* 2020; Meneguzzo 2020g). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed as an epiphyte on trees in the middle or at the edge of the forest

(Pessoa & Alves 2012; Moreira *et al.* 2020). The conservation status of *P. concreta* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from February to December.

Note: Moreira *et al.* (2020) identified *P. concreta* as *P. estrellensis*, however, according to Peraza-Flores (2012), adopted here, *P. estrellensis* is a synonymous of *P. concreta*.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Maxaranguape, Maracajaú, 24/IV/2016, fr., *G.S. Garcia & L.M.G. Gonçalves 152* (UFRN); Nísia Floresta, APA Bonfim-Guaraíras, Dunas de Barreta, 11/I/2017, fr., *G.S. Garcia & L.M.G. Gonçalves 464* (UFRN); Parnamirim, Ponto 58, 30/V/2009, fl. fr., *A.M. Marinho 103* (UFRN); Mata do Jiqui, 28/VIII/2009, fl. fr., *J.L. Costa-Lima et al. 241* (UFRN); Rio do Fogo, Área Militar do Rio do Fogo, 24/IV/2016, veg., *G.S. Garcia & L.M.G. Gonçalves 158* (UFRN); 11/VI/2016, fl. e fr., *G.S. Garcia 262* (UFRN). PARAÍBA: Itapororoca, Fazenda Macacos, 2/VII/1989, fl., *L.P. Félix & G.V. Dornelas s.n* (EAN); João Pessoa, Campus I da UFPB, Mata do Biotério, 29/VII/2014, fl., *L.H.L. Moreira 4* (JPB); Jardim Botânico Benjamim Maranhão, 5/VII/2002, fl., *P.C. Gadelha Neto 717* (JPB); 31/V/2004, fl., *P.C. Gadelha Neto 1147* (JPB); 30/IX/2005, fr., *P.C. Gadelha Neto 1472* (JPB); Trilha do Abraço, 11/VII/2016, fl. fr., *L.H.L. Moreira 137* (JPB); Trilha do Buriti, 7/VII/2016, fl. fr., *L.H.L. Moreira 136* (JPB); Trilha da Ilha, 7/VII/2016, fl., *L.H.L. Moreira 133* (JPB); 11/VII/2016, fl., *L.H.L. Moreira 138* (JPB); Trilha da Nascente, 11/VII/2016, fl. fr., *L.H.L. Moreira 139* (JPB); 11/VII/2016, fr., *L.H.L. Moreira 140* (JPB); 11/VII/2016, fl., *L.H.L. Moreira 141* (JPB); Trilha da Preguiça, 31/VII/2002, fl., *I.B. Lima et al. 14* (JPB); Rio Tinto, Reserva Biológica Guaribas, Mata do Maracujá, Sema 3, 18/V/1989, fl. fr., *L.P. Félix 8252* (EAN); Santa Rita, 30/V/2010, fr., *A. Albuquerque 4* (EAN). PERNAMBUCO: Aliança, Usina Aliança, 22/VII/1986, fl., *O. Lira s.n* (UFP); Cabo de Santo Agostinho, Litoral, entre os Engenhos Megahype e Cayango, 12/IV/2008, fr., *M. Sobral-Leite et al. 748* (IPA, UFP); Igarassu, Usina São José, Mata dos Macacos, 19/XII/2007, fl. fr., *D. Araújo & A. Alves-Araújo 508* (UFP); Mata de Piedade, 25/XI/2009, fl. fr., *E. Pessoa & J.A.N. Souza 195* (UFP); Refúgio Ecológico Charles Darwin, 29/II/1996, fr., *M. Falcão 141* (PEURF); Goiana, RPPN Fazenda Tabatinga, 28/XII/2010, fr., *D. Cavalcanti et al. 382* (JPB); Recife, Dois Irmãos, 15/VII/2004, fl., *L.P. Félix & M. Guerra 10553* (EAN); São Lourenço da Mata, Tapera, São Bento, 1923, fl., *B. Pickel 160* (IPA); 20/VII/1928, fl., *B. Pickel 1685* (IPA); Reserva do Tapacurá, VII/1995, fl., *M. Alves 10095* (UFP).

Prescottia Lindl., Exot. Flo. 2: t. 115. 1824. *nom. cons.*

Plants terrestrial, sympodial, caespitose, sun or shade-loving. Roots cylindrical to fusiform, puberulous, at the base of the stem. Stem not swollen in pseudobulb, inconspicuous. Leaves spiralled, pseudopetiolate, erect or semi-erect, amplexicaulous, flat, membranaceous. Raceme terminal, multiflowered, congested, erect. Flowers not showy, short-pedicellate, not resupinate, bisexual, white, greenish or greenish-white, spotted or not; sepals and petals fused at base; lip entire, cucculate. Column not fused to the lip; pollinia 4, soft. Fruit ellipsoid.

Prescottia (Orchidoideae) comprises ca. 15 neotropical species, of which 12 occur in Brazil, six in the northeast (Azevedo *et al.* 2014; Chase *et al.* 2015). In the study area, three species were identified.

47. *Prescottia leptostachya* Lindl., Bot. Reg. 22: t. 1916. 1836. (Fig. 6C)

Plants with silver-green leaves, margin entire; flowers greenish; sepals oblong, the lateral reflexed, with the distal part adpressed to the ovary; petals linear; lip with apex obtuse, inner surface glabrous.

Distribution, ecology and conservation status: It is endemic to Brazil, occurring in the Atlantic Forest, in the northeast region (Azevedo *et al.* 2014). It is being registered here as occurring in an open tabuleiro (savanna) pocket in Rio Grande do Norte for the first time, where it was observed growing on white sandy soils. The conservation status of *P. leptostachya* was not evaluated (NE).

Phenology: Flowers and fruits in October.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Nísia Floresta, Flona de Nísia Floresta, 16/X/2016, fl. fr., *M.B. Nascimento 284* (UFRN). /

48. *Prescottia oligantha* (Sw.) Lindl., Gen. Sp. Orchid. Pl.: 454. 1840. (Fig. 6D)

Plant with leaves green, margin entire; peduncle bracts rose-red; flowers white, spotted; sepals ovate, with pink spots at apex, the lateral patent or revolute; petals spatulate; lip apex acute, inner surface pubescent.

Distribution, ecology and conservation status: It occurs in the West Indies, southern North America (Florida, Mexico), Central America and tropical South America (Argentina, Bolivia, Brazil, Colombia, Ecuador, Guyana, Paraguay, Peru, Uruguay, and Venezuela) (Azevedo *et al.* 2014). In Brazil, it occurs in the Amazon, Atlantic Forest and Cerrado, all over the country (Azevedo *et al.* 2014; Pessoa *et al.* 2015). It is being registered here as occurring in a *tabuleiro* forest in Rio Grande do Norte for the first time, where it was observed growing on white sandy soils. The conservation status of *P. oligantha* was evaluated by Azevedo *et al.* (2014) as least concern (LC).

Phenology: Flowers and fruits in August.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Pedro Velho, APA Piquirí-Una, 29/VIII/2015, fl. fr., *G.S. Garcia & L.M.G. Gonçalves 6* (UFRN).

49. *Prescottia stachyodes* (Sw.) Lindl., Bot. Reg. 22: t. 1916. 1836. (Fig. 6E)

Plants with leaves dark green, margin entire to serrulate; flowers greenish-white; sepals lanceolate, strongly revolute;

petals linear, strongly revolute; lip apex acute, greenish, with the inner surface glabrous.

Distribution, ecology and conservation status: *Prescottia stachyodes* occurs in North America (Mexico), Central America, West Indies, and South America (Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guyana, Guyana, Paraguay, Peru, Surinam, and Venezuela) (Azevedo *et al.* 2014). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado (Azevedo *et al.* 2014; Moreira *et al.* 2020). In the study area it was found growing in the litter in *tabuleiro* forests in Paraíba and Pernambuco, where it is considered a rare species (Pessoa & Alves 2012; Azevedo *et al.* 2014; Moreira *et al.* 2020). The conservation status of *P. stachyodes* was evaluated by Azevedo *et al.* (2014) as not threatened (NT).

Phenology: Flowers and fruits from June to November.

Material examined: BRAZIL. PARAÍBA: João Pessoa, Jardim Botânico, Mata do Buraquinho, 26/VII/1992, fl., *L.P. Félix 5151* (EAN); 3/IX/1994, fl. fr., *M.R. Barbosa & J.P. Cunha 1413* (JPB); 12/IX/2014, fl. fr., *P.C. Gadelha Neto et al. 3845* (JPB); Mamanguape, Reserva Biológica Guaribas, Sema I, Capim Azul, 26/XI/2014, fl. fr., *L.P. Félix et al. 15228* (EAN); Mataraca, próximo a Br 101, VI/1987, *L.P. Félix & G.V. Dornelas 801* (EAN). PERNAMBUCO: Igarassu, Usina São José, Mata dos Macacos, 16/VIII/2007, fl., *A. Alves-Araújo et al. 533* (IPA, UFP); 14/IX/2011, veg., *D. Araújo et al. 1707* (UFP); Mata de Piedade, 13/VI/2009, veg., *T.A. Pontes 209* (IPA); Recife, Dois Irmãos, Jardim Zoo-Botânico, 15/IX/1966, fl. fr., *E. Ternório 66-170* (IPA); Mata da Compesa, Açude do Prata, 31/VIII/1993, fl., *J.A. Siqueira-Filho & G.S. Baracho 193* (UFP).

Prosthechea Knowles & Westc., Fl. Cab. 2: 111. 1838.

Plants epiphyte, sympodial, erect, sun-loving. Roots cylindrical, at the base of the stem. Pseudobulb heteroblastic, claviform or cylindrical, dorsi-ventrally compressed, conspicuous, enveloped by a scarious sheath at base. Leaves 1-2 per psedobulb, apical, sessile, erect, attenuate, conduplicate, coriaceous. Raceme terminal, few-flowered, lax, erect. Flowers showy, long-pedicellate, not resupinate, bisexual, white, fragrant; sepals and petals free; lip entire. Column fused to the lip; pollinia 4, cartilaginous. Fruit globose-ellipsoid or obovoid, 3-winged.

Prosthechea (Epidendroideae) comprises 117 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 34 occur in Brazil, 11 in the northeast (Vieira & van den Berg 2020). In the study area, two species were identified.

50. *Prosthechea aemula* (Lindl.) W.E.Higgins, Phytologia 82: 376. 1997. (Fig. 6F)

Plants with pseudobulb claviform; leaves elliptic-lanceolate; flowers cream to white; sepals narrow-elliptic; petals oblanceolate; lip sub-orbicular, concave, apex acuminate, with purple veins.

Distribution, ecology and conservation status: *Prosthechea aemula* is widely distributed in Brazil, French Guyana, Guyana, Surinam, and Venezuela (Carnevali *et al.* 2003. In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado (Vieira & van den Berg 2020). In the study area, it was registered in *tabuleiro* forests in Paraíba and Pernambuco, where it was observed in the canopy of trees. The conservation status of *P. aemula* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in September.

Note: *Prosthechea aemula* is a common species already registered in the study area under the name *P. fragrans* (Sw.) W.E.Higgins. According to Ackerman & Díaz (2014) *P. fragrans* occurs in Costa Rica, Cuba, Jamaica, Hispaniola, Mexico, Nicaragua and Panama, with no records for Brazil. Some specimens collected in Trinidad were initially identified as *P. fragrans*, but are now being treated as *P. aemula* (Ackerman 2000).

Material examined: BRAZIL. PARAÍBA: João Pessoa, Bica, 10/X/1984, fl., *L.P. Félix 1* (EAN). PERNAMBUCO: Igarassu, Mata de Piedade, 16/XII/2009, veg., *E. Pessoa & J.A.N. Souza 207* (IPA, UFP).

51. *Prosthechea alagoensis* (Pabst) W.E.Higgings, Phytologia 82: 376. 1997. (Fig. 6G)

Plants with pseudobulb cylindrical; leaves oblong; flowers white; sepals lanceolate; petals oblanceolate with one purple line each; lip ovoid, concave, apex obtuse.

Distribution, ecology and conservation status: *Prosthechea alagoensis* occurs in the Amazon and Atlantic Forest of Brazil. In the northeast it occurs in the states of Alagoas, Bahia, Paraiba and Pernambuco (Vieira & van den Berg 2020). In the study area it was registered in *tabuleiro* forests in Paraíba, where it was observed in the canopy of trees. The conservation status of *P. alagoensis* was not evaluated (NE) by CNCFlora.

Material examined: BRAZIL. PARAÍBA: João Pessoa, 1981, fl., *L.P. Félix 23* (EAN); Parque Arruda Câmara, 1982, fl., *L.P. Félix* 7 (EAN); 1983, fl., *L.P. Félix & G.V. Dornelas 2534* (EAN); Sobre oitizeiro, próximo à fonte da bica, 1985, fl. fr., *L.P. Félix s.n* (EAN 12722).

Rodriguezia Ruiz & Pav., Fl. Peruv. Prodr. 115. 1794.

Rodriguezia (Epidendroideae) comprises 48 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 24 occur in Brazil, nine in the northeast (BFG 2015). In the study area, a single species was identified.

52. *Rodriguezia bahiensis* Rchb.f., Bonpladia (Hannover) 2: 90. 1854. (Fig. 6H)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots at nodes and with a long rhizome. Pseudobulb heteroblastic, compressed dorsi-ventrally. Leaves sessile, 2 basal and 1 apical, narrow-elliptic, conduplicate. Racemes lateral, multiflowered, pendent. Flowers showy, short-

pedicellate, resupinate, bisexual, white with purple spots, spurred; lateral sepals oblanceolate, fused; petals elliptic, free; lip entire, oblanceolate, apex emarginate, larger than other perianth segments; callus 2 , parallels, yellowish; column not fused to the lip; pollinia 2,cartilaginous.

Distribution, ecology and conservation status: It is endemic to the Atlantic Forest in Brazil, occurring in the northeast and southeast regions (BFG 2015). In the study area it was found in *tabuleiro* forests in Pernambuco. According to Pessoa & Alves (2012) *Rodriguezia bahiensis* is a common species in *tabuleiro* forests, occurring at the border and in the middle of the forest. The conservation status of *R. bahiensis* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from February to May.

Material examined: BRAZIL. PERNAMBUCO: Camaragibe, Mata secundária, 1/IV/1987, fl., *A.B.G. Ferreira s.n.* (UFP 7098); Igarassu, Usina São José, capoeira 5, 19/III/2009, fl., *L.M. Nascimento & G. Batista 809* (UFP); Mata de Piedade, 7/III/2009, fl., *E. Pessoa et al. 65* (UFP); 2/III/2010, fl., *E. Pessoa & J.D. Garcia 261* (IPA, UFP); Mata do Pezinho, 24/V/2007, fr., *J.S. Marques & N.A. Albuquerque 108* (UFP); Refúgio Ecológico Charles Darwin, 29/II/1996, fl., *M. Falcão 158* (PEURF, UFP); 29/II/1996, fl., *M. Falcão 136* (PEURF); Recife, Guabiraba, Santuário dos Três Reinos, 11/III/2014, fl., *L.A. Silva et al. 58* (UFP); São Lourenço da Mata, Mata do Toró, 30/III/1983, fl., *Barreto Roxana et al. 6* (IPA); Reserva Florestal de Tapacurá, 30/V/2000, fl., *R.C. Lima s.n.* (UFP 27715).

Sacoila Raf., Fl. Tellur. 2: 86. 1836.

Sacoila (Orchidoideae) comprises seven neotropical species (Chase *et al.* 2015; Salazar *et al.* 2018), of which five occur in Brazil, two in the northeast (Guimarães 2020). In the study area, a single species was identified.

53. *Sacoila lanceolata* (Aubl.) Garay, Bot. Mus. Leafl. 28: 352. 1980. (Fig. 6I)

Plants terrestrial, sympodial, erect, sun-loving. Roots cylindrical, at base of the pseudobulb. Stem not swollen in pseudobulb. Without leaves when flowering. Raceme terminal, multiflowered, erect, glabrous at the base and pilose at the upper third. Flowers showy, short-pedicellate, resupinate, bisexual, spurred, tubular, pubescent on the abaxial side, pink or reddish; sepals and petals lanceolate; lip entire, deltoid, apex acute; column fused to the lip; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: *Sacoila lanceolata* is widely distributed in the Neotropics (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga, Cerrado and Pampa (Guimarães 2020). In the study area it was found in savanna pockets in Rio Grande do Norte, Paraíba and Pernambuco, where it was observed among grasses, in anthropized environments. The conservation status of *S. lanceolata* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in January, February and August.

Material examined: BRASIL. RIO GRANDE DO NORTE: Ceará-Mirim, área para instalação da LT Ceará-Mirim, João Câmara, 23/I/2016, fl., *E.O. Moura & A.R.V. Nunes 481* (UFRN). PARAÍBA: Mamanguape, Reserva Biológica Guaribas, Sema II, 31/VIII/1989, fl., *L.P. Félix & E.S. Santana 5679* (EAN); Santa Rita, Br 101, próximo ao posto da Operação Manzuá, 10/II/1998, fl., *F. Eduardo et al. 4* (JPB). PERNAMBUCO: São Lourenço da Mata, Tapera, 12/1926, fl., *B. Pickel 1225* (IPA); São Bento, 5/II/1932, fl., *B. Pickel 2937* (IPA); Mata do Camocim, 7/I/1998, fl., *A.V. Lopes s.n.* (UFP 21759).

Sarcoglottis C.Presl, Reliq. Haenk. 1: 95. 1827.

Plants terrestrial, sympodial, erect, shade-loving. Roots cylindrical, pubescent, at the base of the stem. Stem not swollen in pseudobulb, inconspicuous. Leafless in flowering time or with leaves pseudopetiolate, spiralled, semi-erect, amplexicaulous, flat, variegate or not, lustrous when fresh, membranaceous. Raceme terminal, many or few-flowered, lax, pubescent, erect. Flowers showy, short-pedicellate, resupinate, bisexual, pubescent, greenish-white or greenish, fragrant or not; dorsal sepal fused with the petals, lateral sepals free; lip entire. Column not fused to the lip; pollinia 2, cartilaginous. Fruit ellipsoid.

Sarcoglottis (Orchidoideae) comprises 48 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 13 occur in Brazil, two in the northeast (Meneguzzo 2020h).

54. *Sarcoglottis acaulis* (Sm.) Schltr. Repert. Spec. Nov. Regni Veg. Beih. 6: 53. 1919. (Fig. 7A)

Plants with leaves oblanceolate, usually with white spots, lustrous when fresh; raceme multiflowered; flowers greenish-white, fragrant; lateral sepals falciform; petals oblanceolate; lip ligulate-anchoriform, apex rounded, reflex.

Distribution, ecology and conservation status: *Sarcoglottis acaulis* is widely distributed in the Caribbean, Bolivia, Brazil, Colombia, Costa Rica, El Salvador, French Guiana, Guyana, Panama, Paraguay, Suriname, Trinidad & Tobago, and Venezuela (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado (Pessoa & Alves 2012; Meneguzzo 2020h). In the study area it was found in *tabuleiro* forests in Rio Grande do Norte, Paraíba and Pernambuco, both at the edge or in the middle of the forest, in the litter. The conservation status of *S. acaulis* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits from July to October.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Timbau do Sul, Parque Estadual de Pipa, 2/VIII/2012, fl., *J.G. Jardim et al. 6328* (UFRN). PARAÍBA: Camaragibe, Casuarinas, 1986, veg., *R.G. Ferreira s.n.* (UFP 6896); Caaporã, 4/IX/2012, fl., *I. B. Lima et al. 1290* (JPB); João Pessoa, 4/IX/1985, fl., *C.A.B. Miranda et al. 6289* (JPB); Cidade Universitária, Campus I da UFPB, 18/IX/1992, fl., *O.T. de Moura 810* (JPB); Jardim Botânico

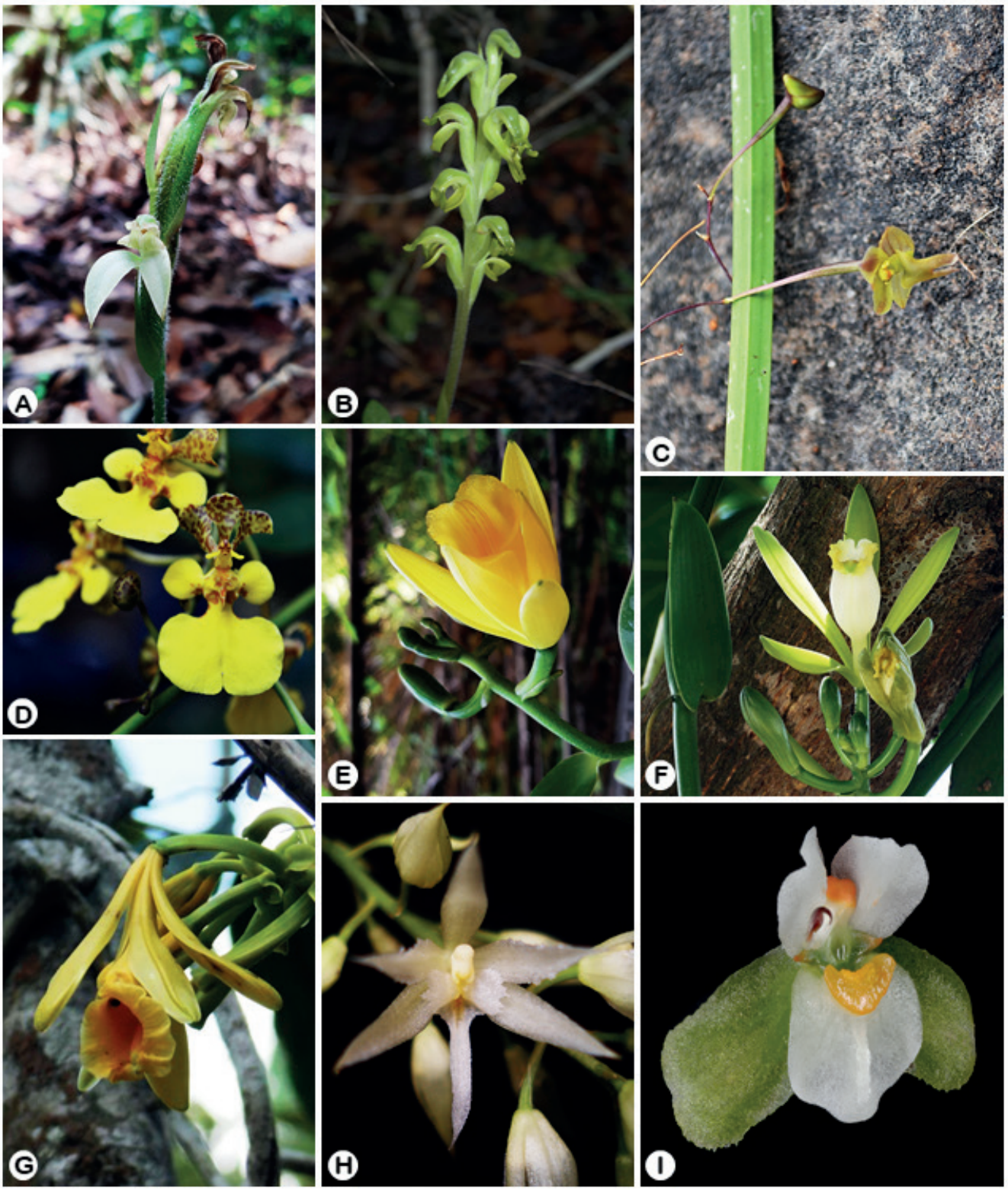

Figure 7. a. *Sarcoglottis acaulis* – flower. **b.** *Sarcoglottis curvisepala* – flower (Photo: Guerra R). **c.** *Scaphyglottis lívida* – flower (Santos IS). **d.** *Trichocentrum cepula* – flower (Photo: Garcia GS). **e.** *Vanilla palmarum* – flower. **f.** *Vanilla phaeantha* – flower (Photo: Ferreira AWC). **g.** *Vanilla pompona* – flower (Photo: Oliveira MS). **h.** *Warmingia eugenii* – flower (Photo: Silva MG). **i.** *Zygostates bradei* – flower (Photo: Royer CA).

Benjamim Maranhão, 15/VIII/1992, fl., *A.C.A. Moura 20* (JPB); 1/X/2002, fl., *C. Antônio 5* (JPB); 29/VII/2002, fl., *P. C. Gadelha Neto et al. 720* (JPB); 23/VIII/2004, fl., *P.C. Gadelha Neto & N.T. Lima 1233* (JPB); 25/VIII/2004, fl., *P.C. Gadelha Neto et al. 1238* (JPB); 25/VIII/2004, fl., *P.C. Gadelha Neto et al. 1237* (JPB); Trilha do Buriti, 6/IX/2016, fl., *L.H.L. Moreira 160* (JPB); Trilha do Macaco, 16/VIII/2016, fl., *L.H.L. Moreira 155* (JPB); Trilha da Nascente, 10/VIII/2016, fl., *L.H.L. Moreira 149* (JPB); 16/VIII/2016, fl., *L.H.L. Moreira 154* (JPB); 16/VIII/2016, fl., *L.H.L. Moreira 157* (JPB); Mamanguape, 12/IX/2004, fl., *P.C. Gadelha Neto et al. 1272* (JPB); 17/VIII/1988, fl., *L.P. Félix & C.A.B. Miranda 8439* (JPB); Reserva Biológica Guaribas, Área II, 31/VIII/1989, fl., *L.P. Félix & E.S. Santana 2185* (EAN, JPB); 2/IX/1989, fl., *L.P. Félix & E.S. Santana 2300* (EAN, JPB); 2004, fl., *R.N.A. Brasil s.n* (JPB 46709); 24/IX/2009, fl., *W.W. Thomas et al. 14854* (JPB); 25/IX/2010, bt., *A. Melo et al. 493* (JPB); Rio Tinto, 17/VI/2017, fl., *R.A.P. Almeida 408* (JPB); Mata do Maracujá, 1/X/2011, fl., *L.P. Félix et al. 13684* (EAN); Santa Rita, 19/VI/2017, fl., *L.A.F. Vieira 67* (JPB). PERNAMBUCO: Igarassu, Usina São José, Mata de Piedade, 10/IX/2008, fl., *A. Alves-Araújo et al. 1056* (UFP); 16/IX/2009, fl., *J.D. Garcia & K. Rajput 1200* (UFP); 16/IX/2009, fl., *T.A. Pontes & J.D. Garcia 217* (HST, IPA, UFP); Paudalho, Engenho Cajueiro Escuro, 2/X/1965, fl., *G. Teixeira 2867* (HST); Recife, Mata de Dois Irmãos, 23/X/1995, fl., *K.C. Porto s.n.* (UFP 11278); 7/X/2010, fl., *E. Pessoa & K. Porto 402* (UFP).

55. *Sarcoglottis curvisepala* Szlach. & Rutk., Ann. Bot. Fenn. 34: 277. 1997. (Fig. 7B)

Plants leafless when flowering; raceme few-flowered; flowers greenish-dark, not fragrant; lateral sepals ligulate to falcate; petals lanceolate; lip rhomboid-elliptic, apex obtuse.

Distribution, ecology and conservation status: It is endemic to Brazil, occurring in the Atlantic Forest, Caatinga and Cerrado , in the northeast, central-west and southeast regions (Monteiro *et al.* 2012; Meneguzzo 2020). It is registered here as occurring in a *tabuleiro* forest in Rio Grande do Norte for the first time. The conservation status of *S. curvisepala* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in December.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Macaíba, Escola Agrícola de Jundiaí, Mata do Olho D'água, 19/XII/2017, fl., *V. P. Moreira 163* (UFRN).

Scaphyglottis Poepp. & Endl., Nov. Gen. Sp. Pl. 1: 58. 1836.

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at the base of the stem. Pseudobulb heteroblastic, cylindrical or fusiform, conspicuous, superposed. Leaves 1-2 per peseudobulb, apical, sessile, erect to semi-erect, attenuate, conduplicate, coriaceous. Racemes terminal, few-flowered, lax, erect. Flowers not showy, short-pedicellate or sessile, resupinate, bisexual, white or greenish; lateral sepals fused at the base; petals free; lip bilobed or entire. Column not fused to the lip; pollinia 4, waxy. Fruit ellipsoid or fusiform.

Scaphyglottis (Epidendroideae) comprises 69 neotropical species (Szlachetko & Kolanowska 2013; Chase *et al.* 2015), of which 14 occur in Brazil, eight in the northeast (BFG 2015). In the study area, four species were identified.

56. *Scaphyglottis emarginata* (Garay) Dressler, Brittonia 56: 64. 2004.

Plants with 1 cylindrical leaf; flowers white; sepals lanceolate; petals linear; lip oblanceolate, apex emarginated.

Distribution, ecology and conservation status: It occurs in Brazil, Cuba, Dominican Republic, and Surinam (BFG 2015; Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon and Atlantic Forest (BFG 2015). In the study area it was found in *tabuleiro* forests in Pernambuco, where it is a rare species (Pessoa & Alves 2012). The conservation status of *S. emarginata* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in December.

Material examined: BRAZIL. PERNAMBUCO: Cabo de Santo Agostinho, mata litorânea, 1986, fl., *M. Silva 6890* (UFP); Igarassu, Mata de Piedade, 16/XII/2009, fl. fr., *E. Pessoa & J.A.N. Souza 200* (HST, IPA).

57. *Scaphyglottis fusiformis* (Griseb.) R.E.Schules, Bot. Mus. Leafl. 17: 205. 1957.

Plants with 1 oblong leaf; flowers white; sepals lanceolate; petals elliptic; lip obovate, apex cuspidate.

Distribution, ecology and conservation status: *Scaphyglottis fusiformis* occurs in Brazil, Colombia, Costa Rica, French Guyana, Guyana, Panama, Peru, Trinidad & Tobago, Surinam, and Venezuela (Szlachetko & Kolanowska 2013). In Brazil, it occurs in the Amazon and Atlantic Forest, in the north and northeast regions (BFG 2015). In the study area it was found in a *tabuleiro* forest in Pernambuco, as an occasional species in the understory (Pessoa & Alves 2012). The conservation status of *S. fusiformis* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in December.

Material examined: BRAZIL. PERNAMBUCO: Igarassu, Mata de Piedade, 16/XII/2009, fl., *E. Pessoa & J.A.N. Souza 204* (IPA, UFP).

58. *Scaphyglottis livida* (Lindl.) Schltr., Beih. Bot. Centralbl. 36: 457. 1918. (Fig. 7C)

Plants with 2 linear leaves; flowers greenish; sepals ovate; petals obovate; lip oblong, apex bilobed.

Distribution, ecology and conservation status: *Scaphyglottis livida* occurs in Belize, Brazil, Colombia, Ecuador, Guatemala, Honduras, Mexico, Peru, and Venezuela (Adams & Cribb 1985; Archilla & Chiron 2013; Govaerts *et al.* 2020). In Brazil, it occurs in the Atlantic Forest and Cerrado , in the northeast, central-west and southeast regions (BFG 2015; Santos & Silva 2020). It is being registered here as occurring in a *tabuleiro* forest in Paraíba for the first time.

The conservation status of *S. livida* was not evaluated (NE) by CNCFlora.

Material examined: BRAZIL. PARAÍBA: Santa Rita, 1983, fl., *L.P. Félix & G.V. Dornelas* 45 (EAN).

59. *Scaphyglottis sickii* Pabst., Orquídea (Rio de Janeiro) 18: 7. 1956.

Plants with 2 oblong leaves; flowers white; sepals oblanceolate; petals linear; lip elliptic, apex acute.

Distribution, ecology and conservation status: *Scaphyglottis sickii* occurs in Brazil, Colombia, Ecuador, French Guyana, Grenada, Guyana, Surinam, Trinidad & Tobago, and Venezuela (Govaerts *et al.* 2020). In Brazil, it occurs in the Amazon and Atlantic Forest , in the north, northeast and central-west regions (BFG 2015; Pessoa & Alves 2012, 2015). In study area it was found as an occasional species in the understory of *tabuleiro* forests in Pernambuco (Pessoa & Alves 2012). The conservation status of *S. sickii* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits in September, November and December.

Material examined: BRAZIL. PERNAMBUCO: Cabo de Santo Agostinho, Mata do Zumbi, XI/1995, fl., *D.R. Siqueira 9248* (EAN); Igarassu, Usina São José, Mata de Piedade, 16/XII/2009, fr., *E. Pessoa & J.A.N. Souza 202* (HST, IPA, UFP); 25/XI/2009, fr., *E. Pessoa & J.A.N. Souza 191* (IPA, UFP); 9/III/2010, fr., *E. Pessoa & J.D. Garcia 310* (UFP); Recife, Reserva Ecológica Mata de Dois Irmãos, 15/IX/1998, fl. fr., *A.C. Souza & J. Urbano 424* (PEURF); São Lourenço da Mata, Engenho São Bento, Mata do Toró, 26/XII/1963, fl., *Andrade-Lima 63-4244* (IPA).

Trichocentrum Poepp. & Endl., Nov. Gen. Sp. Pl., 2: 11. 1836.

Trichocentrum (Epidendroideae), in the broad circumscription of Williams *et al.* (2001), comprises ca. 70 neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which 14 species occur in Brazil, four in the northeast (Meneguzzo 2020i). In the study area, a single species was identified.

60. *Trichocentrum cepula* (Hoffmanns.) J.M.H.Shaw, Orchid Rev. 120: 16. 2012. (Fig. 7D)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at the base of pseudobulb. Pseudobulb heteroblastic, conical. Leaf sessile, 1 per pseudobulb, apical, terete, canaliculate adaxially, with purple spots. Racemes lateral, multiflowered, arched. Flowers showy, long-pedicellate, resupinate, bisexual, yellow with brown spots; lateral sepals and petals reflex to the column; lip trilobed, midlobe reniform, apex emarginate; callus 2 at the base of the lip and 1 in the middle; column not fused to the lip; pollinia 2, cartilaginous.

Distribution, ecology and conservation status: *Trichocentrum cepula* occurs in the Caribbean, Argentina, Bolivia, Brazil, Paraguay, Peru, Surinam, Trinidad & Tobago and Venezuela (Govaerts *et al.* 2020). In Brazil, it occurs in the Cerrado, in the north, northeast, central-west and southeast regions (Meneguzzo 2020i). It is being registered here as occurring in tabuleiro forests in Rio Grande do Norte for the first time, where it was observed on trees. The conservation status of *T. cepula* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in January, July, September and November.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Ceará-Mirim, Fragmento próx. Capela, 9/I/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 101* (UFRN); Faz. Diamante, 11/VII/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 250* (UFRN); Fragmento à Beira da Estrada, próx. Capela, 25/XI/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 411* (UFRN); Goianinha, APA Piquirí-Una, 23/XII/2016, fl., *G.S. Garcia & L.M.G. Gonçalves 447* (UFRN); Macaíba, Escola Agrícola de Jundiaí, 20/IX/2017, fl., *M.B. Nascimento 52* (UFRN).

Vanilla Plum. *ex* Mill., Gard. Dict. Abr. ed. 4. 1754.

Plants hemiepiphytic, scandent, monopodial, sun-loving. Roots cylindrical, at stem nodes. Stem not swollen in pseudobulb, cylindrical, internodes conspicuous. Leaves along the stem length, alternate-distichous, pseudopetiolate, erect, thick. Raceme axial, few-flowered, lax, pendent. Flowers showy, long-pedicellate, resupinate, bisexual, greenish-white, greenish-yellow or golden-yellow, fragrant, ephemeral; sepals and petals free; lip entire or bilobate; callus 1 in the middle of the lip. Column fused to the lip; pollen farinaceous. Fruit fusiform, winged or not, aromatic.

Vanilla (Vanilloideae) comprises ca. 105 pantropical species (Arenas 2003; Chase *et al.* 2015), of which 34 occur in Brazil, 10 in the northeast (BFG 2015; Engels & Rocha 2016). In the study area, three species were identified. Some *Vanilla* species, especially *V. planifolia* Jacks. and *V. pompona* Schiede, are cultivated for their fruits, which are the source of vanilla flavoring (Arenas & Dressler 2010).

61. *Vanilla palmarum* Lindl., Gen. Sp. Orchid. Pl. 436. 1840. (Fig. 7E)

Plants with internodes ca. 3-4 cm long; leaves ovate or elliptic; flowers golden-yellow; sepals and petals oblanceolate; lip entire, apex obtuse, with longitudinal lines on the distal half, pubescent to hirsute, callus not penicillate; column glabrous.

Distribution, ecology and conservation status: *Vanilla palmarum* is widely distributed in South America, occurring in Bolivia, Brazil, Guyana, Peru, Surinam, and Venezuela (Soto Arenas & Cribb 2010). In Brazil, it occurs in the Amazon, Atlantic Forest, Caatinga and Cerrado, in the north, northeast and central-west regions (Barbarena *et al.* 2019). In the study area it was found in *tabuleiro* forests in Paraíba, inhabiting the culm of *Elaeis guineenses* Jacq., an invasive palm, popularly known as Dendê (Moreira *et*

al. 2020). Barbarena *et al.* (2019) recorded nine different palm species as phorophytes of *V. palmarum*, but it occurs predominantly on a single phorophyte palm species in each phytogeographic domain. According to Arenas & Cribb (2010) *V. palmarum* seems to be autogamous, different from other American *Vanilla* species. The conservation status of *V. palmarum* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in August. Fruits from May to September.

Material examined: BRAZIL. PARAÍBA: João Pessoa, Jardim Botânico Benjamim Maranhão, 20/VII/2004, veg., *P.C. Gadelha Neto et al. 1203* (JPB); Trilha da Ilha, 7/VII/2016, fr., *L.H.L. Moreira 134* (JPB); 19/VII/2016, fr., *L.H.L. Moreira 143* (JPB); 27/VII/2016, fr., *L.H.L. Moreira 148* (JPB); 15/VIII/2016, fl., *L.H.L. Moreira 150* (JPB); 15/VIII/2016, fr., *L.H.L. Moreira 151* (JPB); 15/VIII/2016, fr., *L.H.L. Moreira 152* (JPB); 17/VIII/2016, fl., *L.H.L. Moreira 156* (JPB); 6/IX/2016, fr., *L.H.L. Moreira 158* (JPB); 6/IX/2016, fr., *L.H.L. Moreira 159* (JPB); 22/V/2017, fr., *L.H.L. Moreira 189* (JPB); Mangabeira, Jacarapé, 29/XI/1992, veg., *O.T. de Moura 952* (JPB); Santa Rita, RPPN Usina Gargaú, 24/IX/2019, fl., *L.H.L. Moreira et al. 203* (JPB).

62. *Vanilla phaeantha* Rchb.f., Flora 48: 274. 1865. (Fig. 7F)

Plants internodes ca. 5.5-13 cm long; leaves narrow-elliptical; flowers greenish-white; sepals and petals oblanceolate; lip bilobed, apex rounded, without longitudinal lines, glabrous, callus penicillate; column with soft and short trichomes.

Distribution, ecology and conservation status: It is widely distributed in Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Florida (U.S.A), Jamaica, Martinica, Mexico, Panama, Trinidad & Tobago, and Venezuela (Karremans *et al.* 2020). In Brazil, it occurs in the Atlantic Forest, Caatinga and Cerrado, in the northeast, central-west and southeast regions (BFG 2015; Ferreira *et al.* 2017; Engels *et al.* 2020). In the study area it was found in open *tabuleiro* (savanna) pockets in Rio Grande do Norte and Paraíba, and in *tabuleiro* forests in Pernambuco. *V. phaeantha* is a common species in the study area, occurring on shrubs at the edge of the forest or in the canopy of trees. The conservation status of *V. phaeantha* was not evaluated (NE) by CNCFlora.

Phenology: Flowers and fruits between the months of March to December.

Note: Karremans *et al.* (2020) established that *V. phaeantha* is the correct name for *V. bahiana* Hoehne and *V. gardneri* Rolfe.

Material examined: BRAZIL. RIO GRANDE DO NORTE: Canguaretama, 19/XII/2010, veg., *J.G. Jardim et al. 5864* (UFRN); Ceará-Mirim, Rod. 064, 14/XII/2011, fl. fr., *J.G. Jardim et al. 6169* (UFRN); Natal, Parque da Cidade Dom Nivaldo Monte, 16/V/2015, fl., *A.A. Roque et al. 1624* (UFRN); Parnamirim, 24/XI/2007, fl., *A. Ribeiro & M. Araújo 282* (UFRN); Pedro Velho, APA Piquirí-Una, Mata do Pilão, 8/X/2017, fl., *G.S. Garcia 603* (UFRN); São Gonçalo do Amarante, Área Próxima ao Aeroporto, 23/X/2016, fl., *E.O. Moura & P.H.D. Marinho 1014* (UFRN); Fazenda Arvoredo, 20/IX/2011, veg., *J.L. Costa-Lima et al. 597* (UFRN). PARAÍBA: Caaporã, Sítio Brejo de Lima, 23/XI/2014, fl., *P.C. Gadelha Neto 3884* (JPB); João Pessoa, Jardim Botânico Benjamim Maranhão, 9/V/2017, veg., *L.H.L. Moreira & R.A. Pontes 165* (JPB); Mamanguape, Reserva Biológica Guaribas, 2004, veg., *R.N.A. Brasil s.n* (JPB *46713*); 25/XI/2014, fl. fr., *J.M.P. Cordeiro et al. 567* (EAN); 22/XI/2017, veg., *L.P. Félix et al. 17080* (EAN); Sema II, 5/IV/1989, fr., *L.P. Félix & E.S. Santana 8123* (EAN); 8/III/1990, fl. fr., *L.P. Félix & E.S. Santana 2855* (EAN, JPB); 11/XII/1992, veg., *L.P. Félix 7021* (EAN); 27/V/2002, veg., *R.N.A. Brasil et al. 53* (JPB); 29/VI/2002, veg., *R.N.A. Brasil et al. 123* (JPB); 25/XI/2014, fl., *L.P. Félix et al. 15221* (EAN); Rio Tinto, Área III, 17/V/1989, veg., *C.A.B. de Miranda et al. 14008* (JPB); 27/IV/1990, fr., *L.P. Félix & E.S. Santana 2948* (EAN, JPB); 3/VII/2004, veg., *R.N.A. Brasil 235* (JPB); Sapé, RPPN Fazenda Pacatuba, 25/XI/2000, veg., *E.A. César 67* (JPB); 9/III/2001, veg., *E.A. César 107* (JPB); Santa Rita, Usina São João, Lagoa do Paturi, Próximo a Tibirizinho, 10/XI/2011, veg., *C.M.L.R. Araújo & R.A. Pontes 315* (JPB). PERNAMBUCO: Goiana, RPPN Fazenda Tabatinga, 28/XII/2010, bf., *D. Cavalcanti et al. 394* (UFP); Uz. Sta. Tereza, 28/XII/1965, fl. e fr., *A. Lima 65-4352* (IPA); Igarassu, Usina São José, 26/II/2003, veg., *A. Melquíades & G.L. Bezerra 56* (PEURF); Fragmento Chave, 24/XI/2009, fl., *E. Pessoa & J.A.N. Souza 150* (HST, IPA, JPB, UFP); Mata da Zambana, 21/III/2007, fl., D. Araújo *et al. 186* (UFP); Granja São Luiz, 12/I/1970, veg., *L.S. Carneiro s.n.* (IPA 18325); Refúgio Ecológico Charles Darwin, 21/XI/1995, veg., *K. Yoshida-Arns 109* (UFP); 23/I/1996, veg., *M. Oliveira & M.F. Lucena 198* (UFP).

63. *Vanilla pompona* Schiede, Linnaea 4: 573. 1829. (Fig. 7G)

Plants with internodes ca. 9-11.5 cm long; leaves oblong; flowers yellow; dorsal sepal larger than the lateral ones; petals oblanceolate; lip bilobed, with apex retuse, axially grooved on the lower surface, glabrous; column glabrous.

Distribution and ecology: *Vanilla pompona* is a variable, widely distributed species, occurring in Brazil, Bolivia, Colombia, Dominica, Ecuador, French Guiana, Guadeloupe, Guatemala, Guyana, Martinique, Mexico, Nicaragua, Paraguay, Peru, Puerto Rico, Suriname, Trinidad & Tobago, and Venezuela (Karremans *et al.* 2020). In Brazil, it occurs in the Amazonia, Atlantic Forest and Cerrado, in the north, northeast, central-west and southeast regions (BFG 2015; Ferreira *et al.* 2017). In the study area it was found in *tabuleiro* forests in Paraíba and Pernambuco, occurring in the canopy of trees. The conservation status of *V. pompona* was not evaluated (NE) by CNCFlora.

Phenology: Flowers in July, November and December.

Material examined: BRAZIL. PARAÍBA: João Pessoa, Mata do Buraquinho, Jardim Botânico Benjamim Maranhão,

23/VIII/2008, veg., *P.C. Gadelha Neto 1232* (JPB); Cidade Universitária, Campus I da UFPB, Mata do Biotério, 7/XI/2014, fl., *L.H.L. Moreira 5* (JPB). PERNAMBUCO: Igarassu, Usina São José, Mata da Piedade, 9/XII/2008, fl., *E. Pessoa et al. 22* (UFP); São Lourenço da Mata, 26/XII/1929, fl., *B. Pickel 2213* (IPA); 6/XI/2001, veg., *A.L.A. Lima & K. Almeida 9* (JPB); Estação Ecológica de Tapacurá, 4/I/2010, fl., *M.J.N. Rodal & A.M. da Silva 752* (JPB); 17/XI/2010, fl., *E. Pessoa et al. 403* (UFP); 27/IX/2017, veg., *M. Vilança et al. 123* (UFP).

Warmingia Rchb.f., Otia Bot. Hamburg.: 87. 1881.

Warmingia (Epidendroideae) comprises four neotropical species (Chase *et al.* 2015; Govaerts *et al.* 2020), of which *Warmingia eugenii* is the only species that occurs in Brazil (Koch & Barros 2020).

64. *Warmingia eugenii* Rchb.f., Otia Bot. Hamburg.: 87. 1881. (Fig. 7H)

Plants epiphytic, sympodial, caespitose, sun-loving. Roots cylindrical, at the base of the stem. Pseudobulb heteroblastic, conic. Leaves sessile, 1 per pseudobulb, apical, elliptic to lanceolate, conduplicate. Racemes lateral, multiflowered, pendent. Flowers showy, long-pedicellate, resupinate, bisexual, white; sepals and petals lanceolate; lip trilobed, lateral lobes sub-orbicular, apex rounded, mid-lobe linear to lanceolate, apex acuminate; callus 2 at the base of the lip, yellowish; column fused to the lip; pollinia 2, waxy.

Distribution, ecology and conservation status: It is endemic to Brazil, occurring in the Atlantic Forest and Cerrado (Koch & Barros 2020). It was registered in a *tabuleiro* forest in Pernambuco, where it was observed on shrubs. The conservation status of *W. eugenii* was evaluated by CNCFlora as least concern (LC).

Phenology: Flowers in January.

Note: The first and only record of *W. eugenii* in Pernambuco is the collection of the German naturalist Bento Pickel, dating from the 19th century. The collection site was the Tapacurá Ecological Station, located in the municipality of São Lourenço. According to Melo *et al.* (2018) before being established as a protected area, the site underwent many anthropic changes. Perhaps, for this reason, *W. eugenii* was not observed or collected again in the area.

Material examined: BRAZIL. PERNAMBUCO: São Lourenço da Mata, Tapera, 21/I/1929, fl., *B. Pickel 1895* (IPA).

Zygostates Lindl., Edward's Bot. Reg. 23: t. 1927. 1837.

Zygostates (Epidendroideae) comprises 26 neotropical species (Royer *et al.* 2017; Govaerts *et al.* 2020), of which 15 occur in Brazil, five in the northeast (Royer *et al.* 2020). In the study area, a single species was identified.

65. *Zygostates bradei* (Schltr.) Garay, Bot. Mus. Leafl. 21: 263. 1967. (Fig. 7I)

Plants epiphytic, sympodial, caespitose, shade-loving. Roots cylindrical, at the base of the stem. Pseudobulb heteroblastic, ovoid. Leaves sessile, 1 apical, 2 basal, lanceolate-spatulate, conduplicate. Racemes lateral, multiflowered, erect. Flowers showy, short-pedicellate, resupinate, bisexual, asymmetric, greenish-white; lateral sepals longer than other floral elements; petals curved forward; lip entire, sub-quadrate with 1 glandular trichotomous callus; column not fused to the lip; pollinia 4, cartilaginous.

Distribution, ecology and conservation status: It is endemic to the Atlantic Forest in Brazil (Royer *et al.* 2017). In the study area it was found as an occasional species in riparian sites in the understory of a *tabuleiro* forest in Pernambuco (Pessoa & Alves 2012). The conservation status of *Z. bradei* was evaluated by CNCFlora as near threatened (NT).

Phenology: Flowers and fruits in March and December.

Material examined: BRAZIL. PERNAMBUCO: Igarassu, Mata de Piedade, 16/XII/2009, fl. fr., *E. Pessoa & J.A.N. Souza 210* (HST, IPA, UFP); 4/III/2010, fr., *E. Pessoa & J.D. Garcia 294* (UFP); 9/III/2010, fr., *E. Pessoa & J.D. Garcia 312* (UFP).

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