



Original Papers

Eriocaulaceae from Serra da Canastra, Minas Gerais, Brazil

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Abstract

Eriocaulaceae exhibit wide diversity within the *Campo Rupestre*, with the Serra do Espinhaço as their richest region. However, other mountain ranges featuring *Campo Rupestre*, like Serra da Canastra, also harbor a significant number of species. The present work consists of the taxonomic treatment of Eriocaulaceae occurring in the Serra da Canastra, as well as an analysis of the species distribution in three main surrounding *Campo Rupestre* areas: the Espinhaço and Mantiqueira Ranges, and the Chapada dos Veadeiros and neighbor mountains. Thirty-one species were recorded: 19 of *Paepalanthus*, six of *Syngonanthus*, four of *Comanthera*, one of *Eriocaulon*, and one of *Leiothrix*. Canastra shares eight species with Espinhaço, Mantiqueira, and Veadeiros; seven with Espinhaço and Mantiqueira; two with Espinhaço and Veadeiros; five exclusively with the Espinhaço and two exclusively with Veadeiros. Seven species are endemic to Canastra: *Paepalanthus clausenianus*, *P. canastrensis*, *P. polycladus*, *P. sericiscapus*, *P. sinuosus*, *P. uai*, and *Syngonanthus culcitatus*. Photographs, descriptions, identification key and comments on the morphological variations and geographic distribution for each species are presented, in addition to maps of the occurrence and distribution of species in different locations.

Key words: *Campo rupestre*, flora, microendemics, Monocots, taxonomy.

Resumo

Eriocaulaceae são amplamente diversificadas nos Campos Rupestres, sendo que a Serra do Espinhaço é a região mais rica em espécies. Entretanto, outras áreas também abrigam um número expressivo de espécies, como a Serra da Canastra. O presente trabalho consiste na flora de Eriocaulaceae na Serra da Canastra, bem como na análise de distribuição das espécies compartilhadas com as três maiores áreas de Campo Rupestre vizinhas: a Cadeia do Espinhaço, a Serra da Mantiqueira e a Chapada dos Veadeiros e montanhas vizinhas. Foram registradas 31 espécies, sendo 19 de *Paepalanthus*, seis de *Syngonanthus*, quatro de *Comanthera*, uma para *Eriocaulon* e uma para *Leiothrix*. A Canastra compartilha oito espécies com o Espinhaço, Mantiqueira e Veadeiros; sete com Espinhaço e Mantiqueira; duas com Espinhaço e Veadeiros; cinco exclusivamente com o Espinhaço e duas exclusivamente com Veadeiros. Sete espécies são endêmicas da Canastra: *Paepalanthus clausenianus*, *P. canastrensis*, *P. polycladus*, *P. sericiscapus*, *P. sinuosus*, *P. uai* e *Syngonanthus culcitatus*. São apresentadas fotografias, descrições, chave de identificação e comentários sobre as variações morfológicas e distribuição geográfica para cada uma delas, além de mapas de ocorrência e distribuição das espécies nas diferentes localidades.

Palavras-chave: Campo rupestre, flora, microendemismo, Monocotiledôneas, taxonomia.

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Introduction

Eriocaulaceae are Monocots easily recognized for their capituliform inflorescences. The family comprises approximately 1,400 species (Giulietti *et al.* 2012) highly diversified in the *Campo Rupestre*. In Brazil, most of the *Campo Rupestre* areas are in the Espinhaço Range (Bahia and Minas Gerais states) and in the Chapada dos Veadeiros (Goiás state), but they are also found in many other mountains, such as the Serra da Mantiqueira and the Serra da Canastra (Minas Gerais state) (Fernandes *et al.* 2014; Silveira *et al.* 2016). The Serra da Canastra is situated in western Minas Gerais, holding an intermediate position among other *Campo Rupestre* areas: the Espinhaço Range to the northeast, the Chapada dos Veadeiros to the north, and the Serra da Mantiqueira to the south, sharing species with all these areas (Silveira *et al.* 2016).

Álvaro da Silveira collected Eriocaulaceae in the Serra da Canastra and described new species and varieties (Silveira 1928). Broad systematic floristic surveys for the entire flora began in 1994, primarily conducted by the HUFU herbarium team. A parallel floristic study, which did not include the HUFU specimens, documented 269 species (Santana *et al.* 2011), with no mention of Eriocaulaceae. Romero & Nakajima (1999) reported 768 species in the area but did not provide a species list and did not recognize any endemism for Eriocaulaceae. A meticulous analysis of the HUFU collection revealed the presence of several Eriocaulaceae species in the Serra da Canastra, including many that are endemic to the area and three that were new to science (Echternacht *et al.* 2021). There is thus an urge for floristic treatments focusing on Eriocaulaceae conducted by specialists. Our study presents a survey of Eriocaulaceae in Serra da Canastra and an analysis of the species distribution within the Serra da Canastra and other *Campo Rupestre* areas to evaluate its biogeographical connections.

Material and Methods

Serra da Canastra extends from approximately 100 km in a northwestern-southeastern direction, within the Cerrado biome (Fig. 1, Map I and II). Most of the area is protected as the Serra da Canastra National Park, which covers approximately 200,000 hectares, including Chapadão da Canastra and Chapadão da Babilônia (MMA/IBAMA 2005). The relief is mainly influenced by the geological formation of the Canastra group, consisting of

quartzite and mica/schist (Silva *et al.* 2012). This formation gives rise to plateaus known as ‘Chapadões’, with altitudes ranging from 1,100 to 1,496 meters above the sea level, and the steepest slopes facing southwest (MMA/IBAMA 2005). Savanna vegetation dominates the Chapadões, with *Campos Rupestres* found at higher altitudes and slopes, often associated with outcrops and shallow quartzose soils (Silveira *et al.* 2016). In the valleys, Semi-deciduous Forest, Cerrado, and Cerradão vegetation are present (Romero & Nakajima 1999; MMA/IBAMA 2005).

The taxonomic survey relied on herbarium specimens and fieldwork. The primary collection under analysis is HUFU. Furthermore, the taxonomic information for each species was also sourced from studies conducted at the following herbaria: ALCB, B, BHC, BOCH, BR, C, CEN, CEPEC, CESJ, CVRD, ESA, G, GFJP, HB, HBG, HEPH, HRCB, HUEFS, IBGE, INPA, K, LE, LL, M, MBM, MBML, MO, NY, OUPR, P, R, RB, RFA, S, SP, SPF, UB, UEC, UPS, VIES, W, and WU (acronyms according to Thiers, continuously updated). The HUFU collection was revised and updated based on the taxonomic literature for Eriocaulaceae (Koernicke 1863; Bongard 1831; Ruhland 1903; Silveira 1928; Giulietti 1984; Tissot-Squalli 1997; Sano 1999, 2004; Parra 2000; Costa 2005; Parra *et al.* 2010; Trovó 2010; Trovó & Sano 2010; Echternacht 2012; Costa & Sano 2013; Echternacht *et al.* 2015; Watanabe 2015). *Paepalanthus scleranthus* Ruhland (1903: 199) and *Syngonanthus densiflorus* (Körn.) Ruhland (1903: 263) were collected after the conclusion of the herbarium studies, as kindly informed by the collectors Renato Ramos and Luana Sauthier. Since specimens were not available for analysis, their descriptions relied on the type collection, other vouchers, and protologues. Synonyms are cited only for those whose types originate from the Canastra region. In this manuscript, we treat only names valid and accepted at the species level. We adopt the *Paepalanthus s.l.* concept as proposed by Christenhusz *et al.* (2018, 2020) and supported by Stützel *et al.* (2024), therefore not adhering to the splitter classification by Andrino *et al.* (2023).

For the records that were not originally georeferenced, geographic coordinates were assigned based on the information from the sheet labels using the Google Earth (2023) software (<www.earth.google.com>) and the Specieslink geoLoc (2023) tool (<<https://splink.cria.org.br/geoloc>>). Distribution maps for each species and

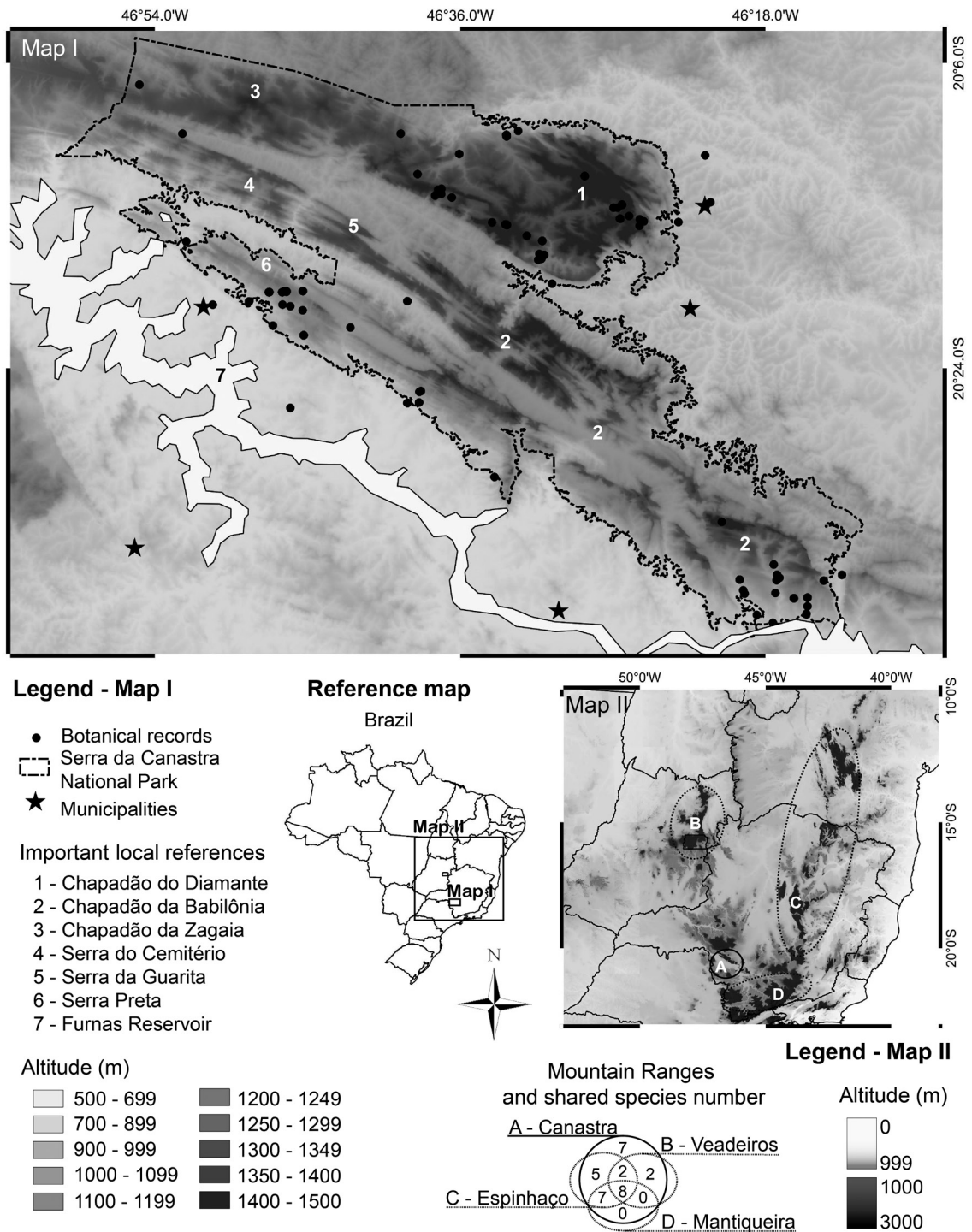


Figure 1 – Map I. Botanical records of Eriocaulaceae in the Serra da Canastra and the boundaries of the Serra da Canastra National Park. Map 2. Main *campos rupestres* areas: A = Serra da Canastra; B = Chapada dos Veadeiros; C = Cadeia do Espinhaço; D = Serra da Mantiqueira.

species richness in the Serra da Canastra are provided (Fig. 2). The species richness of Eriocaulaceae was analyzed and compared with the main *Campo Rupestre* areas surrounding the Serra da Canastra (Fig. 1, Map II): the Chapada dos Veadeiros and associated mountains (detailed below), the Espinhaço Range (including the Quadrilátero Ferrífero) and the Mantiqueira Range. Hereafter, these areas are referred to as Canastra, Veadeiros, Espinhaço, and Mantiqueira, respectively. The Veadeiros area was expanded to include *Campo Rupestre* in the geological formations of the Paranoá and Canastra Groups within the Faixa Brasília. The geographical delimitation of these areas follows the geological structure as detailed in Hasui *et al.* (2012). Each species occurrence in these *Campo Rupestre* areas was assessed based on taxonomic revisions and/or a search in the *Specieslink* database (<www.splink.org.br>); vouchers identified by expert taxonomists are provided in Table 1.

Results and Discussion

Canastra hosts 31 Eriocaulaceae species. *Paepalanthus* is the richest genus (19 species), followed by *Syngonanthus* (6 spp.), *Comanthera* (4 spp.), *Eriocaulon*, and *Leiothrix* (1 sp. each). As shown in Figures 1 and 2, Eriocaulaceae richness is not uniformly distributed throughout Canastra but concentrates on specific sites, especially associated with the quartzitic outcrops and *Campo Rupestre*, which are mainly on the borders of the mountains and Chapadões (Figs. 1-2). The eastern border of the Chapadão do Diamante is the richest region, with 21 species. Other rich areas are the southwestern border near Delfinópolis and the southeastern border near Furnas. Most of the Chapadões are covered by dense savanna vegetation occupied by only a few species of Eriocaulaceae, such as *P. chiquitensis* Herzog (1924: 86), *P. planifolius* (Bong.) Körn. (1863: 413), *P. canastrensis* Silveira (1928: 228), and *P. elongatus* Ruhland (1863: 312). This partially explains why, despite its large extension, Canastra is relatively poor in Eriocaulaceae than other quartzitic mountain ranges. For example, the Ibitipoca State Park (1,532 ha), in Mantiqueira, hosts 22 species (Ferreira *et al.* 2011); the Rio Preto State Park (10,755 ha), in Espinhaço, has 44 species (Echternacht *et al.* 2012), and the Chapada dos Veadeiros National Park (240,000 ha), in Central Brazil, hosts at least 53 species (Trovó & Echternacht 2022).

Table 1 shows the distribution of species that occur in Canastra in the main surrounding *Campo*

Rupestre areas, in the Espinhaço, Mantiqueira, and Veadeiros, which is summarized by a Venn diagram in Fig. 1. Canastra shares 22 species with Espinhaço, 15 with Mantiqueira, and 12 with Veadeiros. We expect a higher similarity with the Espinhaço, as it is a center of Eriocaulaceae diversity (Giulietti & Hensold 1990; Stützel 1998), and probably the richest area in the world. Seven species are shared by Canastra, Mantiqueira, and Espinhaço, but not found in Veadeiros. Two species are found exclusively in Canastra, Espinhaço, and Veadeiros, while they are absent in Mantiqueira. Five species are present in Canastra and Espinhaço, while two are shared between Canastra and Veadeiros. No species exclusively occurs in Canastra and Mantiqueira.

Eight species are present in the four areas, of which none is endemic to *Campo Rupestre*, and most of them are widespread in Brazil (Sano *et al.* 2024). The fact that endemics from *Campo Rupestre* could not occupy these four areas might be explained by habitat heterogeneity, biogeographical barriers, and time for dispersal or extinction. Habitat heterogeneity is expected because of the wide latitudinal range, climatic conditions, and the distinct influence of Cerrado, Caatinga, and Mata Atlântica between the areas (Silveira *et al.* 2016). Another reasonable argument is that connections among these Serras are not effective for most endemics of *Campo Rupestre*.

Seven species are endemic to Canastra: *Paepalanthus clausenianus* Körn. (1863: 323), *P. canastrensis*, *P. uai* Andrino, F.N.Costa & Sano (2021: 129), *P. polycladus* Silveira (1928: 189), *P. sericiscapus* Trovó (2013: 329), *P. sinuosus* Echtern. & Trovó (2021: 29), and *Syngonanthus culcitatus* Echtern. (2021: 31). This number is quite expressive and places Eriocaulaceae in the third position in the number of endemics from Canastra, behind Asteraceae (22 endemics) and Melastomataceae (9), according to Romero & Nakajima (1999). These numbers, however, should be updated, as several new endemic species have been described since then (*e.g.*, Farinaccio & Mello-Silva 2004; Versieux & Wanderley 2008; Batista *et al.* 2010; Oliveira *et al.* 2013).

Regarding the threatened status of the endemic taxa, *Paepalanthus clausenianus* is the only endemic species formally included in the Brazilian Red List (MMA 2022) as Vulnerable. Other works applied the IUCN criteria (IUCN 2001, 2019) for five other species, but these evaluations have not yet been officially validated:

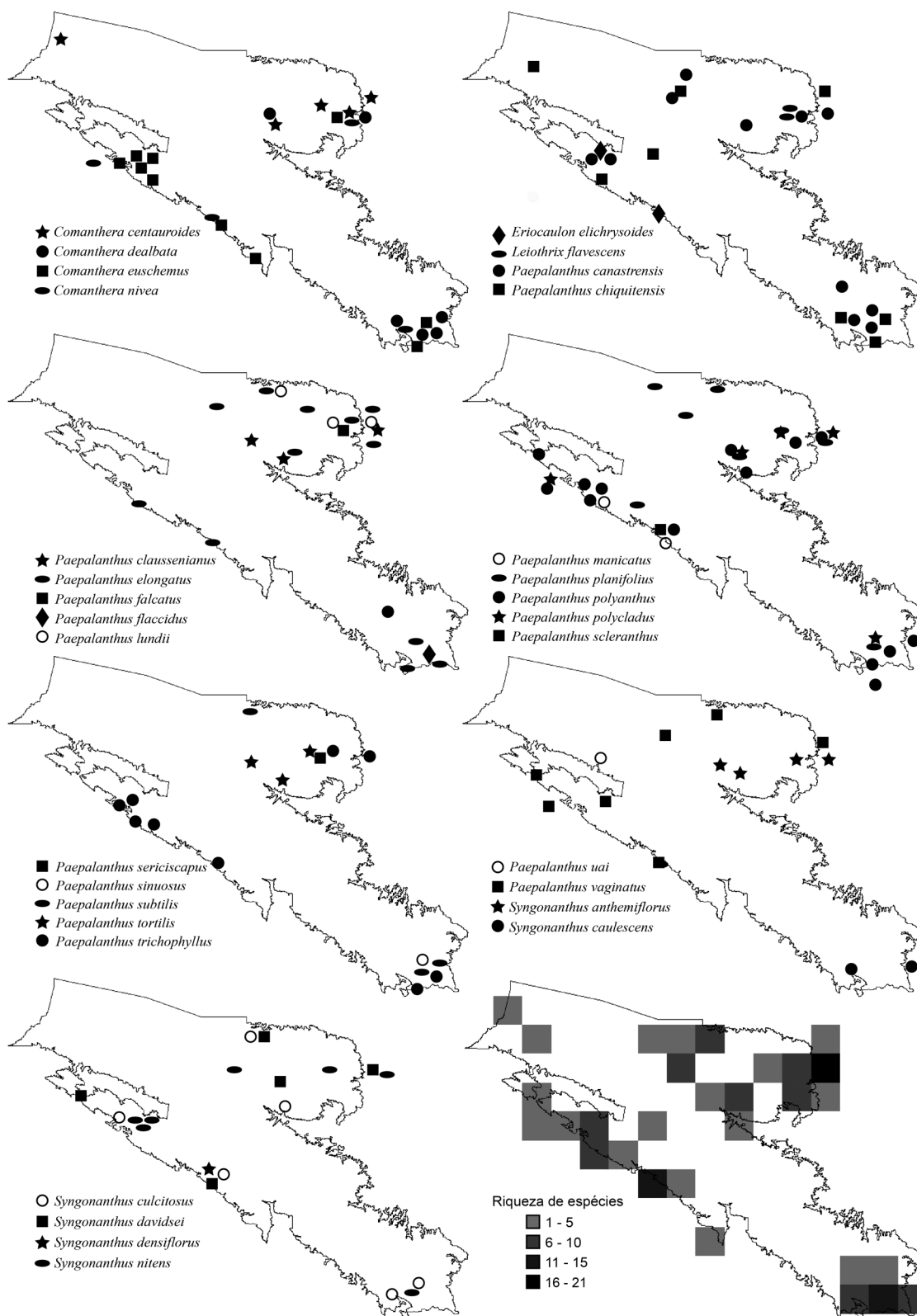


Figure 2 – Geographic distribution of the species of Eriocaulaceae in the Serra da Canastra National Park.

Table 1 – Species occurrences in Serra da Canastra, Cadeia do Espinhaço, Serra da Mantiqueira, and Chapada dos Veadeiros and surrounding mountains, with corresponding vouchers.

Espécie	Endemic	Espinhaço	Mantiqueira	Veadeiros
<i>Comanthera centauroides</i>		<i>Echternacht</i> 1850 (SPF)	<i>Echternacht</i> 1669 (SPF)	
<i>Comanthera dealbata</i>		<i>Echternacht</i> 1858 (SPF)		
<i>Comanthera euschemus</i>				<i>Echternacht</i> 1969 (SPF)
<i>Comanthera nivea</i>		<i>Echternacht</i> 1697 (BHCB)	<i>Echternacht</i> 1608 (BHCB)	
<i>Eriocaulon elichrysoides</i>		<i>Echternacht</i> 1893 (SPF)	<i>Mosen</i> 767 (NY)	
<i>Leiothrix flavescens</i>		<i>Echternacht</i> 1610 (BHCB)	<i>Echternacht</i> 1675 (BHCB)	
<i>Paepalanthus canastrensis</i>	X			
<i>Paepalanthus chiquitensis</i>		<i>Trovó</i> 350 (SPF)		<i>Pirani</i> 1858 (SPF)
<i>Paepalanthus clausenianus</i>	X			
<i>Paepalanthus elongatus</i>		<i>Echternacht</i> 1949 (BHCB)	<i>Echternacht</i> 1562 (SPF)	<i>Faria</i> 1500 (UnB)
<i>Paepalanthus falcatus</i>		<i>Echternacht</i> 1751 (SPF)		
<i>Paepalanthus flaccidus</i>		<i>Echternacht</i> 2166 (SPF)		<i>Echternacht</i> 1968 (BHCB)
<i>Paepalanthus lundii</i>				<i>Irwin</i> 9776 (UB)
<i>Paepalanthus manicatus</i>		<i>Giulietti</i> CFCR3413 (SPF)	<i>Antunes</i> 70 (CESJ)	<i>Soares-Silva</i> 765 (UB)
<i>Paepalanthus planifolius</i>		<i>Echternacht</i> 1780 (SPF)	<i>Echternacht</i> 1515 (BHCB)	<i>Monteiro</i> 76 (RB)
<i>Paepalanthus polyanthus</i>		<i>Sano</i> CFSC13024 (SPF)	<i>Leitão Filho</i> 15217 (UEC)	
<i>Paepalanthus polycladus</i>	X			
<i>Paepalanthus scleranthus</i>		<i>Echternacht</i> 1685 (SPF)	<i>Andrade</i> 560 (HUEFS)	
<i>Paepalanthus serisciscapus</i>	x			
<i>Paepalanthus sinuosus</i>	x			
<i>Paepalanthus subtilis</i>		<i>Hensold</i> 415 (RB)	<i>Mello-Silva</i> 9720 (SPF)	<i>Echternacht</i> 1966 (SPF)
<i>Paepalanthus tortilis</i>		<i>Hensold</i> 3538 (MBM)		
<i>Paepalanthus trichophyllus</i>		<i>Miguire</i> 49223 (NY)	<i>Leitão Filho</i> 19296 (UEC)	<i>Trovó</i> 456 (RB)
<i>Paepalanthus uai</i>	x			
<i>Paepalanthus vaginatus</i>		<i>Echternacht</i> 1786 (SPF)		
<i>Syngonanthus anthemiflorus</i>		<i>Echternacht</i> 1604 (BHCB)		
<i>Syngonanthus caulescens</i>		<i>Echternacht</i> 1601 (BHCB)	<i>Barreto</i> 4674 (BHCB)	<i>Uliana</i> 650 (RB)
<i>Syngonanthus culcitosus</i>	x			
<i>Syngonanthus davidsei</i>		<i>Echternacht</i> 1709 (BHCB)	<i>Echternacht</i> 1627 (BHCB)	<i>Trovó</i> 778 (RB)
<i>Syngonanthus densiflorus</i>		<i>Echternacht</i> 1689 (BHCB)	<i>Amaral</i> 97/164 (UEC)	
<i>Syngonanthus nitens</i>		<i>Echternacht</i> 1718 (SPF)	<i>Urbano</i> 9409 (SPF)	<i>Munhoz</i> 1909 (SPF)

Paepalanthus polycladus, *P. sericiscapus*, and *P. sinuosus* are accessed as Critically Endangered; *P. uai* as Endangered; and *Syngonanthus culcitosus* as Vulnerable (Trovó 2010; Trovó *et al.* 2013; Echternacht *et al.* 2021). *Paepalanthus canastrensis* is the only endemic species not yet assessed as threatened with extinction.

Taxonomic synonyms are cited here for accepted species with heterotypic types from Serra da Canastra. *Syngonanthus canastrensis* Silveira (1928: 228) is synonymous with *Comanthera dealbata* (Silveira) L.R.Parra & Giul. (2010: 1139), and *S. angustifolius* Silveira (1928: 235), with *C. nivea* (Bong.) L.R.Parra & Giul. (2010: 1141), according to Parra *et al.* (2010). *Paepalanthus falcatus* (Bong.) Koern. (1863: 387) is considered an accepted name with *P. callocephalus* Silveira var. *ciliatus* Silveira (1928: 31) under its synonym, following Andrino *et al.* (2022). *Paepalanthus flaccidus* (Bong.) Kunth (1841: 511) has priority over *Paepalanthus babyloniensis* Silveira

(1928: 121) according to Trovó & Sano (2010), and further studies regarding these names are underway. Following Sano (2004), *Paepalanthus percrassus* Silveira (1928: 142) is a synonym of *Paepalanthus clausseianus* Körn. (1863: 232) [= *Actinocephalus clausseianus* (Körn.) Sano (2004: 102)]. Furthermore, *Paepalanthus vaginatus* Koern. (1863: 313) has priority over *P. cylindraceus* Silveira (1928: 81) following Flora e Funga do Brasil (Andrino *et al.* 2024).

Two records have not been identified at the species level, but we lacked sufficient material to assess whether they represent new taxa. The specimen *Nakajima 3934* was misidentified as *Paepalanthus albidus* Gardner (1843: 525), which is a very tiny species, with a stem barely reaching 5 cm long, while the Canastra plant has a very elongated stem, up to 13 cm. The other specimen, *Romero 7809*, was identified as *Paepalanthus strictus* Körn. (1863: 319), but this has a more elongated stem and shorter scapes.

Identification key for the Eriocaulaceae from Serra da Canastra

1. Spathes, scapes, and involucre bracts absent 4.12. *Paepalanthus scleranthus*
- 1'. Spathes, scapes, and involucre bracts present 2
 2. Involucre bract series dissimilar, external involucre bracts golden to stramineous, darker than the internal series, these cream and surpassing the floral disc 3
 - 2'. Involucre bract series similar in color or the external series lighter than the internal series, these not surpassing the floral disc 6
 3. Scapes emerging from a conspicuous reproductive axis; spathes and scapes with glandular hairs; sepals and petals similar in size; petals fused in the upper third, with short triangular lobes soon involute after anthesis 5.1. *Syngonanthus anthemiflorus*
 - 3'. Scapes emerging from the stem apex or leaf axil; spathes and scapes without glandular hairs; sepals shorter than petals; petals fused in the middle third, with long spatulate apex, erect after anthesis 4
 4. Leaves caespitose; spathes pilose adaxially at the apex 1.2. *Comanthera dealbata*
 - 4'. Leaves in basal rosettes; spathes glabrous adaxially at the apex 5
 5. Leaves with contrasting indumentum on the abaxial and adaxial surfaces, with predominantly simple patent hairs abaxially, and appressed malpighiaceae hairs adaxially; leaves not surpassing the spathes 1.3. *Comanthera euschemus*
 - 5'. Leaves with similar indumentum on both surfaces, with similar proportions of appressed malpighiaceae and patent simple hairs; leaves surpassing the spathes 1.4. *Comanthera nivea*
 6. Fertile plants with leaves in basal rosettes; stem subterranean or restricted to the basal rosette 7
 - 6'. Fertile plants with leaves spiraled throughout an elongated aerial stem or throughout a central reproductive axis 19
 7. Involucre bracts pilose abaxially 8
 - 7'. Involucre bracts glabrous abaxially 16
 8. Scape bearing numerous capitula 9
 - 8'. Scape bearing a single capitulum 10

9. Numerous capitula in the scape split at the apex 4.1. *Paepalanthus canastrensis*
- 9'. Numerous capitula in the scape not split to the apex 4.9. *Paepalanthus planifolius*
10. Spathe opening truncate to lacerate 11
- 10'. Spathe opening oblique 12
11. Leaves fenestrate at the base (more visible in translucence); involuclral bracts stramineous; diplostemonous flowers with black glands at petals; stem without ferruginous hairs 2.1. *Eriocaulon elichrysoides*
- 11'. Leaves non-fenestrate; involuclral bracts dark brown; isostemonous flowers with petals lacking glands; stem covered by ferruginous hairs 4.18. *Paepalanthus uai*
12. Involuclral bracts brown in the center, cream in the margins, slightly surpassing the flower disc, tufted at apex; flowers dimerous 4.4. *Paepalanthus elongatus*
- 12'. Involuclral bracts castaneous, stramineous to golden, not surpassing the flower disc, not tufted at apex; flowers trimerous 13
13. Scapes emerging from a conspicuous reproductive axis 5.5. *Syngonanthus densiflorus*
- 13'. Scapes emerging at the stem apex or leaf axil 14
14. Flower disc stramineous to yellowish; gynoecium with nectariferous branches inserted below the stigmatic branches 3.1. *Leiothrix flavescens*
- 14'. Flower disc whitish; gynoecium with nectariferous and stigmatic branches free at the same level 15
15. Fertile lateral branch absent; horizontal rhizome, not thickened by leaf sheaths, lateralized rosette; involuclral bracts triangular to elliptic, whitish lanose abaxially; stigmatic branches bifid 4.5. *Paepalanthus falcatus*
- 15'. Fertile lateral branch present, foliose (more easily seen when detaching the inflorescence from the stem); stem and rosette erect, frequently thickened by leaf sheaths; involuclral bracts linear to lanceolate, pubescent to glabrescent abaxially; stigmatic branches simple 4.7. *Paepalanthus lundii*
16. Involuclral bracts dark brown; flowers dimerous 4.19. *Paepalanthus vaginatus*
- 16'. Involuclral bracts cream, golden, or stramineous; flowers trimerous 17
17. Leaves caespitose; apex round; capitulum cyathiform; sepals shorter than petals; petals with long spatulate apex, erect after anthesis 1.1. *Comanthera centauroides*
- 17'. Leaves rosulate, apex obtuse to acuminate; capitulum hemispheric to obconic; sepals equaling the petals; petals with short triangular lobes, soon involute after anthesis 18
18. Roots cream, fibrous; involuclral bracts of different series equaling in height; leaves homogeneous in color 5.4. *Syngonanthus davidsei*
- 18'. Roots orangish, spongy; involuclral bracts progressively longer from the external to the internal series; leaves with a lighter longitudinal band in the middle (more visible in dry specimens) 5.6. *Syngonanthus nitens*
19. Plants delicate, flexible stem 20
- 19'. Plants robust, stem or central reproductive axis rigid 27
20. Pistillate flowers with petals fused at distal half, free at base and lobes; stem whitish lanose at internodes 21

- 20'. Pistillate flowers with petals free; stem not whitish lanose at internodes..... 22
21. Involucral bracts acute to apiculate; stem usually unbranched, not forming cushions, up to 26 cm long; petals spongy..... 5.2. *Syngonanthus caulescens*
- 21'. Involucral bracts round to obtuse; stem profusely branched, forming cushions, up to 5.5 cm long; petals membranaceous 5.3. *Syngonanthus culcitosus*
22. Flores dimerous..... 23
- 22'. Flores trimerous 24
23. Involucral bracts cream to golden, abaxially glabrous..... 4.6. *Paepalanthus flaccidus*
- 23'. Involucral bracts castaneous to brown, abaxially pilose to glabrescent..... 4.17. *Paepalanthus trichophyllus*
24. Stem 28–80 cm long; scapes in pseudo-lateral fascicles, leaves similar in length along the stem, not congested at the stem apex..... 4.14. *Paepalanthus sinuosus*
- 24'. Stem up to 15 cm long; pseudo-lateral fascicles absent; leaves congested at the stem apex 25
25. Involucral bracts stramineous..... 4.15. *Paepalanthus subtilis*
- 25'. Involucral bracts light to dark brown 26
26. Involucral and floral bracts lanceolate; sepals brown 4.8. *Paepalanthus manicatus*
- 26'. Involucral and floral bracts obovate to oblong; sepals dark brown to blackish..... 4.16. *Paepalanthus tortilis*
27. Scapes emerging from conspicuous foliose lateral reproductive axis; flowers trimerous 28
- 27'. Scapes emerging from the reproductive central axis; flowers dimerous 29
28. Lateral reproductive axis emerging from the rosette; scapes sericeous 4.3. *Paepalanthus claussenianus*
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29. Reproductive central axis small (up to 4 cm long); scapes sericeous; involucral bracts light brown..... 4.13. *Paepalanthus sericiscapus*
- 29'. Reproductive central axis long (up to 2 m); scapes glabrous; involucral bracts dark brown 30
30. Axis bracts shortening toward the apex, with acute apex; leaves glabrous, not ciliate; rhizome absent .. 4.2. *Paepalanthus chiquitensis*
- 30'. Axis bracts similar in size, with round apex; leaves densely pilose, then glabrescent, ciliate; rhizome present..... 4.11. *Paepalanthus polycladus*

1. *Comanthera*.

Herbs terrestrial. Leaves in basal rosette or caespitose, not fenestrated. Scapes free, not emerging from a conspicuous reproductive axis, without glandular hairs, as well as the spathes. Involucral bract series dissimilar, external involucral bracts golden to stramineous, darker than the internal series, these cream and surpassing the floral disc. Floral bracts absent. Flowers 3-merous, isostemonous, petals eglandular. Staminate flowers pedicellate, sepals and petals fused at the base,

stamens free from the corolla, anthers dorsifixed, carpellodes present. Pistillate flowers pedicellate or sessile, sepals free, shorter than petals, petals fused at the middle, free at base and apex, forming long spatulate lobes, stigmatic branches simple, liberating at the same level as nectariferous branches.

Comanthera is sister to *Syngonanthus*, as evidenced by the petals of pistillate flowers fused at the middle and free at the base and top. It differs, however, by sepals of the pistillate flowers smaller

than the petals, these narrow-spatulated with long lobes, and seeds with rough seed surface (Parra *et al.* 2010; Giuletta *et al.* 2012).

1.1. *Comanthera centauroides* (Bong.) L.R. Parra & Giul., Taxon (59): 1143. 2010. Fig. 3a

Herbs 24–41 cm tall. Stem subterranean, branched. Leaves caespitose, linear, apex round, 5–1 cm × 1–3 mm, longer than spathes, sinuous, glabrescent on both surfaces, hairs patent. Spathes 2–4 cm long, abaxial surface pubescent to glabrescent, adaxially glabrous, oblique opening. Scapes 17–30 cm, glabrescent. Capitula 4.5–7.9 mm wide. Involucral bracts below the floral disc, with an apparent fringe of flowers (capitula cyathiform), the external series elliptic, apex round, ca. 2.5 mm, progressively longer toward the internal series, these narrow-elliptic, apex round, ca. 5 mm, all series stramineous except for the cream inner series, glabrous on both surfaces. Staminate flowers ca. 4–7 mm, including the pedicel, this ca. 2.5 mm; sepals elliptic, apex obtuse, 3.5–4 mm, cream, glabrous on both surfaces; petals ovate, apex obtuse, 3.5–4 mm, cream, glabrous on both surfaces; carpellodes castaneous. Pistillate flowers 2.5–3.5 mm, sessile; sepals free, narrow-ovate, apex obtuse, 2–2.5 mm, cream, glabrous on both surfaces; petals spatulate, apex round, 2–2.5 mm, cream, pilose on both surfaces; gynoecium ca. 1.5 mm, ovary ca. 0.5 mm.

Examined material: São Roque de Minas, primeiro morro à direita após a portaria de São Roque, atrás do alojamento, 22.VI.2001, *N.M. Castro 07* (HUFU); morro do Córrego da Fazenda, 22.VI.2001, *N.M. Castro 12* (HUFU); portaria Sacramento em direção à captação de água, 24.VI.2001, *N.M. Castro 20* (HUFU); percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, próximo à parte alta da Casca D’Anta, 29.V.2014, *L. Echternacht 2472* (HUFU); Parque Nacional da Serra da Canastra, após a nascente do Rio São Francisco, 21.VIII.1994, *J.N. Nakajima 428* (HUFU); morro atrás do centro de visitantes, 25.IX.1995, *J.N. Nakajima 1343* (HUFU); trilha para a parte de baixo da Cachoeira da Casca D’Anta, 29.IX.1995, *J.N. Nakajima 1395* (HUFU); estrada para o sítio João Domingos, 20.VIII.1997, *J.N. Nakajima 2634* (HUFU); estrada São Roque de Minas - Sacramento, 5 km da sede, 16.X.1994, *R. Romero 1269* (HUFU); morro após a nascente do Rio São Francisco, 16.VII.1995, *R. Romero 2428* (HUFU); Serra Brava, próximo ao Mirante, 28.IX.1995, *R. Romero 2990* (HUFU); cachoeira Casca D’Anta, parte de cima, 23.VIII.1997, *R. Romero 4510* (HUFU).

Comanthera centauroides is the only species of *C.* subg. *Thysanocephalus* (Körn.) L.R.Parra

& Giul. (2010: 1143) in the area; this subgenus is characterized by cyathiform capitula, i.e., with involucral bracts below the flower level, forming a fringe of flowers. Other features are the senescent involucral bracts, pedicel not elongating during fruit development, and seed surface with micropapillae. In addition, this species has caespitose leaves round at the apex (Echternacht *et al.* 2015).

Comanthera centauroides occurs in Chapadão do Diamante and Chapadão da Zagaia, forming abundant populations (Fig. 2a). Its distribution extends eastwards in the whole Espinhaço in the states of Bahia and Minas Gerais, and to the south as far as São João Del Rei in the Mantiqueira range, as well as in the restingas of Rio de Janeiro state (Echternacht 2012; Silva & Trovó 2014; Echternacht *et al.* 2015).

The records of collections with reproductive material are mainly dated in the second semester, particularly in August and September.

1.2. *Comanthera dealbata* (Silveira) L.R. Parra & Giul., Taxon (59): 1139. 2010.

= *Syngonanthus canastrensis* Silveira, Floral. Mont.: 368. 1928. Type:—BRAZIL. Minas Gerais: “In campis arenosis siccisque in Serra da Canastra”, April 1925, Silveira 743 (holotype: R!). Fig. 3b-c

Herbs 18–37 cm tall. Stem subterranean, branched. Leaves caespitose, linear, apex acute, 5–8 × 0.02–0.06 cm, surpassing the spathes, ascending to recurved, hairy on both surfaces, with appressed malpighiaceae hairs adaxially mainly, and patent simple hairs mainly abaxially. Spathes 2–7 cm long, abaxial surface hairy, adaxial surface hairy at apex, oblique opening. Scapes 20–33 cm, hairy to glabrescent. Capitula 4–10 mm wide. Involucral bracts surpassing the floral disc, clearly dimorphic, the external series circular to obovate, apex round, ca. 1–2 mm, stramineous to golden, progressively longer toward the internal series, these spatulate, apex round, ca. 5 mm, cream, glabrous. Staminate flowers ca. 2–2.3 mm, including the pedicel, this ca. 0.1 mm; sepals oval, apex obtuse, ca. 1.5 mm, cream, glabrous; petals oval, apex obtuse, ca. 2 mm, cream, glabrous; carpellodes cream. Pistillate flowers 2–3 mm, pedicel increasing in size during fruit maturation; sepals free, oval, apex obtuse, ca. 1 mm, cream, glabrous; petals spatulate, apex round, ca. 2.5 mm, cream, glabrous abaxially, hairy adaxially at middle; gynoecium ca. 2.5 mm, ovary ca. 0.7 mm.

Examined material: Capitólio, região de Furnas, estrada para Pedreira, próximo à cachoeira, 21.III.2007, *P.O.*

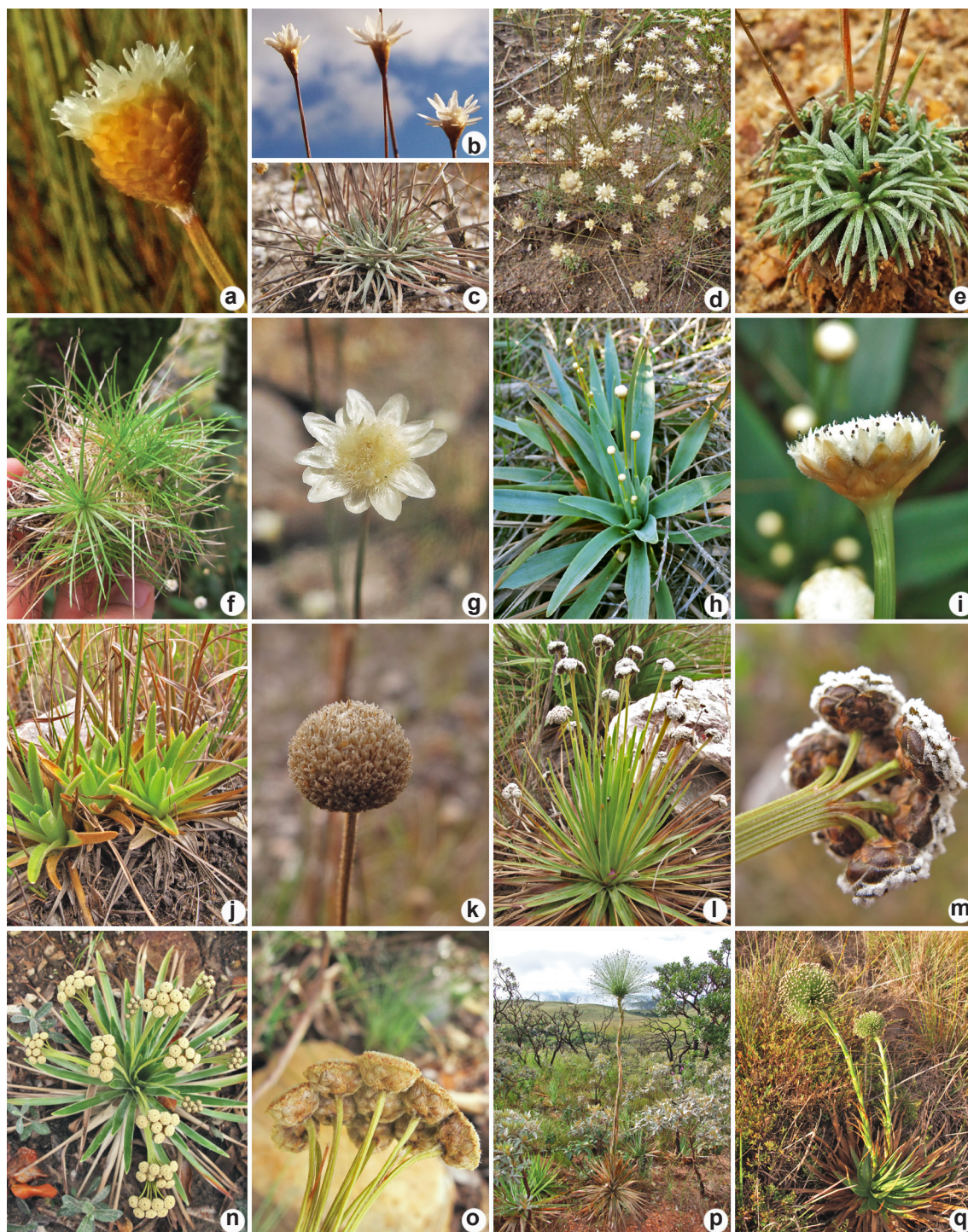


Figure 3 – a–q. Species of Eriocaulaceae in the Serra da Canastra – a. *Comanthera centauroides* – capitulum; b–c. *Comanthera dealbata* – b. capitula; c. leaves and spathes; d–e. *Comanthera euschemus* – d. habit; e. leaves and spathes; f–g. *Comanthera nivea* – f. leaves; g. capitulum; h–i. *Eriocaulon elichrysoides* – h. habit; i. capitulum; j–k. *Leiothrix flavescens* – j. leaves and spathes; k. capitulum; l–o. *Paepalanthus canastrensis* – two morphotypes (l–m and n–o) – l. habit; m. capitula; n. habit; o. capitula; p. *Paepalanthus chiquitensis* – habitat and habit; q. *Paepalanthus clausenianus* – habit. (Photos by L. Echternacht from Serra da Canastra, except: a, k, l. from Biribiri State Park; h, i. from Caraça; and b. by M.S. Freitas).

Rosa 544 (HUFU); Paraíso Perdido, 22.III.2007, *P.O. Rosa 592a* (HUFU); estrada para Gabi Exploração II, 23.III.2007, *P.O. Rosa 627* (HUFU). Delfinópolis, trilha do S. Canyon, 16.V.2003, *R. Romero 6919* (HUFU). São Roque de Minas, Parque Nacional da Serra da Canastra, Furnas, Chapadão da Babilônia, Serra do Turvo, próximo às pedreiras, no alto da pedreira Gabi Exploração, próximo a curso d'água, 2.II.2015, *L. Echternacht 2616* (HUFU); estrada da bifurcação entre a cachoeira Casca D'anta, parte alta e a torre de observação, 30.V.2014, *M.S. Freitas 028* (HUFU); Paraíso Perdido, 16.II.2006, *E.K.O. Hattori 480* (HUFU); estrada da Serra Brava, 23.XI.1995, *J.N. Nakajima 1608* (HUFU); estrada para Pedreira Souza, ca. de 2 km da rodovia MG-050, 17.II.2006, *R. Romero 7691* (HUFU).

Comanthera dealbata is recognized among the other species *C. subg. Comanthera* for its caespitose leaves, and spathe apex adaxially pilose (Echternacht & Parra 2024). Leaf indumentum is also remarkable, glaucous mainly by appressed malpighiaceus hairs on both surfaces.

This species is recorded in Canastra, specifically in Chapadão do Diamante, as well as in the southern Chapadão da Babilônia (Fig. 2a). It also has a distribution to the northeast of the Espinhaço Range in Minas Gerais (Parra 2000; Parra *et al.* 2010).

There are records of fertile plants in January, February, March, May, and November, however, the greater number of collections occurs in the first trimester, coinciding with the period of greatest rainfall.

1.3. *Comanthera euschemus* (Ruhland) L.R. Parra & Giul., Taxon (59): 1140. 2010. Fig. 3d-e

Herbs 15–38 cm tall. Stem subterranean, branched. Leaves in basal rosette, linear, apex acute, $0.5\text{--}3.5 \times 0.02\text{--}0.05$ cm, not surpassing the spathes, recurved, with surfaces distinctly indumented, adaxially by appressed hairs mainly, and abaxially by patent hairs mainly. Spathes 2–4 cm long, abaxially hairy, adaxially glabrous, oblique opening. Scapes 10–30 cm, glabrescent. Capitula 4.3–7.3 mm wide. Involucral bracts surpassing the floral disc, clearly dimorphic, the external series circular, apex round, ca. 1.5 mm, castaneous to golden, progressively longer toward the internal series, these spatulate, apex round, ca. 4 mm, cream, glabrous. Staminate flowers ca. 1–1.5 mm, including the pedicel, this ca. 0.2 mm; sepals elliptical, apex acuminate, ca. 1–1.5 mm, cream, glabrous; petals elliptical, apex round, ca. 1–1.2 mm, cream, glabrous; carpellodes cream. Pistillate flowers 2–2.5 mm, pedicel increasing in size during

fruit maturation; sepals fused at base, elliptical, apex obtuse, ca. 1 mm, cream, glabrous; petals spatulate, apex round, ca. 1.7–2 mm, cream, hairy abaxially at middle, glabrous adaxially; gynoecium ca. 1.7 mm, ovary ca. 0.6 mm.

Examined material: Capitólio, trilha da Pedreira Souza, ca. de 2 km da MG-050, 12.VII.2006, *A.A. Arantes 1937* (HUFU); região da Represa de Furnas, estrada para Pedreira, próximo à cachoeira da rodovia, 22.V.2007, *J.N. Nakajima 4430* (HUFU). Delfinópolis, Serra Preta, chapadão no alto da Serra Preta, 30.I.2015, *L. Echternacht 2598* (HUFU); entre a Cachoeira dos Coqueirinhos e o Paraíso Perdido, 31.I.2015, *L. Echternacht 2604* (HUFU); trilha da Escada de Pedra, 14.IX.2004, *C.A. Faria 29* (HUFU); 14.IX.2004, *E.K.O. Hattori 361* (HUFU); Fazenda Águas da Serra, trilha das cachoeiras, 13.III.2003, *J.N. Nakajima 3493* (HUFU); Fazenda Zê Antunes, trilha Casinha Branca, 11.IV.2002, *R.A. Pacheco 134* (HUFU); Fazenda Água da Serra, trilha Escada de Pedras, 10.III.2003, *R.A. Pacheco 470* (HUFU); Condomínio de Pedras, 17.V.2003, *R.A. Pacheco 597* (HUFU); estrada para Casa Branca, Fazenda Paraíso, Sete Cidades, 10.IV.2002, *R. Romero 6261* (HUFU); trilha da Escada de Pedra, 15.V.2003, *R. Romero 6865* (HUFU); 14.IX.2004, *R. Romero 7083* (HUFU); Condomínio de Pedras, 23.VI.2010, *R. Romero 8275* (HUFU); Cidade de Pedras, 12.III.2003, *R.L. Volpi 562* (HUFU); trilha “Muro de Pedras”, 12.III.2003, *R.L. Volpi 596* (HUFU); Condomínio de Pedras, 17.V.2003, *R.L. Volpi 694* (HUFU). São Roque de Minas, primeiro morro à direita após a portaria de São Roque, atrás do alojamento, 22.VI.2001, *N.M. Castro 08* (HUFU); Parque Nacional da Serra da Canastra, estrada do Chapadão Diamante, 18.III.1995, *J.N. Nakajima 852* (HUFU); estrada para Sacramento, 3 km da sede administrativa, 17.III.1995, *R. Romero 1978* (HUFU); vale da nascente do Rio São Francisco, 17.III.1995, *R. Romero 1991* (HUFU); Paraíso Perdido, Parque Nacional da Serra da Canastra, morro próximo à nascente do Rio São Francisco, 19.II.1997, *R. Romero 3886* (HUFU); Morro do Facão, 30.I.2002, *R. Romero 6227A* (HUFU).

Comanthera euschemus can be distinguished from other species within *C. subg. Comanthera* in Canastra by its recurved leaves, which are shorter than spathes, and with surfaces distinctly indumented, primarily consisting of appressed hairs on the adaxial side and patent hairs on the abaxial side (Echternacht & Parra 2024).

Comanthera euschemus forms abundant populations in Canastra, encompassing Chapadão do Diamante, Chapadão da Babilônia, and Serra Preta (Fig. 2a). Its range extends westward into Goiás and Distrito Federal, covering Serra do Paraná, Serra dos Cristais, and Serra dos Pireneus (Parra 2000; Parra *et al.* 2010).

There are collection records during almost every month of the year, mainly in the first semester, except for August, October, November, and December.

1.4. *Comanthera nivea* (Bong.) L.R. Parra & Giul., Taxon (59): 1141. 2010.

= *Syngonanthus angustifolius* Silveira, Floral. Mont.: 370. 1928. Type:—BRAZIL. Minas Gerais: “In campis arenosis in Serra da Babylonia, prope Passos”, April 1925, Silveira 743 (holotype: R!).

Fig. 3f-g

Herbs 15–35 cm tall. Stem subterranean, branched or not. Leaves in basal rosette, linear, apex acute to mucronate, $0.8\text{--}8.5 \times 0.03\text{--}0.05$ cm, surpassing the spathes, ascending, pubescent to glabrescent, appressed malpighiaceous and patent simple hairs, ciliate. Spathes 1.5–4 cm long, abaxially glabrescent, adaxially glabrous, oblique opening. Scapes 10–30 cm, glabrescent. Capitula 4.5–6.8 mm wide. Involucral bracts surpassing the floral disc, clearly dimorphic, the external series oboval, apex round, ca. 2 mm, stramineous, progressively longer toward the internal series, these spatulate, apex round, ca. 4 mm, cream, glabrous. Staminate flowers ca. 1.5–2 mm, including the pedicel, this ca. 0.5 mm; sepals ovals, apex round, ca. 1–1.2 mm, cream, glabrous; petals ovals, apex round, ca. 1–1.2 mm, cream, glabrous; carpellodes cream. Pistillate flowers 2–3 mm, pedicel increasing in size during fruit maturation; sepals joined at the base, elliptical, apex obtuse, ca. 1.2 mm, cream, glabrous; petals spatulate, apex round, ca. 2–2.5 mm, cream, glabrous; gynoecium ca. 2 mm; ovary ca. 0.5 mm.

Examined material: Delfinópolis, Paraíso Selvagem, ao lado do estacionamento, 1.II.2015, *L. Echternacht 2605* (HUFU); Cânion do Alpinista, dentro do cânion, local sombreado, com mata de galeria, epífita nas duas paredes do cânion, 1.II.2015, *L. Echternacht 2607* (HUFU); trilha para Cachoeira Salto Solitário, 11.III.2003, *J.N. Nakajima 3458* (HUFU); trilha para Mata do Canyon, 22.X.2003, *J.N. Nakajima 3566* (HUFU); região da Represa de Furnas, estrada para Pedreira Souza, ca. de 2 km da rodovia MG-050, 30.IX.2005, *J.N. Nakajima 3930* (HUFU); trilha para Cachoeira do Alpinista, 16.V.2003, *R.A. Pacheco 570* (HUFU); Fazenda José Antunes, trilha da Escada de Pedras, 11.X.2002, *R. Romero 6467* (HUFU); trilha para Cachoeira do Salto Solitário, 11.III.2003, *R. Romero 6721* (HUFU); Paraíso Perdido, córrego Quebra Anzol, 4,5 km da rodovia MG-050, 29.IX.2005, *R. Romero 7245* (HUFU); Cachoeira Águas Claras, Serras de Delfinópolis, Complexo Canastra, trilha da cachoeira, 23.VI.2010, *P.O. Rosa 1312* (HUFU). São

Roque de Minas, estrada da Serra Brava, 23.XI.1995, *J.N. Nakajima 1604* (HUFU).

Comanthera nivea differs from the other *C.* subg. *Comanthera* in Canastra due to its flat leaves, which are longer than spathes, usually occupying more shaded habitats.

Within the Canastra, this species is recorded in Chapadão da Babilônia and Serra Preta (Fig. 2a). Its distribution extends eastward from Espinhaço to Mantiqueira ranges and also reaches the restingas in Espírito Santo (Parra 2000; Parra *et al.* 2010; Silva & Trovó 2022).

The records of reproductive material are primarily dated in the first, second, and third trimesters of the year.

2. *Eriocaulon*.

2.1. *Eriocaulon elichrysoides* Bong., Mém Acad. Imp. Sci. St-Petersbourg, Sér. 6, Sci Math.1: 631. 1831.

Fig. 3h-i

Herbs semi-aquatic, 30–80 cm tall. Stem restricted to the rosette, branched or not. Leaves in basal rosette, fenestrated, lanceolate, apex obtuse, $6\text{--}20 \times 0.5\text{--}2$ cm, erect, glabrescent on both surfaces. Spathes ca. 15 cm, glabrescent, truncate opening. Scapes free, not emerging from a conspicuous reproductive axis, 15–75 cm, glabrescent. Capitula 10.4–13.1 mm wide. Involucral bracts oval to lanceolate, apex obtuse, ca. 5 mm, series similar in color, stramineous, sparsely hairy abaxially in the median region of the internal series, glabrous adaxially, ciliate. Floral bracts lanceolate, apex acute, ca. 4 mm, cream, adaxial surface hairy distally, glabrous adaxially, ciliate. Flowers 3-merous, diplostemonous. Staminate flowers ca. 4 mm including the pedicel, this ca. 0.5 mm; sepals fused at base, lanceolate, apex acute, ca. 4 mm, cream, glabrous on both surfaces, tufted; petals free, ca. 4 mm, cream, glabrous on both surfaces, black glands adaxially; stamens free, anthers black, dorsifixed; carpellodes black, papillose. Pistillate flowers ca. 3 mm, sessile; sepals free, oblanceolate, apex obtuse, ca. 3 mm, stramineous, glabrous on both surfaces, tufted; petals oblanceolate, with black glands adaxially, apex obtuse, ca. 2.5 mm, cream, glabrous abaxially, densely pilose adaxially; gynoecium ca. 2.5 mm, ovary ca. 1 mm, stigma simple, nectariferous branches absent.

Examined material: Delfinópolis, Serra Preta, córrego na Escadaria de Pedras, 31.I.2015, *L. Echternacht 2601* (HUFU); trilha “Escada de Pedras”, Fazenda José Antunes, 11.X.2002, *R. Romero 6486* (HUFU).

Eriocaulon elichrysoides is the sole species of the genus observed in the area. It can be identified by its fenestrated leaves (more apparent in translucence), truncate spathes, diplostemonous flowers with black glands on the petals, and black anthers.

In Canastra, the species is only known from Serra Preta (Fig. 2b). It is broadly distributed beyond Canastra to the east and south, encompassing the Espinhaço and Mantiqueira regions (Tab. 1).

There are two records from Canastra: one from October, quite fertile, and another from January, featuring old inflorescences.

3. *Leiothrix*.

3.1. *Leiothrix flavescens* (Bong.) Ruhland, Pflanzenr. (Engler) IV. 30: 231. 1903. Fig. 3j-k

Herbs terrestrial, 38–47 cm tall. Stem restricted to the rosette, unbranched. Leaves in basal rosette, not fenestrated, lanceolate, apex obtuse, 2–5 × 0.3–0.5 cm, sparsely pilose to glabrescent on both surfaces. Spathes ca. 5–7 cm, sparsely pilose to glabrescent, oblique opening. Scapes free, not emerging from a conspicuous reproductive axis, 30–40 cm, sparsely pilose to glabrescent. Capitula 6.7–9.1 mm wide, flower disc stramineous to yellowish. Involucral bracts oval to oblong, apex acute, 1.5–2.5 mm, series similar in color, dark brown to golden, abaxially hairy at apex, glabrous adaxially, ciliate. Floral bracts oblanceolate, apex acute, ca. 2.5 mm, castaneous, pilose abaxially, glabrous adaxially, ciliate. Flowers 3-merous, isostemonous. Staminate flowers ca. 3 mm including the pedicel, this ca. 1 mm; sepals free, elliptical, apex round to truncate, ca. 1.5 mm, light brown, glabrous on both surfaces, ciliate; petals fused, infundibuliform, ca. 1.5 mm, light brown, glabrous on both surfaces; stamens free, anthers basifixed; carpellodes cream, papillose. Pistillate flowers ca. 3.5 mm, including the pedicel, this ca. 1 mm; sepals free, elliptical, carinate, apex round, ca. 2.5 mm, light brown, sparsely pilose abaxially, glabrous adaxially; petals free, elliptical, apex acute, ca. 2.5 mm, light brown, glabrous on both surfaces, hairy ring between sepals and petals; gynoecium ca. 2.5 mm, ovary ca. 0.5 mm, stigmatic branches simple, and liberating above the nectariferous branches.

Examined material: São Roque de Minas, Parque Nacional da Serra da Canastra, percurso entre São João Batista da Canastra e a Portaria 1 (São Roque - Centro de Visitantes), estrada entre a nascente do Rio São Francisco e a Portaria 1, em direção à vertente sul da

Serra, 31.V.2014, L. Echternacht 2494 (HUFU); beira da estrada chegando na nascente do Rio São Francisco, 31.V.2014, M.S. Freitas 035 (HUFU).

Leiothrix flavescens is the only of the genus recorded in the area. It can be distinguished by the yellowish capitula, the leaves with round apices, and the gynoecium with nectariferous appendices liberating below the stigmatic appendices.

The collections took place at the end of May and plants were already in its final flowering stage, quite aged, which suggests that its reproductive period is in the first quarter.

This species has few records in Canastra, all from Chapadão do Diamante (Fig. 2b). However, it usually forms abundant populations, and it is broadly distributed in eastern Brazil, occurring in Mantiqueira and Espinhaço and throughout South America, reaching Peru, Venezuela, and Guyana (Giulietti 1984).

4. *Paepalanthus*.

Herbs terrestrial. Leaves in basal rosette or spiraled throughout the stem, not fenestrated. Scapes bearing a single or multiple capitula, axillary, terminal, or emerging from a conspicuous reproductive axis in a terminal or lateral position. Involucral bract series similar in color or the external series lighter than the internal series. Floral bracts present. Flowers 2 or 3-merous, isostemonous, petals eglandular. Staminate flowers pedicellate, sepals fused at the base, petals fused, anthers dorsifixed, carpellodes present. Pistillate flowers sessile or pedicellate, sepals and petals free, stigmatic branches simple or bifid, liberating at the same level as the nectariferous branches, or rarely nectariferous branches absent.

Paepalanthus is distinguished by the following character set in Canastra: isostemonous flowers with free petals in the pistillate flowers, and gynoecium with the stigmatic and nectariferous branches separating at the same level, or rarely nectariferous branches absent.

4.1. *Paepalanthus canastrensis* Silveira, Floral. Mont.: 228. 1928. Fig. 3l-o

Herbs 5–40 cm tall. Stem restricted to the rosette, unbranched, sometimes forming caudex. Leaves in basal rosette, lanceolate, apex acute, 1–25 × 0.1–1.3 cm, flat, pubescent to glabrescent on both surfaces, glaucous or not. Spathes 1–18.7 cm long, glabrous, sometimes tufted at apex, truncate opening. Scapes bearing numerous capitula, split at apex, (3–)15–34 cm, pilose to glabrescent, not

emerging from a conspicuous reproductive axis. Capitula 3.8–9.6 mm wide. Involucral bracts oval to lanceolate, apex acute, 2–3 mm, light to dark brown, abaxially sericeous, pilose to glabrescent or glabrous, adaxially glabrous, ciliate or not. Floral bracts lanceolate, apex obtuse, 2–2.5 mm, cream, homogeneously castaneous, or castaneous in the upper region, abaxially hairy from middle to apex, or glabrous on both surfaces, ciliate, tufted. Flowers 3-merous. Staminate flowers ca. 3 mm, including the pedicel, this ca. 0.7 mm; sepals obovate, apex acute, ca. 3 mm, castaneous, glabrous; petals fused, tubulose, ca. 2.5 mm, cream, glabrous; stamens free; carpellodes cream, filiform. Pistillate flowers ca. 3 mm, pedicellate; sepals obovate, apex obtuse, ca. 3 mm, cream to distally brown, glabrous, tufted; petals lanceolate, apex acute, ca. 3 mm, cream, glabrous, ciliate, tufted; gynoecium ca. 3 mm, ovary ca. 0.1 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Delfinópolis, região da Represa de Furnas, estrada depois do Paraíso Perdido, 25.X.2006, *J.N. Nakajima 4246* (HUFU); estrada para Mineradora Gabi Extrações, depois do terceiro córrego, 26.X.2006, *J.N. Nakajima 4360* (HUFU); estrada MG-050, Capitólio - Passos, 500 m antes do Trevo de Furnas, ca. de 15 km, em direção à Serra, 1.X.2005, *R. Romero 7259* (HUFU). São Roque de Minas, Parque Nacional da Serra da Canastra, Garagem das Pedras, 21.VI.2001, *N.M. Castro 02* (HUFU); morro a cerca de 2 km da sede, 23.VI.2001, *N.M. Castro 17* (HUFU); nascente do Rio São Francisco, 20.XI.2002, *P.C. Duarte 104* (HUFU); percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, próximo à Garagem de Pedras, 29.V.2014, *L. Echternacht 2468* (HUFU); próximo à parte alta da Casca D'Anta, 29.V.2014, *L. Echternacht 2473* (HUFU); estrada entre São Roque e a nascente do Rio São Francisco, 31.V.2014, *M.S. Freitas 031* (HUFU); lado direito da estrada no vale do São Francisco, 17.IV.1994, *J.N. Nakajima 274* (HUFU); base do morro próximo à sede administrativa, 15.X.1994, *J.N. Nakajima 517* (HUFU); estrada São Roque de Minas - Sacramento, morro após a nascente do Rio São Francisco, 18.III.1995, *J.N. Nakajima 802* (HUFU); estrada para Sacramento, Garagem das Pedras, 20.III.1995, *J.N. Nakajima 924* (HUFU); Chapadão do Diamante, após a antena, 9.VII.1996, *J.N. Nakajima 1917* (HUFU); colina próximo à sede, lado esquerdo da estrada, 20.II.1994, *R. Romero 629* (HUFU); Morro da Casca D'Anta, 24.II.1994, *R. Romero 728* (HUFU); primeiro morro próximo à sede, 26.VI.1994, *R. Romero 1020* (HUFU); km 19 da estrada de São Roque - Sacramento, 28.VI.1994, *R. Romero 1071* (HUFU); próximo à torre de observação, 23.VIII.1994, *R. Romero 1159* (HUFU); guarita de Sacramento, 14.X.1994,

R. Romero 1239 (HUFU); morro próximo à sede administrativa, 10.I.1995, *R. Romero 1653* (HUFU); 17.III.1995, *R. Romero 1946* (HUFU); 15.VII.1995, *R. Romero 2375* (HUFU); 3 km da sede administrativa, 15.VII.1995, *R. Romero 2403* (HUFU); Chapadão do Diamante, 16.VII.1995, *R. Romero 2450* (HUFU); guarita de Sacramento, 24.IX.1995, *R. Romero 2677* (HUFU); Córrego da Fazenda, morro após o vale do rio São Francisco, 26.IX.1995, *R. Romero 2864* (HUFU); guarita de Sacramento, 18.XI.1995, *R. Romero 3051* (HUFU); estrada para o Sítio João Domingos, 25.V.1996, *R. Romero 3507* (HUFU); final da estrada do Retiro de Pedras, saída do parque, 23.II.1997, *R. Romero 4009* (HUFU); Morro do Careca, 30.I.2002, *R. Romero 6349* (HUFU).

Paepalanthus canastrensis has scapes bearing numerous capitula, which are split at the apex. The taxon is very variable in Canastra and apparently could correspond to more than one species. However, upon comparing all specimens in herbaria, we have observed a morphological gradient. Some subpopulations have leaves covered by a glaucous wax (Fig. 3n) while others do not; spathes vary from reduced and membranaceous, translucent, to developed and papery; involucral bracts vary from sericeous and castaneous (Fig. 3o) to pubescent and dark brown (Fig. 3m), among other features. This gradient could be the result of hybridization, or the subpopulations may indeed freely exchange genes. The existing uncertainty has led us to maintain it as a single taxon, but ongoing taxonomic studies should help clarify the issue (L. Sauthier, personal communication).

This species is endemic to Canastra, where it is broadly recorded from Chapadão do Diamante, Chapadão da Babilônia, and Serra Preta (Fig. 2b). Morphological variation is remarkable in the field and herbarium specimens. Populations were observed to be green and prosperous in burned fields, indicating that the species is tolerant to fire events that are not strong enough to destroy the rhizome and caudex. The species has not yet been assessed as threatened to extinction.

There are records of collections of reproductive material throughout the year, except in December.

4.2. *Paepalanthus chiquitensis* Herzog, Repert. Spec. Nov. Regni Veg. 20: 86. 1924. Fig. 3p

Herbs 1–2 m tall. Rhizome absent, stem restricted to the rosette in sterile plants, developing into a central reproductive axis, unbranched. Leaves in basal rosette, lanceolate, apex acute, 18–37 × 1–3 cm, flat, glabrous. Reproductive

axis erect, 80–190 cm tall. Axis bracts spiraled, progressively smaller from the base to the apex, lanceolate, apex acute, 5–20 × 0.5–1.5 cm, glabrescent. Spathes 3–5 cm long, glabrescent, oblique opening. Scapes 10–30 cm, glabrous. Capitula 6–11.4 mm wide, arranged in the reproductive axis apex. Involucral bracts triangular to obovate, apex acute, 2–5 mm, dark brown, glabrescent abaxially, glabrous adaxially, ciliate or not. Floral bracts linear to spatulate, apex acute to obtuse, 2–2.5 mm, cream, densely pilose to glabrescent abaxially, glabrous adaxially, ciliate. Flowers 2-merous. Staminate flowers ca. 3 mm, including the pedicel, this ca. 0.5 mm; sepals oblanceolate, apex acute, ca. 3 mm, cream to brown, hairy in abaxial surface apex; petals fused, tubulose, ca. 3 mm, cream, glabrous; stamens free; carpellobes cream to brown, papillose. Pistillate flowers ca. 3 mm, sessile; sepals obovate, apex truncate, ca. 3 mm, cream, hairy abaxially, glabrous adaxially, tufted; petals spatulate, apex acute, ca. 3 mm, cream, glabrous, ciliate, tufted; gynoeceum ca. 3 mm, ovary ca. 1 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Capitólio, região de Furnas, estrada para pedreira, próximo à cachoeira da rodovia, 22.V.2007, *P.H.N. Bernardes* 165 (HUFU); estrada depois do Paraíso Perdido, 23.V.2007, *P.H.N. Bernardes* 228 (HUFU); estrada para Pedreira Souza, ca. 2 km da rodovia MG-050, 30.IX.2005, *J.N. Nakajima* 3976 (HUFU), Delfinópolis, Condomínio de Pedras, estrada para Casinha Branca, 12.III.2003, *R.A. Pacheco* 527 (HUFU); Paraíso Selvagem, saída para a trilha Salto Solitário, 16.V.2003, *R.A. Pacheco* 576 (HUFU); região da Represa de Furnas, estrada para Pedreira Souza, ca. de 2 km da rodovia MG-050, 17.II.2006, *R. Romero* 7711 (HUFU). Sacramento, estrada Sacramento - Franca, 8.VI.1984, *R.C. Vieira* 245 (HUFU). São Roque de Minas, percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, entre a Garagem de Pedras e a parte alta da Casca D'Anta, 29.V.2014, *L. Echternacht* 2469 (HUFU); estrada para Sacramento, morro da Garagem de Pedras, 22.III.1995, *J.N. Nakajima* 974 (HUFU); Parque Nacional da Serra da Canastra, 16.IV.1994, *R. Romero* 878 (HUFU); Cachoeira Casca D'Anta, 10.XII.1994, *R. Romero* 1581 (HUFU).

Paepalanthus chiquitensis is easily recognized for its robust habit, being the only species in Serra da Canastra that reaches a height of two meters. Another striking difference of *P. chiquitensis* is the varying sizes of the bracts along the reproductive axis, progressively larger from the base to the apex, with an acute apex (Trovó 2010).

Paepalanthus chiquitensis occurs throughout the Canastra complex, from Chapadão da Babilônia to Chapadão da Zagaia, and Serra Preta (Fig. 2b), forming dense populations. Its distribution extends westward in the Cerrado domain, occurring in Espinhaço and Veadeiros, being widely distributed in Brazil and extending to Bolivia, Venezuela, and Colombia (Trovó 2010; Trovó & Sano 2010). Among the morphological variants of this species by Trovó (2010), the specimens collected in Canastra are clearly related to those from Veadeiros.

The species was collected in the reproductive stage in several months, but the highest concentration of collection dates were in May.

4.3. *Paepalanthus clausenianus* Körn., *Fl. bras.* (Martius & Eichler) 3(1): 323. 1863.

= *Paepalanthus percrassus* Silveira, *Floral. Mont.*: 214. 1928. Type:—BRAZIL. Minas Gerais: “In campis in Serra da Canastra”, April 1925, Silveira 751 (holotype: R!).

Fig. 3q

Herbs 30–80 cm tall. Stem restrict to the rosette, unbranched. Leaves in basal rosette, lanceolate, apex acute, 6–35 × 0.5–1.5 cm, ascending, flat, pubescent to glabrescent, hairs appressed, ciliate. Reproductive axis emerging from the leaf axil, 26–74 cm long; axis bracts lanceolate, apex acute, 4–7 cm × 2.8–6.2 mm, patent to appressed, pubescent to glabrescent, ciliate, hairs appressed. Spathes 0.5–1.2 cm long, pilose to glabrescent abaxially, oblique opening. Scapes 1.7–9.5 cm, sericeous, emerging at the apex of the lateral reproductive axis as spherical umbels. Capitula 1.7–4.5 mm wide. Involucral bracts oblong, apex acuminate, 1–1.5 mm, light brown. Floral bracts linear, slightly navicular, apex acute, ca. 1.5 mm, castaneous, tufted. Flowers 3-merous. Staminate flowers ca. 2 mm, including the pedicel, this ca. 0.3 mm; sepals oblong, apex obtuse, ca. 1.5 mm, light brown, glabrous, ciliate; petals fused, tubulose, 6-lobed, ca. 1 mm, light brown, glabrous; carpellobes dark. Pistillate flowers ca. 2.7 mm, sessile, sepals obovate, navicular, apex acute, ca. 2.7 mm, castaneous, glabrescent; pilose ring present; petals oblong, apex acute, ca. 1 mm, cream, pilose abaxially, glabrous adaxially; gynoeceum ca. 2 mm, ovary ca. 0.6 mm, columns ca. 1.4 mm long, stigmatic branches simple, liberating at the same level of the nectariferous branches.

Examined material: São Roque de Minas, percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, parte alta da Casca D'Anta, 29.V.2014, *L. Echternacht* 2478 (HUFU);

estrada da bifurcação entre a cachoeira Casca D'anta, parte alta e a torre de observação, alto da estrada para a torre de observação, 30.V.2014, *M.S. Freitas 029* (HUFU); Parque Nacional da Serra da Canastra, 20.III.1998, *P.T. Sano 1000* (HUFU).

Paepalanthus clausenianus is distinguished from *P. polyanthus* (Bong.) Kunth (1841: 516) by its reproductive axis arising from the leaf axil, in addition to having sericeous scapes. According to Sano (1999), the species also possesses an exclusive set of diagnosable features in the capitula, including a receptacle with long hairs, blackish pyriform carpellodes, and a gynoeceium with a long column.

This species is endemic to Canastra (Sano 1999) and is represented only by a few records in herbaria, specifically from Chapadão do Diamante (Fig. 2c). Individuals are sparse, not forming dense populations, but the species is not rare in the region, as we frequently find it during our fieldwork. There is one additional record from outside the Serra da Canastra National Park, in the Furnas region, Pimenta municipality (*Goldenberg 544*). The species is considered Vulnerable to extinction (MMA 2022).

Plants were collected with young flowers in March and May.

4.4. *Paepalanthus elongatus* (Bong.) Körn., *Fl. bras.* (Martius & Eichler) 3: 312. 1863. Fig. 4a-c

Herbs 20–100 cm tall. Stem subterranean, branched. Leaves caespitose, linear, apex round, 4–27 × 0.07–0.5 cm, flat to canaliculate, pubescent to glabrescent at both surfaces, velutinous at the base. Spathes 7–14 cm, glabrous, oblique opening. Scapes 18–60 cm, densely pilose, not emerging from a conspicuous reproductive axis. Capitula 5–20 mm wide. Involucral bracts lanceolate, apex acuminate, 3–5 mm, brown at middle, cream and hyaline at margins, slightly surpassing the flower disc, glabrescent abaxially, glabrous adaxially, ciliate, tufted at the apex. Floral bracts lanceolate, apex acuminate, ca. 3 mm, cream to light brown, glabrous, tufted. Flowers 2-merous. Staminate flowers ca. 3 mm, including the pedicel, this ca. 0.1 mm; sepals obovate, apex obtuse, ca. 3 mm, cream, upper portion castaneous, glabrous, tufted at apex; petals fused, tubulose, ca. 2.5 mm, yellowish, glabrous; filaments adnate to corolla; carpellodes cream, papillose. Pistillate flowers ca. 2.5 mm, sessile; sepals oblanceolate, apex acute, ca. 2.5 mm, castaneous, glabrous, tufted; petals oblong, apex obtuse, ca. 2 mm, cream, glabrous, tufted;

gynoeceium ca. 2.5 mm, ovary ca. 1 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Capitólio, região da Represa de Furnas, estrada para Pedreira Souza, ca. 2 km da rodovia MG-050, 30.IX.2005, *A.A. Arantes 1510* (HUFU); 12.VII.2006, *A.A. Arantes 1949* (HUFU); estrada para Gabi Explorações II, 23.III.2007, *P.H.N. Bernardes 117* (HUFU); próximo à cachoeira da rodovia, 22.V.2007, *P.H.N. Bernardes 176* (HUFU); 22.V.2007, *P.H.N. Bernardes 182* (HUFU); região do primeiro córrego, 26.X.2006, *J.N. Nakajima 4305* (HUFU); Represa de Furnas, estrada para Pedreira Souza, ca. 2 km da rodovia MG-050, 17.II.2006, *R. Romero 7689* (HUFU); próximo à cachoeira, 21.III.2007, *P.O. Rosa 522* (HUFU). Delfinópolis, estrada para Casa Branca, Fazenda Paraíso, Sete Cidades, 10.IV.2002, *R. Romero 6291* (HUFU); trilha Escada de Pedra, 15.V.2003, *R. Romero 6882* (HUFU); Condomínio de Pedra, 17.V.2003, *R.L. Volpi 688* (HUFU). Sacramento, 4 km da sede administrativa, 11.V.1995, *R. Romero 2218* (HUFU); Parque Nacional da Serra da Canastra, estrada São Roque de Minas - Sacramento, próximo ao Córrego dos Passageiros, 13.V.1995, *R. Romero 2240* (HUFU); Garagem das Pedras, 13.V.1995, *R. Romero 2242* (HUFU); região da Represa de Furnas, estrada para Pedreira Souza, ca. de 2 km da rodovia MG-050, 17.II.2006, *R. Romero 7686* (HUFU); estrada Sacramento - Franca, 8.VI.1984, *R.C. Vieira 242* (HUFU). São Roque de Minas, Garagem das Pedras 21.VI.2001, *N.M. Castro 01* (HUFU); 21.VI.2001, *N.M. Castro 03* (HUFU); Primeiro morro à direita após a portaria de São Roque, atrás do alojamento, 22.VI.2001, *N.M. Castro 09* (HUFU); Chapada dos Diamantes, 22.VI.2001, *N.M. Castro 14* (HUFU); 22.VI.2001, *N.M. Castro 15* (HUFU); estrada Cachoeira Casca D'Anta, parte de cima, 23.VI.2001, *N.M. Castro 19* (HUFU); percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, próximo à Garagem de Pedras, 29.V.2014, *L. Echternacht 2467* (HUFU); trilha da Casca D'Anta, 19.XI.2002, *H.R. Fleury-Silva 226* (HUFU); próximo ao vale do São Francisco, 17.IV.1994, *J.N. Nakajima 277* (HUFU); Parque Nacional da Serra da Canastra, 25.VI.1994, *J.N. Nakajima 369* (HUFU); 27.VI.1994, *J.N. Nakajima 381* (HUFU); morro próximo à sede, 15.X.1994, *J.N. Nakajima 459* (HUFU); base do morro próximo à sede, 15.X.1994, *J.N. Nakajima 463* (HUFU); Garagem de Pedras, 20.III.1995, *J.N. Nakajima 904* (HUFU); cachoeira da Casca D'Anta, 12.V.1995, *J.N. Nakajima 1052* (HUFU); estrada São Roque de Minas - Sacramento, guarita de Sacramento, 14.VII.1995, *J.N. Nakajima 1156* (HUFU); trilha da Casca D'Anta, 18.VII.1995, *J.N. Nakajima 1244* (HUFU); 18.VII.1995, *J.N. Nakajima 1266* (HUFU); estrada da Serra Brava, 23.XI.1995, *J.N. Nakajima 1607* (HUFU); estrada para sítio João Domingos, 26.V.1996, *J.N. Nakajima 1813* (HUFU); base do morro próximo à sede, 20.II.1994,



Figure 4 – a-u. Species of Eriocaulaceae in the Serra da Canastra – a-c. *Paepalanthus elongatus* – a. habit; b. capitulum (abaxial view); c. mature old capitulum (adaxial view); d-e. *Paepalanthus falcatus* – d. capitula; e. habit; f-g. *Paepalanthus flaccidus* – f. habit; g. capitulum; h-i. *Paepalanthus lundii* – h. leaves and old inflorescences; i. capitula; j. *Paepalanthus manicatus* – habit under boulder; k-l. *Paepalanthus planifolius* – k. habit; l. capitula and floral visitor; m-n. *Paepalanthus polyanthus* – m. habit; n. umbellate inflorescence; o-q. *Paepalanthus polycladus* – o. habit; p. leaves; q. capitulum; r. *Paepalanthus scleranthus* – habit; s. *Paepalanthus sericiscapus* – habit; t-u. *Paepalanthus sinuosus* – t. habit; u. capitula. (Photos by L. Echternacht from Serra da Canastra, except: d-e. from Nakajima et al. 282 [HUFU 5449]; f, g. from Serra de Capanema; s. from Romero et al. 2464 [HUFU 9387]; t, u. from Arantes et al. 1760 [HUFU 44801]; vk. by M.S. Freitas; r. by R. Ramos).

R. Romero 620 (HUFU); Parque Nacional da Serra da Canastra, 16.IV.1994, *R. Romero 862* (HUFU); estrada São Roque de Minas - Sacramento, guarita de Sacramento, 14.X.1994, *R. Romero 1249* (HUFU); estrada para Sacramento, 3 km da sede administrativa, 17.III.1995, *R. Romero 1957* (HUFU); nascente do Rio São Francisco, 17.III.1995, *R. Romero 1982* (HUFU); estrada para Sacramento, 3 km da sede administrativa, 17.III.1995, *R. Romero 2090* (HUFU); morro próximo à sede, 15.VII.1995, *R. Romero 2358* (HUFU); estrada para Sacramento, 3 km da sede administrativa, 15.VII.1995, *R. Romero 2402* (HUFU); Chapada dos Diamantes, 16.VII.1995, *R. Romero 2448* (HUFU); 16.VII.1995, *R. Romero 2490* (HUFU); morro próximo ao córrego dos Passageiros, 19.VII.1995, *R. Romero 2614* (HUFU); Serra Brava, próximo ao mirante, 28.IX.1995, *R. Romero 2994* (HUFU); 25.V.1996, *R. Romero 3464* (HUFU); Chapada dos Diamantes, 29.VI.1997, *R. Romero 4333* (HUFU); parte de cima, 23.VIII.1997, *R. Romero 4511* (HUFU); Chapadão da Zagaia de frente para a Serra das Sete Voltas, após a torre de observação, 18.X.1997, *R. Romero 4738* (HUFU).

Paepalanthus elongatus is recognized for its linear leaves and silvery scapes of its dense hairiness. It also exhibits a cespitous habit and capitula with bicolored bracts, brown at the center grading to cream and hyaline at the margins. Additionally, the flowers bear a yellow corolla tube. It is worth noting that the species displays considerable variability in size and pilosity, with individuals in the Canastra region ranging from smaller to more robust forms. Silveira (1928) described two infraspecific taxa for this species, whose types are from the Serra da Canastra, *P. elongatus* var. *angustifolius* Silveira (1928: 133) (Silveira 792 R) and *P. elongatus* var. *pubescens* Silveira (1928: 133) (Silveira 746 R).

Paepalanthus elongatus is found throughout the Canastra region (Fig. 2c), forming abundant populations. It also has a broad distribution in central Brazil, extending to Espinhaço, Mantiqueira, and Veadeiros.

The species has been collected fertile in almost every month of the year.

4.5. *Paepalanthus falcatus* (Bong.) Körn, *Fl. bras.* (Martius & Eichler) 3: 387. 1863.

= *Paepalanthus callocephalus* Silveira var. *ciliatus* Silveira, Bih. Kongl. Svenska Vetensk.-Akad. Handl.: 31. 1928. Type:—BRAZIL. Minas Gerais: “In campis in Serra do Chapadão, prope Serra da Canastra”, April 1925, *Silveira 749* (holotype R!). Fig. 4d-e

Herbs 16–36 cm tall. Stem subterranean, horizontal, unbranched. Leaves in basal rosette,

lateralized, lanceolate, apex acute to round, 1–8 × 0.1–0.3 cm, flat, densely pilose to glabrescent abaxially, glabrescent adaxially, ciliate. Spathes 3–7 cm, densely pilose to glabrescent, oblique opening. Scapes 13–35 cm, densely pilose to glabrescent, not emerging from a conspicuous reproductive axis. Capitula 7.5–12.8 mm wide. Involucral bracts triangular to elliptical, apex acute, ca. 4 mm, castaneous, whitish lanose abaxially, glabrous adaxially, ciliate. Floral bracts lanceolate, apex acute to acuminate, ca. 3 mm, cream, glabrous at both surfaces, ciliate. Flowers 3-merous. Staminate flowers ca. 4 mm including the pedicel, this ca. 1 mm; sepals elliptical, apex acute, ca. 3.5 mm, cream, glabrous; petals fused, tubulose, ca. 3.5 mm, cream, adaxially hairy; stamens free; carpellodes cream, papillose. Pistillate flowers ca. 3.5 mm, sessile; sepals obovate, apex acute, ca. 3 mm, stramineous, glabrous; petals lanceolate, apex acute, ca. 3 mm, stramineous, glabrous, ciliate, tufted; gynoeceum ca. 3 mm, ovary ca. 1 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: São Roque de Minas, Parque Nacional da Serra da Canastra, Atrás da nascente do Rio São Francisco, 17.IV.1994, *J.N. Nakajima 282* (HUFU); estrada São Roque de Minas - Sacramento, morro após a nascente do Rio São Francisco, 18.III.1995, *J.N. Nakajima 803* (HUFU); estrada do Chapadão Diamante, 18.III.1995, *J.N. Nakajima 832* (HUFU); 16.VII.1995, *R. Romero 2451* (HUFU).

Paepalanthus falcatus has a peculiar feature: the rosettes appear lateralized, probably due to the stem rhizome sympodial development. In addition, leaves are conspicuously ciliated, the spathes long surpass the leaves, and the scapes are densely pilose to glabrescent. Plants in Canastra vary from the type locality in the Espinhaço Range, as the involucral bracts are more triangular, acute, and whitish lanose; however, this species shows a relatively wide distribution and morphological variation in general.

Paepalanthus falcatus is recorded in Canastra from Chapadão do Diamante (Fig. 2c). Its distribution is shared with the Espinhaço only. *Paepalanthus falcatus* forms a species complex with *P. callocephalus*, *P. subfalcatus* Ruhland (1903: 151), and others. These taxa may belong to a single, highly variable species. *Paepalanthus callocephalus* var. *ciliatus* was described from Canastra, differing from the type of variety by having leaves ciliate at the margin, 1–2 cm shorter, and 1 mm wider, as described by Silveira (1928). These characteristics are part of the extensive morphological variability of the vegetative parts

of *P. falcatus*. Inflorescences fully correspond: the scapes pilose with patent simple hairs, the lanceolate stramineous involucre bracts densely covered by whitish indumentum, and similar flower morphology. Therefore, *Paepalanthus callocephalus* var. *ciliatus* is treated here as a synonym of *Paepalanthus falcatus* according to Andrino *et al.* (2022).

The collections of reproductive material are dated to March, April, and July.

4.6. *Paepalanthus flaccidus* (Bong.) Kunth, Enum. Pl.: 511. 1841.

= *Paepalanthus babyloniensis* Silveira, Floral. Mont.: 188. 1928. Type:—BRAZIL. Minas Gerais: “In campis arenosis in serra da Babylonia, inter Passos et Piumhy”, April 1925, Silveira 428 (holotype: R!). Fig. 4f-g

Herbs ca. 80 cm tall. Stem aerial, up to 30 cm, branched. Leaves spiraled throughout the stem, lanceolate, apex acute, $1-0.5 \times 0.1-0.08$ cm, flat, glabrescent abaxially, densely pilose adaxially. Spathes 2–3.5 cm, glabrescent, oblique opening. Scapes 15–40 cm, glabrescent, not emerging from a conspicuous reproductive axis. Capitula 2.8–6.9 mm wide. Involucre bracts lanceolate to oval, apex acute, 1.5–3.5 mm, cream to golden, glabrous, ciliate. Floral bracts lanceolate, apex acute, ca. 2 mm, cream, glabrous at both surfaces, ciliate, tufted. Flowers 2-merous. Staminate and pistillate flowers immature.

Examined material: Capitólio, região de Furnas, morro atrás da Pousada do Rio Turvo, 19.III.2007, *P.O. Rosa* 475 (HUFU).

Paepalanthus flaccidus is similar to *P. trichophyllus* in its slender habit with an elongated stem and spiraled small lanceolate leaves, along with dimerous flowers. However, it is identifiable by its straw-colored to golden involucre bracts, abaxially glabrous.

There is only one record of *Paepalanthus flaccidus* in the area, from southern Chapadão da Babilônia (Fig. 2c). Apart from Canastra, it is also found in the Espinhaço and Veadeiros regions. This specific record was made in March.

Trovó & Sano (2010) considered *Paepalanthus babyloniensis* a synonym of *P. flaccidus*. However, a more detailed analysis of the types revealed that *P. babyloniensis* may be more closely related to *P. trichophyllus*. As further taxonomic treatments regarding those names are underway, we follow the Flora e Funga do Brasil website (Andrino *et al.* 2024).

4.7. *Paepalanthus lundii* Körn., Fl. bras. (Martius) 3(1): 385. 1863. Fig. 4h-i

Herbs 34–48 cm tall. Stem restricted to the rosette, unbranched, erect, thickened by the leaf sheaths, eventually forming a caudex. Leaves in basal rosette, lanceolate, apex acute, $6-16 \times 0.3-1.2$ cm, flat, pubescent to glabrescent in both surfaces. Reproductive axis emerging from the leaf axil, ca. 1 cm long, axis bracts similar to the leaves. Spathes 4–7.5 cm, glabrous, oblique opening. Scapes 15–42 cm, glabrescent, emerging from a short (ca. 1 cm) lateral foliose branch. Capitula 7.8–11.3 mm wide. Involucre bracts in 5–6 series, linear to lanceolate, apex acute, 4–4.5 mm, castaneous, pubescent to glabrescent abaxially, glabrous adaxially, ciliate. Floral bracts lanceolate, apex acute, ca. 2.8 mm, dark brown, glabrous, ciliate, tufted. Flowers 3-merous. Staminate flowers ca. 3 mm including the pedicel, this ca. 0.5 mm; sepals lanceolate, apex acute, ca. 3 mm, castaneous, glabrous on both surfaces, ciliate, tufted; petals fused, tubulose, ca. 2.7 mm, cream, glabrous on both surfaces; stamens free; carpellodes cream, papillose. Pistillate flowers ca. 2.6 mm, sessile; sepals obovate, apex acute, ca. 2.6 mm, dark brown, glabrous on both surfaces, tufted; petals lanceolate, apex acute, ca. 2.5 mm, cream, hyaline, glabrous on both surfaces; gynoecium ca. 2.5 mm, ovary ca. 1 mm, stigmatic branches simple, liberating at the same level of the nectariferous branches.

Examined material: São Roque de Minas, Chapadão do Diamante, nascente do Rio São Francisco, 3.II.2015, *L. Echternacht* 2618 (HUFU); estrada para Sacramento, 3 km da sede administrativa, 10.V.1995, *J.N. Nakajima* 1005 (HUFU); Parque Nacional da Serra da Canastra, 16.IV.1994, *R. Romero* 897 (HUFU).

Paepalanthus lundii has fertile short lateral branches, foliose, and usually bearing more than one scape; these become more noticeable when separating the inflorescence from the stem. Furthermore, the stem is thickened by the leaf sheath and eventually forms a caudex, and the stigmatic branches are simple (Trovó & Echternacht 2023).

In Canastra, *Paepalanthus lundii* occurs in Chapadão do Diamante (Fig. 2c). Outside Canastra, it occurs in Veadeiros.

There are records of fertile plants throughout several months, but the highest concentration is observed in the fourth quarter, coinciding with the rainy period.

4.8. *Paepalanthus manicatus* Poulsen ex. Malme, Bih. Kongl. Svenska Vetensk.-Akad. Handl. 27, Afd. 3: 28. 1901. Fig. 4j

Herbs 3–6 cm tall. Stem aerial, 0.5–2 cm, unbranched. Leaves spiraled throughout the stem, linear, apex acute, 0.5–2 × 0.05–0.1 cm, flat, glabrous abaxially, glabrescent adaxially. Spathes ca. 5.5 mm, glabrescent, oblique opening. Scapes 0.8–4 cm, sparsely pilose, not emerging from a conspicuous reproductive axis. Capitula 2–3 mm wide. Involucral bracts lanceolate, apex acute, 0.3–0.6 mm, dark brown, glabrous, ciliate. Floral bracts lanceolate, apex acute, ca. 0.6 mm, brown, glabrous at both surfaces, ciliate, tufted. Flowers 3-merous. Staminate flowers ca. 0.8 mm including the pedicel, this ca. 0.3 mm; sepals obovate, apex obtuse, ca. 0.6 mm, brown, glabrous on both surfaces; pilose ring between sepals and petals; petals fused, tubulose, ca. 0.6 mm, cream, glabrous; filaments adnate to corolla; carpellodes cream, papillose. Pistillate flowers ca. 1 mm, sessile; sepals obovate, apex acute, ca. 0.8 mm, brown, glabrous, tufted; petals linear, apex acute, ca. 0.8 mm, cream to brown, glabrous, ciliate, tufted; gynoecium ca. 1 mm, ovary ca. 0.3 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Delfinópolis, trilha para Cachoeira do Alpinista, 16.V.2003, *R.A. Pacheco* 583 (HUFU); Condomínio de Pedras, 17.V.2003, *R.A. Pacheco* 605 (HUFU).

Paepalanthus manicatus is a tiny species, like *P. subtilis* Miq. (1851: 221), but it differs in having brown involucral bracts. It is very similar to *P. tortilis* (Bong.) Mart. (1863: 354), but is typically smaller, with lanceolate involucral and floral bracts, as well as brown sepals.

Paepalanthus manicatus occurs within Canastra in Serra Preta (Fig. 2d), and also in the Veadeiros, Espinhaço, and Mantiqueira regions.

The fertile collections were made in May.

4.9. *Paepalanthus planifolius* (Bong) Körn., *Fl. bras.* (Martius & Eichler) 3: 413. 1863. Fig. 4k-l

Herbs 41–66 cm tall. Stem restricted to the rosette, unbranched. Leaves in basal rosette, lanceolate, apex acute, 10–38 × 1–4 cm, flat, glabrescent on both surfaces. Spathes 10–23 mm, glabrous, truncate opening. Scapes bearing numerous capitula, completely fused, 20–46 cm, glabrescent, not emerging from a conspicuous reproductive axis. Capitula 2–5 cm wide. Involucral bracts oval, apex acute, ca. 3.5 mm, light brown

to dark brown, pilose to glabrescent abaxially, glabrous adaxially, ciliate. Floral bracts lanceolate, apex acute, ca. 2.5 mm, cream, glabrous, ciliate, tufted. Flowers 3-merous. Staminate flowers ca. 3 mm including the pedicel, this ca. 0.5 mm; sepals lanceolate, apex acute, ca. 2.5 mm, castaneous, glabrescent abaxially, glabrous adaxially; petals fused, tubulose, ca. 3 mm, cream, glabrous; filaments adnate to corolla; carpellodes cream, papillose. Pistillate flowers ca. 3 mm, sessile; sepals lanceolate, apex acute, ca. 3 mm, castaneous, pilose abaxially, glabrous adaxially, tufted; petals obovate, apex obtuse, ca. 3 mm, cream, glabrous, ciliate, tufted; gynoecium ca. 2.5 mm, ovary ca. 0.5 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Delfinópolis, Furnas, Chapadão da Babilônia, Serra do Turvo, próximo às pedreiras, nos flancos do Rio da Capivara, no caminho para a Cachoeira da Pedreira, 1.II.2015, *L. Echternacht* 2614 (HUFU); Parque Nacional da Serra da Canastra, estrada vicinal 29 km de Delfinópolis, Cachoeira Bateia, 21.VIII.2013, *M.F. Simon* 1963 (HUFU). São Roque de Minas, primeira pontinha após a garagem das pedras em direção a São Roque, 21.VI.2001, *M.N. Castro* 04 (HUFU); nascente do Rio São Francisco, 20.XI.2002, *P.C. Duarte* 105 (HUFU); percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, próximo à parte alta da Casca D'Anta, 29.V.2014, *L. Echternacht* 2474 (HUFU); nascente do rio São Francisco, 29.V.2014, *L. Echternacht* 2479 (HUFU); próximo a uma nascente, 17.IV.1994, *J.N. Nakajima* 273 (HUFU); próximo à estátua do São Francisco, 17.IV.1994, *J.N. Nakajima* 285 (HUFU); beira do rio, 10.V.1995, *J.N. Nakajima* 1025 (HUFU); Parque Nacional da Serra da Canastra, 20.XI.2002, *R.A. Pacheco* 395 (HUFU); proximidades do córrego dos Passageiros, 19.VII.1995, *R. Romero* 2673 (HUFU).

Paepalanthus planifolius is recognized by the short stem restricted to the rosette, the long flat leaves, and the completely united scapes, as observed by Andrino *et al.* (2015).

Paepalanthus planifolius has scapes bearing numerous capitula, not split in the apex. A remarkable feature of this species, especially in the field, is the presence of membranaceous margins at the base of the leaves, which help seal the rosette tank and retain water.

This species is widely distributed in Canastra, including Chapadão do Diamante, Chapadão da Zagaia, Chapadão da Babilônia, and Serra Preta (Fig. 2d). Its distribution extends eastward throughout the Mantiqueira and Espinhaço regions in MG, widely throughout the Atlantic Forest domain, reaching its southern limit in RS (BFG 2015).

There are fertile records in February, April, May, June, July, August, and November, suggesting a continuous bloom throughout the year.

4.10. *Paepalanthus polyanthus* Kunth, Enum. Pl. [Kunth] 3: 516. 1841. Fig. 4m-n

Herbs 19–70 cm tall. Stem restricted to the rosette in sterile plants, unbranched, then developing into a central reproductive axis. Leaves in basal rosette, lanceolate, apex acute, 5–26 × 0.5–3 cm, ascending, flat, pubescent to glabrescent abaxially, tomentose to glabrescent adaxially, hairs appressed, ciliate. Reproductive central axis erect, with conspicuous lateral reproductive branches, spiraled, foliose, 7–32 cm long; lateral axis bracts lanceolate, apex acute, 1–3 × 0.4–1 cm, patent, pubescent to glabrescent, hairs appressed, ciliate. Spathes 0.6–1 cm, pilose to glabrescent abaxially, oblique opening. Scapes 1.5–4.2 cm, pubescent to glabrescent, emerging at the apex of the lateral axis as spherical umbels. Capitula 2.2–4.4 mm wide. Involucral bracts obovate to oblong, apex round, 0.8–2 mm long, brown, distally pilose, and ciliate. Floral bracts oblong, navicular, apex round, ca. 1.5 mm, light brown, tufted. Flowers 3-merous. Staminate flowers ca. 2.1 mm, including the pedicel, this ca. 0.5 mm; sepals obovate, apex obtuse to round, ca. 1.6 mm, light brown, glabrous, ciliate; petals fused, tubulose, 6-lobed, ca. 1.3 mm, stramineous, glabrous; carpellodes castaneous. Pistillate flowers ca. 2 mm, sessile, sepals obovate, apex obtuse, ca. 1.8 mm, light brown, glabrous; petals elliptic, apex acute, ca. 1 mm, cream and hyaline, ciliate from the median to the apical portion; gynoecium ca. 1.2 mm, ovary ca. 0.5 mm, columns ca. 0.7 mm, stigmatic branches simple, liberating at the same level of the nectariferous branches.

Examined material: Capitólio, próximo à cachoeira da estrada, 21.III.2007, *P.H.N. Bernardes* 54 (HUFU); 22.V.2007, *P.H.N. Bernardes* 179 (HUFU); Serra Preta, Casinha Branca, 30.I.2015, *L. Echternacht* 2595 (HUFU); estrada para Pedreira Souza, ca. 2 km da rodovia MG-050, 30.IX.2005, *J.N. Nakajima* 3975 (HUFU); 7.XII.2005, *R. Romero* 7396 (HUFU); 17.II.2006, *R. Romero* 7700 (HUFU); 17.II.2006, *R. Romero* 7702 (HUFU); estrada atrás do Paraíso Perdido, ca. de 5 km da rodovia MG-050, 12.VII.2006, *R. Romero* 7781 (HUFU); região de Furnas, estrada para pedreira Gabi Explorações II, ca. 8 km, 8.XI.2007, *R. Romero* 8041 (HUFU). Delfinópolis, trilha da Escada de Pedras, 14.IX.2004, *E.K.O. Hattori* 420 (HUFU); Paraíso Selvagem, trilha para Salto Solitário, 4.XII.2002, *J.N. Nakajima* 3315 (HUFU); Fazenda Zé Antunes, trilha

Casinha Branca, 11.IV.2002, *R.A. Pacheco* 168 (HUFU); Condomínio de Pedras, 12.III.2003, *R.A. Pacheco* 526 (HUFU); 17.V.2003, *R.A. Pacheco* 603 (HUFU); Fazenda Paraíso, Sete Cidades, 10.IV.2002, *R. Romero* 6284 (HUFU); trilha da Escada de Pedras, 11.X.2002, *R. Romero* 6481 (HUFU); estrada para Gurita, 14.V.2003, *R. Romero* 6845 (HUFU); região da Represa de Furnas, estrada para Cachoeira Feixo da Serra, Rio Turvo, próximo a trecho de asfalto, 15.II.2006, *R. Romero* 7560 (HUFU); Cachoeira Águas Claras, Serras de Delfinópolis, Complexo Canastra, trilha da cachoeira, 23.VI.2010, *P.O. Rosa* 1328 (HUFU); Fazenda Paraíso, Sete Cidades, 8.X.2002, *R.L. Volpi* 226 (HUFU); trilha da Escada de Pedras, 10.III.2003, *R.L. Volpi* 510 (HUFU). Sacramento, Estrada São Roque de Minas - Sacramento, Garagem das Pedras, 13.V.1995, *R. Romero* 2244 (HUFU); Parque Nacional da Serra da Canastra, estrada Sacramento - Franca, 8.VI.1984, *R.C. Vieira* 244 (HUFU). São Roque de Minas, primeiro morro à direita após a portaria de São Roque, atrás do alojamento, 22.VI.2001, *N.M. Castro* 06 (HUFU); estrada São Roque de Minas - Sacramento, morro próximo ao alojamento, 20.XI.2002, *P.C. Duarte* 95 (HUFU); percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, parte alta da Casca D'Anta, 29.V.2014, *L. Echternacht* 2470 (HUFU); estrada a caminho da nascente do Rio São Francisco, 23.III.1999, *S.I. Elias* 337 (HUFU); estrada São Roque de Minas - Sacramento, morro próximo ao alojamento, 17.XII.1999, *M.A. Farinaccio* 326 (HUFU); próximo à guarita de Sacramento, 11.XII.1994, *J.N. Nakajima* 793 (HUFU); Parque Nacional da Serra da Canastra, estrada do Chapadão Diamante, 18.III.1995, *J.N. Nakajima* 853 (HUFU); estrada para Sacramento, morro próximo à sede administrativa, 10.V.1995, *J.N. Nakajima* 990 (HUFU); trilha para a guarita de baixo, 12.V.1995, *J.N. Nakajima* 1062 (HUFU); guarita de Sacramento, 14.VII.1995, *J.N. Nakajima* 1188 (HUFU); base da colina próximo à sede, 20.II.1994, *R. Romero* 619 (HUFU); Cachoeira Casca D'Anta, 10.XII.1994, *R. Romero* 1582 (HUFU); estrada para Sacramento, morro próximo à sede administrativa, 17.III.1995, *R. Romero* 1923 (HUFU); nascente do Rio São Francisco, 15.VII.1995, *R. Romero* 2417 (HUFU); Garagem de Pedras, 19.VII.1995, *R. Romero* 2645 (HUFU); próximo à torre de observação, 22.XI.1996, *R. Romero* 3809 (HUFU); estrada para Serra da Chapada, 14.X.1997, *R. Romero* 4584 (HUFU); captação de água, 11.I.1998, *R. Romero* 4976 (HUFU); nascente do Rio São Francisco, 20.XI.2002, *R. Romero* 6565 (HUFU); estrada São Roque de Minas - Sacramento, morro próximo ao alojamento, 20.XI.2002, *R. Romero* 6588 (HUFU).

Paepalanthus polyanthus differs from *P. clausenianus* in that it features a central axis elongating from the rosette in fertile plants, which bears spiraled fertile lateral branches and pubescent scapes.

This species occurs throughout the Canastra region, forming abundant populations in Chapadão do Diamante, Chapadão da Babilônia, and Serra Preta (Fig. 2d). It extends eastward in Minas Gerais and Bahia, including the Espinhaço and Mantiqueira mountain ranges, and continues southward to Rio de Janeiro, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (Sano *et al.* 2024).

There are records of fertile material every month of the year, except for August.

4.11. *Paepalanthus polycladus* Silveira, Floral. Mont.: 189. 1928. Fig. 4o-q

Herbs 60–100 cm tall. Stem subterranean (rhizome), densely branched, forming numerous rosettes that develop into a reproductive axis. Leaves in basal rosette, lanceolate, apex acute, $1\text{--}7 \times 0.1\text{--}0.4$ cm, flat, densely pilose in both surfaces, then glabrescent. Reproductive axis erect, 16–60 cm long; axis bracts spiraled, similar in size, lanceolate, apex round, $2\text{--}4 \times 0.2\text{--}0.8$ cm, glabrescent to glabrous on both surfaces. Spathes 3–7 cm, glabrous, oblique opening. Scapes 20–50 cm, glabrous, emerging at the reproductive axis apex. Capitula 6.8–10.2 mm wide. Involucral bracts in 4–5 series, obovate, apex acute, 1.5–3 mm, dark brown, glabrous on both surfaces, ciliate. Floral bracts linear, apex acute, ca. 2.5 mm, light brown, glabrous, ciliate toward the apex, tufted. Flowers 2-merous. Staminate flowers ca. 3 mm including the pedicel, this ca. 0.5 mm; sepals navicular, apex acute, ca. 3 mm, light brown, pilose at the distal third of the abaxial surface, glabrous adaxially, ciliate toward the apex, tufted; petals fused, tubulose, ca. 2 mm, cream, glabrous; filaments adnate to corolla; carpellodes cream, papillose. Pistillate flowers ca. 3 mm, sessile; sepals dolabriform, apex obtuse, ca. 3 mm, light brown, hairy in the center and in the abaxial surface apex, glabrescent, tufted; petals elliptical, apex obtuse, ca. 2 mm, light brown, hairy like the sepals; gynoecium ca. 2 mm, ovary ca. 1 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Delfinópolis, Serra Preta, estrada para a fazenda do Antônio Lopes, beira do Rio Santo Antônio, base da Serra Preta, 23.V.1996, *J.N. Nakajima* 1755 (HUFU). Sacramento, Furnas, Chapadão da Babilônia, Serra do Turvo, próximo às pedreiras, nos flancos do Rio da Capivara, no caminho para a Cachoeira da Pedreira, 1.II.2015, *L. Echternacht* 2613 (HUFU); Parque Nacional da Serra da Canastra, Chapadão do Diamante, 11.V.1995, *R. Romero* 2219 (HUFU). São

Roque de Minas, parte de cima, 23.VI.2001, *N.M. Castro* 18 (HUFU); morro da entrada do Parque Nacional, 18.IV.1992, *N.M. Castro* 307 (HUFU); percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, próximo à parte alta da Casca D'Anta, 29.V.2014, *L. Echternacht* 2475 (HUFU); estrada para Sacramento, após o Curral de Pedras, 18.III.1995, *J.N. Nakajima* 867 (HUFU); estrada para Chapadão do Diamante, 18.III.1995, *J.N. Nakajima* 882 (HUFU); estrada para São Roque - Sacramento, 3 km da sede administrativa, 10.V.1995, *J.N. Nakajima* 1009 (HUFU); caminho para a cachoeira Casca D'Anta, 18.VII.1995, *J.N. Nakajima* 1257 (HUFU); guarita de Sacramento, cerca de 1 km, 15.IV.1997, *J.N. Nakajima* 2291 (HUFU); Parque Nacional da Serra da Canastra, 16.IV.1994, *R. Romero* 844 (HUFU); cerca de 2 km da sede administrativa, 15.VII.1995, *R. Romero* 2420 (HUFU); Chapadão da Zagaia de frente para a Serra das Sete Voltas, após a torre de observação, 18.X.1997, *R. Romero* 4733 (HUFU).

Paepalanthus polycladus is distinguished by its branched rhizome, which gives rise to numerous rosettes with densely pilose leaves that later become glabrescent. The center of each rosette develops into a reproductive axis with scapes at the apex, and its bracts are equally large and rounded at the apex.

Paepalanthus polycladus is endemic to Canastra and forms abundant populations in Chapadão do Diamante, Chapadão da Babilônia, and Serra Preta (Fig. 2d). According to Trovó (2010), the species should be considered Critically Endangered based on the criteria B1a, B1b, B2a.

There are collections of fertile material throughout the year, but the highest concentrations occur during the months of the first semester.

4.12. *Paepalanthus scleranthus* Ruhland, Pflanzenr. (Engler) IV, Fam. 30: 199. 1903.

Fig. 4r

Herbs 2–5 cm tall. Stem aerial, 1–4 cm, branched or not. Leaves spiraled throughout the stem, linear, apex acute, $0.5\text{--}1 \times 0.01\text{--}0.3$ cm, flat, glabrescent on both surfaces. Spathes absent. Scapes absent. Capitula 0.8–2.8 mm wide. Involucral bracts absent. Floral bracts ovate, apex acuminate, ca. 1.5 mm, translucent with black apex, glabrous on both surfaces, shortly ciliate. Flowers 2-merous. Staminate flowers ca. 1.5 mm including the pedicel, this ca. 0.5 mm; sepals oblong, apex truncate, ca. 1 mm, translucent with black apex, glabrous on both surfaces, shortly ciliate; petals fused, tubulose, ca. 0.7 mm, translucent, glabrous on both surfaces; stamens free; carpellodes cream, papillose. Pistillate flowers ca. 1 mm, sessile; sepals

ovate, apex obtuse, ca. 1 mm, translucent with black apex, glabrous on both surfaces, shortly ciliate; petals elliptic, apex round to obtuse, ca. 1 mm, translucent, glabrous on both surfaces; gynoecium ca. 1 mm, ovary ca. 0.5 mm, stigmatic branches bifid, nectariferous branches absent.

Examined material: São Roque de Minas, Parque Nacional da Serra da Canastra. Serra Brava, -20,361713S, -46,752277W, 13.III.2020, R. Ramos 963 (SPF).

Paepalanthus scleranthus is easily recognized by its small size, the absence of spathes and scapes, and involucre bracts with blackish capitula.

Paepalanthus scleranthus occurs in the Serra Brava region of Canastra (Fig. 2d) and is widely distributed in the Espinhaço and Mantiqueira mountain ranges.

It was collected fertile in March.

4.13. *Paepalanthus sericiscapus* Trovó, Novon, 22: 329. 2013. Fig. 4s

Herbs 15–20 cm tall. Stem restricted to the rosette in sterile plants, unbranched, then developing into a central reproductive axis. Leaves in basal rosette, lanceolate, apex acute, 1.5–2 × 0.4–0.6 cm, flat, glabrous on both surfaces. Reproductive axis erect, 3.5–4 cm long; axis bracts spiraled, similar in size, lanceolate, apex acute, 2.5–3.5 × 0.3–0.5 cm, glabrous on both surfaces. Spathes 2.5–3 cm, glabrous, oblique opening. Scapes 13.5–15 cm, sericeous, emerging at the reproductive axis apex. Capitula 7–9 mm wide. Involucre bracts in 3–4 series, oval, apex acute to obtuse, ca. 3 mm, light brown, glabrous on both surfaces, ciliate. Floral bracts linear, apex acute, ca. 2 mm, cream, glabrous, ciliate, tufted. Flowers 2-merous. Staminate flowers ca. 3 mm including the pedicel, this ca. 0.5 mm; sepals navicular, apex acute, ca. 3 mm, light brown, glabrous on both surfaces, ciliate, tufted; petals fused, tubulose, ca. 1 mm, cream, glabrous internally; stamens free; carpellodes cream, papillose. Pistillate flowers ca. 3 mm, including the pedicel, this ca. 0.3 cm; sepals dolabriform to navicular, apex acute, ca. 3 mm, light brown, glabrous on both surfaces, tufted; petals elliptical, apex round, ca. 1 mm, cream, glabrous on both surfaces; gynoecium ca. 1 mm, ovary ca. 0.5 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: São Roque de Minas, Parque Nacional da Serra da Canastra, Chapadão do Diamante, 16.VII.1995, R. Romero 2464 (HUFU).

Paepalanthus sericiscapus, along with *P. polycladus* and *P. chiquitensis*, has scapes emerging

at the apex of a central axis. It is distinct due to its sericeous scapes and a small reproductive axis (4 cm).

This species is endemic to Canastra, with only one record from Chapadão do Diamante (Fig. 2e). It has never been recollected despite our field efforts to survey the area of this record. According to Trovó *et al.* (2013), the species should be considered Critically Endangered based on criteria B1a.

The record was made in July, and it featured mature male flowers and young pistils.

4.14. *Paepalanthus sinuosus* Echtern. & Trovó, Syst. Bot. 46(1): 29. 2021. Fig. 4t–u

Herbs 28–80 cm tall. Stem aerial, up to 80 cm, prostrate, branched. Leaves spiraled throughout the stem, lanceolate, apex acute to acuminate, 1–3 × 0.08–0.2 cm, flat, patent to slightly recurved, pilose to glabrescent on both surfaces. Spathes 1–3 cm, pilose to glabrescent abaxially, oblique opening. Scapes in pseudo-lateral fascicula, 4–13 cm, pilose to glabrescent, not emerging from a conspicuous reproductive axis. Capitula 3.8–4.7 mm wide. Involucre bracts in 3–4 series, ovate, apex acute, 1.6–1.9 mm, the external light brown, the internal dark brown, pilose to glabrescent abaxially, glabrous adaxially, ciliate. Floral bracts lanceolate, apex obtuse, ca. 1.5 mm, light brown, pilose at the apex of the abaxial surface, glabrous adaxially, ciliate, tufted. Flowers 3-merous. Staminate flowers ca. 1.7 mm including the pedicel, this ca. 0.5 mm; sepals oblanceolate to obovate, apex obtuse to mucronate, ca. 1.5 mm, light brown, pilose as the flower bracts, ciliate; petals fused, tubulose, ca. 1 mm, light brown, glabrous on both surfaces; filaments adnate to the corolla; carpellodes brown, filiform. Pistillate flowers ca. 2 mm, including the pedicel, this ca. 0.1 cm; sepals oblanceolate to obovate, apex obtuse, ca. 1.5 mm, light brown, pilose as the floral bracts; petals oblanceolate, apex obtuse, ca. 2 mm, light brown, densely pilose abaxially, adaxial surface pilose at apex, tufted; gynoecium ca. 1.5–2 mm, ovary ca. 0.5 mm, stigmatic branches simple, liberating at the same level of the nectariferous branches.

Examined material: Capitólio, região da represa de Furnas, cachoeira abaixo da trilha da Pedreira Souza, campo rupestre, 17.II.2006, A.A. Arantes *et al.* 1760 (HUFU); estrada p/ pedreira Gabi exploração II ca. 8 km, cerrado, campo rupestre, 8.XI.2007, P.H.N. Bernardes *et al.* 339 (HUFU).

Paepalanthus sinuosus differs from other species by its architecture, featuring an elongated

stem and scapes in terminal fascicles that become lateralized after the growth of lateral buds. Other similar species in Canastra with elongated stems include *P. trichophyllus* and *P. flaccidus*, but these have dimerous flowers.

This species is endemic to Canastra and is known from the type collection only, made near the Furnas Dam at Chapadão da Babilônia (Fig. 2e) (Echternacht *et al.* 2021). We failed to find the species during fieldwork. We presume it to be rare or locally extinct since the region has experienced severe habitat loss due to mining. The species is assessed as Critically Endangered by Echternacht *et al.* (2021), according to criteria B1B2ab (ii, iii) of IUCN (2019).

Reproductive material was collected in November and February.

4.15. *Paepalanthus subtilis* Miq., Stirp. Surinam. Slect.: 221. 1851. Fig. 5a-b

Herbs 4–10 cm tall. Stem aerial, 0.7–2 cm, unbranched. Leaves spiraled throughout the stem, linear, apex acute, 0.2–1.5 × 0.03–0.1 cm, flat, glabrous on both surfaces. Spathes 4.9–8.6 mm, glabrous, oblique opening. Scapes 2–6 cm, pilose to glabrescent, not emerging from a conspicuous reproductive axis. Capitula 1.8–3.9 mm wide. Involucral bracts in 4 series, triangular, apex acute, 0.8–1.6 mm, stramineous, glabrous on both surfaces, ciliate. Floral bracts lanceolate, apex acute, ca. 1.4 mm, dark brown, glabrescent abaxially, glabrous adaxially, ciliate. Flowers 3-merous. Staminate flowers ca. 1.4 mm including the pedicel, this ca. 0.5 mm; sepals lanceolate, apex acute, ca. 1 mm, light brown to dark brown, glabrous on both surfaces, ciliate; petals fused, tubulose, ca. 1 mm, cream, glabrous on both surfaces; filaments adnate to the corolla; carpellodes cream, papilose. Pistillate flowers ca. 1.3 mm, sessile; sepals lanceolate, apex acute, ca. 1.3 mm, light brown to dark brown, glabrous on both surfaces, tufted; petals lanceolate, apex acute, ca. 1.3 mm, cream, glabrous on both surfaces, tufted; gynoecium ca. 1.3 mm, ovary ca. 0.5 mm, stigmatic branches simple, liberating at the same level of the nectariferous branches.

Examined material: Delfinópolis, estrada para pedreira Souza, ca. de 2 km da MG-050, 17.II.2006, A.A. Arantes 1712 (HUFU); região da Represa de Furnas, cachoeira abaixo da trilha da Pedreira Souza, 17.II.2006, A.A. Arantes 1756 (HUFU); Paraíso Selvagem, trilha para cachoeira Salto Solitário, 11.III.2003, R. Romero 6722 (HUFU); Fazenda José Antunes, trilha da Escada de

Pedras, 10.III.2003, R.L. Volpi 523 (HUFU). São Roque de Minas, Furnas, Chapadão da Babilônia, Serra do Turvo, próximo às pedreiras, no alto da pedreira Gabi Exploração, próximo ao curso d'água, 2.II.2015, L. Echternacht 2617 (HUFU); Parque Nacional da Serra da Canastra, 16.IV.1994, R. Romero 852 (HUFU).

Paepalanthus subtilis are tiny plants with cream involucral bracts, as *P. albidus*. It is distinguished by glabrous leaves, simple stigmatic branches, and brown sepals.

In Canastra, this species occurs in Chapadão do Diamante and southern Chapadão da Babilônia (Fig. 2e). It is widely distributed in Brazil, reaching also Venezuela and Suriname (Hensold 1999).

Plants were collected in the reproductive period in February, March and April.

4.16. *Paepalanthus tortilis* (Bong.) Mart. ex Körn., *Fl. bras.* (Martius) 3: 354. 1863. Fig. 5c

Herbs 3–13 cm tall. Stem aerial, 1–4 cm, unbranched. Leaves spiraled throughout the stem, linear, apex acute, 0.5–2.6 × 0.08–0.1 cm, flat, glabrescent in both surfaces. Spathes 3.9–9.5 mm, sparsely pilose, oblique opening. Scapes 1–8 cm, pilose, not emerging from a conspicuous reproductive axis. Capitula 0.8–2.8 mm wide. Involucral bracts obovate, apex acute, 1 mm, dark brown to blackish, glabrous on both surfaces, ciliate. Floral bracts oblong, apex obtuse, ca. 1 mm, brown, glabrous on both surfaces, ciliate. Flowers 3-merous. Staminate flowers ca. 1 mm including the pedicel, this ca. 0.5 mm; sepals obovate, apex obtuse, ca. 1 mm, dark brown to blackish, glabrous on both surfaces, ciliate, tufted; petals fused, tubulose, ca. 0.7 mm, cream, glabrous on both surfaces; stamens free; carpellodes cream, papilose. Pistillate flowers ca. 1 mm, sessile; sepals obovate, apex obtuse, ca. 1 mm, dark brown to blackish, glabrous on both surfaces, tufted; petals obovate, apex obtuse, ca. 1 mm, cream, glabrous on both surfaces, tufted; gynoecium ca. 1 mm, ovary ca. 0.5 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: São Roque de Minas, estrada para Sacramento, Garagem das Pedras, 20.III.1995, J.N. Nakajima 903 (HUFU); estrada para a Cachoeira Casca D'Anta, 20.III.1995, J.N. Nakajima 931 (HUFU); Parque Nacional da Serra da Canastra, estrada São Roque de Minas - Sacramento, próximo à torre de observação, 15.V.1995, J.N. Nakajima 1115 (HUFU).

Paepalanthus tortilis is a highly variable species, with stems ranging from very elongated to short. In the Canastra region, it typically appears relatively small, reaching heights of up to 13 cm.



Figure 5 – a–v. Species of Eriocaulaceae in the Serra da Canastra – a–b. *Paepalanthus subtilis* – a. habit; b. capitula; c. *Paepalanthus tortilis* – habit; d–e. *Paepalanthus trichophyllus* – d. elongated stems and leaves; e. capitulum; f–g. *Paepalanthus uai* – f. habit; g. capitulum; h–i. *Paepalanthus vaginatus* – h. leaves, spathes and scapes; i. capitula; j–l. *Syngonanthus anthemiflorus* – j. leaves and inflorescence axis, axis bracts and spathe; k. capitulum with yellow flowers (adaxial view); l. capitulum (abaxial view); m. *Syngonanthus caulescens* – habit; n–p. *Syngonanthus culcitosis* – n. cushion habit; o. capitula; p. elongated stem and leaves. q–r. *Syngonanthus gracilis* – two morphotypes (q and r) – q. habit, with patent flat leaves; r. habit, with recurved terete leaves; s–t. *Syngonanthus densiflorus* – s. axis bracts and spathes; t. capitula; u–v. *Syngonanthus nitens* – u. leaves and spathes; v. capitulum. (Photos by L. Echternacht from Serra da Canastra, except: c. from Nakajima et al. 1115 [HUFU 9004]; f, g. from Nakajima & Romero 726 [HUFU 7128]).

Therefore, it may be confused with *P. manicatus*; however, it can be distinguished by its obovate involucre bracts and oblong floral bracts, as well as its dark brown sepals, which are nearly black.

Paepalanthus tortilis is found in the Chapadão do Diamante region of Canastra (Fig. 2e) and has a wide distribution across South America, particularly in eastern Brazil, including the Espinhaço region.

It was collected in March and May while fertile.

4.17. *Paepalanthus trichophyllus* (Bong.) Körn., Fl. bras. (Martius & Eichler) 3: 318. 1863.

Fig. 5d-e

Herbs 10–48 cm tall. Stem aerial, 1–18 cm, branched. Leaves spiraled throughout the stem, linear, apex acute, 0.2–1.8 × 0.04–0.2 cm, flat, glabrous abaxially, densely pilose to glabrescent adaxially. Spathes 1–3.5 cm, densely pilose to glabrescent, oblique opening. Scapes 4–26 cm, densely pilose, not emerging from a conspicuous reproductive axis. Capitula 2.8–7.6 mm wide. Involucre bracts in 3–4 series, elliptical, apex acute, 1–2.5 mm, castaneous to brown, densely pilose to glabrescent abaxially, glabrous adaxially, ciliate. Floral bracts oblong, apex acute, ca. 2 mm, castaneous, glabrous in both surface, ciliate, tufted. Flowers 2-merous. Staminate flowers ca. 2 mm including the pedicel, this ca. 0.5 mm; sepals obovate, apex acute, ca. 2 mm, castaneous, glabrous on both surfaces, ciliate, tufted; petals fused, tubulose, ca. 1.7 mm, cream, glabrous on both surfaces; filaments adnate to corolla; carpellodes cream, papillose. Pistillate flowers ca. 1.5 mm, sessile; sepals obovate, apex obtuse, ca. 1.5 mm, castaneous, glabrous on both surfaces, tufted; petals obovate, apex obtuse, ca. 1.5 mm, cream, glabrous on both surfaces, tufted; gynoecium ca. 1.5 mm, ovary ca. 0.5 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Capitólio, região da Represa de Furnas, estrada da Pedreira Souza, ca. de 2 km da MG-050, 17.II.2006, A.A. Arantes 1730 (HUFU); 12.VII.2006, A.A. Arantes 1945 (HUFU); próximo à cachoeira da rodovia, 22.V.2007, P.H.N. Bernardes 172 (HUFU); 21.III.2007, P.O. Rosa 534 (HUFU). Delfinópolis, Paraíso Selvagem, trilha entre o estacionamento e o Cânion do Alpinista, 1.II.2015, L. Echternacht 2606 (HUFU); Fazenda Zé Antunes, trilha Casinha Branca, 11.IV.2002, R.A. Pacheco 109 (HUFU); Fazenda Água da Serra, trilha Escada de Pedras, 10.III.2003, R.A. Pacheco 500 (HUFU); Condomínio de Pedras,

17.V.2003, R.A. Pacheco 606 (HUFU); estrada para Casa Branca, Fazenda Paraíso, 10.IV.2002, R. Romero 6250 (HUFU); trilha para cachoeira Salto Solitário, 11.III.2003, R. Romero 6724 (HUFU); trilha Escada de Pedra, 15.V.2003, R. Romero 6878 (HUFU); Sete Cidades, 8.X.2002, R. L. Volpi 212 (HUFU); Cidade de Pedras, 12.III.2003, R.L. Volpi 565 (HUFU); 17.V.2003, R. L. Volpi 674 (HUFU). São Roque de Minas, Percurso entre São João Batista da Canastra e a Portaria 1 (São Roque - Centro de Visitantes), estrada entre a nascente do Rio São Francisco e a Portaria 1, em direção à vertente sul da Serra, 31.V.2014, L. Echternacht 2496 (HUFU); nascente do Rio São Francisco, 31.V.2014, M.S. Freitas 034 (HUFU); na base do morro próximo ao alojamento, 7.XII.1994, J.N. Nakajima 652 (HUFU); estrada para a cachoeira dos Rolinhos, 21.XI.1995, J.N. Nakajima 1533 (HUFU); estrada para cachoeira Casca D'Anta, 23.XI.1995, J.N. Nakajima 1614 (HUFU); 20.III.1995, R. Romero 938 (HUFU); estrada São Roque de Minas - Sacramento, 3 km da sede administrativa, 10.I.1995, R. Romero 1682 (HUFU); Vale do Rio São Francisco, 3 meses após queimada, 10.I.1995, R. Romero 1698 (HUFU); Vale do Rio São Francisco, 3 meses após queimada, 17.III.1995, R. Romero 1983 (HUFU); 17.III.1995, R. Romero 1986 (HUFU); Parque Nacional da Serra da Canastra, próximo à entrada do Minério, 11.I.1998, R. Romero 5021 (HUFU).

Paepalanthus trichophyllus is similar to *P. flaccidus* due to its slender habit, elongated stem, spiraled small lanceolate leaves, and dimerous flowers. However, it can be distinguished by its brown involucre bracts, which are abaxially pilose to glabrescent.

It is fertile throughout the year, but especially during the first semester.

In Canastra, this species has a wide distribution, encompassing Chapadão do Diamante, Chapadão da Babilônia, and Serra Preta (Fig. 2e). It also occurs in *Campo Rupestre* regions within Espinhaço, Mantiqueira, and Veadeiros.

4.18. *Paepalanthus uai* Andrino, F.N.Costa & Sano, Phytotaxa 509(1): 129. 2021. Fig. 5f-g

Herbs 6–11 cm tall. Stem restricted to the rosette, unbranched. Leaves in basal rosettes, linear, apex acute, 6–8 × 0.1–0.06 cm, flat, glabrescent on both surfaces. Spathes 0.4–1.5 mm, glabrous, truncate opening. Scapes 5–8 cm, pilose, not emerging from a conspicuous reproductive axis. Capitula 6.5–7.4 mm wide. Involucre bracts in 3–4 series, ovate to obtrulate, apex acute to obtuse, 2.2–2.9 mm, dark brown, pubescent abaxially, glabrous adaxially, ciliate. Floral bracts lanceolate, apex obtuse, ca. 2.6 mm, light brown to brown, pilose to glabrescent at the distal third

of the abaxial surface, glabrous adaxially, ciliate, tufted. Flowers 3-merous. Staminate flowers ca. 3.2 mm including the pedicel, this ca. 0.5 mm; sepals oblanceolate, apex obtuse, ca. 2 mm, light brown to brown, pilose to glabrescent at the distal third of the abaxial surface, glabrous adaxially, ciliate, tufted; petals fused, tubulose, ca. 2 mm, cream, glabrous; filaments adnate to corolla; carpellodes cream at base, brown at the fimbriate apex, clavate. Pistillate flowers ca. 2.5 mm, including the pedicel, this ca. 0.3 mm; sepals oblanceolate to obtrullate, apex obtuse to cuspidate, ca. 2.5 mm, light brown to brown, pilose to glabrescent at the distal third of the abaxial surface, glabrous adaxially, ciliate, tufted; petals oblanceolate, apex obtuse, ca. 2 mm, cream, glabrous, ciliate, tufted; gynoecium ca. 2.5 mm, ovary ca. 0.5 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Delfinópolis, Parque Nacional da Serra da Canastra, trilha do Zé Carlinho, subida para a Serra do Cemitério, 9.XX.2002, *J.N. Nakajima et al. 3214* (HUFU). São Roque de Minas, Parque Nacional da Serra da Canastra, Garagem de Pedras, estrada para Sacramento, campo limpo, solo arenoso-pedregoso, 3 meses após a queimada, 9.XII.1994, *J.N. Nakajima & R. Romero 726* (HUFU); estrada S.R. Minas Sacramento, Garagem de Pedras, *campo rupestre*, 18.XX.1994, *R. Romero et al. 1367* (HUFU, OUPR, SPF); *Campo rupestre*, 12.I.1995, *R. Romero et al. 1763* (HUFU, SPF); Campo sujo, 16.XX.1997, *R. Romero et al. 4646* (HUFU).

Paepalanthus uai is distinguished from other species by its woolly stem thickened by the leaf sheath and covered in ferruginous hairs, as well as truncate to lacerate spathes.

This species is endemic to Serra da Canastra, with recorded populations in Chapadão do Diamante and Serra do Cemitério (Fig. 2f). Notably, it has not been collected in the past 18 years, despite recent efforts to recover it, and might be considered Critically Endangered (Echternacht *et al.* 2021).

Reproductive material was collected in October and December.

4.19. *Paepalanthus vaginatus* Körn., *Fl. bras.* (Martius & Eichler) 3: 313. 1863.

= *Paepalanthus cylindraceus* Silveira, *Floral. Mont.*: 130. 1928. Type:—BRAZIL. Minas Gerais: “In arenosis in Serra do Chapadão”, April 1925, *Silveira 748* (holotype R!). Fig. 5h-i

Herbs 30–80 cm tall. Stem restricted to the rosette, sometimes branched. Leaves in basal

rosette, lanceolate, apex acute, 2–17 × 0.08–0.5 cm, flat, glabrescent in both surfaces. Spathes 3–13 cm, glabrescent, oblique opening. Scapes 20–70 cm, glabrous, not emerging from a conspicuous reproductive axis. Capitula 6.9–11.8 mm wide. Involucral bracts in 4–5 series, triangular to oval, apex acute to obtuse, 1–2.5 mm, dark brown, glabrous on both surfaces, ciliate in the apex. Floral bracts linear to lanceolate, apex obtuse, ca. 1.5 mm, castaneous, glabrous on both surfaces, ciliate, tufted. Flowers 2-merous. Staminate flowers ca. 2 mm including the pedicel, this ca. 0.5 mm; sepals lanceolate, apex obtuse, ca. 2 mm, castaneous, glabrous on both surfaces, ciliate in the apex, tufted; petals fused, tubulose, ca. 1.7 mm, cream, glabrous on both surfaces; stamens free; carpellodes cream, papillose. Pistillate flowers ca. 3 mm, including the pedicel, this ca. 0.5 mm; sepals lanceolate, apex obtuse, ca. 3 mm, castaneous, glabrous on both surfaces, tufted; petals lanceolate, apex round, ca. 2.7 mm, light brown, glabrous on both surfaces, tufted; gynoecium ca. 3 mm, ovary ca. 1 mm, stigmatic branches bifid, liberating at the same level of the nectariferous branches.

Examined material: Delfinópolis, Furnas, região da Represa de Furnas, morro próximo a Pousada do Rio Turvo, beira da represa, 30.IX.2005, *A.A. Arantes 1535* (HUFU); Serra Preta, chapadão no alto da Serra Preta, 30.I.2015, *L. Echternacht 2596* (HUFU); estrada para guarita, 14.V.2003, *R.A. Pacheco 549* (HUFU); 14.V.2003, *R. Romero 6819* (HUFU); trilha Escada de Pedra, 15.V.2003, *R. Romero 6870* (HUFU). Sacramento, Parque Nacional da Serra da Canastra, próximo à guarita de Sacramento, 16.III.1995, *R. Romero 1843* (HUFU); 16.III.1995, *R. Romero 1861* (HUFU); 16.III.1995, *R. Romero 1897* (HUFU); estrada São Roque de Minas - Sacramento, próximo ao Córrego dos Passageiros, 13.V.1995, *R. Romero 2238* (HUFU). São Roque de Minas, morro da entrada do Parque Nacional, 18.IV.1992, *N.M. Castro 305* (HUFU); percurso entre a portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, aproximadamente 7 km após a portaria 2, 29.V.2014, *L. Echternacht 2466* (HUFU); estrada para Casa de Pedra, 23.II.1994, *J.N. Nakajima 196* (HUFU); próximo ao vale do São Francisco, 17.IV.1994, *J.N. Nakajima 275* (HUFU); Parque Nacional da Serra da Canastra, 25.VI.1994, *J.N. Nakajima 371* (HUFU); estrada São Roque de Minas - Sacramento, guarita de Sacramento, 14.VII.1995, *J.N. Nakajima 1148* (HUFU); cerca de 1 km, 15.IV.1997, *J.N. Nakajima 2295* (HUFU); Parque Nacional da Serra da Canastra, 15.IV.1994, *R. Romero 805* (HUFU); 3 km da sede administrativa, 17.III.1995, *R. Romero 1952* (HUFU); 17.III.1995, *R. Romero 1971* (HUFU); vale da nascente do Rio São Francisco, 17.III.1995, *R. Romero 1987* (HUFU); lagoa

rodeada por plantações de pinheiros, 26.I.2002, R. Romero 6361 (HUFU).

Paepalanthus vaginatus can be distinguished by its highly elongated spathes, long glabrescent scapes, and dimerous flowers. The dark brown involucre bracts and the discoid young capitula are also remarkable.

The collections of reproductive material date from several months of the year; however, the greatest concentration refers to the first semester.

Paepalanthus vaginatus forms abundant populations in Canastra, specifically in Chapadão do Diamante and Serra Preta (Fig. 2f).

Paepalanthus vaginatus was described from the Quadrilátero Ferrífero and also occurs in the Espinhaço Range, forming abundant populations. The type of *P. cylindraceus*, which was described from Serra da Canastra, exhibits all the diagnostic characteristics of *P. vaginatus* and is here considered synonymous with it, according to Andrino *et al.* (2024).

5. *Syngonanthus*.

Herbs terrestrial. Stem subterranean or aerial, short to elongate. Leaves in basal rosette or spiraled throughout the stem, not fenestrated. Scapes emerging at the stem apex or leaf axil, or from a conspicuous reproductive axis. Floral bracts absent or present. Flowers 3-merous, isostemonous, petals eglandular. Staminate flowers pedicellate, sepals fused at the base, petals tubulose, stamens adnate to the corolla, anthers dorsifixed, carpellodes present. Pistillate flowers pedicellate, sepals free, petals fused in the upper third, free at base and middle, as well as at the very apex, forming short triangular lobes soon involute after anthesis, stigmatic branches simple, liberating at the same level of the nectariferous branches, or rarely nectariferous branches absent.

Syngonanthus is sister to *Comanthera*, as evidenced by the petals of pistillate flowers fused at the middle and free at the base and top. It differs, however, by the sepals of the pistillate flowers equalling the petals, these with short triangular lobes, and seeds with reticulated surface (Parra *et al.* 2010; Giuliatti *et al.* 2012).

5.1. *Syngonanthus anthemiflorus* (Bong.) Ruhland, Pflanzenr. (Engler) IV. 30: 258. 1903.

Fig. 5j-l

Herbs 15–25 cm tall. Stem subterranean, branched. Leaves in basal rosette, linear, apex acute to acuminate, 6–12 × 0.6–1.4 mm, recurved,

flat, densely pilose abaxially, pilose adaxially, hairs patent. Reproductive axis conspicuous, 1 per rosette, 1.5–4 cm. Axis bracts absent along the axis, restricted to a distal whorl, linear, apex acuminate, 5.8–11.8 mm, ascending to erect, pilose on both surfaces, with patent simple and glandular hairs abaxially, and appressed hairs adaxially, ciliate. Spathes 1.5–2.5 cm, densely pilose abaxially, with simple and glandular patent hairs, oblique opening. Scapes emerging at the reproductive axis apex, 11–18 cm, densely pilose, simple and glandular patent hairs. Capitula 9–12 mm wide. Involucre bracts in 4–7 series, clearly dimorphic, the external series oval to oboval, apex acute to acuminate, 1–4 mm, light brown to stramineous, glabrescent, progressively longer toward the internal series, these spatulate, apex round, 3–4 mm, surpassing the floral disc, cream, glabrous. Floral bracts narrow obovate to spatulate, apex acuminate, ca. 3 mm, cream, hairy in the central region, abaxially and sometimes also adaxially. Flowers 3-merous. Staminate flowers 2–2.5 mm, including the pedicel, this ca. 0.5 mm; sepals fused at base, elliptical, apex acute, ca. 2 mm, cream, hairy as the flower bracts; petals fused, ca. 1.5 mm, cream, membranaceous, glabrous; filaments adnate to corolla; carpellodes present. Pistillate flowers 2–2.5 mm, including the pedicel, this 0.3–0.5 mm; sepals elliptical, apex acute, ca. 2.5 mm, cream, abaxially pilose at middle, glabrous adaxially; pilose ring present; petals obovate, apex acuminate, ca. 1.5 mm, cream, adaxially slightly pilose, adaxially glabrous; gynoecium ca. 1.5 mm, ovary ca. 1 mm, nectariferous branches present.

Examined material: Delfinópolis, trilha Escada de Pedra, 15.V.2003, R. Romero 6879 (HUFU). São Roque de Minas, Parque Nacional da Serra da Canastra, percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, próximo à parte alta da Casca D'Anta, 29.V.2014, L. Echternacht 2476 (HUFU); estrada entre São Roque e a nascente do Rio São Francisco, 31.V.2014, M.S. Freitas 030 (HUFU); estrada do Chapadão Diamante, 18.III.1995, J. N. Nakajima 820 (HUFU); base da colina próximo à sede, 20.II.1994, R. Romero 649 (HUFU); estrada para Sacramento, 3 km da sede administrativa, 17.III.1995, R. Romero 1952 (HUFU); estrada para Sacramento, 3 km da sede administrativa, 19.II.1997, R. Romero 3841B (HUFU).

Syngonanthus anthemiflorus is distinguished from the congeners in the area by involucre bracts long surpassing the flower disc (Fig. 5k-l), a feature that approaches it to *Comanthera* subg. *Comanthera* (i.e., *C. dealbata*, *C. euschemus*, and *C. nivea*). However, it differs from these species

by the scapes emerging from a conspicuous reproductive axis (Fig. 5j) and the presence of glandular hairs on the axis bracts, spathes, and scapes. *Syngonanthus anthemiflorus* is a morphologically highly variable species, with two varieties recognized. Plants from Canastra resemble *S. anthemiflorus* var. *similis* (Ruhland) L.R.Parra & Giul. (1997: 228), as they correspond to larger plants and have clearer involucre bracts.

In Serra da Canastra, this species occurs in Chapadão do Diamante (Fig. 2f), representing a disjunction with its occurrence in the Espinhaço Range in Minas Gerais, where it is widely distributed and forms abundant populations (Echternacht 2012).

Collections date from the first semester, but as noted by Parra (1998), reproductive plants can be found practically throughout the year.

5.2. *Syngonanthus caulescens* (Poir.) Ruhland, Pflanzenr. (Engler) IV. 30: 267. 1903. Fig. 5m

Herbs 9–21 cm tall. Stem aerial, up to 26 cm, usually unbranched, internodes with whitish lanose indumentum. Leaves spiraled throughout the stem, lance-linear, apex acute, 1.7–1 × 0.1–0.2 cm, ascending to patent, flat to canaliculate, sparsely hairy on both surfaces, hairs appressed. Spathes 1–2.5 cm, sparsely hairy, simple appressed hairs, apex tufted, oblique opening. Scapes 4–16 cm, hairy to glabrescent, simple patent hairs, not emerging from a conspicuous reproductive axis. Capitula 4.2–5.5 mm wide. Involucre bracts in ca. 4 series, similar in color, gradual in shape, longer inwardly, the external oval, apex acuminate to apiculate, ca. 1.5 mm, cream with stramineous basis, glabrous, internal series elliptical, apex acuminate to acute, ca. 2 mm, not surpassing the floral disc, cream, glabrous. Floral bracts absent. Flowers 3-merous. Staminate flowers 1.8–2 mm, including the pedicel, this ca. 0.5 mm; sepals free, elliptical, apex acuminate, ca. 1.8 mm, cream, glabrous; petals fused at base ca. 1/3 their length, ca. 0.7 mm, spongy, cream, glabrous; filaments adnate to the corolla at base; carpellodes present. Pistillate flowers 1.5–2 mm, including the pedicel, this ca. 0.2 mm; sepals elliptical, apex acuminate, ca. 2 mm, cream, glabrous; petals spatulate to unguiculate, apex acuminate, ca. 1.5 mm, cream, abaxially hairy in the upper region, adaxially glabrous; gynoecium ca. 1.5 mm, ovary ca. 1 mm, nectariferous branches present.

Examined material: Capitólio, região de Furnas, estrada para Pedreira Gabi Exploração II, ca. de 8 km, 8.XI.2007,

P.H.N. Bernardes 340 (HUFU); Paraíso Perdido, próximo à pousada Pé da Serra, rio nos fundos da pousada, 1.II.2015, L. Echternacht 2609 (HUFU); Cachoeira da Filó, 24.V.2007, J.N. Nakajima 4539 (HUFU); estrada para Cachoeira Feixo da Serra, 13.VII.2006, R. Romero 7849 (HUFU).

Syngonanthus caulescens is morphologically similar to *S. culcitosis* but can be distinguished by its acute to acuminate involucre bracts, lanceolate leaves, and pistillate flowers with spongy petals (Echternacht *et al.* 2021).

Syngonanthus caulescens is recorded in southern Chapadão da Babilônia (Fig. 2f) and is widely distributed throughout Brazil and South America (Watanabe 2015).

It was collected fertile in February, May, July, and November.

5.3. *Syngonanthus culcitosis* Echtern., Syst. Bot. 46(1): 31. 2021. Fig. 5n-p

Herbs 6–32 cm tall. Roots whitish, spongy. Stem aerial, 1–5.5 cm, profusely branched, forming cushions up to 50 cm wide, internodes with whitish lanose indumentum. Leaves spiraled throughout the stem, linear to oblanceolate, apex obtuse, 0.5–2.5 cm × 0.05–0.2 cm, ascending to patent, flat, densely pilose to glabrescent in both surfaces, appressed simple hairs and also scattered patent glandular hairs. Spathes 15–4 cm, pilose to glabrescent, with glandular patent hairs, oblique opening. Scapes 5–32 cm, sparsely pilose to glabrescent, glandular patent hairs not emerging from a conspicuous reproductive axis. Capitula 3.2–6 mm wide. Involucre bracts in 4–6 series, similar in color, gradual in shape, series longer inwardly, round to oblanceolate, apex round to obtuse, 1.3–2.7 mm, cream with stramineous basis, glabrescent to glabrous abaxially, glabrous adaxially, as long as the flower disc. Floral bracts absent. Flowers 3-merous. Staminate flowers 2–2.5 mm, including the pedicel, this 0.5–1 mm; sepals fused at base, narrow elliptic, apex obtuse, 1.5–2 mm, cream, pilose abaxially at the upper half, glabrous adaxially; petals fused, tubulose, ca. 1.8 mm, membranaceous, cream, glabrous; filaments adnate to the corolla; carpellodes papillose. Pistillate flowers ca. 3 mm, including the pedicel, this ca. 1 mm; sepals lanceolate, apex round to obtuse, ca. 2 mm, cream, glabrous; petals oblong, apex round to obtuse, ca. 1.5 mm, cream, glabrous; gynoecium 1.5–2 mm, ovary ca. 0.6 mm, nectariferous branches present.

Examined material: Capitólio, região da represa de Furnas, Chapadão da Babilônia, Serra do Turvo,

próximo às pedreiras, nos flancos do Rio da Capivara, em cachoeira que corta a estrada, no caminho para a Cachoeira da Pedreira, -46.293056°, -20.613611°, SAD69, 1.II.2015, *L. Echternacht et al.* 2612 (HUFU, B, OUPR, SPF); Paraíso Perdido, córrego Quebra Anzol, 4.5 km da rodovia MG-050, -46.323333°, -20.624444°, 29.XI.2005, *R. Romero et al.* 7246 (HUFU). Delfinópolis, Cânion do Alpinista, dentro do cânion, no pé da Cachoeira do Alpinista, -46.642222°, -20.434444°, SAD69, 1.II.2015, *L. Echternacht et al.* 2608 (HUFU, OUPR); Faz. José Antunes, trilha “Escada de Pedras”, -46.3872°, -20.2604°, 11.XX.2002, *R. Romero et al.* 6453 (HUFU, OUPR). São Roque de Minas, PARNA Serra da Canastra, nascente do Rio São Francisco, -46.446667°, -20.243611°, WGS84, 29.IV.2015, *L. Echternacht et al.* 2480 (HUFU, OUPR); nascente do Rio São Francisco, borda de capão, 15.VI.1995, *R. Romero et al.* 2407 (HUFU, OUPR, SPF); Cachoeira da Casca D’Anta, parte de cima, *campo rupestre*, 17.VII.1995, *R. Romero et al.* 2508 (HUFU, OUPR); Cachoeira dos Rolinhos, ilha, borda do córrego, 21.VIII.1997, *R. Romero et al.* 4481 (HUFU, OUPR).

Syngonanthus culcitosus distinguishes itself from other species by its cushion-like growth habit, characterized by elongated, densely branched, woolly stems. It can also be differentiated from *S. caulescens* by its round involucre bracts, linear to oblanceolate leaves, and pistillate flowers with membranaceous petals (Echternacht *et al.* 2021).

This species is endemic to Canastra, where it is commonly observed near the rivers at humid and often shadowed sites. It has been collected in Chapadão do Diamante, Chapadão da Babilônia, and Serra Preta (Fig. 2g) (Echternacht *et al.* 2021). It is assessed as Vulnerable following the criteria B1B2ab(i, ii, iii) of IUCN (2019), according to Echternacht *et al.* (2021).

It was collected fertile in February, April, July, August, October, and November, suggesting a more or less continuous flowering period.

5.4. *Syngonanthus davidsei* Huft, Ann. Missouri Bot. Gard. 72(2): 448. 1985. Fig. 5q-r

Herbs 6–28 cm tall. Roots cream, fibrous. Stem subterranean, branched or not. Leaves in basal rosette, linear, apex obtuse to acute, 0.3–1.9 × 0.03–0.1 cm, patent to recurved, flat to semiterete, pilose to glabrescent on both surfaces, hairs patent. Spathes 1–3 cm, pilose to glabrescent, with glandular patent hairs, oblique opening. Scapes 4–27 cm, pilose to glabrescent, with glandular and simple patent hairs, not emerging from a conspicuous reproductive axis. Capitula 2.2–6.4 mm wide. Involucre bracts in 5–6 series, similar in color and shape, equaling in height, elliptical to

obovate, apex obtuse to round, 0.3–0.5 mm, cream to golden, glabrous, not surpassing the floral disc. Floral bracts absent. Flowers 3-merous. Staminate flowers 1–2.5 mm, including the pedicel, this ca. 0.5–1 mm; sepals fused in the lower half, elliptical, apex acute, ca. 0.5–2 mm, cream, abaxially hairy at the center of the apex to glabrescent, glabrous adaxially; petals fused, ca. 0.5–1 mm, membranaceous, cream, glabrous; filaments adnate to corolla; carpellodes present. Pistillate flowers ca. 1.5–2.5 mm, including the pedicel, this ca. 0.3–1 mm; sepals ovate to elliptical, apex acuminate, 1.5–2 mm, cream, glabrous; petals oblong, apex acuminate, 1–1.5 mm, membranaceous, cream, glabrous; gynoecium 1–1.5 mm, ovary 0.5–1 mm, nectariferous branches absent.

Examined material: Capitólio, região de Furnas, estrada para Gabi Explorações II, 23.III.2007, *P.H.N. Bernardes 114* (HUFU). Delfinópolis, estrada para Gurita, 14.V.2003, *R. Romero 6817* (HUFU); trilha Escada de Pedras, 15.V.2003, *R.L. Volpi 646* (HUFU). São Roque de Minas, Chapada dos Diamantes, 22.VI.2001, *N.M. Castro 16* (HUFU); Parque Nacional da Serra da Canastra, 18.IV.1992, *N.M. Castro 321* (HUFU); percurso entre a Portaria 2 (São João Batista da Canastra) e a nascente do Rio São Francisco, próximo à parte alta da Casca D’Anta, 29.V.2014, *L. Echternacht 2471* (HUFU); estrada da bifurcação entre a cachoeira Casca D’anta, parte alta e a torre de observação, 30.V.2014, *M.S. Freitas 025A* (HUFU); 30.V.2014, *M.S. Freitas 025B* (HUFU); 30.V.2014, *M.S. Freitas 026* (HUFU); 30.V.2014, *M.S. Freitas 027* (HUFU); 25 km da guarita de Sacramento, 22.III.1995, *J.N. Nakajima 967* (HUFU); Guarita de Sacramento, cerca de 1 km, 15.IV.1997, *J.N. Nakajima 2298* (HUFU); 15.IV.1997, *J.N. Nakajima 2301* (HUFU); estrada para Sacramento, vale da nascente do Rio São Francisco, 17.III.1995, *R. Romero 1985* (HUFU); nascente do córrego dos Peixes, 16.IV.1997, *R. Romero 4039* (HUFU); trilha do córrego da Fazenda, 16.IV.1997, *R. Romero 4076* (HUFU).

Syngonanthus davidsei is morphologically close to *Syngonanthus nitens* Ruhland (1903: 254) in Canastra, with scapes emerging from the rosette; it is, however, a smaller plant, with cream fibrous root, and involucre bracts equaling in height among the series. The species displays morphological variety in the area: some populations have a stem reduced to the rosette, these solitary, and patent flat leaves (Fig. 5q), while others are rhizomatous, branched, with terete recurved leaves (Fig. 5r), more similar to the *Syngonanthus gracilis* (Bong.) Ruhland (1903: 249) species concept (Echternacht 2012). The morphological complexity and an apparent gradient led us to recognize one single taxon, determined as *S. davidsei*, due to

the absence of nectariferous appendices in the gynoecium. A population analysis in Canastra could test the species circumscription.

This species occurs in Chapadão da Babilônia and Serra Preta in Canastra (Fig. 2g), with a broad distribution in Brazil and South America (Echternacht 2012).

It was collected fertile in the first semester.

5.5. *Syngonanthus densiflorus* (Körn.) Ruhland, Pflanzenr. (Engler) IV, Fam. 30: 263. 1903.

Fig. 5s-t

Herbs ca. 1 m tall. Roots withish, spongy. Stem subterranean, branched or not. Leaves cespitose, linear, apex obtuse, 10–45 × 0.3–0.5 cm, recurved, flat, hairy on both surfaces, soon glabrescent, hairs patent, simple and glandular, ciliate. Reproductive axis conspicuous, 1 per rosette, ca. 12–30 cm. Spiraled bracts sparse along the axis, ca. 0.5–1 cm, and also whorled at the apex, these lanceolate to linear, acute, up to 15 cm, erect, pilose on both surfaces as the leaves. Spathes 4–17 cm, pilose as the leaves, oblique opening. Scapes 25–73 cm, hairy, malpighiaceus appressed and simple patent hairs, glabrescent, emerging from the reproductive axis apex. Capitula 0.8–1.5 cm wide. Involucral bracts in 8–10 series, uniformly stramineous, triangular to lanceolate, apex obtuse to acute, simple hairs abaxially, not surpassing the floral disc. Floral bracts lanceolate to oblong, apex obtuse, ca. 3 mm, cream, hyaline, abaxially hairy in the central region. Flowers 3-merous. Staminate flowers ca. 3 mm, including the pedicel, this ca. 0.5 mm; sepals fused at base, elliptical, apex acute, ca. 2.5 mm, cream, abaxially distally hairy; petals fused, tubulose, ca. 2.5 mm, cream, membranaceous, glabrous; filaments adnate to corolla; carpellodes clavate. Pistillate flowers ca. 4 mm, including the pedicel, this up to 5 mm; sepals elliptical, apex acute, ca. 3.5 mm, cream, abaxially pilose at middle, glabrous adaxially; pilose ring present; petals obovate, apex obtuse, ca. 3 mm, cream, adaxially slightly pilose, adaxially glabrous; gynoecium ca. 3 mm, ovary ca. 1 mm, nectariferous branches present.

Examined material: Delfinópolis, Parque Nacional da Serra da Canastra, Chapadão da Babilônia, estrada para Cachoeira do Paraíso, lado esquerdo, 20°21'57.48"S, 46°43'44.44"W, 13.III.2020, *L.J. Sauthier et al.* 115 (SPF).

Syngonanthus densiflorus also has a conspicuous reproductive axis subtending the scapes, as *S. anthemiflorus*, but its involucral

bracts equal the floral disc in height. It is the tallest *Syngonanthus* in the area.

There is one record only of this species, collected in March, at Chapadão da Babilônia, on the road to Paraíso waterfall (Fig. 2g). Although rare in Canastra, it is widespread in the Cerrado and occurs beyond Brazil in Peru and Bolivia (Echternacht 2012; Echternacht & Watanabe 2024).

The specimen Sauthier 115 was seen by photo only. Description was based on the syntypes (Riedel 2348 [B, S, UPS], Weddel 2383 [P], Gardner 2966 [BM, F, G, K, NY, OXF]); flowers were described based on Evangelista 72 (BHCB), complemented by the protologue.

5.6. *Syngonanthus nitens* (Bong.) Ruhland, Pflanzenr. (Engler) IV. 30: 254. 1903.

= *Syngonanthus retrorsociliatus* Silveira, Floral. Mont.: 347. 1928. Type:—BRAZIL. Minas Gerais: “In campis arenosis in serra do Chapadão et serra da Babylonia”, April 1925, Silveira 747 (syntype: R!).

Fig. 5u-v

Herbs 14–60 cm tall. Roots orangish, spongy. Stem subterranean, branched or not. Leaves in basal rosette, linear, apex acuminate, 1.3–3.1 × 0.04–0.2 cm, recurved, flat, with a lighter longitudinal band in the middle (more visible in dry specimens), hairy abaxially, sparsely pilose adaxially, hairs patent. Spathes 2–7 cm, densely pilose to glabrescent adaxially, whit glandular patent hairs, tufted abaxially at apex, oblique opening. Scapes 13–54 cm, glabrous, golden, not emerging from a conspicuous reproductive axis. Capitula 5.2–10 mm wide. Involucral bracts in 5–6 series, similar in color, gradual in shape and size, the external oblong, apex obtuse to round, ca. 1 mm, golden, pale with age, glabrous, internal series progressively longer, ovate, apex round, ca. 2.5 mm, glabrous, not surpassing the floral disc. Floral bracts absent. Flowers 3-merous. Staminate flowers 3–4 mm, including the pedicel, this ca. 0.5–1 mm; sepals fused in the lower half, elliptical, apex acute, 2.5–3 mm, cream, pilose on both surfaces in the distal half; petals fused, ca. 0.5–1 mm, membranaceous, cream, glabrous; filaments adnate to the corolla; carpellodes present. Pistillate flowers 3–4 mm, including the pedicel, this ca. 0.5–1 mm; sepals elliptical, apex acute, 1.5–2 mm, cream, pilose to glabrescent on both surfaces; petals oblong, apex acuminate, 1–1.5 mm, membranaceous, cream, glabrous; gynoecium 1.5–2 mm, ovary 1.5–2 mm, nectariferous branches present.

Examined material: Delfinópolis, Serra Preta, chapadão no alto da Serra Preta, 30.I.2015, *L. Echternacht* 2597 (HUFU); córrego na Escadaria de Pedras, 31.I.2015, *L. Echternacht* 2603 (HUFU); Fazenda Zé Antunes, trilha para Cachoeira Triângulo, 6.XII.2002, *J.N. Nakajima* 3396 (HUFU); região da Represa de Furnas, estrada depois do Paraíso Perdido, 25.X.2006, *J.N. Nakajima* 4227 (HUFU); Fazenda Águas da Serra, trilha das cachoeiras, 13.III.2003, *R. Romero* 6758 (HUFU); estrada para Casinha Branca, próximo à entrada da Fazenda Águas da Serra, 12.III.2003, *R.L. Volpi* 550 (HUFU). Sacramento, Parque Nacional da Serra da Canastra, estrada São Roque de Minas - Sacramento, próximo ao Córrego dos Passageiros, 13.V.1995, *R. Romero* 2233 (HUFU); 13.V.1995, *R. Romero* 2239 (HUFU); estrada Sacramento - Franca, perto da Cemig, 3.VIII.1984, *R.C. Vieira* 297 (HUFU). São Roque de Minas, primeira pontinha após a garagem das pedras em direção a São Roque, 21.VI.2001, *N.M. Castro* 05 (HUFU); morro do córrego da fazenda, 22.VI.2001, *N.M. Castro* 11 (HUFU); Parque Nacional da Serra da Canastra, 18.IV.1992, *N.M. Castro* 315 (HUFU); nascente do Rio São Francisco, 31.V.2014, *M.S. Freitas* 032 (HUFU); próximo ao vale do São Francisco, 17.IV.1994, *J.N. Nakajima* 276 (HUFU); estrada do Chapadão Diamante, 18.III.1995, *J.N. Nakajima* 857 (HUFU); caminho para a Cachoeira Casca D'Anta, 18.VII.1995, *J.N. Nakajima* 1265 (HUFU); base da colina próximo à sede, 20.II.1994, *R. Romero* 621 (HUFU); morro próximo à sede administrativa, 17.III.1995, *R. Romero* 1940 (HUFU); estrada para Sacramento, 3 km da sede administrativa, 17.III.1995, *R. Romero* 1959 (HUFU); morro após a nascente do Rio São Francisco, 16.VII.1995, *R. Romero* 2421 (HUFU); Chapadão do Diamante, 16.VII.1995, *R. Romero* 2447 (HUFU); proximidade do córrego dos Passageiros, 19.VII.1995, *R. Romero* 2617 (HUFU); morro após a nascente do Rio São Francisco, 19.II.1997, *R. Romero* 3879 (HUFU); nascente do córrego dos Peixes, 16.IV.1997, *R. Romero* 4055 (HUFU); estrada para Sacramento - São Roque de Minas, próximo à entrada do Minério, 11.I.1998, *R. Romero* 5024 (HUFU).

Syngonanthus nitens is remarkable for its golden scapes, popularly called “capim dourado” (golden grass). It differs from *S. davidsei* by its orangish spongy roots and involucre bracts gradually longer from the external to the internal series, usually taller. Dry materials also frequently display leaves with a lighter longitudinal band in the middle.

Syngonanthus nitens is widely distributed in Canastra, in Chapadão do Diamante, Chapadão da Babilônia, and Serra Preta (Fig. 2g), being widespread in Brazil from south to north, and occurring in Colombia, Venezuela, and Paraguay (Echternacht 2012).

It was collected in the reproductive stage throughout the year, but more frequently in the first semester.

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Data availability statement

In accordance with Open Science communication practices, the authors inform that all data are available within the manuscript.

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