



Original Paper

Verbenaceae in Itacolomi State Park, Minas Gerais, Brazil: richness, geographical distribution, and a new synonym for *Stachytarpheta commutata*

Vitor Araújo da Silva^{1,3}, Pedro Henrique Cardoso² & Livia Echternacht^{1,4,5}

Abstract

Verbenaceae includes 32 genera and approximately 800 species distributed mainly in the Neotropical region, especially diversified in Brazil, where the *campo rupestre* stands out as an important vegetation type for the family. The Itacolomi State Park (ISP) is located in the southeast of the Quadrilátero Ferrífero, Minas Gerais state (MG), Brazil. Vegetation at the Park is composed of *campo rupestre* and forest remnants among degraded areas. The present research provides a floristic treatment of Verbenaceae in this protected area. Data were obtained from fieldwork and herbarium study. A total of 13 species were recorded: *Glandularia phlogiflora*, *Lantana camara*, *Lantana fucata*, *Lantana tiliaefolia*, *Lantana trifolia*, *Lippia brasiliensis*, *Lippia hermannioides*, *Lippia organoides*, *Petrea volubilis*, *Stachytarpheta cayennensis*, *Stachytarpheta commutata*, *Verbena litoralis* and *Verbena rigida*. Among them, six are new records for the ISP. *Stachytarpheta glabra*, endemic to MG, was found in an area of *canga* very close to the boundaries of the Park. Additionally, *S. viscidula*, whose type locality is close to the Park, is proposed as a new synonym for *S. commutata*, whose type specimen comes from the Park. We provide an identification key, descriptions, photographs and comments on taxonomy, ecology and distribution for each species.

Key words: *campo rupestre*, conservation, Lamiales, Quadrilátero Ferrífero, taxonomy.

Resumo

Verbenaceae inclui 32 gêneros e cerca de 800 espécies distribuídas principalmente na região Neotropical, especialmente diversificada no Brasil, onde os *campos rupestres* destacam-se como um importante tipo vegetacional para a família. O Parque Estadual do Itacolomi (PEIT) está localizado na região sudeste do Quadrilátero Ferrífero, Minas Gerais (MG), Brasil. Possui uma vegetação composta por *campo rupestre* e remanescentes florestais entre áreas degradadas. O presente estudo fornece um tratamento florístico para Verbenaceae nesta unidade de conservação. Os dados foram obtidos diretamente em campo e nos herbários. Um total de 13 espécies foram registradas: *Glandularia phlogiflora*, *Lantana camara*, *Lantana fucata*, *Lantana tiliaefolia*, *Lantana trifolia*, *Lippia brasiliensis*, *Lippia hermannioides*, *Lippia organoides*, *Petrea volubilis*, *Stachytarpheta cayennensis*, *Stachytarpheta commutata*, *Verbena litoralis* e *Verbena rigida*. Dentre elas, seis são registradas pela primeira vez para a flora do PEIT. *Stachytarpheta glabra*, endêmica de MG, foi encontrada em uma área de *canga* muito próxima aos limites do Parque. Além disso, *S. viscidula*, cuja localidade tipo é próxima ao Parque, é proposta como um novo sinônimo de *S. commutata*, cujo espécime tipo é proveniente do Parque. Nós fornecemos uma chave de identificação, descrições, fotografias e comentários sobre taxonomia, ecologia e distribuição para cada espécie.

Palavras-chave: *campo rupestre*, conservação, Lamiales, Quadrilátero Ferrífero, taxonomia.

¹ Universidade Federal de Ouro Preto, Inst. Ciências Exatas e Biológicas, Depto. Biodiversidade, Evolução e Meio Ambiente, Ouro Preto, MG, Brazil.

² Universidade Federal do Rio de Janeiro, Museu Nacional, Depto. Botânica, Pós-graduação em Ciências Biológicas (Botânica), Quinta da Boa Vista, Rio de Janeiro, RJ, Brazil. ORCID: <<https://orcid.org/0000-0002-6198-6729>>.

³ ORCID: <<https://orcid.org/0000-0002-8763-1141>>.

⁴ ORCID: <<https://orcid.org/0000-0003-1534-7181>>.

⁵ Author for correspondence: livia.echter@ufop.edu.br

Introduction

Verbenaceae includes 32 genera and approximately 800 species distributed mainly in the Americas with a few groups in the Old World (Cardoso *et al.* 2021a). This family has as its centers of diversity the subtropical and subarid regions of South America (Sanders 2001; Atkins 2004). In Brazil, it is represented by 15 genera and about 290 species, of which 190 are endemic (Salimena *et al.* 2020). Recent studies show that the numbers of species may vary as new taxa are recognized for the genus *Lantana* L. (Cardoso *et al.* 2019a). *Lippia* L. and *Stachytarpheta* Vahl. are the most species-rich genera, with high levels of endemic species, especially in the Espinhaço Range (Atkins 2005; Salimena *et al.* 2013; Cardoso & Salimena 2020a; Salimena & Cardoso 2020). Minas Gerais state is noteworthy for having a great species richness of the family, with 14 genera and 128 species (Salimena *et al.* 2020), several of them threatened with extinction due to the expansion of agribusiness and urbanization (Salimena *et al.* 2013).

Verbenaceae, currently restricted to the subfamily Verbenoideae Briq. (excluding Monochileae tribe) (Cantino *et al.* 1992a, 1992b), is supported as a monophyletic taxon, comprising currently eight tribes (Marx *et al.* 2010). Recent molecular analysis of the Lantaneae show non-monophyly of the *Lantana/Lippia* clade and indicate the necessity of a new circumscription of the taxa, whether dismembering them into smaller genera, fusing them into a single genus, or recognizing major clades as taxa using phylogenetic nomenclature under the PhyloCode (Lu-Irving & Olmstead 2013; Lu-Irving *et al.* 2021). Representatives of these taxa have enormous economic potential, especially for the various species of *Lippia* that have medicinal and pharmacological properties and are used for the extraction of essential oils, food, cosmetics, tea and insect control. Furthermore, several species of *Lantana* are used for ornamental purposes, with *Lantana camara* L. being a well-known and widely cultivated species in several countries (Silva 1999; Pascual *et al.* 2001; Atkins 2004; Marx *et al.* 2010; Sousa & Costa 2012).

Regional floras improve local surveys, enrich collections in herbaria, and contribute to the knowledge on species distribution and morphological variability (GSPC 2006). In Minas Gerais state, local floras have focused on protected areas, such as the Serra do Cipó National Park

(Salimena & Giuliatti 1998), Grão-Mogol State Park (Salimena & Silva 2009), Ibitipoca State Park (Cruz & Salimena 2017), Reserva Biológica da Represa do Grama (Cardoso *et al.* 2017), Serra Negra da Mantiqueira State Park (Cardoso *et al.* 2018), Serra do Papagaio State Park (Cardoso *et al.* 2019b), Caparaó National Park (Cardoso *et al.* 2019c), Serra da Canastra National Park (Cardoso *et al.* 2020a), and Pico do Itambé State Park (Cardoso *et al.* 2020b). These studies document important local richness and species of restricted distribution, mainly in the Cerrado Domain.

The Quadrilátero Ferrífero (literally translated as “iron quadrangle”, in reference to a quadrangular distribution of this mountainous complex) is an important iron ore province in southeastern Brazil, located in south-central Minas Gerais, covering an area of about 7,000 km² (Dorr 1969; Quadrilátero Ferrífero 2050, 2018) between two Brazilian hotspot domains: the Atlantic Forest and the Cerrado (Mittermeier *et al.* 2004, 2011). The intense mining activities in this region cause major changes to the landscape and habitat quality, with serious impacts on biodiversity (Jacobi & Carmo 2008).

The Itacolomi State Park (ISP) is a strictly protected area, in the southeastern Quadrilátero Ferrífero, integrating an ecotonal region between the Cerrado and the Atlantic Forest Domains, with forest remnants among degraded areas, affected mainly by fire, and *campo rupestre* at the higher elevations (Messias *et al.* 2017). Pico do Itacolomi is the highest point in the Park, at 1,772 m elevation, and is a regional symbol that has served as a guiding landmark for travelers. The naturalists Johann Baptiste von Spix and Carl Friedrich Phillip von Martius, in 1818, when passing by Ouro Preto, reported, “Itacolomi, shaded at the base by the blackness of the woods and standing out of all the neighbors with its rocky and bare summit, it dominates the whole region” (Martius & Spix 1981).

Some floristic treatments at the family level have been accomplished in the ISP (Alves 1990; Dutra *et al.* 2005, 2008a,b, 2009; Lima *et al.* 2007, 2010; Coser *et al.* 2010; Bünger *et al.* 2012; Almeida *et al.* 2014). Floristic surveys have also been conducted in this protected area, including a list specifically for the *campo rupestre* by Peron (1989), mentioning the occurrence of three species of Verbenaceae. More recently, the inventory was updated by Messias *et al.* (2017), who recorded 1,600 species of Spermatophytes in 122 families, of which 79 species are threatened

with extinction. Messias *et al.* (2017) reported 11 species of Verbenaceae, but it was evident that a more in-depth taxonomic study for the family was needed. Thus, the present research comprises the floristic treatment of Verbenaceae, providing an identification key, descriptions, photographs and comments on taxonomy, ecology and distribution for each species, contributing to the management and conservation of the family in the Quadrilátero Ferrífero.

Material and Methods

The Itacolomi State Park was created by law nº 4.495, in 1967, with an area that occupies approximately 7,500 ha in the municipalities of Ouro Preto and Mariana, Minas Gerais state (43°32'30" to 43°22'30"W and 20°22'30" to 20°30'00"S). Climate is Cwb, with dry winters and humid summers, according to Köppen's classification (Álvares *et al.* 2013). The vegetation is predominantly represented by montane semideciduous forest, *campo rupestre*, intermixed with Cerrado elements, and anthropized areas. Forest formations generally occur at altitudes of 700 m to 1,350 m (Pedreira & Sousa 2011; Messias *et al.* 2017), while the *campo rupestre* occur usually above 1,000 m elevation (Messias *et al.* 2017). Regarding the *campo rupestre* geological formation within the ISP, most of it is composed of quartzitic rocks, but ferruginous *campo rupestre*, locally called *canga*, is also present (Dutra *et al.* 2005; Carmo & Jacobi 2013; Messias *et al.* 2017). Stratigraphy is formed by metamorphic rocks, corresponding mainly to quartzite of the Itacolomi Group (Minas Supergroup), and schists of the Rio das Velhas Supergroup. Soil may be characterized in two main types: quartzose, white sandy to gravelly soil, and yellowish-red, more clayey latosols (Castañeda 1993).

The species survey was based on virtual herbaria databases analyzed on the speciesLink (<<http://www.splink.org.br/>>) and ReFlora (<<http://floradobrasil.jbrj.gov.br/reflora/>>) platforms. Results also depend upon a compilation from the following herbaria: BHCB, CESJ, OUPR and RB were physically analyzed; K, NY, UB and VIC were analyzed from online images (acronyms according to Thiers, continuously updated). In addition, field expeditions were carried out in November and December 2020 and January 2021. Social isolation related to the pandemic COVID-19 compromised the more exhaustive previously planned fieldwork. Newly collected materials are deposited at OUPR.

Taxonomic identification was performed based on the Flora e Funga do Brasil (Cardoso & Salimena 2020a,b; O'Leary 2020; O'Leary *et al.* 2020; Salimena & Cardoso 2020; Silva *et al.* 2020) and specialized literature (Rueda 1994; Silva 1999; Atkins 2005; O'Leary *et al.* 2007, 2012; O'Leary & Thode 2016). In order to understand taxonomic definitions, nomenclatural types were consulted from JSTOR Plants platform (<<https://plants.jstor.org/>>) and protologs were also consulted whenever necessary. Morphological terminology follows Gonçalves & Lorenzi (2011), Harris & Harris (2001), and Radford *et al.* (1974). Only native or naturalized species were included in the taxonomic treatment. Introduced species were included in the identification key only.

The family description presented herein is based on the genera and species that occur in the study area. A more elaborate description for the family is available online on the Flora e Funga do Brasil platform (<<https://floradobrasil.jbrj.gov.br/FB246/>>). Morphological descriptions of the species are standardized and the main diagnostic features that allow their recognition in ISP are given in the taxonomic comments. Additional specimens were used to complement the description of species lacking some morphological characters that could not be observed in the specimens from ISP, such as flowers or fruits. Phenology and habitat information were obtained based on field observations and annotations on exsiccate labels. Maps were created using the QGIS program version 3.10.7. For those specimens for which coordinates were absent on exsiccate labels, but that presented comments of area of occurrence, georeferencing was realized using the software Google Earth (<<http://earth.google.com/>>). Classification of vegetation follows the Technical Manual of the Brazilian Vegetation (IBGE 2012).

Results and Discussion

Verbenaceae is represented in ISP by 13 species distributed in six genera (Tab. 1). Among them, *Stachytarpheta commutata* Schauer has its type locality within the ISP, and is frequent in the area. Comparing our results with the checklist of Messias *et al.* (2017), we recorded an additional six species (*Glandularia phlogiflora* (Cham.) Schnack & Covas, *Lantana tiliaefolia* Cham., *Lippia brasiliensis* (Link) T.R.S.Silva, *Lippia origanoides* Kunth, *Petrea volubilis* L. and *Verbena rigida* Spreng), while specimens corresponding to three species (*Stachytarpheta glabra* Cham., *S.*

Table 1 – List of Verbenaceae species found in the Itacolomi State Park, with distribution in Brazil; phytogeographic domains and vegetation types; occurrence in common with the other floristic treatments in Minas Gerais state. Key: It = Pico do Itambé; Ibt = Ibitipoca; SN = Serra Negra; SP = Serra do Papagaio; CA = Serra da Canastra; C = Caparaó; RG = Represa do Gama; GM = Grão-Mogol; SC = Serra do Cipó.

Species	Author	Distribution (regions)	Distribution (domains)	Vegetation types	Shared with
<i>Glandularia phlogiflora</i>	(Cham.) Schnack & Covas	Central-West, South and Southeast	Atlantic Forest, Pampa, Pantanal	<i>campo de altitude</i> , Riverine Forest And/Or Gallery Forest, Mixed Ombrophyllous Forest	SP
<i>Lantana camara</i>	L.	All regions	All domains	All vegetation type	Ibt, SN, RG, SP, It
<i>Lantana fucata</i>	Lindl.	Northeast, Center-West, Southeast, South, and North (only in Pará state)	All domains	Almost all vegetation type	Ibt, SN, RG, SP, C
<i>Lantana tiliaefolia</i>	Cham.	North, Northeast and Southeast	Amazon Rainforest, Caatinga, Cerrado, and Atlantic Forest	Anthropic area, <i>caatinga</i> (stricto sensu), <i>restinga</i> , Rock outcrop vegetation	-
<i>Lantana trifolia</i>	L.	All regions	Amazon Rainforest, Cerrado, Atlantic Rainforest	Anthropic area, <i>campo de várzea</i> , Cerrado (lato sensu), Riverine Forest And/Or Gallery Forest, <i>terra firme</i> forest, Inundated Forest (<i>várzea</i>), Seasonally Semideciduous Forest	-
<i>Lippia brasiliensis</i>	(Link) T.R.S. Silva	South, Southeast and Northeast	Caatinga, Cerrado, Atlantic Forest and Pampa	Cerrado (lato sensu), Riverine Forest And/Or Gallery Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest	RG
<i>Lippia hermannioides</i>	Cham.	Central-West (Distrito Federal, Goiás), North (Tocantins), Northeast (Bahia), and Southeast (Minas Gerais)	Caatinga, Cerrado, and Atlantic Forest	Grassland, <i>campo rupestre</i> , <i>carrasco</i> , Cerrado (lato sensu), Seasonally Semideciduous Forest, Rock outcrop vegetation	SC, GM
<i>Lippia organoides</i>	Kunth.	All regions	Amazon Rainforest, Caatinga, Cerrado, Atlantic Forest, Pantanal	Almost all vegetation type	Ibt, SN, It
<i>Petrea volubilis</i>	L.	All regions	Amazon Rainforest, Cerrado, and Atlantic Forest	Amazonian <i>campinarana</i> , Riverine Forest and/or Gallery Forest, <i>terra firme</i> forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest)	CA

Species	Author	Distribution (regions)	Distribution (domains)	Vegetation types	Shared with
<i>Stachytarpheta cayennensis</i>	(Rich.) Vahl	All regions	Amazon Rainforest, Caatinga, Cerrado, Atlantic Forest, Pampa, Pantanal	Almost all vegetation type	RG, C
<i>Stachytarpheta commutata</i>	Schauer	Southeast (Minas Gerais)	Cerrado	<i>campo rupestre</i>	-
<i>Verbena litoralis</i>	Kunth.	Central-West, South and Southeast	Cerrado, Atlantic Forest, and Pampa	Anthropic area, <i>campo de altitude</i> , <i>campo rupestre</i> , Mixed Ombrophyllous Forest, <i>restinga</i>	Ibt
<i>Verbena rigida</i>	Spreng.	Central-West, South and Southeast	Cerrado, Atlantic Forest, and Pampa	Anthropic area, <i>campo de altitude</i> , <i>campo rupestre</i> , Mixed Ombrophyllous Forest	C, SN

jamaicensis (L.) Vahl and *S. mexiae* Moldenke) were reidentified as *S. commutata*, *S. cayennensis* (Rich.) Vahl and *S. commutata*, respectively.

During our research, *Stachytarpheta glabra* was found in an area of *canga* very close to the administrative headquarters of the ISP, forming abundant populations, but outside the legally protected area (Fig. 1). The specimen cited as *S. glabra* by Messias *et al.* (2017) (voucher *M.C.T.B Messias 1016* [OUPR 20180]), from inside the Park, was reidentified as *S. commutata*. We opted to include this species in the taxonomic treatment, because it occurs in the Serra do Itacolomi, over *canga*, which is a vegetation type severely threatened (Jacobi & Carmo 2008; Jacobi *et al.* 2011), and it is a species recognized for its important ecological role (Jacobi & Antonini 2008). Other species present in this area of *canga* are *Lippia hermannioides* Cham. and *S. commutata*. To include these occurrences in the taxonomic treatment is therefore important to subsidize the conservation of the ISP's buffer zone, and might eventually justify the expansion of the conservation unit boundaries in the future. Specimens from this area have labels noted as "Parque Estadual do Itacolomi", "*canga*", and "Estrada do Tesoureiro"; however, the *canga* area, confirmed by the coordinates (approximately 43°31'2"W, 20°26'22"S), are outside the Park limits.

Regarding the geographic distribution in ISP, *Lantana fucata* Lindl., *Lantana tiliaefolia*, *Lippia hermannioides*, *Lippia origanoides* and *S. commutata* occur in quartzitic *campo rupestre*. However, *L. fucata* is also found in anthropized areas, along secondary forest edges and roadsides.

Only *Lippia brasiliensis* occurs within the forest. The species *Glandularia phlogiflora*, *Lantana camara* L., *Lantana trifolia* L., *Stachytarpheta cayennensis*, *Verbena litoralis* Kunth., and *V. rigida* are distributed in anthropized areas, close to Fazenda do Manso and to the Park headquarters, or along trails, as in the Calais and Serrinha region. *Petrea volubilis* is commonly planted for ornamental purposes and eventually might escape from cultivation and become naturalized (Rueda 1994); however, in the ISP we cannot assume it is not native, because it was collected within native vegetation. Furthermore, this species is widespread in Brazil and has been recorded within others protected areas, such as the Itatiaia National Park (Santiago *et al.* 2020) and the Serra da Canastra National Park (Cardoso *et al.* 2020a).

Studying herbarium collections, we found two specimens previously identified as *Glandularia selloi* (Spreng.) Tronc. (vouchers *L.G. Pedrosa 1269* [OUPR 32756] and *L.G. Pedrosa 1358* [OUPR 33113], both collected in 2019) and the determination was confirmed by Dr. Verônica Thode (personal communication). However, in Brazil, this species is endemic to the state of Rio Grande do Sul (RS), in the vegetation types *campo de altitude*, *campo limpo*, and *restinga* (O'Leary *et al.* 2020). In the ISP, it was collected near a lawn in anthropic areas. Therefore, we assume that this species might be recently introduced accidentally in the ISP (maybe mixed with commercial grass imported from RS), and we decided to include it in the identification key but not in the taxonomic treatment, as it is not native to the Park.

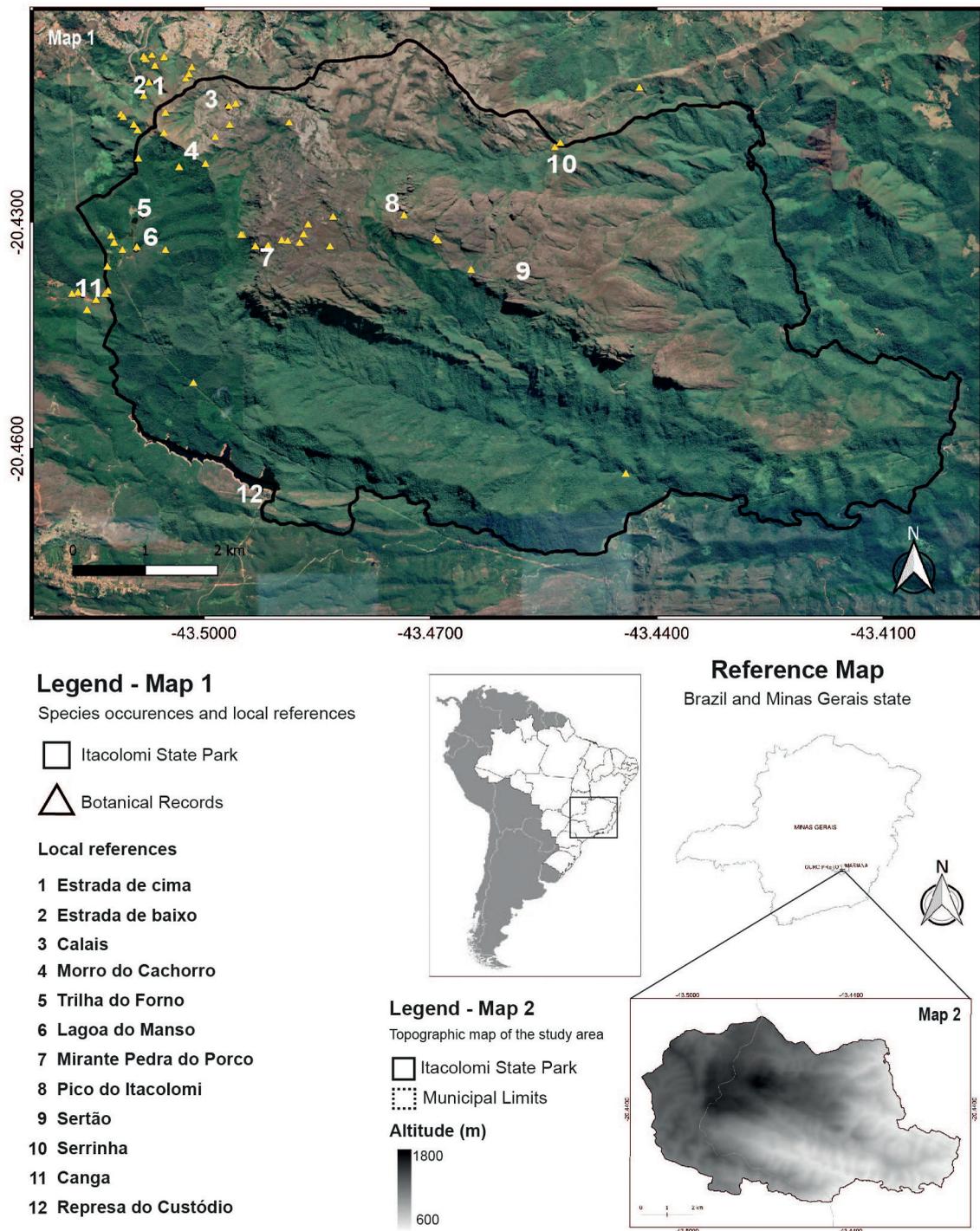


Figure 1 – Maps of Itacolomi State Park (ISP) – Map 1. Satellite image with the Park delineated, analyzed specimens and localities of interest. Map 2. Altitudinal range and municipality limits.

Comparing the Verbenaceae richness in ISP with other protected areas in Minas Gerais state, the ISP presents a greater number of species. However, there is a higher representation of ruderal and widely distributed species in ISP compared with Serra do Cipó National Park (Salimena & Giulietti 1998), Grão-Mogol State Park (Salimena & Silva 2009), Ibitipoca State Park (Cruz & Salimena 2017), Reserva Biológica da Represa do Gramma (Cardoso *et al.* 2017), Serra Negra da Mantiqueira State Park (Cardoso *et al.* 2018), Serra do Papagaio State Park (Cardoso *et al.* 2019a), Caparaó National Park (Cardoso *et al.* 2019b), Serra da Canastra National Park (Cardoso *et al.* 2020a), and Pico do Itambé State Park (Cardoso *et al.* 2020b). In general, ruderal or widespread species are most commonly shared between ISP and these areas (Tab. 1).

The occurrence of *Lippia hermannioides* for the Ibitipoca State Park was not considered here because the specimen cited was reidentified as Lamiaceae (Cardoso *et al.* 2019a).

Verbenaceae J. St.-Hil.

Herbs, subshrubs, shrubs or lianas, branches cylindrical or tetragonal, with or without prickles, glabrous or pilose. Leaves opposite or 3–4 verticillate, petiolate, margin entire, serrate or crenate, glabrous or pilose. Inflorescences axillary or terminal; bracts equal or unequal each other, deciduous or persistent in fructification. Flowers sessile or pedicellate; calyx green, purplish-green, purplish-blue or purple, tubular, cylindrical-tubular, 2–5-lobed, 4–5-toothed, lobes longer or shorter than the corolla, persistent in fruit, accrescent or not; corolla white, blue, yellow, orange, red, violet, lilac or pink, zygomorphic, hypocrateriform, bilabiate or not; stamens 4 fertile, didynamous, or 2 fertile and 2 staminodes, connective appendages present or absent, thecae parallel or divergent; ovary 1–2-carpelate, ovules 1–2 per locule; style terminal. Fruit drupe with 1–2 pyrenes or schizocarp divided into 2–4 cluses, outer surface smooth, rugose, striated or reticulate.

Identification key for the species of Verbenaceae in the Itacolomi State Park and nearby areas

1. Lianas; flowers pedicellate; calyx lobes longer than the corolla9. *Petrea volubilis*
- 1'. Shrubs; subshrubs or herbs; flowers sessile; calyx lobes shorter than the corolla 2
 2. Androecium with 2 fertile stamens and 2 staminodes, thecae divergent 3
 - 2'. Androecium with 4 fertile stamens, thecae parallel 5
 3. Corolla lilac, 6–8 mm long; inflorescences with calyx immersed in the depressions of the rachis 10. *Stachytarpheta cayennensis*
 - 3'. Corolla blue, 16–18 mm long; inflorescences with calyx not immersed in the depressions of the rachis 4
 4. Branches, leaves, bracts and calyx sericeous to villous 11. *Stachytarpheta commutata*
 - 4'. Branches, leaves, bracts and calyx glabrous 12. *Stachytarpheta glabra* (found near the limits of the ISP)
 5. Corolla bilabiate; fruit schizocarp with 2 cluses or a 1–2-pyrenate drupe 6
 - 5'. Corolla not bilabiate; fruit schizocarp with 4 cluses 12
 6. Branches with prickles 7
 - 6'. Branches without prickles 8
 7. Leaves with base attenuate; peduncle 1–4 cm long; bracts equal, lanceolate, deciduous in fructification 2. *Lantana camara*
 - 7'. Leaves with base cordate; peduncle 4–9 cm long; bracts unequal, external lanceolate to oblong, internal narrow-elliptical, persistent in fructification 4. *Lantana tiliaefolia*
 8. Leaves 3–4 verticillate 5. *Lantana trifolia*
 - 8'. Leaves opposite 9
 9. Bracts unequal to each other, external wide-ovate and internal ovate 3. *Lantana fucata*
 - 9'. Bracts equal to each other 10
 10. Inflorescences 3–4 per axil; bracts tetrastichous 8. *Lippia organoides*
 - 10'. Inflorescences 1 per axil; bracts spirallate 11

11. Branches tetragonal; leaves with margin entire near the base, serrate toward the apex, strigose in both surfaces; bracts ca. 10 mm long; fruit drupe, 2-pyrenate..... 6. *Lippia brasiliensis*
- 11'. Branches cylindrical; leaves with margin entire up to the median portion, crenate toward the apex, adaxial surface scabrous, abaxial surface hirsute; bracts 5–8 mm long; fruit schizocarp composed of 2 cluses..... 7. *Lippia hermannioides*
12. Leaves not entire, 3-sected to bipinnatifid *Glandularia selloi* (introduced plant)
- 12'. Leaves entire 13
13. Calyx 16–18 mm long; corolla 23–26 mm long; subsessile connective appendages present. 1. *Glandularia phlogiflora*
- 13'. Calyx 3–4 mm long; corolla 4–10 mm long; connective appendages absent 14
14. Branches glabrescent; leaves with margin entire near the base, serrate toward the apex; bracts 2–3 mm long; calyx ca. 3 mm long; corolla ca. 4 mm long 13. *Verbena litoralis*
- 14'. Branches hispid; leaves with margin incised-serrate; bracts ca. 5 mm long; calyx ca. 4 mm long; corolla (5–)8–10 mm long 14. *Verbena rigida*

1. *Glandularia phlogiflora* (Cham.) Schnack & Covas, Darwiniana, 6: 475. 1944. *Verbena phlogiflora* Cham., Linnaea 7: 266. 1832. Typus: BRAZIL: F. Sellow (lectotypus, designated by Peralta & Múlgura (2011), G not seen; isolectotypus photography in K! [K000470726], E not seen).

Fig. 2a

Herbs, ca. 1.5 m tall, branches tetragonal, without prickles, hirsute, hairs glandular present. Leaves opposite, petiolate, blade 1–5.4 × 0.2–1.5 cm, chartaceous, oval-lanceolate, base attenuate, decurrent along the petiole, margin serrate, apex acute, both surfaces strigose, hairs glandular present. Inflorescences 6–8 cm long, terminal, peduncle 2–4 cm long; flowers sessile; bracts equal, ca. 6 mm long, spirallate, lanceolate, margin ciliate, apex acute, adaxial surface hirsute, persistent in fructification; calyx 16–18 mm long, not immersed in the depressions of the rachis, persistent in fruit, tubular, 5-toothed, purplish-green, hirsute, hairs glandular over the veins only; corolla 23–26 mm long, hypocrateriform, not bilabiate, violet to lilac, puberulous, hairs glandular present at apical part only; stamens 4, didynamous, adnate to the corolla tube to its upper third, thecae parallel, connective appendages subsessile; ovary ca. 1 mm long. Fruit schizocarp, composed of 4 cluses, brown, outer surface rugose, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, 23.X.2018, fl., *L.G. Pedrosa 916* (OUPR). Venda do Campo e Parque Estadual do Itacolomi, 24.I.2019, fl., *L.G. Pedrosa 1267* (OUPR).

Additional material: BRAZIL. MINAS GERAIS: Baependi, estrada da Pousada Campos de Altitude para o Centro de Apoio ao Pesquisador, 24.III.2017, fl. and fr., *P.H. Cardoso & F.R.G. Salimena 20* (CESJ).

Glandularia phlogiflora can be recognized by having hirsute branches; oval-lanceolate leaves; inflorescences represented by multifloral spikes arranged in terminal umbel; calyx with purplish veins; and corolla violet to lilac with tube up to 26 mm long. It is distributed in eastern regions of Argentina, Paraguay, and Brazil from the Central-West to South and Southeast regions, in the Atlantic Forest, Pampa, and Pantanal domains (O'Leary & Thode 2016; O'Leary *et al.* 2020). In ISP, two specimens were recorded, one cited from “campo sujo/encosta” and the second on a hill; we presume it could be considered as a *campo rupestre* physiognomy and along roadsides. Collected in flower and fruit in January and October.

2. *Lantana camara* L., Sp. pl. 2: 627. 1753. Typus: Habitat in America caldiore: *C. Linnaeus 783.4* (lectotypus, designated by Moldenke & Moldenke (1983), photography in LINN!). Fig. 2b

Shrubs, 0.3–1.5 m tall, branches tetragonal, armed with prickles, hirsute, hairs glandular present. Leaves opposite, petiolate, blade 2–9 × 1–5 cm, chartaceous, elliptical to ovate, base attenuate, margin crenate, apex acute-acuminate, adaxial surface hirsute to strigose, abaxial surface hirsute, hairs glandular present. Inflorescences 0.7–1.3 cm long, axillary, 1 per axil, peduncle 1–4 cm long; flowers sessile; bracts equal, ca. 3 mm long, spirallate, deciduous in fructification, lanceolate, margin ciliate, apex acute, adaxial surface tomentose; calyx ca. 2 mm long, not immersed in the depressions of the rachis, persistent in fruit, tubular, 2-lobed, each lobe 2-toothed, green, pubescent, hairs glandular present; corolla 7–10



Figure 2 – a-h. Verbenaceae of Itacolomi State Park – a. *Glandularia phlogiflora*; b. *Lantana camara*; c. *Lantana fucata*; d. *Lantana tiliaefolia*; e. *Lantana trifolia*; f. *Lippia brasiliensis*; g. *Lippia hermannioides*; h. *Lippia origanoides*. (Photos: a. Sérgio Bordignon; f,h. Luciano Pedrosa; b,c,d,e,g. Vitor Araújo)

mm long, hypocrateriform, bilabiate, red, yellow, orange or pink, pubescent, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 2 mm long. Fruit drupe, composed of 1 pyrene, green when immature, purple to black when mature, outer surface rugose, partly surrounded by the calyx.

Selected material: Mariana, Parque Estadual do Itacolomi, Margem do Maynard, 3.II.2006, fl., *M.C.T.B. Messias 1094* (OUPR). Ouro Preto, estrada de baixo, 43°30'27.66"W, 20°24'30.65"S, 1,237 m, 19.I.2021, fl. and fr., *V.A. Silva 44* (OUPR); trilha do Calais, 43°30'19.18"W, 20°24'29.19"S, 1,225 m, 14.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 11* (OUPR); Serrinha, 43°26'32.12"W, 20°24'44.41"S, 1,075 m, 17.XII.2020, fl. and fr., *V.A. Silva & L. Echternacht 35* (OUPR); 43°27'12.69"W, 20°25'12.56"S, 1,242 m, 17.XII.2020, fl. and fr., *V.A. Silva & L. Echternacht 37* (OUPR).

Lantana camara can be easily identified by its prickly branches; equal bracts, deciduous in fructification and red, yellow or orange corollas. In ISP, a specimen with pink corolla and red to orange throat was found (voucher *V.A. Silva 44*). In this regard, Sanders (2001) categorizes the corolla colors from yellow to orange as wild forms of *L. camara*, and the other variations may be derived from introgression with cultivated forms. This species is native to tropical America, but currently occurs in several areas of the globe, making it the most widely distributed species of the genus (Silva 1999). In Brazil it occurs in all states and phytogeographic domains; it is a ruderal species of invasive behavior and is cultivated for ornamental purposes (Lorenzi 1991; Silva *et al.* 2020). In ISP, this species was registered in anthropic areas, along trails, roadsides, close to the banks of the Maynard river and in degraded areas, rarely occurring above 1,240 m elevation. Collected in flower and fruit in January, February, November and December.

3. *Lantana fucata* Lindl., Bot. Reg., 10: t. 798. 1824. Typus: BRAZIL. BAHIA: Salvador, *J. Lindley* (lectotypus, designated by Silva (2001), [illustration] in Icon. Bot. Reg. 10: t. 798. 1824).

Fig. 2c

Shrubs, 0.7–2 m tall, branches tetragonal, without prickles, pubescent to hirsute, hairs glandular present. Leaves opposite, petiolate, blade 0.8–6 × 0.3–3 cm, chartaceous, ovate-elliptical, base truncate or attenuate, margin serrate, apex acute, adaxial surface strigose to pubescent, abaxial surface tomentose to hirsute, hairs glandular present. Inflorescences 0.9–2.5 cm long, axillary,

1 per axil, peduncle 0.5–3.7 cm long; flowers sessile, bracts unequal, spirallate, persistent in fructification, external 7–9 mm long, wide-ovate, internal 4–7 mm long, ovate, margin ciliate, apex acuminate, adaxial surface pubescent; calyx ca. 1 mm long, not immersed in the depressions of the rachis, persistent in fruit, tubular, 2-lobed, each lobe 2-toothed, green, sericeous, hairs glandular present; corolla 6–10 mm long, hypocrateriform, bilabiate, lilac or pink, throat yellow, pubescent, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 1 mm long. Fruit drupe, composed of 1-pyrene, green when immature, magenta to vinaceous when mature, outer surface rugose, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, 43°30'25"W–43°29'07"W, 20°24'29"S–20°25'03"S, 1,110–1,450 m, 13.V.1998, fl., *J.A. Lombardi 2268* (CESJ); Alto do Itacolomi, 19.VII.1972, fl., *J. Badini* (OUPR 19376); Brejo depois da pocilga, próximo ao forno abandonado, 30.VII.1997, fl., *H.C. de Sousa & A.V.M. Matos 162* (OUPR); estrada de baixo - transecto 1, 18.X.2001, fl. and fr., *V.F. Dutra 81* (OUPR); estrada do Museu do Chá, sentido est. do Tesoureiro, 43°30'46.09"W, 20°26'9.64"S, 1,317 m, 15.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 18* (OUPR); Lagoa do Manso, 1.II.2002, *A. Oliveira & A.G. Rocha* (OUPR 17507); Pico do Itacolomi, no meio de Serra, 19.VIII.1972, *M.A. Lisboa* (OUPR 3136); trilha do Calais, 43°30'19.18"W, 20°24'29.19"S, 1,225 m, 14.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 12* (OUPR); trilha do forno, Mata 1,340 m, 43°30'12"W, 20°25'22"S, 28.X.2009, fl., *E.S. Cândido et al. 239* (OUPR); trilha do Mirante do Custódio, 43°30'5.21"W, 20°27'5.08"S, 1,319 m, 15.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 16* (OUPR); trilha para o Sertão, 43°28'9.65"W, 20°25'56.08"S, 1,605 m, 16.XI.2020, fl. and fr., *V.A. Silva & L. Echternacht 28* (OUPR); 43°27'52.60"W, 20°26'11.12"S, 1,450 m, 16.VI.2020, fl. and fr., *V.A. Silva & L. Echternacht 30* (OUPR).

Lantana fucata is recognized by unequal bracts, the external ones wide-ovate and the internal ovate, with apex acuminate, being persistent in fructification, and lilac or pink corollas with a yellow throat. The species occurs in temperate subtropical and tropical regions of the Americas (Silva 1999). In Brazil it occurs in the Northeast, Center-West, Southeast, South, and North (only in Pará state); and in all phytogeographic domains, often associated with anthropic environments (Silva *et al.* 2020). It is widely distributed in ISP, being found in *campo rupestre* close to quartzitic outcrops, anthropized areas, along trails and

roadsides, near streams and along secondary forest borders. Collected in flower in May and August, and in fruit in January, October and November.

4. *Lantana tiliaefolia* Cham., *Linnaea* 7(1): 122. 1832. Typus: BRAZIL. BAHIA: *F.W. Sieber* (lectotypus, designated by Silva (2001), photography in B! [11502-010]). Fig. 2d

Shrubs, ca. 2 m tall, branches tetragonal, armed with prickles, villous, hairs glandular abundant. Leaves decussate, petiolate, blade 4–8.5 × 2.5–5.5 cm, chartaceous, cordiform to ovate, base cordate, margin serrate, apex acute to acuminate, adaxial surface pubescent, abaxial surface villous, abundant hairs glandular on both surfaces. Inflorescences 1–1.5 cm long, axillary, 1 per axil, peduncle 4–9 cm long; flowers sessile; bracts unequal, spirallate, persistent in fructification, external 6–7 mm long, lanceolate to oblong, internal 4–5 mm long, narrow-elliptical, margin ciliate, apex acute to obtuse, adaxial surface tomentose; calyx ca. 2 mm long, not immersed in the depressions of the rachis, persistent in fruit, tubular, 2-lobed, each lobe 2-toothed, green, villous, hairs glandular present; corolla ca. 11 mm long, hypocrateriform, bilabiate, red, rarely yellow or orange, pubescent, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary 1–2 mm long. Fruit drupe, composed of 1-pyrene, green when immature, black when mature, outer surface smooth, partly surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, Morro do Cachorro, próximo às antenas, 43°30'19.10"W, 20°25'5.71"S, 1,524 m, 22.I.2021, fl. and fr., *V.A. Silva* 50 (OUPR).

Lantana tiliaefolia is distinguished by having abundant glandular hairs covering all parts of the plant; leaves with cordate base; peduncle up to 9 cm long; unequal bracts, the external ones lanceolate to oblong and the internal narrow-elliptical, with apex acute to obtuse; and red, yellow or orange corollas. It is a widely distributed species across the Neotropics (Silva 1999; Silva & Lima 2012). In Brazil, it occurs in the North, Northeast and Southeast regions, in the Amazon Rainforest, Caatinga, Cerrado, and Atlantic Forest domains (Silva *et al.* 2020). During the fieldwork, a small but well-developed population was found in anthropized areas of quartzitic *campo rupestre*, in Morro do Cachorro at approximately 1,500 m elevation. Collected in flower and fruit in January.

5. *Lantana trifolia* L., Sp. Pl. 2: 626. 1753. Typus: Pl. Amer. (Burmam ed.), designated by Verdcourt (1992), t. 70. 1756. Fig. 2e

Shrubs, 0.5–2 m tall, branches tetragonal, without prickles, strigose, hairs glandular present. Leaves 3–4-verticillate, petiolate, blade 3.2–9 × 1.4–4.8 cm, chartaceous to coriaceous, ovate to oval-elliptical, base cuneate, margin crenate, apex acute, adaxial surface strigose, abaxial surface tomentose, hairs glandular present. Inflorescences 0.8–4 cm long, axillary, 1–2 per axil, peduncle 3–8 cm long; flowers sessile; bracts unequal, spirallate, persistent in fructification, external 6–8 mm long, ovate to lanceolate, internal 3–5 mm long, ovate, margin ciliate, apex caudate, adaxial surface sericeous; calyx 1–2 mm long, not immersed in the depressions of the rachis, accrescent in fruit, tubular, 2-lobed, green, sericeous, hairs glandular present; corolla ca. 5 mm long, hypocrateriform, bilabiate, lilac or pink, throat yellow, pubescent, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 0.5 mm long. Fruit drupe, composed of 1-pyrene, green when immature, pink to purple when mature, outer surface rugose, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, Base do Itacolomi, 24.X.1978, fl., *J. Badini* (OUPR 23691); estrada de baixo, 43°30'27.66"W, 20°24'30.65"S, 1,237 m, 19.I.2021, fl. and fr., *V.A. Silva* 45 (OUPR); Fazenda do Manso, 8.XII.1984, *J. Badini* (OUPR 26478); trilha de Calais, 43°30'18.97"W, 20°24'29.89"S, 1,216 m, 18.I.2021, fl. and fr., *V.A. Silva* 40 (OUPR).

Lantana trifolia is recognized by strigose and unarmed branches; leaves 3–4-verticillate; external bracts ovate-lanceolate with caudate apex; corolla ca. 5 mm long; and infructescences with several pink to purple fruits at maturity. It is a Neotropical species (Silva 1999), invasive and ruderal (Lorenzi 1991; Silva & Lima 2012), widely distributed in Brazil, from the Amazon Rainforest to Cerrado and Atlantic Forest domains (Silva *et al.* 2020). In ISP it was found in anthropized areas, along trails and roadsides, and near the Park headquarters. It was collected in flower and fruit in January, October, November and December.

6. *Lippia brasiliensis* (Link) T.R.S. Silva, *Darwiniana* 40: 58. 2002. *Lantana brasiliensis* Link, *Enum. hort. berol.* alt. 2: 126. 1822. Typus: BRAZIL. SÃO PAULO: Parque do Estado de São Paulo, 10.XII.1930, *F.C. Hoehne* (neotypus,

designated by Silva (2001), photography in SPF! [10380]; isoneotypus photography in NY! [00452405]). Fig. 2f

Shrubs, 1–2 m tall, branches tetragonal, without prickles, strigose, glabrescent, hairs glandular absent. Leaves decussate, petiolate, blade 3–16.2 × 0.6–5.2 cm, chartaceous, elliptical, base attenuate, decurrent along the petiole, margin entire near the base, serrate toward the apex, apex acuminate, sparsely strigose on both surfaces, hairs glandular absent. Inflorescences 1.2–2.4 cm long, axillary, 1 per axil, peduncle 0.3–1 cm long; flowers sessile, bracts equal, ca. 10 mm long, spirallate, persistent in fructification, lanceolate, margin ciliate, apex acute, adaxial surface sericeous; calyx ca. 4 mm long, not immersed in the depressions of the rachis, persistent in fruit, tubular, 2-lobed, each lobe 2-toothed, green, sericeous, hairs glandular present; corolla 8–12 mm long, hypocrateriform, bilabiate, white, throat yellow, pubescent, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 0.5 mm long. Fruit drupe, composed of 2-pyrens, brown, outer surface smooth, partly surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, 28.III.2019, fl. and fr., *L.G. Pedrosa 1496* (OUPR); 22.XII.2019, fl. and fr., *L.G. Pedrosa 2397* (OUPR).

Lippia brasiliensis can be identified by its elliptical leaves with sparsely strigose indumentum on both surfaces, serrate margin from middle to apex; equal and lax bracts, about 10 mm long; and white corollas with yellow throat. It occurs in Argentina, Brazil, Guyana, Paraguay and Venezuela (Múlgura *et al.* 2012). In Brazil, it is distributed in the South, Southeast and Northeast regions, in Caatinga, Cerrado, Atlantic Forest and Pampa domains (Salimena & Cardoso 2020). In ISP it was found inside the forest only, in flower and fruit in the months of March and December.

7. *Lippia hermannioides* Cham., *Linnaea* 7: 219. 1832. Typus: BRAZIL. MINAS GERAIS: *F. Sellow 1443* (lectotypus, designated by Cardoso *et al.* (2021c), photography in B! [100279590]).

Fig. 2g

Shrubs, 0.5–2 m tall, branches cylindrical, without prickles, strigose, hairs glandular present. Leaves decussate, subpetiolate, blade 0.2–2 × 0.1–1 cm, chartaceous, elliptical to obovate, base cuneate, margin entire up to the middle, crenate towards

the apex, apex acute to obtuse, adaxial surface scabrous, abaxial surface hirsute, hairs glandular present. Inflorescences 1–1.5 cm long, axillary, 1 per axil, peduncle ca. 0.1 cm long; flowers sessile, bracts equal, 5–8 mm long, spirallate, persistent in fructification, lanceolate, margin ciliate, apex acute, adaxial surface pubescent to hirsute; calyx 2–3 mm long, not immersed in the depressions of the rachis, accrescent in fruit, tubular, 2-lobed, green, sericeous, hairs glandular present; corolla 6–9 mm long, hypocrateriform, bilabiate, white to pink, throat yellow, lilac or white, pubescent, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 0.5 mm long. Fruit schizocarp, composed of 2 cluses, brown, outer surface smooth, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, Calais, 2.II.2009, fl., *M.C.T.B. Messias 2304* (OUPR); 5.II.2004, fl., *M.C.T.B. Messias 852* (OUPR); Canga Ferruginosa, próx. à Estrada do Tesoureiro, 43°31'2.89"W, 20°26'22.38"S, 1,370 m, 15.XI.2020, fl., *V.A. Silva & A. Soldevila 25* (OUPR); estrada de baixo, 43°30'39.60"W, 20°24'56.85"S, 1,293 m, 22.I.2021, fl., *V.A. Silva 48* (OUPR); trilha do Calais, 43°30'8.56"W, 20°24'39.93"S, 1,276 m, 14.XI.2020, fl., *V.A. Silva & A. Soldevila 14* (OUPR); trilha do Calais, 43°30'7.03"W, 20°24'37.90"S, 1,259 m, 18.I.2021, fl., *V.A. Silva 42* (OUPR); Serrinha, 43°27'10.05"W, 20°25'10.56"S, 1,224 m, 17.XII.2020, fl., *V.A. Silva & L. Echternacht 36* (OUPR); subida para o Itacolomi, 13.IV.1986, fl., *M.V. Peron* (OUPR 26782).

Additional material: BRAZIL. MINAS GERAIS: Biribiri, Alto da Jacuba, estrada entrando em frente ao Campus II da UFVJM, 43°33'15" W, 18°12'10"S, 9.IV.2016, fl. and fr., *J.E.Q. Faria 5621* (CESJ). APA Felício dos Santos, 43°17'21"W, 18°08'42"S, 10.VI.2006, fl. and fr., *F.R.G. Salimena et al. 1381* (CESJ).

Lippia hermannioides is a densely branched shrub, aromatic, with cylindrical branches; tiny, elliptical to obovate leaves, with margin crenate from middle to apex, revolute; inflorescences of up to 4–5 flowers; white corolla with strongly yellow throat before anthesis, changing to lilac with white throat after anthesis. It is endemic to Brazil, with records from the Central-West (Distrito Federal, Goiás), North (Tocantins), Northeast (Bahia) and Southeast (Minas Gerais) regions, occurring in the Caatinga, Cerrado, and Atlantic Forest domains (Salimena & Cardoso 2020). In ISP, the species occurs in quartzose *campo rupestre*, close to outcrops, associated with sandy to gravelly soils, as well as along roadsides and forest borders.

Nearby the Park borders, it occurs in ferruginous *campo rupestre* (Silva & Soldevila 25). It was more frequently observed in the Calais region, generally from 1,200 to 1,600 m elevation. Collected in flower and fruit in January, February, June, August, November, and December.

8. *Lippia origanoides* Kunth, Nov. Gen. Sp. 2: 267. 1817 [1818]. Typus: VENEZUELA. SUCRE: Cumana, Punta Araya, *F. Humboldt & A. Bonpland* (holotypus photography in P! [P00670117]; isotypus photography in P! [713713] and SI! [fragment of P, SI073903]). Fig. 2h

Shrubs, 0.4–2 m high, branches cylindrical, without prickles, hirsute, hairs glandular present. Leaves opposite, petiolate, blade 0.5–5 × 0.1–2 cm, chartaceous, oval-elliptical to oblong, base cuneate, margin crenate, apex obtuse, adaxial surface sericeous, abaxial surface tomentose, hairs glandular present. Inflorescences 0.4–1 cm long, axillary, 2–4 per axil, peduncle 0.1–0.2 cm long; flowers sessile, bracts equal, ca. 2 mm long, tetrastichous, persistent in fructification, ovate, margin ciliate, apex attenuate, adaxial surface hirsute; calyx ca. 1 mm long, not immersed in the depressions of the rachis, accrescent in fruit, tubular, 2-lobed, green, hirsute, hairs glandular present; corolla 3–4 mm long, hypocrateriform, bilabiate, white, throat yellow, hirsute, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 0.5 mm long. Fruit schizocarp, composed of 2 cluses, brown, outer surface smooth, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, a caminho do Pico do Itacolomi, 15.III.2020, fl., *L.G. Pedrosa 2782* (OUPR).

Additional material: BRAZIL. MINAS GERAIS: Lima Duarte, RPPN Serra Negra, 20.IV.2009, fl. and fr., *L.M. Neto et al. 679* (CESJ). Olaria, Serrinha, sítio do Rinaldo Degredo, 28.VII.2009, fl. and fr., *F.S. Souza et al. 751* (CESJ).

Lippia origanoides is a strongly aromatic shrub and can be distinguished from the other *Lippia* species in the ISP by its tiny inflorescences, numerous per axil; and tetrastichous and imbricate bracts. This species presents a great variation in the size and shape of the leaves, with almost 30 synonyms recognized for this taxon (O’Leary *et al.* 2012; Salimena & Cardoso 2020). It is widely distributed in South America, with records from Bolivia, Brazil, Guyana, Paraguay, Argentina, and

Venezuela. It is also found in Mesoamerica (Costa Rica and Mexico) and in the southern United States (O’Leary *et al.* 2012). In Brazil, it occurs in all regions and almost all phytogeographic domains, except in Pampa (Salimena & Cardoso 2020). In ISP, it can be found in quartzitic *campo rupestre*, along the Calais trail, and on the way to Pico do Itacolomi (personal communication of Luciano Pedrosa). Collected in flower in March.

9. *Petrea volubilis* L., Sp. Pl. 2: 626. 1753. Typus: Habitat in America, [notes from Moldenke (1938): cultivated plant in George Clifford’s garden, Netherlands, Hartecamp, material from Veracruz, Mexico], 1735-1737, *C. Linnaeus* (lectotypus, designated by Moldenke (1938), photography in BM! [BM000646189]). Fig. 3a

Lianas, branches cylindrical, without prickles, glabrous. Leaves decussate, petiolate, blade 2.4–7.5 × 0.6–3 cm, chartaceous, elliptical to obovate, base cuneate, margin entire, apex acute or obtuse, both surfaces glabrous. Inflorescences 22–27.5 cm long, axillary; flowers pedicellate, pedicel ca. 10 mm long; bracts equal, ca. 4 mm long, solitary, deciduous in fructification, lanceolate, margin ciliate, apex acute, adaxial surface puberulous; calyx 11–20 mm long, not immersed in the depressions of the rachis, accrescent in fruit, cylindrical-tubular, 5-lobed, lilac, puberulous, hairs glandular present; corolla 6–10 mm long, infundibuliform, not bilabiate, lilac, throat white, puberulous, hairs glandular present in lobes only; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 1.5 mm long. Fruit drupe, composed of 2-pyrenate, brown, outer surface rugose, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, 3.III.2019, fl., *L.G. Pedrosa 1380* (OUPR).

Additional material: BRAZIL. MINAS GERAIS: São Roque de Minas, Vale dos Cândidos, 16.X.1997, fl. and fr., *R. Romero et al. 4715* (CESJ).

Petrea volubilis is characterized by its lianescent habit; leaves with entire margin; racemose inflorescences; lilac, petaloid calyx, longer than the corolla; and deciduous corollas. It is the most widely distributed species of the genus, occurring from southern Mexico to Peru and Paraguay, with great variation in leaf size, flower size, habit, and indument, which has contributed to a long list of synonyms (Rueda 1994). In Brazil, it occurs in all regions, from the Amazon Rainforest, Cerrado, to the Atlantic Forest domains (Cardoso



Figure 3 – a-i. Verbenaceae of Itacolomi State Park – a. *Petrea volubilis*; b. *Stachytarpheta cayennensis*; c-d. *Stachytarpheta commutata* from quartzitic *campo rupestre* – c. habit; d. inflorescences and rotund, crenate leaves; e-f. from ferruginous *campo rupestre* (*canga*) – e. habit; f. inflorescences and obovate crenate-serrate leaves; g. *Stachytarpheta glabra**; h. *Verbena litoralis*; i. *Verbena rigida*. (Photos: a. Mauricio Mercadante; i. Rodrigo Penati; d. Livia Echter; b,c,e,f,g,h. Vitor Araújo). * = Species found near the limits of the Park.

& Salimena 2020b), being also recorded in the Canastra and Itatiaia National Parks. In ISP, one specimen was recorded, cited from “*campo sujo*” on the specimen label; we presume this could be considered as a *campo rupestre* physiognomy. In personal contact with the collector, we were informed that the specimen was found close to the trail in the Calais region. In spite of the fact that this species frequently escapes cultivation (Rueda 1994), we cannot assume that it is not native from the ISP, since it was collected within native vegetation. Collected in flower in March.

10. *Stachytarpheta cayennensis* (Rich.) Vahl, Enum. Pl. 1: 208. 1804. *Verbena cayennensis* Rich., Actes Soc. Hist. Nat. Paris 1: 105. 1792. Typus: FRENCH GUIANA. CAYENNE: 1792, *M. Leblond 356* (lectotypus, designated by Munir (1992), photography in G! [G00366556]).

Fig. 3b

Subshrubs, 0.3–1 m tall, branches tetragonal, without prickles, pubescent on opposite surfaces, glabrescent on the other two, hairs glandular absent. Leaves opposite, petiolate, blade 0.9–6 × 0.5–2.3 cm, chartaceous, ovate to oblong, base attenuate, decurrent along the petiole, nectaries conspicuous abaxially, margin serrate, apex acute, adaxial surface glabrescent to strigose, abaxial surface sparsely pubescent, hairs glandular absent. Inflorescences 14–33 cm long, terminal, peduncle 0.3–1.5 cm long; flowers sessile; bracts equal, 3–5 mm long, adpressed to the calyx, persistent in fructification, lanceolate, margin puberulous, apex acuminate, adaxial surface glabrescent; calyx 5–6 mm long, immersed in the depressions of the rachis, persistent in fruit, tubular, 4-toothed, purplish-green, pubescent, hairs glandular absent; corolla 6–8 mm long, hypocrateriform, not bilabiate, lilac to violet, throat white, glabrous; stamens 2 fertile, 2 staminodes, adnate to the corolla tube to its upper third, thecae divergent, connective appendages absent; ovary ca. 1.5 mm long. Fruit schizocarp, composed of 2 cluses, brown, outer surface reticulate, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, Canga Ferruginosa, próx. à Estrada do Tesoureiro, 43°30'51.65"W, 20°26'25.55"S, 1,317 m, 15.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 20* (OUPR); 43°30'55.83"W, 20°26'30.08"S, 1,366 m, 15.XI.2020, fl., *V.A. Silva & A. Soldevila 26* (OUPR); estrada de baixo, 43°30'28.63"W, 20°24'29.40"S, 1,187 m, 19.I.2021, fl., *V.A. Silva 43* (OUPR); Margem do Domingos, 3.II.2006, fl., *M.C.T.B. Messias 1096* (OUPR); Lagoa do Manso, 12.III.1999, *H.C. de*

Sousa (OUPR 22360); próximo à Fazenda do Manso, 22.XI.2001, fl., *M.C.T.B. Messias & V.F. Dutra 529* (OUPR); trilha do Calais, 43°30'19.18"W, 20°24'29.19"S, 1,225 m, 14.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 13* (OUPR).

Stachytarpheta cayennensis can be recognized by the tetragonal branches with indumentum pubescent on two opposite surfaces and glabrescent in the other two; inflorescences up to 33 cm long; calyx immersed in the depressions of the rachis; and lilac or violet corollas. It is distributed across the Americas, being naturalized in tropical and subtropical regions (Atkins 2005). In Brazil, it occurs in all regions and phytogeographic domains, as a ruderal species (Lorenzi 1991; Cardoso & Salimena 2020a). In ISP, it is found in anthropized areas, along trails and roadsides, close to the Park headquarters, near streams and along borders of secondary forest. Collected in flower and fruit in January, February, March, and November.

11. *Stachytarpheta commutata* Schauer, Prodr. [A. P. de Candolle] 11: 570. 1847. Typus: BRAZIL. MINAS GERAIS: In umbrosis saxosis montis Itacolumni et alibi in editis montosis prov. Minarum Brasiliæ, *F. Sellow* (lectotypus, designated by Cardoso *et al.* (2019d), photography in G! [G00366568!]; isolectotypus photography in HAL! [HAL0115265!] and K! pro parte [K000065196]). = *Stachytarpheta viscidula* Schauer. Prodr. [A.P. de Candolle] 11: 570. 1847. Typus: BRAZIL. MINAS GERAIS: In montosis prov. Minarum Brasiliæ, Cachoeira do Campo, 1840, *P. Claussen 1044* (lectotypus, designated by Cardoso *et al.* (2019d), photography in BR! [BR0000008024848]; isolectotypus photography in BR! [BR0000005503247, BR0000008024862], G! [G00677950, G00677951, G00418953], HAL! [HAL0115151], K! [K000065255], M! [M0111682], NY! [NY00138119, NY00138120], P! [P00713824, P02994764], and W! [W0073888]). *syn. nov.*

Fig. 3c-f

Shrubs, 0.3–2 m tall, branches cylindrical, without prickles, villous, hairs glandular absent. Leaves opposite, petiolate, blade 0.7–4 × 0.4–2.6 cm, chartaceous, obovate to rotund, base attenuate, decurrent along the petiole, nectaries conspicuous abaxially, margin crenate to serrate, apex rounded, obtuse or acute, adaxial surface sericeous to villous, abaxial surface villous, hairs glandular present. Inflorescences 1–4 cm long, rachis elongated in fructification up to 8 cm long; terminal, peduncle 0.1–0.7 cm long, flowers sessile; bracts equal,

7–12 mm long, adpressed to the calyx, persistent in fructification, lanceolate, margin ciliate, apex acute, adaxial surface villous; calyx 9–12 mm long, not immersed in the depressions of the rachis, persistent in fruit, tubular, 4-toothed, purplish-green, sericeous-villous, hairs glandular present; corolla 16–17 mm long, hypocrateriform, not bilabiate, blue, pubescent, hairs glandular present; stamens 2 fertile, 2 staminodes, adnate to corolla tube up to the middle, thecae divergent, connective appendages absent; ovary ca. 2 mm long. Fruit schizocarp, composed of 2 cluses, brown, outer surface reticulate, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, Alto do Itacolomi, 15.VIII.1972, *M.A. Lisboa* (OUPR 3135); 26.II.1986, fl., *M.V. Peron* (OUPR 5755); Canga Ferruginosa, próx. à Estrada do Tesoureiro, 43°31'2.89"W, 20°26'22.38"S, 1,370 m, 15.XI.2020, fl., *V.A. Silva & A. Soldevila 24* (OUPR); 43°30'59.96"W, 20°26'21.79"S, 1,356 m, 15.XI.2020, fl., *V.A. Silva & A. Soldevila 22* (OUPR); caminho para o Pico do Itacolomi, 17.VII.1979, fl., *G. Martinelli & A.M. Carvalho 4738* (RB); *L. Damazio* (RB 607294); *campo rupestre* no caminho para o Pico do Itacolomy, 1,480 m, 43°29'48"W, 20°25'02"S, 27.X.2006, fl., *F. Marino et al. 101* (RB, BHCB); estrada da torre, 5.III.1994, fl., *M.B. Roschel & S. Dias* (OUPR 7398); Lagoa Seca, 22.X.2008, fr., *M.C.T.B. Messias & M. Gastauer 2237* (OUPR); Morro do Cachorro, 29.IX.1973, *J. Badini* (OUPR 3498); 29.IX.1973, fl., *J. Badini* (OUPR 21416); Pico do Itacolomi, trilha do Baú, 12.VI.1999, fl., *M.G. Bovini & G.A. Moraes 1650* (RB, RUSU); Pico d'Itacolomy, 1883-1884, fl. and fr., *A.F.M. Glaziou 15329* (K); 25.II.1987, *T.S.M. Grandi et al.* (BHCB 8238); 1,600 m, 43°30'25"W, 20°24'29"S, 13.V.1998, fl., *L.G. Temponi 4* (BHCB, CESJ); Pico do Itacolomi, *F.C. Pinto* (OUPR 3575); fl., *M.A. Zurlo* (OUPR 26319); Serra do Itacolomim, 22.IV.1957, fl., *E. Pereira & Pabst 3076* (RB); triha para Lagoa Seca, 30.I.2006, fl., *M.C.T.B. Messias 1016* (OUPR); trilha da Lagoa, 1,582 m, 43°29'14"W, 20°25'58"S, 7.VI.2008, fl., *G.E. Valente et al. 2361* (VIC); 10.VIII.1895, fl. and fr., *Herb. Schwacke 11530* (RB); trilha do Pico do Itacolomi, 43°29'19.95"W, 20°25'57.40"S, 1,611 m, 14.XI.2020, fl., *V.A. Silva & A. Soldevila 15* (OUPR); trilha para o Sertão, 43°28'8.39"W, 20°25'57.16"S, 1,591 m, 16.XI.2020, fl., *V.A. Silva & L. Echternacht 29* (OUPR).

Additional material: BRAZIL. MINAS GERAIS: Cachoeira do Campo, IV. 1839, fl., *P.C.D. Claussen/L. Riedel 131* (BR0000005503247); 1840, fl., *P.C.D. Claussen 1044* (BR8024862, NY138118, HAL115151, SI3634, NY138119, P713824, M111682, K65255, F17622); 1840, fl., *P.C.D. Claussen* (P02994764, NY00138120); VIII-IV.1840, *P.C.D. Claussen* (BR8024848, K65195). Ouro Preto, habitat em subalpini ferruginossi campis inter Pires et V. Rica. Provinciae Min.

Ger., fl., *C.F.P. von Martius 888* (M0111683, M0111684, SI003627); 1814-1831, fl., *F. Sellow* (F0BN017608, G00366568, HAL0115265).

Stachytarpheta commutata is characterized by its cylindrical, completely hairy branches; leaves obovate to rotund, with crenate to serrate margin; and congested inflorescences. Flowers at anthesis are dark blue with black throat, thereafter gradually changing to light blue to purple. It is endemic to the *campo rupestre* of Minas Gerais state (Atkins 2005; Cardoso & Salimena 2020a). In this study area, it can be found along the Lagoa Seca trail, on the way to the Peak, Morro do Cachorro, and in Sertão. In Sertão and Morro do Cachorro regions, it is found close to rocky outcrops, and in Lagoa Seca it occurs near the trail, in *campo limpo* vegetation, over white sandy, quartzose soil. However, it was also found on the ferruginous *canga* outside the protected area of the ISP (*Silva & Soldevila 22, 24*), where well developed populations are observed, with individuals up to 2 m tall. This species is distributed in ISP generally from 1,250 to 1,650 m above sea level. Collected in flower almost all year round, except in the months of April and July, and in fruit in the month of October. Atkins (2005) considered *S. commutata* as an endangered species, according to IUCN categories.

Stachytarpheta commutata was described by Schauer (1847) based on gatherings of Martius, Lund, Riedel, and Sellow (all without collector number), from the Itacolomi region, in Minas Gerais. In sequence, Schauer (1847) described *S. viscidula*, having as syntypes specimens collected by Riedel s.n. and Claussen ("Mart. h. bras. n. 1044"), from Cachoeira do Campo, a district of Ouro Preto municipality (Atkins 2005), located just ca. 22 km from the type locality of *S. commutata*. Schauer (1847) distinguished *S. viscidula* from *S. commutata* by its subviscid-villous indumentum and oblong leaves. Atkins (2005) also considered both as distinct species, being *S. viscidula* characterized by its much more viscid indumentum, obovate leaves and inflorescences up to 7 cm long, while *S. commutata* by its less viscid indumentum, rotund leaves and inflorescences up to 3 cm long. According to Atkins (2005), *S. viscidula* is known from the type specimen only.

Cardoso *et al.* (2019d) typified these two names, choosing as lectotype of *S. commutata* the collection of Sellow housed at G, and of *S. viscidula* the specimen of Claussen deposited at BR (full citation in the species heading). When they designated the lectotype of *S. viscidula*, 11

syntypes of Claussen that fit the circumscription of *S. commutata* were excluded from the type collection of this species, since it eventually represents a mixture of different species (Cardoso *et al.* 2019d). Thus, only three of Claussen's specimens deposited at BR were interpreted by Cardoso *et al.* (2019d) as the type specimens of *S. viscidula*. Two other specimens deposited at P and W, which also have oblong leaves, following the circumscription of Schauer (1847) and Atkins (2005), were recognized as *S. viscidula* (Cardoso *et al.* 2019d). Despite the close geographic distribution of these species and the few morphological differences, both have continued to be treated as distinct species (Cardoso & Salimena 2020a).

However, during field work, it was possible to observe that in some populations of *Stachytarpheta commutata*, leaf shape varied from rotund to obovate. In the quartzitic *campo rupestre*, individuals with rotund leaves and crenate margins are frequently found, but in the *canga* leaves are obovate with crenate-serrate margins (Fig. 3e-f). Indumentum also varies according to the environment: when it occurs over rocky, ferruginous or quartzitic soil, individuals present densely hairy branches, but when in sandy soils, indumentum becomes less dense. Regarding the inflorescence length, in the genus *Stachytarpheta*, most species have inflorescences that elongate during fructification (Atkins 2005; Cardoso & Salimena 2020a). Thus, this feature is weakly diagnostic for the recognition of two taxa. Therefore, it is notable that the morphological differences established in the past circumscriptions to distinguish the sympatric *S. commutata* and *S. viscidula* (Schauer 1847; Atkins 2005) indeed represent variations of what we consider as a single taxon.

These names were described in the same work (Schauer 1847), with no priority over each other. However, we consider *S. commutata* as the accepted name, because it has been more commonly applied in herbaria, and *S. viscidula* as its synonym.

12. *Stachytarpheta glabra* Cham., *Linnaea* 7: 250. 1832. Typus: BRAZIL: *F. Sellow* (lectotypus, designated by Cardoso *et al.* (2019d), photography in K! [K000065054]; isolectotypus photography in BR! [BR0000005505036] and G! [G00366569, G00366582]). Fig. 3g

Shrubs, 1–2 m tall, branches cylindrical, without prickles, glabrous. Leaves decussate, petiolate, blade 1.4–5.6 × 0.4–2.2 cm, chartaceous, elliptical to wide-elliptical, base attenuate, decurrent along the petiole, nectaries conspicuous

abaxially, margin serrate, apex acuminate, both surfaces glabrous. Inflorescences 1.5–6.4 cm long, terminal, peduncle 0.2–0.8 cm long; flowers sessile, bracts equal, 5–7 mm long, adpressed to the calyx, persistent in fructification, lanceolate, margin glabrous, apex acute, adaxial surface glabrous; calyx 10–12 mm long, not immersed in the depressions of the rachis, persistent in fruit, tubular, 4-toothed, purplish-blue, glabrous; corolla ca. 18 mm long, hypocrateriform, not bilabiate, blue, puberulous, hairs glandular present; stamens 2 fertile, 2 staminodes, adnate to the corolla tube to its upper third, thecae divergent, connective appendages absent; ovary ca. 3 mm long. Fruit schizocarp, composed of 2 cluses, brown, outer surface reticulate, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, Canga Ferruginosa, próx. à Estrada do Tesoureiro, 43°30'59.96"W, 20°26'21.79"S, 1,356 m, 15.XI.2020, fl., *V.A. Silva & A. Soldevila 21* (OUPR); 43°31'2.89"W, 20°26'22.38"S, 1,370 m, 15.XI.2020, fl., *V.A. Silva & A. Soldevila 23* (OUPR); Estrada do Tesoureiro, 12.IV.2007, fl., *R.S. Araújo* (CESJ 52575). **Additional material:** BRAZIL. MINAS GERAIS: Ouro Preto, Campus UFOP, Canga DEGEO, 5.VI.2008, fl. and fr., *E.S. Cândido et al. 11* (OUPR); Serra das Camarinhas, Morro São Sebastião, a trilha se inicia na antiga pedreira e termina na nascente do Rio das Velhas, próxima à Rua das Camarinhas, 43°30'13"W, 20°22'12"S, fl. and fr., *C.C.V. Badia & L.R. Miguel 98* (OUPR).

Stachytarpheta glabra can be easily recognized by presenting glabrous branches, leaves, bracts and calyx; elliptical leaves with discolorous blade, dark green adaxially and light green abaxially, serrate margin; inflorescences in lax spikes; purplish-blue calyx and blue corollas. It is endemic to Minas Gerais state, notably to the quartzose and ferruginous *campo rupestre* (Atkins 2005; Cardoso & Salimena 2020a). It is found in *canga* vegetation bordering the ISP (*Silva & Soldevila 21, 23; Araújo s.n.*), with large populations, frequently at altitudes around 1,300 m elevation. Collected in flower in April and November.

13. *Verbena litoralis* Kunth. *Nov. Gen. Sp.* 2: 276. 1818. Typus: PERU. TRUJILLO: In salsis maritimis Oceani Pacifici prope Truxillo, Santa et Lima, *A.J.A. Bonpland* (lectotypus, designated by Macbride (1960), photography in P! [P500760]).

Fig. 3h

Herbs, 0.6–1.5 m tall, branches tetragonal, without prickles, glabrescent. Leaves opposite, sessile, blade 2.4–9.3 × 0.1–2 cm, membranaceous, narrow-elliptical, base attenuate, subamplexicaul,

margin entire near the base, serrate toward the apex, apex acute, adaxial surface sericeous, abaxial surface strigose, hairs glandular absent. Inflorescences 0.4–3.3 cm long, terminal, peduncle 0.3–5.5 cm long; flowers sessile; bracts equal, 2–3 mm long, spirallate, persistent in fructification, oval-lanceolate, margin ciliate, apex acuminate, adaxial surface strigose; calyx ca. 3 mm long, not immersed in the depressions of the rachis, accrescent in fruit, tubular, 5-toothed, purplish-green, pubescent, hairs glandular absent; corolla ca. 4 mm long, infundibuliform, not bilabiate, lilac, sericeous, hairs glandular present; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 1 mm long. Fruit schizocarp, composed of 4 cluses, brown, outer surface striate, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, Cerrado and gallery forest with some campo, 43°30'21"W, 20°23'15"S, 31.I.1971, 1,650 m, fl., *H.S. Irwin et al. 29512* (NY); Canga Ferruginosa, próx. à Estrada do Tesoureiro, 43°30'51.65"W, 20°26'25.55"S, 1,317 m, 15.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 19* (OUPR); estrada do Museu do Chã, sentindo est. do Tesoureiro, 43°30'45.60"W, 20°26'21.08"S, 1,318 m, 15.XI.2020, fl. and fr., *V.A. Silva & A. Soldevila 17* (OUPR); estrada de baixo, 43°30'38.34"W, 20°24'58.42"S, 1,247 m, 19.I.2021, fl. and fr., *V.A. Silva 47* (OUPR); Morro do Cachorro, 43°29'59.39"W, 20°25'20.53"S, 1,486 m, 22.I.2021, fl. and fr., *V.A. Silva 49* (OUPR); trilha do Calais, 43°30'18.97"W, 20°24'29.89"S, 1,216 m, 18.I.2021, fl. and fr., *V.A. Silva 41* (OUPR).

Verbena litoralis is characterized by glabrescent branches; leaves with margin serrate from middle to apex, attenuate, subamplexicaul base; numerous, cylindrical inflorescences; and lilac corollas less than 4 mm long. It is native to South America, widely distributed throughout North and Central America, South Africa, Australia and in the Pacific islands, showing great morphological variation (O'Leary *et al.* 2007). In Brazil, it occurs in the Central-West, Southeast and South regions, in the Cerrado, Atlantic Forest, and Pampa domains (O'Leary 2020). In ISP, it is recorded in anthropized areas, along trails and roadsides, and it was also found in Morro do Cachorro, in areas affected by fires.

14. *Verbena rigida* Spreng. Syst. veg. ed. 16.IV: 230. 1827. Typus: BRAZIL. RIO GRANDE DO SUL: *F. Sellow 428* (lectotypus, designated by Munir (2002), photography in VT! [UVMVT026303]; isolectotypus photography in P! [P00650861]). Fig. 3i

Herbs, 0.2–1 m tall, branches tetragonal, without prickles, hispid, hairs glandular absent.

Leaves decussate, sessile, blade 3.5–8.2 × 0.6–1.6 cm, chartaceous, oblong-elliptical, base truncate, margin incised-serrate, apex acute, adaxial surface scabrous, abaxial surface hispid, hairs glandular absent. Inflorescences 3.2–7.3 cm long, terminal, peduncle 0.9–2.6 cm long; flowers sessile; bracts equal, ca. 5 mm long, spirallate, persistent in fructification, narrow-ovate, margin ciliate, apex acuminate, adaxial surface hispid; calyx ca. 4 mm long, not immersed in the depressions of the rachis, accrescent in fruit, tubular, 5-toothed, purplish-green, pubescent, hairs glandular present; corolla (5–)8–10 mm long, hypocrateriform, not bilabiate, lilac, hirsute, hairs glandular absent; stamens 4, didynamous, adnate to corolla tube up to the middle, thecae parallel, connective appendages absent; ovary ca. 1.5 mm long. Fruit schizocarp, composed of 4 cluses, brown, outer surface striate, surrounded by the calyx.

Selected material: Ouro Preto, Parque Estadual do Itacolomi, 8.I.1988, fl., *J.L. Silva* (OUPR 2205).

Additional material: BRAZIL. MINAS GERAIS: Lima Duarte, RPPN Serra Negra, 22.II.2008, fl. and fr., *F.R.G. Salimena et al. 2616* (CESJ); 19.IX.2014, fl. and fr., *F.R.G. Salimena et al. 3758* (CESJ).

Verbena rigida can be distinguished by its leaves with incised-serrate margin and truncate base; inflorescences arranged in three paraclades, bracts longer than calyx; and conspicuous, lilac corollas, 8–10 mm long. It is native to South America, with records from Uruguay, Brazil, Bolivia, and Argentina. It is naturalized in Central America, the USA, parts of Europe, South Africa and East Asia (O'Leary *et al.* 2007). In Brazil, it is distributed in the Southeast, South and Central-West regions, in the Cerrado, Atlantic Forest, and Pampa domains (O'Leary 2020). In ISP, one specimen was registered near the Manso; recent records have not been observed. Collected in flower in January.

Our data indicate that species with ruderal and/or invasive behavior, such as *Lantana camara*, *L. trifolia*, *Stachytarpheta cayennensis* and *Verbena litoralis*, as well as widespread species, like *Lantana fucata*, *Lantana tiliaefolia*, *Lippia origanoides*, and *Verbena rigida*, occur in ISP mostly in areas with anthropic activities, such as along roads, and notably along the Calais trail, a region frequently affected by fire, and close to urbanization. This points to the fact that floristic composition changes under human impact (Fujaco *et al.* 2010; Messias *et al.* 2017). Calais is also the area where most

collections of *Lippia hermannioides* come from in the Park, and this is a species with a more restricted distribution than those previously cited, occurring mainly in the Cerrado (Bromley 1983; Salimena & Cardoso 2020).

Regarding species with more restricted distribution in Brazil, only *Stachytarpheta commutata* is endemic from *campo rupestre* in Minas Gerais state. Despite *S. commutata* being frequent in the Park, it is notable that its subpopulations are small and fragmented; ISP is important for the taxonomy of the species, being its type locality. *Stachytarpheta glabra* is recorded from one single area, over *canga*, close to the external border of the ISP; it is also an endemic species to MG state and an important representative of the threatened flora of the ferruginous *campo rupestre* (Jacobi *et al.* 2007).

This study contributes to the understanding of spatial distribution of Verbenaceae in the ISP, giving the basis for the development of management and conservation plans, especially regarding species with more restricted distribution patterns. Furthermore, the richness of the Verbenaceae was updated in relation to the previous floristic survey (Messias *et al.* 2017), by correction of misidentifications, recording specimens that were unidentified and additional field collections, demonstrating the importance of taxonomic studies at the family level. Additionally, the new synonym is a contribution to the taxonomy of *Stachytarpheta*, a genus especially rich in the Cerrado domains, but with complicated boundaries between some species.

Finally, the occurrence of Verbenaceae species with invasive behavior, anthropic preferences or remarkable presence in degraded areas, can be used to infer the influences of human impact on the landscape. Species with medicinal importance can also be part of environmental education activities in the Itacolomi State Park.

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