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Original Paper

Checklist of polypores (Agaricomycetes, Basidiomycota) reveals seventeen new records in Brazilian Atlantic Forest fragments at the Poços de Caldas Plateau, Minas Gerais[1]

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Abstract

This is the first survey of macrofungi carried out at the Poços de Caldas Plateau, Minas Gerais, Brazil, an area of high biological importance according to the Ministry of Environment. The survey of polypores was performed monthly, from June/2018 to May/2019 in ten transects (200 m² each) distributed in fragments of the Brazilian Atlantic Forest, a montane seasonal semideciduous forest. Two orders, 8 families, 21 genera, and 23 species were identified, of which one is a new record for Brazil, *Tropicoporus drechsleri*, and 16 are new records for the state of Minas Gerais. A list of species is included in this study, as well as illustrations for the new records, a key for taxonomic identification, and remarks on the distribution of the recorded species. The study also includes annotations about substrate, taxonomy discussion, and a full description of the new record for the country.

Keywords: Hymenochaetales, mycology, Neotropical fungi, Polyporales, taxonomy.

Resumo

Este é o primeiro inventário de macrofungos realizado no Planalto de Poços de Caldas, Minas Gerais, uma área de alta importância biológica de acordo com o órgão de política brasileira do meio ambiente, Ministério do Meio Ambiente. O levantamento de políporos foi executado mensalmente de junho/2018 até maio/2019, em dez transectos (200 m² cada) distribuídos em fragmentos de floresta estacional semidecidual montana da Mata Atlântica Brasileira. Duas ordens, 8 famílias, 21 gêneros e 23 espécies foram identificadas, dentre as quais verificou-se um novo registro para o Brasil, *Tropicoporus drechsleri*, e 16 novos registros para o estado de Minas Gerais. Uma lista de espécies está presente neste trabalho, bem como, uma prancha de fotos dos novos registros, uma chave para determinação dos táxons e comentários sobre a distribuição das espécies. O estudo também contempla anotações sobre o substrato, discussões taxonômicas e a descrição completa para o novo registro referente ao país.

Palavras-chave: Hymenochaetales, micologia, fungos neotropicais, Polyporales, taxonomia.

Introduction

Polypores are lignicolous macrofungi with tubular hymenophore, belonging to the class Agaricomycetes, phylum Basidiomycota (Ryvarden 1991; Webster & Weber 2007; Hibbett *et al*. 2014).

Polypores establish an ecological relationship with the substrate as saprobes, but can also act as parasites, and rarely as mycorrhiza (Zjawiony 2004). Saprobes play a major role in the global carbon cycle and in decomposition within ecosystems (Harvey & Thurston 2001; Dighton 2003). In addition, these fungi establish a series of interactions with a variety of organisms in the deadwood microhabitat (Stokland 2012).

This group of fungi is useful for humans because of its biomass (used as food) and metabolomics (used as medicine or intermediates in

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industrial chemical processes) (Grienke *et al*. 2014; Nguyen *et al*. 2018; Willis 2018), among others.

Only a fraction of the total number of species present in Brazilian tropical ecosystems is known, and several taxonomic problems involving native taxa represent a knowledge gap (Berrin *et al*. 2012).

The Atlantic Forest, one of the richest neotropical biomes in terms of biotic composition, is identified as a "hotspot" for its elevated rates of diversity, endemism, and deforestation (Myers *et al*. 2000). It has been considered a relevant site for investigation of the diversity of polypores (Baltazar *et al*. 2012). Although Minas Gerais is one of the largest states in the country, it has records for less than 600 species in the Fungi kingdom, with only five herbaria registering but a few amount of vouchers in their mycological collections (Maia *et al*. 2007; Baltazar *et al*. 2012; Maia *et al*. 2015; Williams & Teodoro 2015; Maia *et al*. 2019).

This study focuses on the taxonomic investigation of polypores present in two fragments of the Brazilian Atlantic Forest, a montane seasonal semideciduous forest, at the Poços de Caldas Plateau, Minas Gerais. We provide a list of species, a photo plate of the new records, a dichotomous taxonomic key, and remarks on the distribution of the recorded species, as well as comments on substrates and taxonomic discussions.

Materials and Methods

Study area and inventoried sites

The Poços de Caldas Plateau is located within the Brazilian Atlantic biome, and located in the South and Southwest mesoregions of the Minas Gerais state (21°47'14"S and 46°33'59"W) (Ministério do Meio Ambiente 2007; Instituto Brasileiro de Geografia e Estatística 2019). The plateau has a maximum altitude of 1,636 m.a.s.l. and its climate is classified in the Köppen-Geiger Scale as "mild"mesothermal with mean temperatures ranging from 10 to 15 °C (Moraes & Jiménez-Rueda 2008; Instituto Brasileiro de Geografia e Estatística 2019). According to the Instituto Brasileiro de Geografia e Estatística (2006), the single type of forested phytophysiognomy at the Poços de Caldas plateau is the montane seasonal semideciduous forest.

Sample collection and preservation

Our fungi inventory was collected from two forest fragments in the municipality of Poços de Caldas. Ten transects of 200 m² each were demarcated in these fragments, according to the measurements recommended by Zak & Willig (2004) and in a recent study developed in Brazil by Abrahão *et al*. (2019). Sample collection was performed monthly from June/2018 to May/2019, and the first author collected all materials. During the survey, basidiomata where photographed, georeferenced, collected with a knife and individually packed in paper bags. Samples were preserved by dehydration in an oven with air ventilation at room temperature and then frozen at -20 °C. Vouchers are deposited at the Anders Fredrik Regnell (AFR) Herbarium, at Fundação Jardim Botânico de Poços de Caldas (FJBPC).

Analysis of basidiomata and species taxonomy

Basidiomata were studied using the traditional methods applied in the taxonomy of polypores (Ryvarden 2004). By means of macromorphological examination with the aid of a stereoscopic microscope, the attachment, seasonality, consistency, color, surface, thickness, construction, and configuration of the basidiomata were analyzed; for more details see Ryvarden (2004). Microscopic characterization of the fungi was performed using freehand longitudinal and transversal cuts of the basidiomata. In order to hydrate the sections, a KOH solution (5%) was used. Phloxine (1%) was used to stain the protoplasm, and Melzer´s reagent was adopted for verification of chemical reactions in spores and hyphae (Teixeira 1995). Microstructures, including hyphae, sterile elements, and basidia, were classified by type, color, size, and positive or negative chemical reactions. For the characterization of basidiospores the variables size, shape, color, presence, and type of ornaments, as well as, positive or negative chemical reactions were evaluated.

Current names, classifications, authors, and synonyms of the identified taxa were check on the Index Fungorum electronic database (2021) and on referential literature. The geographic distributions of the species in Brazil were verified using proper literature and data from the online platform Flora do Brasil 2020 (continuously updated).

Substrate classes: host type and size

The differences in the ecology of polypores is in some way or another linked with its substrate variables (Lodge *et al*. 2004). Some variables of

the wood are host type and size (Lodge *et al*. 2004). Host type was divided into seven categories: dead twig, dead branch, dead trunk, stand dead tree, living tree, stump, or exposed root. For size, we adopted the six classes of diameter proposed by Lodge *et al*. (2004): less than 1.0 cm, 1.1–2.5 cm, 2.6–5.0 cm, 5.1–10 cm, 10.1–20 cm, or more than 20 cm. Although this is not a work of research in ecology, we recommend that more annotated checklists incorporate this approach, given the importance of substrate information, and the opportunity to compare data that is quite easy extract during the field work.

Results and Discussion

Checklist of polypores

The first checklist of polypores in Brazilian Atlantic Forest fragments at the Poços de Caldas Plateau reveals one new record for Brazil and sixteen new records for Minas Gerais (Tab. 1), evidencing a knowledge gap about polypores in these geographic regions, especially in the state. A total of 23 species, 21 genera, 8 families, and two orders (Tab. 1) were identified, and all reported fungi represent new records for the Poços de Caldas Plateau (Tab. 1).

Table 1 – List of polypore species, including new records and its substrates, concerning type and size, reported in Brazilian Atlantic Forest Fragments at the Poços de Caldas Plateau, Minas Gerais. Legend: (Ω) = New record for Brazil; (Φ) = New record for Minas Gerais.

Order/ Family/Species	Angiosperm deadwood substrates	Deadwood size classes in diam. (cm)[1]
Hymenochaetales		
Hymenochaetaceae		
Inonotus multisetifer Abrahão & Gugliotta Φ	On trunk	> 20
Fuscoporia gilva (Schwein.) T. Wagner & M. Fisch	On stand tree	2.6-5.0; 5.1-10
Tropicoporus drechsleri Salvador-Montoya & Popoff Ω	On stand tree	> 20
Schizoporaceae		
Echinoporia aculeifera (Berk. & M.A. Curtis) Ryvarden Φ	On branch	1.1-2.5
Echinoporia inermis G. Coelho Φ	On branch	1.1-2.5; 2.6-5.0
Oxyporaceae		
Oxyporus populinus (Schumach.) Donk Φ	On stand tree	> 20
Polyporales		
Irpicaceae		
Trametopsis brasiliensis (Ryvarden & de Meijer) Gómez-Mont. & Robledo Φ	On stand tree	10.1-20
Meripilaceae		
Physisporinus lineatus (Pers.) F. Wu, Jia J. Chen & Y.C. Dai Φ	On trunk	5.1-10; 10.1-20
Rigidoporus ulmarius (Sowerby) Imazeki Φ	On trunk	> 20
Meruliaceae		
Emmia latemarginata (Durieu & Mont.) Zimtr., Spirin & Malysheva Φ	On branch	2.6-5.0; 5.1-10
Steccherinaceae		
Flaviporus brownii (Humb.) Donk Φ	On exposed root and stump	10.1-20
Steccherinum neonitidum Westphalen & Tomšovský Φ	On branch, trunk and stand tree	2.6-5.0; 5.1-10
Steccherinum undigerum (Berk. & M.A. Curtis) Westphalen & Tomšovský	On branch and stand tree	2.6-5.0; 5.1-10
Polyporaceae		
Cerioporus stereoides (Fr.) Zmitr. & Kovalenko Φ	On branch	2.6-5.0
Dichomitus setulosus (Henn.) Masuka & Ryvarden Φ	On branch	1.1-2.5; 2.6-5.0

Order/ Family/Species	Angiosperm deadwood substrates	Deadwood size classes in diam. (cm)[1]
Favolus brasiliensis (Fr.) Fr.	On branch and trunk	2.6-5.0; 10.1-20
Funalia caperata (Berk.) Zmitr. & Malysheva	On branch	5.1-10
Ganoderma australe (Fr.) Pat.	On trunk	10.1-20
Haploporus papyraceus (Cooke) Y. C. Dai & Niemelä Φ	On branch	2.6-5.0
Lentinus arcularius (Batsch) Zmitr. Φ	On branch	10.1-20
Perenniporiella neofulva (Lloyd) Decock & Ryvarden Φ	On branch, trunk, and stand tree	2.6-5.0; 5.1-10
Polyporus guianensis Mont. Φ	On branch	2.6-5.0
Trametes villosa (Sw.) Kreisel	On branch and trunk	1.1-2.5; 2.6-5.0; 5.1-10; 10.1-20

[1] Substrate size classes according to Lodge *et al*. *(*2004).

Polypores and their substrates

All polypores were collected from angiosperm deadwood substrates (Tab. 1). Seventeen species were found on a single type of substrate (*e.g*. branch or trunk), four species on two types (*e.g*. branch and trunk), and two species on three types (e.g. branch, trunk, and stand dead tree) (Tab. 1). This pattern was similarly revealed in an ecological research conducted by Borba-Silva *et al*. (2015) where most species were found on a single type of substrate and fewer species on two types. However, they did not find any species on three types of substrate. The majority of species were sampled from branches of small to medium size in diameter (1.0-15 cm), and this could be partially explained by the fact that this type of substrate tend to be more frequent in the forest than dead trunks, stand dead trees (Lodge *et al*. 2004), stumps, and exposed roots. The results obtained by Borba-Silva *et al*. (2015) concur with ours, with a majority of species sampled from dead branches. Dead twigs are the smallest-sized wood debris, which are also relatively frequent in the forest (Lodge *et al*. 2004), but no species was sampled from this substrate, indicating a preference of polypores for abundant small- to medium-sized wood debris with 1–10 cm in diameter (Tab. 1).

Identification key for polypores, including new records, for Brazilian Atlantic Forest fragments at the Poços de Caldas Plateau, Minas Gerais

1. Basidiomata stipitate.
    2. Presence of a black cuticle on the stipe ..... 17. *Polyporus guianensis*
    2’. Black cuticle absent on the stipe.
        3. Basidiomata centrally stipitate ..... 13. *Lentinus arcularius*
        3’. Basidiomata eccentrically to almost laterally stipitate ..... 6. *Favolus brasiliensis*

1’. Basidiomata resupinate to sessile pileate.
    4. Basidiomata strictly resupinate.
        5. Ornamented basidiospores ..... 11. *Haploporus papyraceus*
        5’. Basidiospores smoothie.
            6. Hyphal system dimitic.
                7. Basidiomata white, pores 1–2/mm ..... 2. *Dichomitus setulosus*
                7’. Basidiomata pink, pores 9–10/mm ..... 19. *Steccherinum neonitidum*
            6’. Hyphal system monomitic.
                8. Hymenial setae present ..... 12. *Inonotus multisetifer*
                8’. Hymenial setae absent ..... 5. *Emmia latemarginata*
    4’. Basidiomata effused-reflexed to pileate, if resupinate only when young.
        9. Basidiospores double-walled, endospore ornamented ..... 10. *Ganoderma australe*
        9’. Basidiospores simple-walled, without ornamentation.

10. Hymenial setae present.
    11. Basidiomata less than 5 cm wide, context homogeneous, with both skeletal and generative hyphae, pores 8–10/mm ..... 9. *Fuscoporia gilva*
    11'. Basidiomata usually found up to 10 cm wide, context duplex, composed only of generative hyphae, pores 4–6/mm ..... 23. *Tropicoporus drechsleri*

10'. Hymenial setae absent.
    12. Arthroconidia present.
        13. Hirsute orange projections present in the abhymenial surface .... 3. *Echinoporia aculeifera*
        13'. Hirsute orange projections absent ..... 4. *Echinoporia inermis*
    12'. Arthroconidia absent.
        14. Hyphal system monomitic to pseudodimitic, generative hyphae with simple septa.
            15. Basidiomata white to ivory-cream, basidiospores 3–4.5 × 3–4 µm .... 14. *Oxyporus populinus*
            15'. Basidiomata cream, pale buff to orange, basidiospores larger.
                16. Basidiomata less than 5 cm wide, basidiospores 4.5–6 × 4–5 µm .... 16. *Physisporinus lineatus*
                16'. Basidiomata more than 5 cm wide, basidiospores (7–)8–10 × 6 µm .... 18. *Rigidoporus ulmarius*
        14'. Hyphal system trimitic, dimitic or pseudodimitic, generative hyphae with clamps.
            17. Hyphal system trimitic.
                18. Hymenial surface grayish putty to brownish gray, granular dissepiments .... 1. *Cerioporus stereoides*
                18'. Hymenial surface white to cream, dissepiments without a granular nature.
                    19. Basidiomata thin, flexible and papery, pileus gray and villose, abhymenial surface not becoming black with KOH ..... 21. *Trametes villosa*
                    19'. Basidiomata rigid, coriaceous, pileus brown with hairs intercalated in zones, abhymenial surface becoming black with KOH ..... 8. *Funalia caperata*
            17'. Hyphal system dimitic to pseudodimitic.
                20. Hymenial surface sulfurous yellow ..... 7. *Flaviporus brownii*
                20'. Hymenial surface different colored.
                    21. Cystidia present ..... 20. *Steccherinum undigerum*
                    21'. Cystidia absent.
                        22. Pores 0.5–1.5/mm, basidiospores allantoid, bent, 5–6 × 2–3 µm .... 22. *Trametopsis brasiliensis*
                        22'. Pores 6–8/mm, basidiospores globose to subglobose, not bent, 3–5 × 3–4.5 µm ..... 15. *Perenniporiella neofulva*

1. ***Cerioporus stereoides*** (Fr.) Zmitr. & Kovalenko, International Journal of Medicinal Mushrooms (Redding) 18(1): 33. 2016. Fig. 1a

Basionym: *Polyporus stereoides* Fr., Observ. Mycol. (Havniae) 2: 258. 1818.

Description: Ryvarden (2015) as *Datronia stereoides*.

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'28.3"S, 46°37'08.7"W, 25.VI.2018, F.P. Cláudio *et al*. 131 (AFR); 21°46'27.9"S, 46°37'08.7"W, 24.VII.2018, F.P. Cláudio *et al*. 172 (AFR); 21°46'28.14"S, 46°37'08.57"W, 27.XI.2018, F.P. Cláudio *et al*. 275 (AFR).

Cerioporus stereoides is characterized by its thin basidiomata, regular, angular, and medium, 3–4(–5)/mm pores, the granulose nature of its dissepiment walls due to the abundance of dendrohyphidia, and by a transient black line in the upward context that is difficult to observe because of the thin basidiomata. Despite the similarities, *Cerioporus scutellatus* (Schwein) Zmitr., has smaller basidiomata, rarely above 1 cm, and *Coriolopsis brunneoleuca* (Berk.) Ryvarden, has larger, 2–3/mm, pores and dextrinoid skeletal hyphae (Ryvarden 2015).

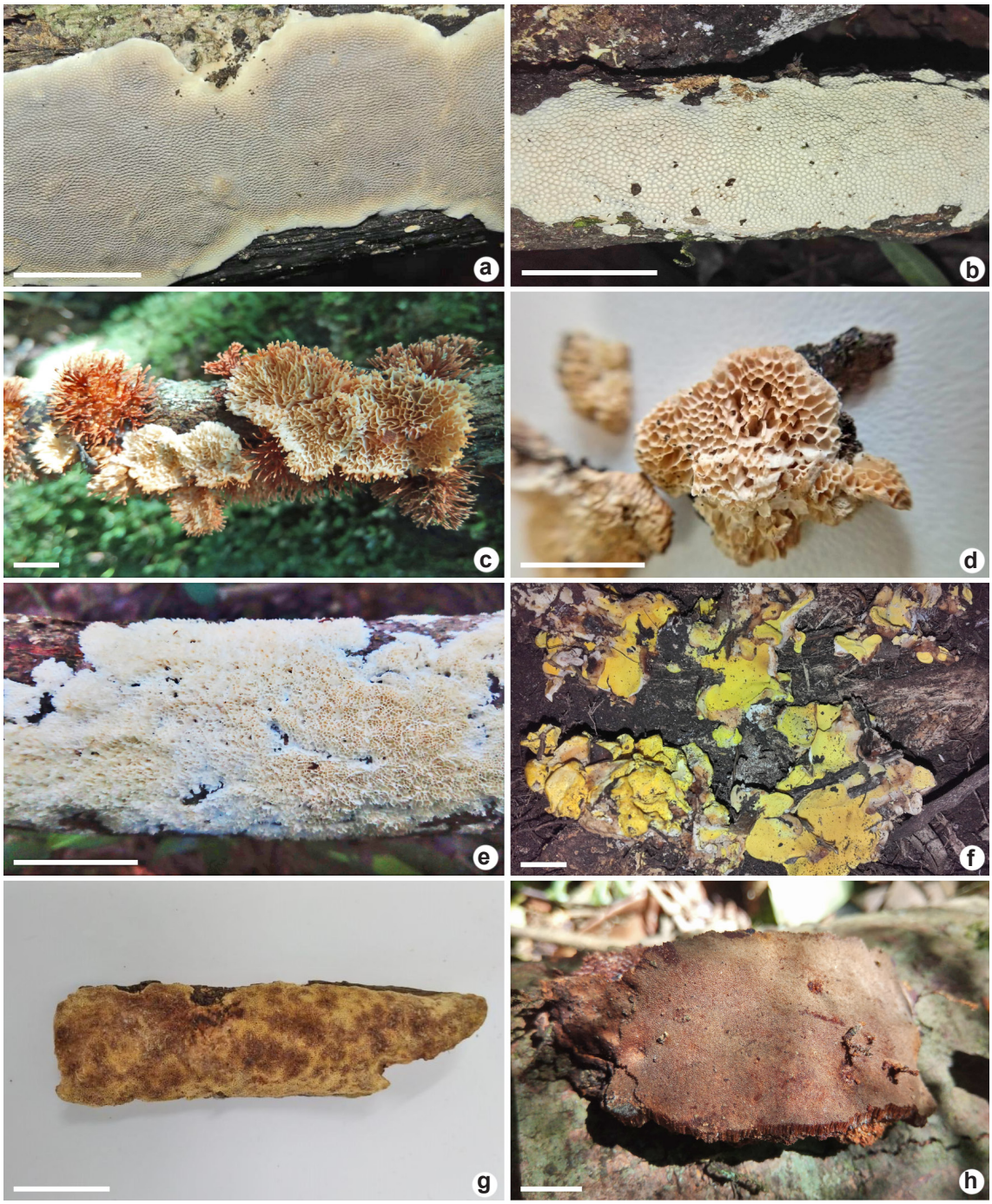

Figure 1 – a-h. Macromorphology of the basidiomata – a. *Cerioporus stereoides* (Cláudio *et al*. 131); b. *Dichomitus setulosus* (Cláudio *et al*. 137); c. *Echinoporia aculeifera* (Cláudio *et al*. 302); d. *Echinoporia inermis* (Cláudio *et al*. 279); e. *Emmia latemarginata* (Cláudio *et al*. 321); f. *Flaviporus brownii* (Cláudio *et al*. 121); g. *Haploporus papyraceus* (Cláudio *et al*. 441); h. *Inonotus multisetifer* (Cláudio *et al*. 334). Scale bar = 1 cm.

This is a widely distributed species with collections in Asia, Europe, North America, Central America, and South America (Lindblad 2000; Núñez & Ryvarden 2001; Motato-Vásquez *et al*. 2014; Ryvarden 2015; Álvarez *et al*. 2016). A phylogenetic analysis of Neotropical specimens is necessary to set out its geographic distribution and specific morphological concept.

Previously recorded in the states of Amapá, Pará, Acre, Rondônia, Rio Grande do Norte, Pernambuco, São Paulo (Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015), and now in Minas Gerais. Not so often collected in the country, this species was recorded in dense ombrophilous forest (Baltazar & Gibertoni 2009; Motato-Vásquez *et al*. 2014; Maia *et al*. 2015), and now in a montane seasonal semideciduous forest of the Brazilian Atlantic Forest.

2. *Dichomitus setulosus* (Henn.) Masuka & Ryvarden, Mycol. Res. 103(9): 1130. 1999. Fig. 1b

Basionym: *Poria setulosa* Henn., Bol. Jb. 28(3): 321. 1900.

Description: Ryvarden (2015).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'26.8"S, 46°37'06.5"W, 25.VI.2018, F.P. Cláudio *et al*. 135 (AFR); 21°46'26.6"S, 46°37'06.8"W, 25.VI.2018, F.P. Cláudio *et al*. 136 (AFR); 21°46'26.9"S, 46°37'06.4"W, 25.VI.2018, F.P. Cláudio *et al*. 137 (AFR); 21°46'27.0"S, 46°37'06.3"W, 23.VII.2018, F.P. Cláudio *et al*. 170 (AFR); 21°46'27.0"S, 46°37'06.4"W, 23.VII.2018, F.P. Cláudio *et al*. 171 (AFR); 21°46'26.71"S, 46°37'7.22"W, 27.XI.2018, F.P. Cláudio *et al*. 273 (AFR); 21°46'26.2"S, 46°37'06.7"W, 29.I.2019, F.P. Cláudio *et al*. 338 (AFR); 21°46'26.6"S, 46°37'06.4"W, 29.I.2019, F.P. Cláudio *et al*. 339 (AFR); 21°46'26.9"S, 46°37'05.8"W, 25.II.2019, F.P. Cláudio *et al*. 362 (AFR).

The white, resupinate, and coriaceous basidiomata with larger, 1–2/mm, angular pores, and the long projections visible in the dissepiments due its numerous hyphal pegs are substantial features for the identification of this species, which are not seen in combination in any other taxa of the genus (Ryvarden 2015).

Previously recorded in the states of Pará, Ceará, Piauí, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul (Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015), and now in Minas Gerais. In the Brazilian Atlantic Forest, this species occurs in phytophysiognomies of dense ombrophilous forest, submontane seasonal semideciduous forest (Westphalen *et al*. 2010; Pires *et al*. 2017), and now in montane seasonal semideciduous forest.

3. *Echinoporia aculeifera* (Berk. & M.A. Curtis) Ryvarden, Mycotaxon 20(2): 330. 1984. Fig. 1c

Basionym: *Trametes aculeifera* Berk. & M.A. Curtis, J. Linn. Soc. Bot. 10(45): 319. 1868.

Description: Ryvarden (2015).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'51.2"S, 46°37'19.7"W, 28.I.2019, F.P. Cláudio *et al*. 302 (AFR).

Echinoporia is an easily recognizable genus of polypores in the Neotropical region, where its represented by two species, because it produces relatively large asexual spores, called arthroconidia (Ryvarden 2015). *Echinoporia aculeifera* can be discriminated *in situ* from *E. inermis* by its cream basidiomata covered with linear to cylindrical orange projections that appear since its initial stage of development (Ryvarden 2015).

Previously recorded in the states of Bahia, Mato Grosso do Sul, Paraná, Rio Grande do Sul, São Paulo (Baltazar & Gibertoni 2009; Motato-Vásquez *et al*. 2015), and now in Minas Gerais. Almost all records of this species in the country are from the Brazilian Atlantic Forest, where it occurs in the following phytophysiognomies: mixed ombrophilous forest, dense ombrophilous forest (Maia *et al*. 2015), and now montane seasonal semideciduous forest.

4. *Echinoporia inermis* G. Coelho, Fungal Planet, A Global Initiative to Promote the Study of Fungal Biodiversity 27: [2]. 2008. Fig. 1d

Description: Coelho (2008).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'50.5"S, 46°37'19.2"W, 18.VI.2018, F.P. Cláudio *et al*. 279 (AFR); 21°46'50.8"S, 46°37'18.8"W, 28.I.2019, F.P. Cláudio *et al*. 311 (AFR).

Both Neotropical *Echinoporia* species present a similar hymenial surface configuration, that is, cream-colored with large, regular to irregular pores, which is an indicator for the identification of these taxa in natura. Nevertheless, in field conditions, *E. inermis* can be discriminated from *E. aculeifera* by its white basidiomata, glabrous or with scales in the abhymenial surface, but always without orange projections (Ryvarden 2015).

Previously recorded in the states of Rio Grande do Sul, São Paulo (Coelho 2008; Motato-

Vásquez *et al*. 2015), and now in Minas Gerais. This is the third time this species is sampled since its first description in 2008, and all specimens were collected in the Brazilian Atlantic Forest, which reinforces the statement proposed by Motato-Vásquez *et al*. (2015) that *E. inermis* is endemic to this biome. Within the biome, this species was recorded in dense ombrophilous forest (Motato-Vásquez *et al*. 2015), and now in montane seasonal semideciduous forest.

5. *Emmia latemarginata* (Durieu & Mont.) Zmitr., Spirin & Malysheva, in Zmitrovich, Malysheva & Spirin, Mycena 6: 33. 2006. Fig. 1e

Basionym: *Polyporus latemarginatus* Durieu & Mont., Syll. Gen. sp. Crypt. (Paris): 163. 1856.

Description: Ryvarden (2016) as *Oxyporus latemarginatus*.

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'25.0"S, 46°37'10.2"W, 29.01.2019, F.P. Cláudio *et al*. 321 (AFR); 21°46'25.3"S, 46°37'10.6"W, 25.II.2019, F.P. Cláudio *et al*. 350 (AFR).

Emmia latermarginata is characterized by its resupinate, soft when fresh and brittle when dried basidiomata, with large, angular pores, lacerated dissepiments, narrowly ellipsoid, (4.5–)5–6 × 3–4 µm basidiospores, and clavate to cylindrical cystidia with encrustations in the apex. *Oxyporus hexaporoides* Ryvarden & Iturr has similar basidiomata differentiated by its broadly ellipsoid, 3–4.5 × 2.2–2.5 µm basidiospores (Ryvarden 2016).

Previously recorded in the states of Paraná, Santa Catarina, Rio Grande do Sul, São Paulo (Baltazar & Gibertoni 2009; Gibertoni *et al*. 2015; Maia *et al*. 2015; Pires *et al*. 2017), and now in Minas Gerais. This is the second record of the species in the Southeast region. *Emmia latemarginata* is a rare species in the country with few collections, restricted to the Brazilian Atlantic Forest (Maia *et al*. 2015; Pires *et al*. 2017). The phytophysiognomies within the biome where this species was recorded were dense ombrophilous forest, submontane seasonal semideciduous forest (Ryvarden & Meijer 2002; Pires *et al*. 2017), and now montane seasonal semideciduous forest.

6. *Favolus brasiliensis* (Fr.) Fr., Linnaea 5: 511. 1830.

Basionym: *Daedalea brasiliensis* Fr. Syst. Mycol. (Lundae) 1: 332. 1821.

Description: Palacio *et al*. (2021).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'51.6"S, 46°37'18.4"W, 19.IX.2018, F.P. Cláudio *et al*. 224 (AFR); 21°46'51.6"S, 46°37'21.4"W, 22.X.2018, F.P. Cláudio *et al*. 238 (AFR); 21°46'50.3"S, 46°37'18.7"W, 22.10.2018, F.P. Cláudio *et al*. 248 (AFR); forest fragment parallel with the road 267, 21°46'26.32"S, 46°37'9.72"W, 27.XI.2018, F.P. Cláudio *et al*. 272 (AFR); 21°46'26.2"S, 46°37'09.6"W, 20.XII.2018, F.P. Cláudio 292 (AFR).

Recent investigations conducted by Palacio *et al*. (2021) showed that *F. brasiliensis* is a species complex and further studies will be crucial to delimit its morphological concept and geographical distribution. However, white to pale yellow, flexible, strong eccentrically to almost laterally stipitate basidiomata, glabrous and radially striate abhymenial surface, larger, angular pores, and entire to slightly lacerate dissepiments covering the hymenial surface are attributes for its determination in the field. It differs from *F. radiatifibrillosus* Palacio & R.M. Silveira, *F. rugulosus* Palacio & R.M. Silveira, and *F. yanomami* Palacio & Menolli, which also have radially elongated pores, by the glabrous and radially striate abhymenial surface (Palacio *et al*. 2021).

Previously recorded in the states of Acre, Amazonas, Pará, Rondônia, Roraima, Alagoas, Bahia, Ceará, Paraíba, Pernambuco, Rio Grande do Norte, Maranhão, Sergipe, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Rio de Janeiro, São Paulo, Paraná, Rio Grande do Sul, and Santa Catarina (Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015). This species complex was commonly collected in the Brazilian Atlantic Forest where it was found in phytophysiognomies of dense ombrophilous forest and montane seasonal semideciduous forest (Baltazar & Gibertoni 2009; Motato-Vásquez *et al*. 2014; Pires *et al*. 2017; Komonen *et al*. 2018; Palacio *et al*. 2021).

7. *Flaviporus brownii* (Humb.) Donk [as 'brownei'], Persoonia 1(2): 215. 1960. Fig. 1f

Basionym: *Polyporus brownii* (Humb.) Pers., Mycol. eur. (Erlanga) 2: 121. 1825.

Description: Gerber & Loguercio-Leite (1997).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'27.9"S, 46°37'07.6"W, 30.I.2019, F.P. Cláudio *et al*. 344 (AFR). 21°46'27.9"S, 46°37'07.6"W, 28.V.2019, F.P. Cláudio *et al*. 428 (AFR).

Easily recognizable in the nature by its pileate, coriaceous to resinous basidiomata – which is a common feature in the genus due to agglutination

of hyphae – a dark reddish brown abhymenial surface, and a distinct sulfurous yellow hymenial surface with small pores that are difficult to see without a magnifying lens (Gerber & Loguercio-Leite 1997). Microscopically, this species presents a monomitic to pseudodimitic hyphal system, relatively tiny and ellipsoid basidiospores, and apically encrusted cystidia (Gerber & Loguercio-Leite 1997; Westphalen *et al*. 2018).

Previously recorded in the states of Paraná, Santa Catarina, Rio Grande do Sul, São Paulo (Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015; Pires *et al*. 2016b), and now in Minas Gerais. In the country, *F. brownii* was collected only in the Brazilian Atlantic Forest, where it appears to be restricted (Maia *et al*. 2015). In this biome, the species was recorded in mixed ombrophilous forest, dense ombrophilous forest (Westphalen & Silveira 2013; Pires *et al*. 2017), and now in montane seasonal semideciduous forest.

8. *Funalia caperata* (Berk.) Zmitr. & Malysheva, Mikol. Fitopatol. 47(6): 375. 2013.

Basionym: *Polyporus caperatus* Berk., Ann. Nat. Hist., Mag. Zool. Bot. Geol. 3: 391. 1839.

Description: Ryvarden (2015) as *Datronia caperata.*

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'51.1"S, 46°37'19.9"W, 19.IX.2018, F.P. Cláudio *et al*. 211 (AFR).

This species can be recognized in the field by its annual, coriaceous basidiomata, which have a concentrically zonate abhymenial surface composed by adpressed tomentose zones (Ryvarden 2015). It differs from *Datronia taylorii* (Murrill) Ryvarden by the larger pores and larger basidiospores, and from *Cerioporus glabrus* (Ryvarden) Zmitr. by the tomentose zones and larger pores (Ryvarden 2015).

Previously recorded in the states of Acre, Amapá, Pará, Roraima, Rondônia, Tocantins, Alagoas, Bahia, Pernambuco, Paraíba, Piauí, Sergipe, Minas Gerais, São Paulo, Rio de Janeiro, Paraná, Santa Catarina, and Rio Grande do Sul (Maia & Carvalho 2010; Gugliotta *et al*. 2015). A commonly collected species in the Brazilian Atlantic Forest (Baltazar & Gibertoni 2009; Westphalen & Silveira 2013; Maia *et al*. 2015; Pires *et al*. 2017). It is known to occur in dense ombrophilous forest, submontane seasonal semideciduous forest, and montane seasonal semideciduous forest (Abrahão *et al*. 2009; Pires *et al*. 2017; Komonen *et al*. 2018).

9. *Fuscoporia gilva* (Schwein.) T. Wagner & M. Fisch, Mycologia 94(6): 1013. 2002.

Basionym: *Boletus gilvus* Schwein., Schr. Naturf. Ges. (Leipzig) 1: 96. 1822.

Description: Ryvarden (2004) as *Phellinus gilvus*.

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'28.1"S, 46°37'08.7"W, 25.VI.2018, F.P. Cláudio *et al*. 130 (AFR); 21°46'25"S, 46°37'11"W, 28.VI.2018, F.P. Cláudio *et al*. 155 (AFR).

This species has high morphological plasticity and more studies are needed to clarify its strict morphological concept (Ryvarden 2004; Campo-Santana *et al*. 2015). Nevertheless, the gregarious, relatively small, pileate to effused-reflexed basidiomata, glabrous to scrupose or hispid abhymenial surface, brown context, subulate to ventricose hymenial setae, and small ellipsoid basidiospores are diagnostic features for its identification (Ryvarden 2004; Groposo *et al*. 2007; Campos-Santana *et al*. 2015).

Previously recorded in the states of Acre, Amazonas, Amapá, Pará, Rondônia, Roraima, Alagoas, Bahia, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Sergipe, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Rio de Janeiro, São Paulo, Paraná, Rio Grande do Sul, and Santa Catarina (Maia & Carvalho 2010; Gibertoni *et al*. 2015; Maia *et al*. 2015; Komonen *et al*. 2018). This species was recorded several times in the Brazilian Atlantic Forest where it occurs in mixed ombrophilous forest, dense ombrophilous forest, submontane seasonal semideciduous forest, and montane seasonal semideciduous forest (Baltazar & Gibertoni 2009; Westphalen *et al*. 2010; Westphalen & Silveira 2013; Motato-Vásquez *et al*. 2014; Maia *et al*. 2015; Pires & Gugliotta 2016a; Komonen *et al*. 2018).

10. *Ganoderma australe* (Fr.) Pat., Bull. Soc. Mycol. Fr. 5(2,3): 65. 1889.

Basionym: *Polyporus australis* Fr., Elench. fung. (Greisfswald) 1: 108. 1828.

Description: Ryvarden (2004).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'51.3"S, 46°37'20.7"W, 26.VI.2018, F.P. Cláudio *et al*. 138

(AFR); 21°46'51.4"S, 46°37'20.6"W, 26.VI.2018, F.P. Cláudio *et al*. 141 (AFR); 21°46'38.9"S, 46°37'09.0"W, 21.XII.2018, F.P. Cláudio *et al*. 296 (AFR).

Ganoderma australe and *G. applanatum* (Pers.) Pat. are almost indistinguishable by morphological features, forming a species complex (Leonard 1998; Gugliotta *et al*. 2011). As stated by Moncalvo & Buchanan (2008) molecular and biological evidence supports the existence of cryptic species nested in eight clades derived from the complex, which are strongly correlated with geographical origins (2 from the Northern Hemisphere, 1 from the Southern Hemisphere, 1 from the Southern Hemisphere and Asia, 1 from Asia, 1 from Malaysia, 1 from Neotropics, and 1 from Thailand). Therefore, it is more appropriate to identify our specimens as *G. australe*, common in the tropical zone, than as *G. applanatum* common in the temperate zone (Ryvarden 2004; Moncalvo & Buchanan 2008).

Ganoderma australe can be identified by the perennial, woody basidiomata, dull, brown to black, with a thick cuticle abhymenial surface, dark brown tubes that are not completely separated by layers of context, often light-colored walls, and basidiospores up to 8 µm (Leonard 1998; Ryvarden 2004). The size of basidiospores is a classical feature for the discrimination between *G. australe* and *G. applanatum*, which usually has smaller spores, but it cannot be used solely because measurements can overlap (Leonard 1998). The revision of almost 50 specimens of *G. australe* collected in the municipality of São Paulo (Gugliotta *et al*. 2011) showed that basidiospore size is highly variable, which corroborates the variations observed in our investigation. In conjuction with the actual evidences, this fact possibly indicates that cryptic species are involved in what we now know as the Neotropical *G. australe* clade.

Previously recorded in the states of Pará, Amazonas, Roraima, Rondônia, Pernambuco, Bahia, Minas Gerais, São Paulo, Rio de janeiro, Paraná, Santa Catarina, Rio Grande do Sul, and Mato Grosso do Sul (Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015). A commonly collected species in the Brazilian Atlantic Forest, where it is known to occurs in mixed ombrophilous forest, dense ombrophilous forest, submontane seasonal semideciduous forest, and now in montane seasonal semideciduous forest (Baltazar & Gibertoni 2009; Westphalen *et al*. 2010; Gugliotta *et al*. 2011; Torres-Torres *et al*. 2012; Westphalen *et al*. 2013; Motato-Vásquez *et al*. 2014; Pires *et al*. 2017).

11. *Haploporus papyraceus* (Cooke) Y. C. Dai & Niemelä, in Dai, Niemelä & Kinnunen, Ann. Bot. fenn. 39(3): 181. 2002. Fig. 1g

Basionym: *Boletus papyraceus* Schwein., Schr. Naturf. Ges. Leipzig 1: 99. 1822.

Description: Ryvarden (2016) as *Pachykytospora papyracea*.

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'52.9"S, 46°37'18.0"W, 26.IV.2019, F.P. Cláudio *et al*. 441 (AFR).

Haploporus papyraceus can be identified by its annual, resupinate, adherent, buff, stained with pink to purple tint basidiomata, large pores, 1–3/mm, and ornamented and relatively large basidiospores. *Haploporus papyraceus* differs from the morphologically similar species, *Haploporus alabamae* (Berk. & Cooke) Ryvarden, by its stained with pink to purple tint basidiomata, larger pores, and slightly larger basidiospores (Ryvarden 2016).

Previously recorded in the states of Roraima, Pará, Pernambuco, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul (Drechsler-Santos *et al*. 2008; Gugliotta *et al*. 2015), and now in Minas Gerais. The majority of records for this species in the country are from the Brazilian Atlantic Forest, and a minority is from the Brazilian Cerrado (Maia *et al*. 2015). In the Brazilian Atlantic Forest, it is known to be found in dense ombrophilous forest, mixed ombrophilous forest, submontane seasonal semideciduous forest (Westphalen *et al*. 2010; Maia *et al*. 2015), and now in montane seasonal semideciduous forest.

12. *Inonotus multisetifer* Abrahão & Gugliotta, Mycotaxon 120: 36. 2012. Fig. 1h

Description: Abrahão & Gugliotta (2012).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'26.6"S, 46°37'09.3"W, 29.I.2019, F.P. Cláudio *et al*. 334 (AFR).

Inonotus multisetifer and *I. adnatus* Ryvarden are closely related species presenting annual, resupinate, strongly adnate, and brown to cinnamon basidiomata, margin thin to absent, tubes deep, pores tiny, round to angular, presence of hymenial setae, and setal hyphae (Ryvarden 2005; Abrahão & Gugliotta 2012). What clearly defines and distinguishes this specimen as *I. multisetifer* rather than *I. adnatus*, only known from the Type collection in Costa Rica (Ryvarden 2005), is its slightly wider basidiomata and larger, (7–)8–10 ×

8–9 µm [vs. 7–8.8 µm diam.; Ryvarden (2005)], subglobose to globose basidiospores.

Previously recorded in the Type collection in São Paulo (Abrahão & Gugliotta 2012), and now in Minas Gerais. This is the second record for this rare species since its first description in 2012 (Abrahão & Gugliotta 2012). *Inonotus* species are often short-lived, which could partially explain the fact that only two collections of *I. multisetifer* have been made in the country (Ryvarden 2005). Both specimens were sampled in a seasonal semideciduous forest of the Brazilian Atlantic Forest (Abrahão & Gugliotta 2012). More studies focusing on the survey of polypores in the Brazilian Atlantic Forest can expand its area of distribution and/or reveal if it inhabits other phytophysiognomies in the biome.

13. *Lentinus arcularius* (Batsch) Zmitr. International Journal of Medicinal Mushrooms (Redding) 12(1): 88. 2010. Fig. 2a

Basionym: *Boletus arcularius* Batsch, Elench. fung. (Halle): 97. 1783.

Description: Ryvarden (2016) as *Polyporus arcularius*.

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'25.2"S, 46°37'11.4"W, 25.II.2019, F.P. Cláudio *et al*. 355 (AFR). 21°46'39.3"S, 46°37'09.2"W, 26.III.2019, F.P. Cláudio *et al*. 371 (AFR).

This species belongs to the genus group Leucoporus, which presents centrally stipitate and leathery basidiomata, without a black cuticle on the stipe (Ryvarden 2016). A circular pileus, generally with depressed center, ciliated margin, and especially the larger pores, 1.5–3/mm, are field characters for the identification of this species.

Previously recorded in the states of Pará, Rondônia, Bahia, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul (Baltazar & Gibertoni 2009; Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015), and now in Minas Gerais. *Lentinus arcularius* is a relatively rare species in the country due its small number of collections (Baltazar & Gibertoni 2009; Maia *et al*. 2015). In the Brazilian Atlantic Forest, this species was recorded in dense ombrophilous forest (Maia *et al*. 2015), and now in montane seasonal semideciduous forest.

14. *Oxyporus populinus* (Schumach.) Donk, Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 9: 204. 1933. Fig. 2b

Basionym: *Boletus populinus* Schumach., Enum. pl. (Kjbenhavn) 2: 384. 1803.

Description: Ryvarden (2016).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'50.3"S, 46°37'18.3"W, 26.V.2019, F.P. Cláudio *et al*. 436 (AFR).

The whitish to ivory-cream basidiomata, the monomitic hyphal system with simple septate hyphae, the subglobose basidiospores, and the presence of true hymenial cystidia are distinctive features for the classification of this specimen in the genus *Oxyporus* rather than any other related genera (Ryvarden 2016; Wu *et al*. 2017). Three pileate species of *Oxyporus* are recorded for Brazil, two in the South region and one in the North region, including *O. cinnamomeus* Núñez & Ryvarden, *O. mollis* Gibertoni & Ryvarden, and *O. populinus* (Maia & Carvalho 2010; Gibertoni *et al*. 2012, 2015). The later, like our specimen, has whitish to ivory-cream basidiomata, abundant and incrusted cystidia, and albeit originally described in Europe, it is distributed worldwide (Ryvarden 2016). The former, has cinnamon basidiomata, slightly larger basidiospores, and is only known for Brazil and Japan, where the Type collection comes from (Ryvarden 2016). Finally, *O. mollis*, only know from the Type location in the North of Brazil, differs by its yellowish basidiomata, concentrically zonate abhymenial surface, and smooth cystidia (Ryvarden 2016).

Previously recorded in the states of Paraná, Rio Grande do Sul (Baltazar & Gibertoni 2009; Maia *et al*. 2015), and now in Minas Gerais, the first state in the Southeast region with this record. All Brazilian specimens of *O. populinus* were collected in the Brazilian Atlantic Forest, specifically in the phytophysiognomies of mixed ombrophilous forest (Ryvarden & Meijer 2002), and now in montane seasonal semideciduous forest.

15. *Perenniporiella neofulva* (Lloyd) Decock & Ryvarden, Mycol. Res. 107(1): 94. 2003. Fig. 2c

Basionym: *Polyporus neofulvus* Lloyd, Mycol. Writ. 4: 13. 1915.

Description: Decock & Ryvarden (2003).

Material selected: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'24.5"S, 46°37'10"W, 28.VI.2018, F.P. Cláudio *et al*. 152 (AFR); 21°46'24.5"S, 46°37'10"W, 23.VII.2018, F.P. Cláudio *et al*. 163 (AFR); forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'51.3"S, 46°37'19.4"W, 22.X.2018, F.P. Cláudio *et al*. 242 (AFR); 21°46'50.8"S, 46°37'19.2"W, 20.XII.2018, F.P. Cláudio *et al*. 281 (AFR); 21°46'51.2"S,

Figure 2 – a-h. Macromorphology of the basidiomata – a. *Lentinus arcularius* (Cláudio *et al*. 355); b. *Oxyporus populinus* (Cláudio *et al*. 436); c. *Perenniporiella neofulva* (Cláudio *et al*. 193); d. *Physisporinus lineatus* (Cláudio *et al*. 404); e. *Polyporus guianensis* (Cláudio *et al*. 352); f. *Rigidoporus ulmarius* (Cláudio *et al*. 161); g. *Steccherinum neonitidum* (Cláudio *et al*. 202); h. *Trametopsis brasiliensis* (Cláudio *et al*. 228). Scale bar = 1 cm.

46°37'19.1"W, 28.I.2019, F.P. Cláudio *et al*. 308 (AFR); 21°46'51.1"S, 46°37'19.3"W, 4.V.2019, F.P. Cláudio *et al*. 434 (AFR).

Perenniporiella neofulva is characterized by its annual to biannual, pileated basidiomata, soft when fresh and becoming leathery after dehydration, smooth, azonate to concentrically zonate abhymenial surface, white to gray hymenial surface, dimitic hyphal system and globose to subglobose, thick-walled basidiospores (Decock & Ryvarden 2003). Nevertheless, it is necessary to highlight that thicker basidiomata, with slightly smaller pores and the production of slightly smaller basidiospores are quite substantial to discriminate this species when compared with the morphologically similar *P. micropora* (Ryvarden) Decock & Ryvarden (Decock & Ryvarden 2003).

Previously recorded in the states of São Paulo, Paraná and Rio Grande do Sul (Maia & Carvalho 2010; Gugliotta *et al*. 2015), and now in Minas Gerais. *Perenniporiella neofulva* is known from only a few localities in Brazil (Maia *et al*. 2015). It was more often collected in the Brazilian Atlantic Forest than in other biomes of the country (Gugliotta *et al*. 2015; Maia *et al*. 2015). In the Brazilian Atlantic Forest, *P. neofulva*, was recorded in mixed ombrophilous forest, dense ombrophilous forest (Westphalen & Silveira 2013; Pires *et al*. 2017), and now in montane seasonal semideciduous forest.

16. *Physisporinus lineatus* (Pers.) F. Wu, Jia J. Chen & Y.C. Dai, in Wu, Chen, Vlasák & Dai, Mycologia 109(5): 760. 2017. Fig. 2d

Basionym: *Polyporus punctatus* Jungh., Verh. Batav. Genootsch. Kunst. Wet. 17(2): 64. 1838.

Description: Ryvarden (2016) as *Rigidoporus lineatus*.

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'24.9"S, 46°37'11.3"W, 27.XI.2018, F.P. Cláudio *et al*. 269 (AFR); 21°46'25.3"S, 46°37'10.9"W, 30.IV.2019, F.P. Cláudio *et al*. 404 (AFR).

Physisporinus lineatus is characterized by its annual, applanate to imbricate, coriaceous basidiomata, concentrically zonate, vivid orange when fresh to pale cream when dried abhymenial surface, orange-red when fresh, drying pinkish-purple hymenial surface, and small pores, (7–)9–10/mm. In contrast with the similar species *Rigidoporus microporus* (Sw.) Overeem, P. lineatus produces encrusted cystidia, and slightly larger basidiospores (Ryvarden 2016).

Previously recorded in the states of Acre, Amazonas, Pará, Rondônia, Roraima, Alagoas, Bahia, Maranhão, Paraíba, Pernambuco, São Paulo, Paraná, Rio Grande do Sul, Santa Catarina (Maia & Carvalho 2010; Gugliotta *et al*. 2015), and now in Minas Gerais. *Physisporinus lineatus* is widely distributed in the Brazilian Atlantic Forest, where it was collected in mixed ombrophilous forest, dense ombrophilous forest, submontane seasonal semideciduous forest (Baltazar & Gibertoni 2009; Westphalen *et al*. 2010; Maia *et al*. 2015), and now in montane seasonal semideciduous forest.

17. *Polyporus guianensis* Mont., Annls. Sci. Nat., Bot., sér. 2 13(1): 201. 1840. Fig. 2e

Description: Ryvarden (2016).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'25.2"S, 46°37'11.0"W, 25.II.2019, F.P. Cláudio *et al*. 352 (AFR); 21° 46'25.3"S, 46°37'10.7"W, 25.V.2019, F.P. Cláudio *et al*. 399 (AFR).

This species belongs to the genus group Melanopus, which is recognize by a black cuticle covering the stipe (Ryvarden 2016). In particular, *P. guianensis* can be discriminated from the other species in the group by the large pores, 1–2/mm, and paler abhymenial surface (Ryvarden 2016).

Previously recorded in the states of Pará, Amazonas, Acre, Paraíba, Pernambuco, Bahia, Mato Grosso, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul (Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015), and now in Minas Gerais. In the Brazilian Atlantic Forest, *P. guianensis*, was collected in fragments of dense ombrophilous forest, submontane seasonal semideciduous forest (Westphalen *et al*. 2010; Maia *et al*. 2015), and now in montane seasonal semideciduous forest.

18. *Rigidoporus ulmarius* (Sowerby) Imazeki, Bull. Gov. Forest Exp. Stn Tokyo 57: 119.1952. Fig. 2f

Basionym: *Boletus ulmarius* Sowerby, Col. fig. Engl. Fung. Mushr. (London) 1(11): 88. 1797

Description: Ryvarden (2016).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'26"S, 46°37'10"W, 28.VI.2019, F.P. Cláudio *et al*. 161 (AFR).

Large pileate basidiomata and large basidiospores are particular to this species when compared to the others included in the genus, which makes it easy to identify (Ryvarden 2016). In addition, it can be recognized by pinkish-buff to

pale cream basidiomata, pinkish buff when fresh to vinaceous buff when dry hymenial surface, and the presence of fusoid cystidiols.

Previously recorded in the states of Amazonas, Amapá, Pará, Roraima, Bahia, São Paulo, Paraná, Rio Grande do Sul, Santa Catarina (Maia & Carvalho 2010; Gugliotta *et al*. 2015), and now in Minas Gerais. *Rigidoporus ulmarius* is a relatively common species in the Brazilian Atlantic Forest, where it was collected in mixed ombrophilous forest, dense ombrophilous forest, submontane seasonal semideciduous forest (Westphalen *et al*. 2010; Maia *et al*. 2015), and now in montane seasonal semideciduous forest.

19. *Steccherinum neonitidum* Westphalen & Tomšovský, in Westphalen, Rajchenberg, Tomšovský & Gugliotta, Persoonia 41: 137. 2018. Fig. 2g

Description: Westphalen *et al*. (2018).

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'25"S, 46°37'11"W, 22.VIII.2018, F.P. Cláudio *et al*. 202 (AFR); 21°46'25.2"S, 46°37'11"W, 25.II.2019, F.P. Cláudio *et al*. 354 (AFR); 21°46'25.1"S, 46°37'11.1"W, 29.IV.2019, F.P. Cláudio *et al*. 393 (AFR).

This species is very similar to *S. nitidum* (Pers.) Vesterh. as they share annual, resupinate basidiomata, easily separable from the substrate, and pinkish hymenial surface (Ryvarden 2015; Westphalen *et al*. 2018). Despite these similarities, *S. neonitidum* has smaller pores, 8–10/mm (vs. 4–7/mm) and smaller, 3–4 × 3 µm (vs. 3.7–4.5 × 2–2.7 µm) basidiospores than S. nitidum (Westphalen *et al*. 2018).

Previously recorded in the states of Rio Grande do Sul, São Paulo (Westphalen *et al*. 2018), and now in Minas Gerais. According to Westphalen *et al*. (2018), this species was traditionally identified in Brazil as *Junghuhnia nitida* (Pers.) Ryvarden due its morphological similarities. Therefore, the distribution of *S. neonitidum* in the country is probably underestimated; however, its synonyms were never cited for Minas Gerais. What we currently known of its distribution in the Brazilian Atlantic Forest is that it occurs in dense ombrophilous forest (Pires *et al*. 2017; Westphalen *et al*. 2018), and now in montane seasonal semideciduous forest.

20. *Steccherinum undigerum* (Berk. & M. A. Curtis) Westphalen & Tomšovský, Persoonia 41: 138. 2018.

Basionym: *Polyporus undiger* Berk. & M. A. Curtis, J. Linn. Soc. Bot. 10(45): 317. 1868.

Description: Ryvarden (2015) as *Junghuhnia undigera* ['undigerus'].

Material selected: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'26.9"S, 46°37'06.8"W, 25.VI.2018, F.P. Cláudio *et al*. 133 (AFR); 21°46'25.2"S, 46°37'11.4"W, 22.VIII.2018, F.P. Cláudio *et al*. 200 (AFR); forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'51.2"S, 46°37'19"W, 26.VI.2018, F.P. Cláudio *et al*. 144 (AFR).

The thin, flexible, imbricated, often effused-reflexed basidiomata with small pores, often-irregular dissepiments are characters for field diagnostic of this species (Westphalen *et al*. 2018). *Steccherinum semisupiniforme* (Murrill) Miettinen, a somewhat similar species, has tougher basidiomata and smaller basidiospores (Westphalen *et al*. 2018).

Previously recorded in the states of Pará, São Paulo, Minas Gerais, Paraná, Rio Grande do Sul, and Santa Catarina (Maia & Carvalho 2010; Gugliotta *et al*. 2015; Maia *et al*. 2015; Komonen *et al*. 2018). In the Brazilian Atlantic Forest this species occurs in mixed ombrophilous forest, dense ombrophilous forest, and montane seasonal semideciduous forest (Westphalen & Silveira 2013; Motato-Vázquez *et al*. 2014; Pires *et al*. 2017; Komonen *et al*. 2018).

21. *Trametes villosa* (Sw.) Kreisel, Monografías, Ciências, Univ. Habana, Ser. 16(4): 83. 1971.

Basionym: *Boletus villosus* Sw., Prodr.: 148. 1788.

Description: Ryvarden (2016).

Material selected: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'25.4"S, 46°37'10.3"W, 5.VIII.2019, F.P. Cláudio *et al*. 227 (AFR); 21°46'25.3"S, 46°37'10.6"W, 2.VIII.2019, F.P. Cláudio *et al*. 351 (AFR); forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'50.8"S, 46°37' 16.3"W, 25.II.2019, F.P. Cláudio *et al*. 343 (AFR); 21°46'51.0"S, 46°37'19.3"W, 26.III.2019, F.P. Cláudio *et al*. 382 (AFR).

Trametes villosa can be recognized in the field by the thin, flexible basidiomata, concentrically zonate, covered with a whitish tomentum abhymenial surface, and large pores with dentate dissepiments covering the hymenial surface (Ryvarden 2016).

Previously recorded in the states of Amazonas, Amapá, Pará, Roraima, Bahia, Pernambuco, Mato Grosso do Sul, Rio de Janeiro, Minas Gerais, São Paulo, Paraná, Rio Grande do Sul, and Santa Catarina (Maia & Carvalho 2010; Gugliotta *et al*.

2015; Maia *et al*. 2015; Komonen *et al*. 2018). *Trametes villosa* is a common species in Brazil and it is distributed in all of the country´s biomes (Maia *et al*. 2015). In the Brazilian Atlantic Forest, this species is known to inhabit mixed ombrophilous forest, dense ombrophilous forest, submontane seasonal semideciduous forest, and montane seasonal semideciduous forest (Westphalen *et al*. 2010; Westphalen & Silveira 2013; Motato-Vásquez *et al*. 2014; Pires *et al*. 2017; Komonen *et al*. 2018).

22. *Trametopsis brasiliensis* (Ryvarden & de Meijer) Gómez-Mont. & Robledo, in Gómez-Montoya, Drechsler-Santos, Ferreira-Lopes, Tomšovský, Urcelay & Robledo, Phytotaxa 311(2): 163. 2017. Fig. 2h

Basionym: *Antrodiella brasiliensis* Ryvarden & de Meijer, Syn. Fung. (Oslo) 14: 40. 2002.

Description: Ryvarden (2015) as *Antrodiella brasiliensis* ['brasilensis'].

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment parallel with the road 267, 21°46'25.4"S, 46°37'10.3"W, 24.IX.2018, F.P. Cláudio *et al*. 228 (AFR).

Imbricated basidiomata, deep tubes, larger, angular, split and sinuous pores, and allantoid to markedly bent, 5–6 × 2–3 µm basidiospores are remarkable features of *T. brasiliensis*. The similar species *T. cervina* (Schwein.) Tomšovský has larger basidiospores, (5.5–)6–9(–10) × (1.7–)2–3 µm, and *T. aborigena* Gómez-Mont. & Robledo has more robust basidiomata with yellowish red to dark yellowish-brown radial veins in the abhymenial surface (Gómez-Montoya *et al*. 2017).

Previously recorded in the states of Paraná (Ryvarden & Meijer 2002; Gugliotta *et al*. 2015; Maia *et al*. 2015), and now in Minas Gerais. Since its original description in 2002, *T. brasiliensis* has been found in a few localities in Brazil, and all specimens were collected in the Brazilian Atlantic Forest (Maia *et al*. 2015), suggesting that it can be a rare, endemic species. In the biome, this species was recorded in mixed ombrophilous forest (Meijer 2008), and now in montane seasonal semideciduous forest.

23. *Tropicoporus drechsleri* Salvador-Montoya & Popoff, in Salvador-Montoya, Costa-Rezende, Ferreira-Lopes, Borba-Silva & Popoff, Phytotaxa 338(1): 80. 2018. Fig. 3a-b

Description: Basidiomata perennial, pileate, sessile, broadly attached, applanate to triquetrous, solitary to gregarious, semicircular, up to 8 cm wide, woody. Abhymenial surface smooth brown to smooth black colored, turning black in contact with KOH, concentrically zonate, prominent furrowed zones, cracked and rimose with age, frequently with mosses growing on it. Margin entire, acute, light brown to buff brown, thick to thin in well-developed specimens. Context leathery yellow to brown colored, azonate, fibrous, duplex, with an inconspicuous but distinctive and thin dark line near the abhymenial surface. Tubes cinnamon brown to leathery yellow. Hymenial surface poroid, dark brown to a lighter brown in old specimens, appearing with a more fuscous color when observed from different angles due to the contrast light. Pores regular, circular, sometimes presenting a deviating form in elliptical shape, 4–6/mm, 300–480 µm diam.. Dissepiment thick, entire, velutinate. Hyphal system monomitic in the context and dimitic in the tubes. Context hyphae composed of generative hyphae with simple septa, yellow, not swallowing in KOH, thin- to thick-walled, 2.5–5 µm wide. Tramal hyphae composed by generative and skeletal hyphae (3–4 µm wide), yellow, thick-walled. Basidia not seen. Basidiospores ellipsoid, yellow, thick-walled, IKI-, 5–6 × 4–5 µm. Hymenial setae yellow, frequently present, normally arising from the subhymenium, straight to ventricose, thick-walled, 15–35 × 3–5.9 µm.

Material examined: BRAZIL. MINAS GERAIS: Poços de Caldas, forest fragment in the "Area 2"of the Fundação Jardim Botânico de Poços de Caldas, 21°46'50.7"S, 46°37'18.9"W, 17.V.2018, F.P. Cláudio 114 (AFR); 21°46'50"S, 46°37'19"W, 26.VI.2018, F.P. Cláudio *et al*. 146 (AFR).

The basidiomata morphotype resembling species of the "*Inonotus linteus*"complex featuring perennial seasonality, a pileate habit, a dimitic hyphal system in the tubes and a monomitic in the context, ellipsoid, yellow and thick-walled basidiospores, as well as, the presence of hymenial setae include this specimen in the genus *Tropicoporus* (Zhou *et al*. 2015). Of the circumscribed *Tropicoporus* species with Neotropical distribution, *T. drechsleri* is the only one presenting, in conjunction, a pileate habit with a duplex context, particularly discriminated by a thin dark line between the abhymenial surface and the context (Salvador-Montoya *et al*. 2018). Moreover, other remarkable morphological features for the recognition of this species are applanate to triquetrous basidiomata, concentrically zonate, cracked, rimose, and/or with furrowed zones

Figure 3 – a-b. Macromorphology of young and old basidiomata, respectively – a-b. *Tropicoporus drechsleri* (Cláudio *et al*. 146, 114). Scale bar = 1 cm.

abhymenial surface, ellipsoid, yellow, thick-walled basidiospores, and hymenial setae normally arising from the subhymenium (Salvador-Montoya *et al*. 2018). Our specimens have slightly larger basidiospores, 5–6 × 4–5 µm, than those reported by Salvador-Montoya *et al*. 2018, (4–)4.5–5(–5.5) × (3–)3.5–4(–4.5) µm. It is possible, that this variation occurred given that we had measured 15 basidiospores due to scarcity of spores in the examined materials. During the field work, brownish spore prints were seen in its substrate justifying the scarcity.

Tropicoporus sideroxylicola (Vlasák & Y.C. Dai) L.W. Zhou, Y.C. Dai & Vlasák, *T. dependens* (Murrill) L.W. Zhou, Y.C. Dai & Vlasák, and *T. pseudolinteus* (Vlasák & Y.C. Dai) L.W. Zhou, Y.C. Dai & Vlasák also produce perennial, pileate, woody basidiomata with a cracked to rimose, black or lighter-colored, concentrically zonate abhymenial surface, but do not present a duplex context, and may present larger pores (*T. sideroxylicola*), sometimes slightly smaller pores (*T. dependens*), and/or be composed only of a dimitic hyphal system (*T. sideroxylicola*/ *T. dependens*) (Vlasák *et al*. 2013; Salvador-Montoya *et al*. 2018). *Tropicoporus excentrodendri* L.W. Zhou & Y.C. Dai and *T. drechsleri* present a duplex context, but the former has tiny pores 7–8/mm (vs. 4–6/mm), slightly smaller basidiospores 3.4–4 × 2.9–3.6 µm (vs. 5–6 × 4–5 µm; our measurements), and a dimitic hyphal system (Zhou *et al*. 2015).

Worldwide distribution: Previously recorded in a seasonally dry tropical forest in Argentina (Salvador-Montoya *et al*. 2018); this is a new record for Brazil. Like the Type collection, these specimens were sampled in a seasonally dry tropical forest (Salvador-Montoya *et al*. 2018). Even though *T. drechsleri* was for the first time recorded in Brazil, this species may be widely distributed in areas of the Brazilian Atlantic Forest. *Tropicoporus linteus* s. s. was delimited from specimens collected in Florida (USA) and Central America (Tian *et al*. 2012), and studies with *T. linteus* s. lat. collected in tropical Asia and tropical and subtropical America are constantly revealing new species (Tian *et al*. 2012; Vlasák *et al*. 2013; Coelho *et al*. 2016; Salvador-Montoya *et al*. 2018). No research has been done in Brazil to revise *T. linteus* s. lat. and the analysis of herbaria material from Alagoas, Bahia, Ceará, Paraíba, Paraná, Pernambuco, Piauí, Santa Catarina, São Paulo, and Sergipe, identified as *Inonotus linteus* (Berk. & M.A. Curtis) Teixeira or *Phellinus linteus* (Berk. & M.A. Curtis) Teng (Campos-Santana *et al*. 2015; Maia *et al*. 2015; Pires & Gugliotta 2016a), can reveal a greater occurrence of *T. drechsleri* and/or new species.

Conclusions

The relatively large number of new records from a relatively small sampling area (as compared with the whole area of the state of Minas Gerais) evidences the need for further basic scientific research, which can also contribute with new and interesting data about species distributions. If the goals are the conservation, application and valuation of fungi, it is crucial to study and publish on them (Mace 2004).

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