



Poroid Hymenochaetaceae (Basidiomycota) from Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, São Paulo, Brazil

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Abstract

This survey presents the first poroid Hymenochaetaceae checklist from Parque Estadual da Serra do Mar, São Paulo state, Brazil, where 24 species are presented. *Fulvifomes melleoporus*, *Fuscoporia chrysea*, *Fuscoporia rhabarbarina*, *Inonotus linteus*, *Inonotus portoricensis*, *Phellinus grenadensis*, *Phellinus roseocinereus* and *Phellinus undulatus* are cited for São Paulo state for the first time, and *Fulvifomes glaucescens* is a new record to Brazil. Full description of the new record for Brazil, comments on the new records for São Paulo state, photos of the new records, as well as an identification key for the 24 confirmed species found in the park are presented.

Key words: Atlantic Forest, diversity, fungi, polypores.

Resumo

Esta pesquisa apresenta a primeira lista de espécies de fungos poroides da família Hymenochaetaceae do Parque Estadual da Serra do Mar, São Paulo, Brasil, onde 24 espécies são registradas pela primeira vez na localidade. *Fulvifomes melleoporus*, *Fuscoporia chrysea*, *Fuscoporia rhabarbarina*, *Inonotus linteus*, *Inonotus portoricensis*, *Phellinus grenadensis*, *Phellinus roseocinereus* e *Phellinus undulatus* são citados para o estado de São Paulo pela primeira vez e *Fulvifomes glaucescens* é um novo registro para o Brasil. São apresentadas descrição do registro novo para o Brasil, comentários sobre os registros novos para o estado de São Paulo e fotos dos novos registros, além de uma chave de identificação para as 24 espécies encontradas no parque.

Palavras-chave: Mata Atlântica, diversidade, fungos, políporos.

Introduction

The family Hymenochaetaceae Donk (1948) is included into the order Hymenochaetales and 27 genera are accepted in the family, with 487 species (Kirk *et al.* 2008). All the species of this group live as saprophytes or parasites on a wide diversity of angiosperms and gymnosperms playing a fundamental role in wood rotting and being part of the carbon cycling in the forest ecosystems; however, they are understudied in most tropical regions (Ryvarden 1991).

This group is defined by simple septa in the generative hyphae, xanthochroic reaction, yellow to deep brown basidiomata, frequent occurrence of setae, and they cause white rot (Ryvarden 1991; Dai 2010). However, recent molecular studies

have shown that many genera into the family are polyphyletic and new genera are being created to include the different species, once traditional characters used before to separate the genera occur in parallel in different groups (Wagner & Fischer 2001; Wagner & Fischer 2002; Dai *et al.* 2008; He & Dai 2012; Vlasák *et al.* 2013).

Brazilian Atlantic forest is one of the most important tropical forests in the world, considered a hotspot of diversity, the flora and fauna may include 1–8% of the world's total species (da Silva & Casteleti 2003). Ribeiro *et al.* (2009) estimates a remaining coverage in a range of 11.4% to 16%, which demonstrates the extremely degraded state of the Atlantic forest, warning to urgent conservation and restoration actions.

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According to Baltazar & Gibertoni (2009), the family Hymenochaetaceae in the Brazilian Atlantic forest is represented for 103 species. The genus with the highest number of recorded species is *Phellinus* Quél. (42 species), followed by *Hymenochaete* Lév. (27 species). There are several studies on the diversity of fungi in the Brazilian Atlantic forest (Góes-Neto *et al.* 2000; Groposo & Loguercio-Leite 2005; Drechsler-Santos *et al.* 2008; Westphalen *et al.* 2010; Motato-Vásquez & Gugliotta 2013; Westphalen & Silveira 2013; Motato-Vásquez *et al.* 2014) but this study presents the first poroid Hymenochaetaceae checklist for Parque Estadual da Serra do Mar, the largest Atlantic forest reserve in the São Paulo State. In this study, full description of the new record for Brazil, comments on the new records to São Paulo State, photos of the new records, as well as an identification key for the 24 confirmed species found in the park are presented.

Material and Methods

Parque Estadual da Serra do Mar (PESM) occupies 315,000 ha of São Paulo state and Núcleo Santa Virgínia is one of its eight nuclei. Situated in the municipalities of São Luiz do Paraitinga and Natividade da Serra, the Núcleo Santa Virgínia covers a total area of 17,000 ha and is located in the geographical coordinates 45°03'W and 23°24'S to 45°11'W and 23°17'S. The altitudinal range varies from 860 m to 1650 m, maximum temperatures 35°C, average of 21°C and a low of -3°C, its vegetation is characterized by Mountain Dense Ombrophilous Forest (Evergreen Forest from Plateau), with some small Altitude Fields sections (Steppe) and Fog Forest (Forest of Serra do Mar Crest) (Joly *et al.* 2012).

Bimonthly, samples were collected from April 2013 to April 2014. The sampling followed the recommendations of Fidalgo & Bononi (1984). Macro and microscopic characters of the basidiomata were analyzed to identify the specimens, following the recommendations of Fidalgo (1968), Ryvar den (1991) and Teixeira (1962, 1995). Melzer's reagent was used to check amyloid and dextrinoid reactions in micro structures. The basidiospores dimensions were obtained as Coelho (2005) proposed, by calculating the ratio $Q = L/W$ and average of Q_m (where $L =$ length and $W =$ width).

The main identification keys were Larsen & Cobb-Pouille (1990), Gilbertson & Ryvar den (1986), Gilbertson & Ryvar den (1987), Ryvar den (2004) and Groposo *et al.* (2007). All materials collected are deposited in the Herbarium SP.

Results and Discussion

Hymenochaetaceae is represented in the Parque Estadual da Serra do Mar by 24 species, all new records to the park, and nine represent new records for São Paulo State, *Fulvifomes melleoporus* (Murrill) Baltazar & Gibertoni, *Fuscoporia chrysea* (Lév.) Baltazar & Gibertoni, *Fuscoporia rhabarbarina* (Berk.) Groposo, Log.-Leite & Góes-Neto, *Inonotus linteus* (Berk. & M.A. Curtis) Teixeira, *Inonotus portoricensis* (Overh.) Baltazar & Gibertoni, *Phellinus grenadensis* (Murrill) Ryvar den, *Phellinus roseocinereus* (Murrill) D.A. Reid and *Phellinus undulatus* (Murrill) Ryvar den. Also, *Fulvifomes glaucescens* (Petch) Y.C. Dai is recorded for the first time in Brazil.

Key to species of poroid Hymenochaetaceae from Parque Estadual da Serra do Mar

- | | | |
|-----|--|---------------------------------|
| 1. | Basidioma completely resupinate | 2 |
| 1'. | Basidioma effused-reflexed to pileate | 9 |
| 2. | Hyphal system monomitic | <i>Inonotus tropicalis</i> |
| 2'. | Hyphal system dimittic | 3 |
| 3. | Hymenial setae absent | 4 |
| 3'. | Hymenial setae present | 6 |
| 4. | Basidiospores dextrinoid | <i>Fomitiporia maxonii</i> |
| 4'. | Basidiospores unchanging in Melzer's reagent | 5 |
| 5. | Pores 4–6 per mm, basidiospores pale golden yellow | <i>Fulvifomes melleoporus</i> |
| 5'. | Pores 6–8 per mm, basidiospores rusty brown | <i>Fomitiporella umbrinella</i> |
| 6. | Basidiospores dextrinoid | <i>Fomitiporia bambusarum</i> |
| 6'. | Basidiospores unchanging in Melzer's reagent | 7 |

7. Hymenial setae hooked to straight *Phellinus undulatus*
- 7'. Hymenial setae only straight 8
8. Basidiospores cylindrical *Fuscoporia ferrea*
- 8'. Basidiospores broadly ellipsoid to subglobose *Fulvifomes glaucescens*
9. Hyphal system monomitic 10
- 9'. Hyphal system dimitic, or at least dimitic in the trama 12
10. Setal hyphae present *Inonotus portoricensis*
- 10'. Setal hyphae absent 11
11. Pores 4–6 per mm *Cyclomyces iodinus*
- 11'. Pores 7–9 per mm *Cyclomyces tabacinus*
12. Hymenial setae absent 13
- 12'. Hymenial setae present 17
13. Basidiospores dextrinoid *Fomitiporia apiahyna*
- 13'. Basidiospores unchanging in Melzer's reagent 14
14. Basidiospores $3.0\text{--}3.5 \times 3.0 \mu\text{m}$ *Phylloporia pectinata*
- 14'. Basidiospores longer 15
15. Pores 7–9 per mm *Fulvifomes nilgheriensis*
- 15'. Pores up to 7 per mm 16
16. Basidiospores $4.0\text{--}6.0 \times 3.0\text{--}5.0 \mu\text{m}$, pores 4–7 per mm ..
..... *Phellinus grenadensis*
- 16'. Basidiospores $5.5\text{--}7.0 \times 4.0\text{--}5.0 \mu\text{m}$, pores (3) 4–5 per mm
..... *Fulvifomes rimosus*
17. Hymenial setae hooked to straight
..... *Fuscoporia wahlbergii*
- 17'. Hymenial setae only straight 18
18. Pileus with distinct black crust
..... *Fuscoporia rhabarbarina*
- 18'. Pileus without a black crust 19
19. Pores 5–7 per mm 20
- 19'. Pores 7–11 per mm 22
20. Basidiospores $2.0\text{--}2.5 \mu\text{m}$ wide
..... *Fuscoporia chrysea*
- 20'. Basidiospores wider 21
21. Basidiospores ellipsoid to ovoid,
hyaline, $4.0\text{--}5.0 \times 3.0\text{--}3.5 \mu\text{m}$..
..... *Fuscoporia gilva*
- 21'. Basidiospores ellipsoid to
subglobose, yellowish, $4.8\text{--}5.5$
 $\times 3.9\text{--}4.6 \mu\text{m}$... *Inonotus linteus*
22. Pore surface cinnamon to
deep umber brown
... *Fuscoporia callimorpha*
- 22'. Pore surface yellow-fulvous,
yellow to reddish brown ...
..... 23
23. Basidiospores broadly
oval, $3.5\text{--}4.0 \times 2.0\text{--}3.0$
 μm *Phellinus*
roseocinereus
- 23'. Basidiospores broadly
ellipsoid, $4.5\text{--}6.0 \times$
 $3.5\text{--}5.0 \mu\text{m}$
..... *Fuscoporia senex*

Species list

Cyclomyces iodinus (Mont.) Pat., Essai taxonomique sur les familles et les genres des Hyménomycètes 98. 1900.

Description: Ryvarden (2004).

Materials examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Corcovado, 11.VI.2013, *R.M. Pires 49* (SP), *R.M. Pires 53* (SP); Trilha do Poço do Pito, 7.VIII.2013, *R.M. Pires et al.112* (SP); Trilha do Garcês, 12.II.2014, *R.M. Pires et al.244* (SP).

Cyclomyces tabacinus (Mont.) Pat., Essai Tax. Hyménomyc. (Lons-le-Saunier): 98. 1900.

Description: Ryvarden (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Ipiranga, 17 IV 2013, *R.M. Pires et al.5* (SP).

Fomitiporella umbrinella (Bres.) Murrill, North American Flora 9(1): 13. 1907.

Description: Ryvarden & Johansen (1980) and Núñez & Ryvarden (2000).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pau de Bala, 25.IV.2014, *R.M. Pires 276* (SP).

Fomitiporia apiahyna (Speg.) Robledo, Decock & Rajchenberg s.l., Mycologia 102(6): 1315. 2010.

Description: Ryvarden (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Garcês, 12.II.2014, *R.M. Pires et al.253* (SP).

Fomitiporia bambusarum (Rick) Campos-Santana & Decock, Cryptogamie, Mycologie 36(1): 48. 2015.

Description: Larsen & Cobb-Poulle (1990).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Corcovado, 11.VI.2013, *R.M. Pires et al.50* (SP).

Fomitiporia maxonii Murrill, North American Flora 9(1): 11. 1907.

Description: Ryvarden (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pirapitinga, 27.IV.2014, *R.M. Pires et al.327* (SP).

Fulvifomes glaucescens (Petch) Y.C. Dai, Fungal Diversity 45: 192. 2010. Figs. 1d-g; 3a

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Poço do Pito, 26.IV.2014, *R.M. Pires et al.307* (SP).

Additional material examined: SRI LANKA. NUWARA ELIYA: Hakgala, *T. Petch* (?), V.1913, K (M) 163705, Type.

Basidioma: annual, resupinate, becoming woody hard upon drying, up to 20 cm long, 10 cm wide and 0.2 cm thick, dark brown to black with age. Pore surface: greyish brown when fresh, dark brown when bruised, sometimes with a glaucous shade; cracked when dry, margin rust-brown, very narrow to almost lacking, pores circular to angular, 7–8(9) per mm. Hyphal system: dimitic, generative hyphae with simple septa, hyaline to pale yellow in KOH, simple to slightly branched, up to 4 µm wide; skeletal hyphae yellowish to pale rusty brown, thick-walled with a narrow lumen, unbranched or with rare branched, 2–5 µm in diam. Sterile elements: hymenial setae frequent, ventricose to subulate, straight, 14–24 × 4.5–7.0 µm. Basidia: not seen. Basidiospores: broadly ellipsoid to subglobose, yellowish, thick-walled, smooth, IKI-, 3.9–4.6 × 3.1–3.7 µm, Q = 1.2–1.4, Q_m = 1.2.

Remarks: this species is known from Africa and Asia (Ryvarden & Johansen 1980; Larsen &

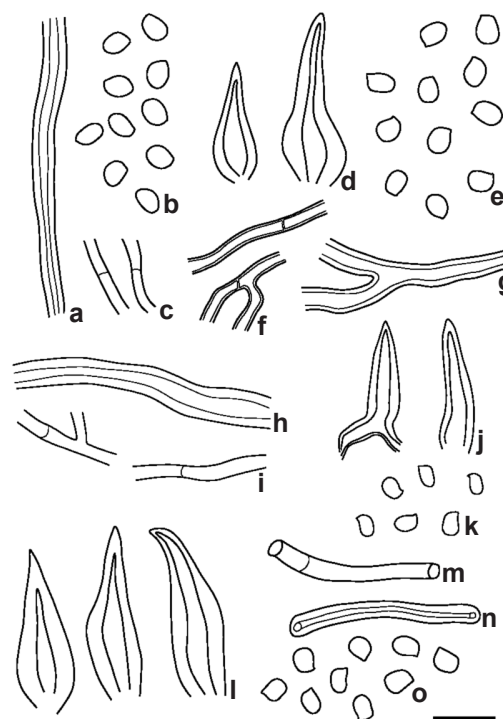


Figure 1 – a-c. *Fulvifomes melleoporus* – a. skeletal hyphae; b. basidiospores; c. generative hyphae. d-g. *Fulvifomes glaucescens* – d. hymenial setae; e. basidiospores; f. generative hyphae; g. skeletal hyphae. h-k. *Fuscoporia rhabarbarina* – h. skeletal hyphae; i. generative hyphae; j. hymenial setae; k. basidiospores. l-o. *Fuscoporia chrysea* – l. hymenial setae; m. generative hyphae; n. skeletal hyphae; o. basidiospores. Scale bar = 10 µm.

Cobb-Pouille 1990). The first record from America was in México (Valenzuela *et al.* 2012) and now is recorded for Brazil. The tiny pores in the resupinate basidiomata and the yellowish, thick-walled and medium size basidiospores can define this species. Nuñez & Ryvarden (2000) concern this is a somewhat confusing species and the size of the setae is a variable characteristic. In Dai (2010) reviewing for Chinese Hymenochaetaceae, he brought up some disagreements between authors concerning the validity of this species.

Fulvifomes melleoporus (Murrill) Baltazar & Gibertoni, Mycotaxon 111: 205. 2010.

Figs. 1a-c; 3b

Description: Larsen & Cobb-Pouille (1990) and Ryvarden (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pau de Bala, 25.IV.2014, *R.M. Pires et al.* 280 (SP).

Remarks: *F. melleoporus* has perennial and resupinate basidiomata, with a golden brown to dark purplish brown pore surface. The lack of setae and small pale golden yellow basidiospores ($4.0\text{--}4.6 \times 3.2\text{--}3.7 \mu\text{m}$) are characteristic for recognizing this species. It is known in three Brazilian States: Mato Grosso do Sul, Bahia and Rio Grande do Norte (Maia *et al.* 2015), and now in São Paulo.

Fulvifomes nilgheriensis (Mont.) Bondartseva & S. Herrera, Mikologiya i Fitopatologiya 26(1): 13. 1992.

Description: Larsen & Cobb-Pouille (1990) and Ryvarden (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Poço do Pito, 7.VIII.2013, *R.M. Pires et al.* 115 (SP).

Fulvifomes rimosus (Berk.) Fiasson & Niemelä, Karstenia 24(1): 26. 1984.

Description: Ryvarden (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Corcovado, 11.VI.2013, *R.M. Pires et al.* 68 (SP).

Fuscoporia callimorpha (Lév.) Groposo, Log.-Leite & Góes-Neto, Mycotaxon 101: 57. 2007.

Description: Ryvarden & Johansen (1980).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pirapitinga (na sub-trilha do olho d'água), 29.X.2013, *R.M. Pires et al.* 135 (SP).

Fuscoporia chrysea (Lév.) Baltazar & Gibertoni, Mycotaxon 111: 206. 2010. Figs. 11-o; 3c

Description: Ryvarden & Johansen (1980) and Ryvarden (2004).

Materials examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha

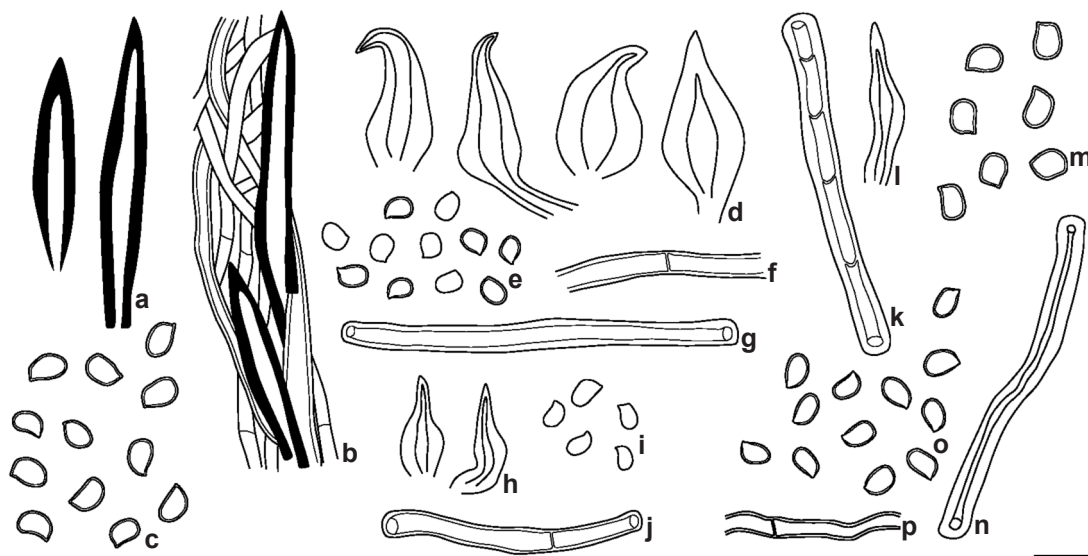


Figure 2 – a-c. *Inonotus portoricensis* – a. setal hyphae; b. trama; c. basidiospores. d-g. *Phellinus undulatus* – d. hymenial setae; e. basidiospores; f. generative hyphae; g. skeletal hyphae. h-j. *Phellinus roseocinereus* – h. hymenial setae; i. basidiospores; j. generative hyphae. k-m. *Inonotus linteus* – k. generative hyphae; l. hymenial setae; m. basidiospores. n-p. *Phellinus grenadensis* – n. skeletal hyphae; o. basidiospores; p. generative hyphae. Scale bar (a-b) = 20 μm ; (c-p) = 10 μm .

do Pirapitinga, 13.VI.2013, R.M. Pires et al. 83 (SP); 27.IV.2014, R.M. Pires et al.330 (SP).

Additional material examined: PERNAMBUCO: São Vicente Férrer, Mata do Estado (Siriji), J.M. Baltazar et al., 1164 (URM).

Remarks: This species is characterized macroscopically by its effused reflexed basidioma,

with small and imbricate pilei and microscopically by the common hymenial setae ($24\text{--}30 \times 6.0\text{--}8.0 \mu\text{m}$) and basidiospores broadly ellipsoid and hyaline ($3.5\text{--}4.1 \times 2.0\text{--}2.5 \mu\text{m}$). The concept of this species is not well established and Ryvarden (2004) suggests that the original description is only an early stage of development of basidioma, and



Figure 3 – a. *Fulvifomes glaucescens*; b. *Fulvifomes melleoporius*; c. *Fuscoporia chrysea*; d. *Fuscoporia rhabarbarina*; e. *Inonotus linteus*; f. *Inonotus portoricensis*; g. *Phellinus grenadensis*; h. *Phellinus roseocinereus*; i. *Phellinus undulatus*. Scale bar = 1 cm.

a bigger pileus could be formed in later stages. *Fuscoporia gilva* is quite similar, differing by surface color and pore size (brown and 6–8 per mm in *F. gilva* and yellow and 5–6 per mm in *F. chrysea*). This collection represents the first record to São Paulo State and to Southern Brasil. So far, this species only have been recorded in Pernambuco, Northeast Brazil (Maia *et al.* 2015).

Fuscoporia ferrea (Pers.) G. Cunn., Bulletin of the New Zealand Department of Industrial Research 73: 7. 1948.

Description: Ryvarden & Gilbertson (1994).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pirapitinga, 18.XII.2013, *R.M. Pires et al.* 194 (SP).

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

Description: Ryvarden (2004).

Materials examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Ipiranga, 17.IV.2013, *R.M. Pires et al.* 17 (SP), *R.M. Pires et al.* 21 (SP); Trilha do Corcovado, 11.VI.2013, *R.M. Pires et al.* 54 (SP); Trilha do Poço do Pito, 7.VIII.2013, *R.M. Pires et al.* 104 (SP), *R.M. Pires et al.* 108 (SP); 30.X.2013, *R.M. Pires et al.* 149 (SP), *R.M. Pires et al.* 151 (SP); Trilha do Pirapitinga, 31.X.2013, *R.M. Pires et al.* 168 (SP); 10.II.2014, *R.M. Pires et al.* 220 (SP); 27.IV.2014, *R.M. Pires et al.* 323 (SP).

Fuscoporia rhabarbarina (Berk.) Groppo, Log.-Leite & Góes-Neto, Mycotaxon 101: 61. 2007. Figs. 1h-k; 3d

Description: Ryvarden & Johansen (1980) and Gerber & Loguercio-Leite (1997).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Poço do Pito, 7.VIII.2013, *R.M. Pires et al.* 100 (SP).

Remarks: *F. rhabarbarina* is a pileate, wood and perennial species, with hyphal system dimitic and hymenial setae 20–30 × 4.0–5.0 µm. It is characterized by the glabrous black pilei surface and small basidiospores ellipsoid and hyaline (3.5–4.0 × 2.0–3.0 µm). Known in Rio Grande do Sul and Santa Catarina states (Maia *et al.* 2015), it is the first record to São Paulo state.

Fuscoporia senex (Nees & Mont.) Ghobad-Nejhad, Mycotaxon 101: 208. 2007.

Description: Nuñez & Ryvarden (2000).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Poço do Pito, 26.IV.2014, *R.M. Pires et al.* 314 (SP).

Fuscoporia wahlbergii (Fr.) T. Wagner & M. Fisch., Mycological Research 105(7): 780. 2001.

Description: Dai (2010) and Ryvarden (2004).

Materials examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Ipiranga, 18.IV.2013, *R.M. Pires et al.* 36 (SP); Trilha do Garcês, 12.II.2014, *R.M. Pires et al.* 259 (SP).

Inonotus linteus (Berk. & M.A. Curtis) Teixeira, Revista Brasileira de Botânica 15(2): 126. 1992.

Figs. 2k-m; 3e

Description: Tian *et al.* (2013).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Poço do Pito, 30.X.2013, *R.M. Pires et al.* 157 (SP).

Remarks: *I. linteus* is a species complex characterized by pileate basidiomata, a heterogeneous hyphal system with a monomitic context and a dimitic hymenophoral trama, hymenial setae and basidiospores broadly ellipsoid to subglobose, yellowish and thick-walled (Tian *et al.* 2013). This collection has rare hymenial setae, pore size 5–6 per mm, basidiospores 4.8–6.2 × 4.0–4.9 µm. The basidiospores in our material are bigger than the Tian *et al.* (2013) descriptions [4.8–5.5(–5.7) × (3.8–)3.9–4.6(–4.8) µm], but the name was accepted, since it can be a normal variation within the species. For more accurate resolution, molecular data are needed. It is the first report to São Paulo State, but it is well-known in northeast Brazil (Alagoas, Bahia, Ceará, Paraíba, Pernambuco, Piauí and Sergipe states), and southern Brazil (Paraná and Santa Catarina states) (Maia *et al.* 2015).

Inonotus portoricensis (Overh.) Baltazar & Gibertoni, Mycotaxon 111: 206. 2010.

Figs. 2a-c; 3f

Description: Borba-Silva *et al.* (2013).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Ipiranga, 17.IV.2013, *R.M. Pires et al.* 23 (SP).

Additional material examined: BRASIL. PERNAMBUCO: Recife, Parque Estadual de Dois Irmãos, Trilha atrás do casarão, *J.M. Baltazar et al.*, 500 (URM). ALAGOAS: Pilar, RPPN-Fazenda S. Pedro, *T.B. Gibertoni*, s.n. (URM).

Remarks: The species is characterized by its sessile pilei, applanate to effused-reflexed basidioma with a more or less persistent velvety brown tomentum separated from the context by a distinct dark line (Ryvarden 2004). It presents, besides, setal hyphae (70–240 × 8–15 µm) and basidiospores broadly ellipsoid to ellipsoid and slightly thick-walled (4.8–5.5 × 3.6–4.2 µm and $Q_m=1.3$), at first

pale yellow, becoming pale rusty brown with age (Larsen & Cobb-Pouille 1990). It has been reported to tropical and sub-tropical America; in Brazil, it is known in Alagoas, Bahia, Pernambuco, Rio Grande do Sul and Santa Catarina States (Borba-Silva *et al.* 2013; Campos-Santana *et al.* 2015; Maia *et al.* 2015). This collection represents the first record to São Paulo State.

Inonotus tropicalis (M.J. Larsen & Lombard) T. Wagner & M. Fisch., *Mycologia* 94(6): 1009. 2002.
Description: Lowe (1966) and Ryvardeen (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Ipiranga, 12.VI.2013, R.M. Pires *et al.* 73 (SP); Trilha do Pirapitinga, 31.X.2013, R.M. Pires *et al.* 176 (SP).

Additional material examined: BRASIL. RIO GRANDE DO SUL: São Leopoldo, 1904, Rick 14 (S F15659 Holotype), Rick 423 (S F15660 Paratype).

Phellinus grenadensis (Murrill) Ryvardeen, *Norwegian Journal of Botany* 19: 234. 1972.

Figs. 2n-p; 3g

Description: Ryvardeen (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pirapitinga, 11.II.2014, R.M. Pires *et al.* 240 (SP).

Remarks: It is the first citation for São Paulo state, but known in other seven Brazilian states (Alagoas, Bahia, Pernambuco, Rio Grande do Norte, Rio de Janeiro, Paraná and Santa Catarina) (Maia *et al.* 2015). *P. grenadensis* presents perenial and pileate basidiomata, at first reddish brown, tomentose, then becoming crustose, dark brown to dull (Larsen & Cobb-Pouille 1990). Tubes distinctly stratified separated by context layers. Dimitic hyphal system and hymenial setae absent. Basidiospores ellipsoid, golden yellow to rusty brown ($4.0\text{--}6.0 \times 3.0\text{--}5.0 \mu\text{m}$).

Phellinus roseocinereus (Murrill) D.A. Reid, *Memoirs of the New York Botanical Garden* 28(1): 194. 1976. Figs. 2h-j; 3h

Description: Ryvardeen (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Garcês, 12.II.2014, R.M. Pires *et al.* 258 (SP).

Remarks: this species presents a pileate, sessile, woody, convex to unguulate basidiomata, yellow to reddish brown pore surface (6–10 per mm) and basidiospores broadly oval and hyaline ($3.5\text{--}4.0 \times 2.0\text{--}3.0 \mu\text{m}$). Larsen & Cobb-Pouille (1990) described the presence of hymenial setae $20\text{--}30 \times 4.0\text{--}5.0 \mu\text{m}$, in the present collection the setae are smaller ($15\text{--}20 \times 4.0\text{--}7.0 \mu\text{m}$). Once

reported to Pernambuco State, now is cited to São Paulo State (Maia *et al.* 2015).

Phellinus undulatus (Murrill) Ryvardeen, *Norwegian Journal of Botany* 19: 235. 1972.

Figs. 2d-g; 3i

Description: Lowe (1966) and Loguercio-Leite & Wright (1995).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pau de Bala, 25.IV.2014, R.M. Pires *et al.* 283 (SP).

Remarks: The species is known from tropical and sub-tropical areas (Ryvardeen 2004), and was reported to Alagoas, Pará and Santa Catarina Brazilian states (Maia *et al.* 2015). This collection is the first citation for São Paulo state. It is characterized by its resupinate basidioma, golden-brown margin and greyish brown pore surface. Microscopically, the hooked hymenial setae ($19\text{--}25 \times 8\text{--}12 \mu\text{m}$) are diagnostic, although some straight setae may occur. The basidiospores are broadly ellipsoid and hyaline ($4.1\text{--}4.6 \times 3.2\text{--}3.6 \mu\text{m}$).

Phylloporia pectinata (Klotzsch) Ryvardeen, *Synopsis Fungorum* 5: 196. 1991.

Description: Ryvardeen (2004).

Material examined: São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pirapitinga, 8.VIII.2013, R.M. Pires *et al.* 121 (SP).

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