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Survey of the diversity of Hymenochaetaceae (Hymenochaetales, Basidiomycota) in the Brazilian Amazon

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ABSTRACT

The Brazilian Amazon occupies an area of around 50% of the Brazilian territory and covers nine states. This region is home to a high diversity of plants and fungi. However, the knowledge of these groups is still limited, which could affect the assessment of their geographic distribution and diversity of species and, consequently, conservation strategies aimed at them. Hymenochaetaceae is a family of fungi in the phylum Basidiomycota and has 893 known species worldwide. The goal of this study was to provide an updated review of the literature and collection databases on the diversity of Hymenochaetaceae species occurring in the Brazilian Amazon. A total of 45 species were confirmed to occur in the region with valid records, while 34 species were considered doubtful in view of the type locality and/or lack of ecological and phylogenetic data, and were excluded from the occurrence list until they undergo a more in-depth review. The most representative genera were *Fuscoporia*, *Coltricia*, *Hymenochaete* and *Fomitiporia*. The states of Pará and Rondônia had the highest number of species. The 45 valid species of Hymenochaetaceae registered in this study provide a baseline for conservation strategies and policies, and highlight the importance of covering the extensive sampling gaps in the region and to carry out new taxonomic studies to better understand the diversity of fungi in the Amazon.

KEYWORDS: conservation, distribution, Neotropics, rainforest, wood decaying fungi

Levantamento da diversidade de Hymenochaetaceae (Hymenochaetales, Basidiomycota) na Amazônia brasileira

RESUMO

A Amazônia brasileira ocupa uma área de cerca de 50% do território brasileiro e abrange nove estados. Esta região abriga uma alta diversidade de plantas e fungos. No entanto, o conhecimento sobre esses grupos ainda é limitado, o que pode restringir estudos sobre a distribuição geográfica e diversidade de espécies, e, consequentemente, estratégias para conservação. Hymenochaetaceae é uma família de fungos do filo Basidiomycota e possui 893 espécies conhecidas em todo o mundo. O objetivo deste estudo foi fornecer uma revisão atualizada da literatura e dos bancos de dados de coleções sobre a diversidade de espécies de Hymenochaetaceae ocorrentes na Amazônia brasileira. Um total de 45 espécies foi confirmado como ocorrendo na região com registros válidos, enquanto 34 espécies foram consideradas duvidosas em vista da localidade-tipo e/ou ausência de dados ecológicos e filogenéticos, e foram excluídas da lista de ocorrência até que passem por uma revisão mais aprofundada. Os gêneros mais representativos foram *Fuscoporia*, *Coltricia*, *Hymenochaete* e *Fomitiporia*. Os estados do Pará e Rondônia apresentaram o maior número de espécies. As 45 espécies válidas de Hymenochaetaceae registradas neste estudo fornecem uma base para estratégias e políticas de conservação e destacam a importância de cobrir as grandes lacunas de amostragem na região e de realizar novos estudos taxonômicos para melhor compreender a diversidade de fungos na Amazônia.

PALAVRAS-CHAVE: conservação, distribuição, Neotrópicos, floresta tropical, fungos decompositores

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INTRODUCTION

The family Hymenochaetaceae *sensu* Donk includes 893 species described worldwide, distributed in 42 genera (Wijayawardene *et al.* 2022), but the true diversity is likely underestimated (Wu *et al.* 2022). *Phellinus* Quél. (202 species), *Hymenochaete* Lév. (149) and *Inonotus* P. Karst. (120) are the most representative genera (Wijayawardene *et al.* 2022). The main characteristics of Hymenochaetaceae *sensu* Donk are the rusty colored basidiomata, with varying arrangement on the substrate (pileate, resupinate, effused-reflexed and stipitate), simple-septate generative hyphae with permanent darkening when in contact with potassium hydroxide (KOH), dark brown and pointed setae (in most species), often simple, rarely starry, bifurcate, covered or of hyphal and tramal origin (Parmasto and Parmasto 1979; Gill and Steglich 1987; Ryvarden 1991; 2004; Léger 1998; Baltazar *et al.* 2009; Wang *et al.* 2023).

Species of this family cause white rot in wood, breaking down lignin, cellulose and hemicellulose, and act as saprophytes, parasites of living trees, and ectomycorrhizal symbionts (Ryvarden, 1991, 2004; Larsson *et al.* 2006; Cannon and Kirk 2007; Dai *et al.* 2007; Tedersoo *et al.* 2007; 2010; Morera *et al.* 2017; Vasco-Palacios *et al.* 2018). Some species have been intensively studied for their use in traditional medicine and pharmacology (Jang *et al.* 2004; Li *et al.* 2004; Bae *et al.* 2005a; 2005b; Dong *et al.* 2009; Dai *et al.* 2010; Zapora *et al.* 2016; Yan et *al.* 2017; He *et al.* 2021).

The occurrence of Hymenochaetaceae species in the Brazilian Amazon has been reported in taxonomic reviews (Sotão *et al.* 1991; 1997; 2002a; 2002b; 2003; 2009; Jesus 1996; Campos *et al.* 2005; Gomes-Silva and Gibertoni 2009a; 2009b; 2012a; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Soares *et al.* 2014; Xavier *et al.* 2018; Couceiro *et al.* 2022). New records and new taxa are frequently published (Campos and Cavalcanti 2000; Gomes-Silva *et al.* 2009; 2012b; 2013; Martins-Júnior *et al.* 2011; Soares *et al.* 2018; Alves-Silva *et al.* 2020; Yuan *et al.* 2020; Silva *et al.* 2021; Lima *et al.* 2022; Oliveira *et al.* 2022; Freire and Soares 2024). However, most records from the Brazilian Amazon are based only on morphological data and, therefore, may be imprecise or doubtful, especially considering that type locality and species complex issues within the family have not yet been resolved.

Estimates indicate that around 90% of fungi species are unknown to science (Antonelli *et al.* 2020). The typically high rate of endemism in the Amazon indicates that this biome likely houses many undiscovered fungal species (Hawksworth and Lücking 2017), which is relevant as they play a fundamental role in natural ecosystems (Finlay and Thorn 2019). Thus, we aimed to carry out an updated survey of the diversity and distribution of Hymenochaetaceae species in the Brazilian Amazon based on scientific literature and database records.

MATERIAL AND METHODS

Survey

This survey was based on a comprehensive review of the literature published until March 2024 citing occurrences of Hymenochaetaceae in the Brazilian Amazon (see Figure 1 for the geographical boundaries of the biome adopted in here). Records of species with Neotropical, Pantropical, or other regional distribution that had phylogenetic support, as well as ecological data (substrate or host), were considered valid. Records lacking substantial information were classified as dubious and, therefore, excluded. Information about type locality and distribution of the species was also checked on the following databases: Flora e Funga do Brasil (http://floradobrasil.jbrj.gov.br); SpeciesLink (http://www.splink.org.br); and Index Fungorum (http://www.indexfungorum.org/). The classification and nomenclature of the species followed the Mycobank database (http://www.mycobank.org).

The following information on species considered valid are provided here: (1) species name, author(s), and publication record; (2) basionym and synonyms (including species with nomenclatural changes); (3) description [author(s) and year]; (4) type locality; (5) host/substrate; (6) distribution in the states that compose the Brazilian Amazon and corresponding references. For excluded taxa, we provide the species name/author(s) and type locality.

Distribution map

The distribution map of the Hymenochaetaceae in the Brazilian Amazon was created according to shapefiles available in the Instituto Brasileiro de Geografia e Estatística (https://www.ibge.gov.br/). We used the coordinates of collection sites available in publications. If the coordinates were not available, we used reference coordinates for the municipality or other toponymal associated with the collection site in the publication. The map was created using software QGIS v. 3.28, datum SIRGAS 2000.

RESULTS

A total of 79 species of Hymenochaetaceae were registered for the Brazilian Amazon, yet only records of 45 species (distributed in 12 genera) were considered valid. Based on 24 publications, there were 36 confirmed occurrence sites of Hymenochaetaceae species with geographic coordinates (Figure 1; Supplementary Material, Table S1). The remaining 34 species recorded in the literature for were excluded from our updated list for the Brazilian Amazon (Supplementary Material, Table S2) due to inconsistencies with the type locality of the species and because the studies reporting them only present morphological data and lack further key information that could support the veracity of the record.

The most representative genera were *Fuscoporia* Murrill with eight species, followed by *Coltricia* Gray (7), *Hymenochaete* (6) and *Fomitiporia* Murrill (5) (Figure 2). *Hymenochaete iodina* (Mont.) Baltazar and Gibertoni was recorded in seven states, followed by *H. damicornis* (Link) Lév. and *Coltricia hamata* (Romell) Ryvarden, recorded in six states each. The highest number of species were recorded in the states of Pará (23 species) and Rondônia (20), while the states of Maranhão and Tocantins had records of only two species each (Figure 3).

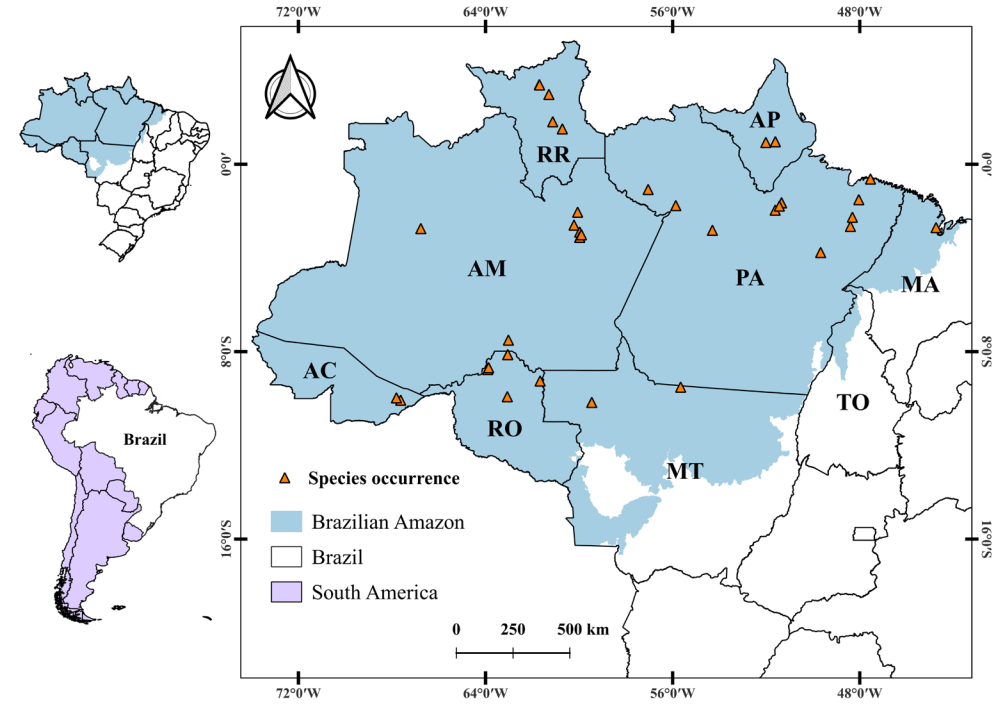

Figure 1. Occurrence records of Hymenochaetaceae in the Brazilian Amazon. Brazilian states: AC = Acre; AM = Amazonas; AP = Amapá; MA = Maranhão; MT = Mato Grosso; PA = Pará; RO = Rondônia; RR = Roraima; TO = Tocantins.

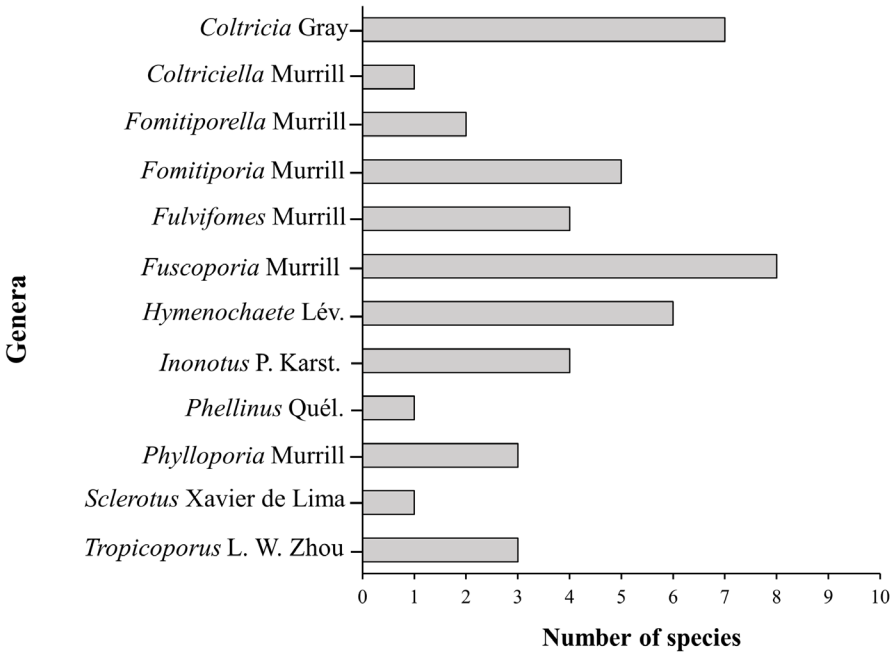

Figure 2. Number of species per Hymenochaetaceae genera with valid records in the Brazilian Amazon.

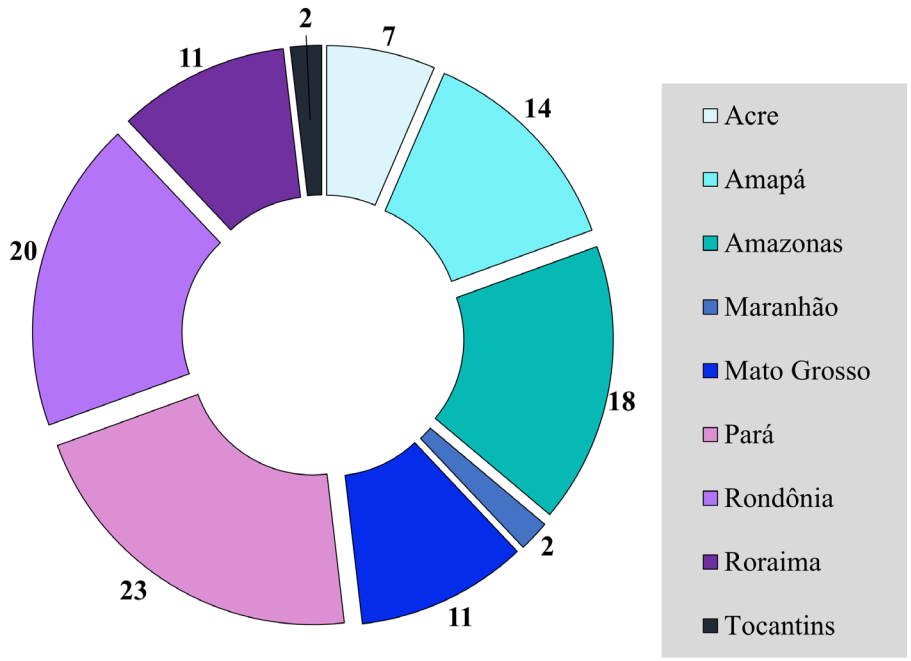

Figure 3. Number of valid records of Hymenochaetaceae species per state of the Brazilian Amazon.

List of Hymenochaetaceae in the Brazilian Amazon

Coltricia Gray, A natural arrangement of British plants 1: 644 (1821)

Coltricia barbata Ryvarden & de Meijer, Synopsis Fungorum 15: 46 (2002)

Description: Ryvarden (2004).

Type locality: Paraná (Brazil).

Host/substrate: On the ground, in dense ombrophilous forest.

Distribution: Amapá, Pará and Rondônia (Gomes-Silva *et al.* 2012a; Soares *et al.* 2014; Gibertoni *et al.* 2015; Xavier *et al.* 2018; Couceiro *et al.* 2022).

Coltricia duportii (Pat.) Ryvarden, Occasional Papers of the Farlow Herbarium of Cryptogamic Botany 18: 140 (1983)

Basionym: *Xanthochrous duportii* Pat., Bulletin de la Société Mycologique de France 28: 34 (1912).

Description: Ryvarden (2004).

Type locality: French Guiana.

Host/substrate: On trunk of Arecaceae.

Distribution: Rondônia (Gomes-Silva *et al.* 2012a; Gibertoni *et al.* 2015).

Coltricia focicola (Berk. & M.A. Curtis) Murrill, North American Flora 9(2): 92 (1908)

Basionym: *Polyporus focicola* Berk. & M.A. Curtis, Journal of the Linnean Society. Botany 10: 305 (1869).

Description: Ryvarden (2004).

Type locality: USA.

Host/substrate: On soil, usually on campfire site.

Distribution: Amapá and Pará (Gomes-Silva *et al.* 2012a; Gibertoni *et al.* 2015; Couceiro *et al.* 2022).

Coltricia globispora Gomes-Silva, Ryvarden & Gibertoni, Mycological Progress 8(4): 274 (2009)

Description: Gomes-Silva *et al.* (2009).

Type locality: Rondônia (Brazil).

Host/substrate: On soil.

Distribution: Rondônia and Pará (Gomes-Silva *et al.* 2009; Gibertoni *et al.* 2015; Couceiro *et al.* 2022).

Coltricia hamata (Romell) Ryvarden, Svensk Botanisk Tidskrift 68: 276 (1974)

Basionym: *Pelloporus hamatus* Romell, Bihang til Kongliga Svenska Vetenskaps-Akademiens Handlingar 26 (16): 26 (1901).

Description: Ryvarden (2004).

Type locality: Mato Grosso (Brazil).

Host/substrate: On trunks.

Distribution: Amapá, Amazonas, Mato Grosso, Pará, Rondônia and Roraima (Torrend 1926; Fidalgo 1968; Gomes-Silva *et al.* 2009; 2012a; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Soares *et al.* 2014; Gibertoni *et al.* 2015; Freire and Soares 2024).

Coltricia navispora (T.W. Henkel, Aime & Ryvarden) Y.C. Dai & F. Wu, Fungal Diversity 113: 11 (2022)

Basionym: *Coltriciella navispora* T.W. Henkel, Aime & Ryvarden, Mycologia 95(4): 617 (2003).

Description: Aime *et al.* (2003).

Type locality: Guyana.

Host/substrate: On trunks.

Distribution: Amazonas (Gibertoni *et al.* 2015).

Coltricia velutina Baltazar & Gibertoni, Mycologia 102(6): 1258 (2010)

Description: Baltazar *et al.* (2010).

Type locality: Pernambuco (Brazil).

Host/substrate: On soil.

Distribution: Rondônia (Gomes-Silva *et al.* 2012a; Gibertoni *et al.* 2015).

Coltriciella Murrill, Bulletin of the Torrey Botanical Club 31 (6): 348 (1904)

Coltriciella oblectabilis (Lloyd) Kotl., Pouzar & Ryvarden, Ceská Mykologie 38(3): 140 (1984)

Basionym: *Polystictus oblectabilis* Lloyd, Synopsis of the stipitate polyporoids (7): 164 (1912).

Description: Ryvarden (2004).

Type locality: Brazil.

Host/substrate: On soil.

Distribution: Amazonas and Rondônia (Gibertoni *et al.* 2015; Gomes-Silva *et al.* 2008).

Fomitiporella Murrill, North American Flora 9 (1): 12 (1907)

Fomitiporella membranacea (Wright & Blumenf.) Y.C. Dai & F. Wu, Fungal Diversity 113: 25 (2022)

Basionym: *Phellinus membranaceus* J.E. Wright & Blumenf., Mycotaxon 21: 422 (1984)

≡ *Fulvifomes membranaceus* (J.E. Wright & Blumenf.) Baltazar & Gibertoni, Mycotaxon 111: 206 (2010)

Description: Wright and Blumenfeld (1984) and Ryvarden (2004).

Type locality: Argentina.

Host/substrate: On Angiospermae.

Distribution: Pará (Gomes-Silva *et al.* 2009; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Gibertoni *et al.* 2015).

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

Basionym: *Poria umbrinella* Bres., Hedwigia 35: 282 (1896).

≡ *Phellinus umbrinellus* (Bres.) S. Herrera & Bondartseva, Mikologiya i Fitopatologiya 14 (1): 8 (1980)

Description: Salvador-Montoya *et al.* (2020).

Type locality: Santa Catarina (Brazil).

Host/substrate: On dead wood.

Distribution: Amapá, Mato Grosso and Pará (Gomes-Silva *et al.* 2009; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Soares *et al.* 2014; Gibertoni *et al.* 2015).

Fomitiporia Murrill, North American Flora 9 (1): 7 (1907)

Fomitiporia conyana Alves-Silva & Drechsler-Santos, Mycological Progress 19(8): 781 (2020)

Description: Alves-Silva *et al.* (2020).

Type locality: Mato Grosso (Brazil).

Host/substrate: On dead standing trunk.

Distribution: Amazonas, Mato Grosso and Roraima (Alves-Silva *et al.* 2020; Silva *et al.* 2021).

Fomitiporia impercepta Morera, Robledo & Urcelay, Phytotaxa 321(3): 281 (2017)

Description: Morera *et al.* (2017).

Type locality: Argentina.

Host/substrate: On living trunk of *Lithraea molleoides.*

Distribution: Amazonas and Roraima (Silva *et al.* 2021).

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

≡ *Phellinus maxonii* (Murrill) D.A. Reid, Kew Bulletin 35 (4): 867 (1981)

Description: Ryvarden (2004).

Type locality: Costa Rica.

Host/substrate: On decayed wood.

Distribution: Roraima (Silva *et al.* 2021).

Fomitiporia murrillii Alves-Silva, R.M. Silveira & Drechsler-Santos, Mycological Progress 19(8): 783 (2020)

Description: Alves-Silva *et al.* (2020).

Type locality: Rio Grande do Sul (Brazil).

Host/substrate: Growing on living *Eucalyptus* sp. tree.

Distribution: Roraima (Silva *et al.* 2021).

Fomitiporia neotropica Campos-Santana, Amalfi, R.M. Silveira, Robledo & Decock, Mycological Progress 13(3): 610 (2014)

Description: Campos-Santana *et al.* (2013).

Type locality: Argentina.

Host/substrate: On dead standing trunk of Angiospermae.

Distribution: Amazonas and Roraima (Silva *et al.* 2021).

Fulvifomes Murrill, Northern Polypores (5): 49 (1914)

Fulvifomes karitianaensis V.R. Targino de Oliveira, V. Xavier de Lima & Gibertoni, Sydowia 75: 5 (2022)

Description: Oliveira *et al.* (2022).

Type locality: Rondônia (Brazil).

Host/substrate: On decayed wood.

Distribution: Rondônia (Oliveira *et al.* 2022).

Fulvifomes kawakamii (M.J. Larsen, Lombard & Hodges) T. Wagner & M. Fisch., Mycologia 94 (6): 1009 (2002)

Basionym: *Phellinus kawakamii* M.J. Larsen, Lombard & Hodges, Mycologia 77: 346 (1985).

Description: Larsen *et al.* (1985).

Type locality: Hawaiian Islands (USA).

Host/substrate: On wood of *Casuarina equisetifolia.*

Distribution: Pará and Rondônia (Oliveira *et al.* 2022).

Fulvifomes luteoumbrinus (Romell) Y.C. Dai & Vlasák, Fungal Diversity 113: 58 (2022)

Basionym: *Phaeoporus luteoumbrinus* Romell, Bihang til Kongliga Svenska Vetenskaps-Akademiens Handlingar 26 (16): 27 (1901).

≡ *Aurificaria luteoumbrina* (Romell) D.A. Reid, Kew Bull. 17(2): 279 (1963)

≡ *Inonotus luteoumbrinus* (Romell) Ryvarden, Synopsis Fungorum (Oslo) 21: 79 (2005)

= *Phellinus sublinteus* (Murrill) Ryvarden, Norwegian Journal of Botany 19: 235 (1972)

Description: Ryvarden (2005).

Type locality: Brazil.

Host/substrate: Not located.

Distribution: Acre, Mato Grosso, Rondônia and Tocantins (Bononi 1992; Gibertoni *et al.* 2015).

Fulvifomes waimiriatroariensis V.R. Targino de Oliveira & Gibertoni, Sydowia 75: 8 (2022)

Description: Oliveira *et al.* (2022).

Type locality: Amazonas (Brazil).

Host/substrate: On unidentified living tree.

Distribution: Amazonas (Oliveira *et al.* 2022).

Fuscoporia Murrill, North American Flora 9 (1): 3 (1907)

Fuscoporia chrysea (Lév.) Baltazar & Gibertoni, Mycotaxon 111: 206 (2010)

Basionym: *Polyporus chryseus* **Lév.**, Annales des Sciences Naturelles Botanique sér. 3, 5: 301 (1846).

≡ *Phellinus chryseus* (Lév.) Ryvarden, A preliminary polypore flora of East Africa: 151 (1980)

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

Type locality: Colombia.

Host/substrate: Not located.

Distribution: Pará (Couceiro *et al.* 2022).

Fuscoporia griseopora (Reid) Y.C. Dai & F. Wu, Fungal Diversity 113: 72 (2022)

Basionym: *Phellinus griseoporus* D.A. Reid, Memoirs of the New York Botanical Garden 28: 192 (1976).

Description: Ryvarden (2004).

Type locality: Costa Rica.

Host/substrate: On roots of *Danaea cuspidata.*

Distribution: Amapá, Pará and Rondônia (Gomes-Silva *et al.* 2009; Soares *et al.* 2014; Gibertoni *et al.* 2015; Freire and Soares 2024).

Fuscoporia labyrinthica (Soares, Gomes-Silva & Ryvarden) Y.C. Dai & F. Wu, Fungal Diversity 113: 72 (2022)

Basionym: *Phellinus labyrinthicus* Soares, Gomes-Silva & Ryvarden, Synopsis Fungorum 38: 57 (2018).

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

Type locality: Amapá (Brazil).

Host/substrate: On dead wood of Angiospermae.

Distribution: Acre and Amapá (Soares *et al.* 2018).

Fuscoporia licnoides (Mont.) Oliveira-Filho & Gibertoni, Fungal Diversity 104: 129 (2020)

Basionym: *Polyporus licnoides* Mont., Annales des Sciences Naturelles Botanique 13: 204 (1840).

Description: Yuan *et al.* (2020).

Type locality: French Guiana.

Host/substrate: On dead branches.

Distribution: Pará and Rondônia (Yuan *et al.* 2020).

Fuscoporia rhabarbarina (Berk.) Groposo, Log.-Leite & Góes-Neto, Mycotaxon 101: 61 (2007)

Basionym: *Polyporus rhabarbarinus* Berk., Annals and Magazine of Natural History 3: 388 (1839).

Description: Groposo *et al.* (2007).

Type locality: Brazil.

Host/substrate: Not located.

Distribution: Pará (Couceiro *et al.* 2022).

Fuscoporia scruposa (Fr.) Gibertoni & Oliveira-Filho, Fungal Diversity 104: 130 (2020)

Basionym: *Polyporus scruposus* Fr., Epicrisis Systematis Mycologici: 473 (1838)

= *Phellinus gilvus* var. *scruposus* (Fr.) S. Ahmad, Basidiomycetes of West Pakistan: 59 (1972).

Description: Ryvarden (2004).

Type locality: Not located.

Host/substrate: Not located.

Distribution: Maranhão (Yuan *et al.* 2020).

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

Basionym: *Polyporus senex* Nees & Mont., Annales des Sciences Naturelles Botanique 5: 70 (1836).

≡ *Phellinus senex* (Nees & Mont.) Imazeki, Bulletin of the Government Forest Experimental Station Meguro 57: 115 (1952)

Description: Ryvarden (2004).

Type locality: Chile.

Host/substrate: On rotten trunks.

Distribution: Amazonas, Maranhão and Pará (Sousa 1980; Sotão *et al.* 2003; Gibertoni *et al.* 2015; Freire and Soares 2024).

Fuscoporia undulata (Murrill) Bondartseva & S. Herrera, Mikologiya i Fitopatologiya 26(1): 13 (1992)

Basionym: *Fomitiporia undulata* Murrill, North American Flora 9 (1): 10 (1907).

≡ *Phellinus undulatus* (Murrill) Ryvarden, Norwegian Journal of Botany 19: 235 (1972)

Description: Ryvarden (2004).

Type locality: Belize.

Host/substrate: On decayed log.

Distribution: Amapá and Pará (Sotão *et al.* 2009; Martins-Júnior *et al.* 2011; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Soares *et al.* 2014; Gibertoni *et al.* 2015; Xavier *et al.* 2018; Couceiro *et al.* 2022).

Hymenochaete Lév., Annales des Sciences Naturelles Botanique 5: 150 (1846)

Hymenochaete damicornis (Link) Lév., Annales des Sciences Naturelles Botanique, 3 5: 151 (1846)

Basionym: *Stereum damicorne* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 40 (1809).

Description: Parmasto (2001).

Type locality: Brazil.

Host/substrate: Not located.

Distribution: Acre, Amazonas, Mato Grosso, Pará, Rondônia and Roraima (Hennings 1904; Gibertoni *et al.* 2003; Gomes-Silva *et al.* 2012a; Gibertoni *et al.* 2015; Couceiro *et al.* 2022; Freire and Soares 2024).

Hymenochaete iodina (Mont.) Baltazar & Gibertoni, Journal of the Torrey Botanical Society 139: 432 (2012)

Basionym: *Polyporus iodinus* Mont., Annales des Sciences Naturelles Botanique 16: 108 (1841)

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

Description: Ryvarden (2004).

Type locality: French Guiana.

Host/substrate: On rotten wood.

Distribution: Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia and Roraima (Gomes-Silva *et al.* 2009; 2012a; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Soares *et al.* 2014; Gibertoni *et al.* 2015; Xavier *et al.* 2018).

Hymenochaete leonina Berk. & M.A. Curtis, Journal of the Linnean Society. Botany 10: 334 (1868)

Description: Parmasto (2001).

Type locality: Cuba.

Host/substrate: On dead wood.

Distribution: Amazonas, Mato Grosso, Pará, Rondônia and Roraima (Léger 1998; Gibertoni *et al.* 2003; Gomes-Silva *et al.* 2012a; Gibertoni *et al.* 2015).

Hymenochaete luteobadia (Fr.) Höhn. & Litsch., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. 1 116:750 (1907)

Basionym: *Thelephora luteobadia* Fr., Linnaea 5: 526 (1830).

Description: Parmasto (2001).

Type locality: Suriname.

Host/substrate: On tree trunks.

Distribution: Amazonas, Mato Grosso, Pará, Rondônia, Roraima and Tocantins (Fidalgo 1968; Léger 1998; Gibertoni *et al.* 2003; Gomes-Silva *et al.* 2012a; Gibertoni *et al.* 2015; Couceiro *et al.* 2022).

Hymenochaete reniformis (Fr.) Lév., Annales des Sciences Naturelles Botanique 3 5: 151 (1846)

Basionym: *Stereum reniforme* Fr., Epicrisis Systematis Mycologici: 546 (1838)

≡ *Stipitochaete reniformis* (Fr.) Ryvarden, Transactions of the British Mycological Society 85 (3): 538 (1985).

Description: Ryvarden (1985).

Neotype locality: Brazil.

Host/substrate: Not located.

Distribution: Acre and Mato Grosso (Gibertoni *et al.* 2003; Gibertoni *et al.* 2015).

Hymenochaete unicolor Berk. & M.A. Curtis, Journal of the Linnean Society. Botany 10: 335 (1868)

Description: Parmasto (2001).

Type locality: Cuba.

Host/substrate: On dead trees.

Distribution: Rondônia (Gomes-Silva *et al.* 2012a; Gibertoni *et al.* 2015).

Inonotus P. Karst., Meddelanden af Societas pro Fauna et Flora Fennica 5: 39 (1879)

Inonotus amazonicus Gibertoni & Ryvarden, Mycoscience 54(2): 117 (2013)

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

Type locality: Mato Grosso (Brazil).

Host/substrate: On hardwood tree.

Distribution: Mato Grosso (Gomes-Silva *et al.* 2013; Gibertoni *et al.* 2015).

Inonotus calcitratus (Berk. & M.A. Curtis) Gomes-Silva & Gibertoni, Mycoscience 54: 117 (2013)

Basionym: *Polyporus calcitratus* Berk. & M.A. Curtis, Journal of the Linnean Society. Botany 10: 314 (1869)

≡ *Phellinus calcitratus* (Berk. & M.A. Curtis) Ryvarden, Norwegian Journal of Botany 19: 234 (1972).

Description: Ryvarden (2004).

Type locality: Cuba.

Host/substrate: Not located.

Distribution: Amapá, Amazonas, Pará and Rondônia (Sousa 1980; Gomes-Silva *et al.* 2009; Sotão *et al.* 2009; Martins-Júnior *et al.* 2011; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Soares *et al.* 2014; Gibertoni *et al.* 2015; Xavier *et al.* 2018).

Inonotus fibrosus (Ryvarden, Gomes-Silva & Gibertoni) Oliveira-Filho & Gibertoni, Synopsis Fungorum 38: 58 (2018)

Basionym: *Phellinus fibrosus* Ryvarden, Gomes-Silva & Gibertoni, Phytotaxa 67: 56 (2012).

Description: Gomes-Silva *et al.* (2012b).

Type locality: Amazonas (Brazil).

Host/substrate: On angiosperm tree.

Distribution: Amazonas (Gomes-Silva *et al.* 2012b; Gibertoni *et al.* 2015).

Inonotus sousae (Ryvarden, Gomes-Silva & Gibertoni) Oliveira-Filho & Gibertoni, Synopsis Fungorum 38: 59 (2018)

Basionym: *Phellinus sousae* Ryvarden, Gomes-Silva & Gibertoni, Phytotaxa 67: 57 (2012).

Description: Gomes-Silva *et al.* (2012b).

Type locality: Brazil.

Host/substrate: On angiosperm tree.

Distribution: Mato Grosso and Rondônia (Gomes-Silva *et al.* 2012b; Gibertoni *et al.* 2015).

Phellinus Quél., Enchiridion Fungorum in Europa media et praesertim in Gallia Vigentium: 172 (1886)

Phellinus ferrugineovelutinus (Henn.) Ryvarden, Norwegian Journal of Botany 19:234 (1972)

Basionym: *Poria ferrugineovelutina* Henn., Hedwigia 44: 59 (1905).

Description: Ryvarden and Johansen (1980).

Type locality: Amazonas (Brazil).

Host/substrate: On bark tree.

Distribution: Acre and Amazonas (Hennings 1905; Batista *et al.* 1966; Gibertoni *et al.* 2015).

Phylloporia Murrill, Torreya 4: 141 (1904)

Phylloporia chrysites (Berk.) Ryvarden, Norwegian Journal of Botany 19: 235 (1972)

Basionym: *Polyporus chrysites* Berk., Hooker's Journal of Botany and Kew Garden Miscellany 8: 233 (1856).

Description: Núñez and Ryvarden (2000).

Type locality: Venezuela.

Host/substrate: Not located.

Distribution: Acre, Amazonas, Pará and Rondônia (Bononi 1992; Sotão *et al.* 2009; Gomes-Silva *et al.* 2013; Medeiros *et al.* 2013; Gibertoni *et al.* 2015; Couceiro *et al.* 2022).

Phylloporia sancti-georgii (Pat.) Y.C. Dai & F. Wu, Fungal Diversity 113: 129 (2022)

Basionym: *Polyporus sancti-georgii* Pat., in Patouillard & Lagerheim, Bull. Soc. mycol. Fr. 11(4): 207 (1895)

≡ *Phellinus sancti-georgii* (Pat.) Ryvarden, Norwegian Journal of Botany 19: 235 (1972).

Description: Ryvarden (2004).

Type locality: Venezuela.

Host/substrate: On deciduous wood.

Distribution: Pará (Freire and Soares 2024).

Phylloporia spathulata (Hook.) Ryvarden, Synopsis Fungorum 5: 196 (1991)

Basionym: *Boletus spathulatus* Hook., Synopsis Plantarum 1: 9 (1822).

Description: Ryvarden (2004).

Type locality: Ecuador.

Host/substrate: Not located.

Distribution: Amapá, Amazonas, Pará, Rondônia and Roraima (Theissen 1911; Batista *et al.* 1966; Capelari and Maziero 1988; Silva and Minter 1995; Gomes-Silva *et al.* 2009; 2013; Gibertoni *et al.* 2013; Medeiros *et al.* 2013; Soares *et al.* 2014; Gibertoni *et al.* 2015; Xavier *et al.* 2018; Couceiro *et al.* 2022).

Sclerotus Xavier de Lima, Cryptogamie, Mycologie 43 (1): 10 (2022)

Sclerotus extensus (Lév.) Xavier de Lima, Cryptogamie, Mycologie 43(1): 10 (2022)

Basionym: *Polyporus extensus* **Lév.**, Annales des Sciences Naturelles Botanique 5: 129 (1846).

Description: Lima *et al.* (2022).

Type locality: Guadeloupe.

Host/substrate: On wood.

Distribution: Amapá and Pará (Lima *et al.* 2022; Freire and Soares 2024).

Tropicoporus L.W. Zhou, Y.C. Dai & Sheng H. Wu, Fungal Diversity 77: 341 (2015)

Tropicoporus anchietanus (Decock & Ryvarden) Y.C. Dai & F. Wu, Fungal Diversity 113: 170 (2022)

Basionym: *Phellinus anchietanus* Decock & Ryvarden, Cryptogamie Mycologie 18: 222 (1997).

Description: Ryvarden (2004).

Type locality: Acre (Brazil).

Host/substrate: On bark of a tree.

Distribution: Amapá (Xavier *et al.* 2018).

Tropicoporus dependens (Murril) L. W. Zhou, Y.C. Dai & Vlasák, Fungal Diversity 77: 344 (2015)

Basionym: *Pyropolyporus dependens* Murrill, North American Flora 9 (2): 106 (1908)

≡ *Phellinus dependens* (Murrill) Imazeki, Bulletin of the Government Forest Experimental Station Meguro 57: 114 (1952).

Description: Ryvarden (2004).

Type locality: Cuba.

Host/substrate: On decaying trunks.

Distribution: Amapá, Amazonas and Pará (Sousa 1980; Medeiros *et al.* 2013; Soares *et al.* 2014; Gibertoni *et al.* 2015; Xavier *et al.* 2018).

Tropicoporus detonsus (Fr.) Y.C. Dai & F. Wu, Fungal Diversity 113: 172 (2022)

Basionym: *Polyporus detonsus* Fr., Linnaea 5: 519 (1830)

≡ *Phellinus detonsus* (Fr.) Ryvarden, Synopsis Fungorum 19: 173 (2004)

= *Tropicoporus tropicalis* (M.J. Larsen & Lombard) L.W. Zhou & Y.C. Dai, Fungal Diversity 77: 345 (2015).

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

Type locality: Costa Rica.

Host/substrate: On decaying trunks.

Distribution: Amapá (Lima *et al.* 2022).

DISCUSSION

This survey provides an updated overview of the diversity and distribution of species of Hymenochaetaceae in the Brazilian Amazon, with 45 valid species confirmed for the region. This figure is higher than the 32 species of Hymenochaetaceae listed by Gomes-Silva and Gibertoni (2009b) for the Brazilian Amazon, but lower than the 64 species listed for the geographically more restricted and semi-arid northeastern region of Brazil (Lira *et al*. 2015). The lower numbers of species recorded in the Brazilian Amazon compared to the northeastern region of Brazil may reflect undersampling and survey gaps in the Amazon resulting in a still underestimated diversity of fungi in the region.

In this study, most species considered to be valid occurrences have a Neotropical or Pantropical distribution. The type specimen of *Fulvifomes kawakamii* is from the Nearctic region (Hawaii, USA), but the species has a valid record in the state of Pará, Brazil, which is supported by phylogenetic evidence (Larsen *et al.* 1985; Oliveira *et al*. 2022). The 34 excluded species require an in-depth review in order to confirm or refute their occurrence in the Amazon. For example, *Fulvifomes mangrovicus* (Imazeki) T. Hatt. has for many years been reported to occur in the state of Pará (Campos and Cavalcanti 2000; Sotão *et al*. 2003; Campos *et al.* 2005; Gibertoni *et al.* 2015), but the type specimen of this species is from Japan. *Fuscoporia callimorpha* (Lév.) Groposo, Log.-Leite & Góes-Neto (type locality: Madagascar) was recorded in the states of Amapá and Pará (Xavier *et al*. 2018; Couceiro *et al.* 2022; Freire and Soares 2024), and this species shares morphological characters with other species of *Fuscoporia* (Chen *et al*. 2020), such as *Fuscoporia rhabarbarina* (Groposo *et al.* 2007).

Other excluded taxa represent species complexes. *Fulvifomes robiniae* (Murrill) Murrill has distribution in the temperate zones of the USA, where it primarily grows on living *Robinia pseudoacacia* L. trees (Salvador-Montoya *et al.* 2018). Initially, this species was described as being morphologically variable and widely distributed in North and Central America (Kotlaba and Pouzar 1978; Gilbertson and Ryvarden 1987). However, morphological, ecological and molecular studies have shown that specimens resembling *F. robiniae* from different regions of the Americas correspond to distinct species (Salvador-Montoya *et al.* 2018; 2022; Martínez *et al.* 2023). *Fuscoporia gilva* (Schwein.) T. Wagner & M. Fisch. is considered a cosmopolitan and morphologically variable species (Fidalgo and Fidalgo 1968). Brazilian specimens previously identified as *F. gilva sensu lato* were grouped into four clades [*F. semiarida* (Lima-Júnior, C.R.S. de Lira & Gibertoni), *F. licnoides*, *F. scruposa*, and *F. formosana* (T.T. Chang & W.N. Chou) T. Wagner & M. Fisch], but the type specimen of *F. gilva* (PH74281) was not analyzed and, therefore, *F. gilva sensu stricto* is not recognized in Brazil (Yuan

et al. 2020). The type specimen of *Hymenochaete cacao* (Berk.) Berk. & M.A. Curtis is from India (Berkeley and Curtis 1869) and the species has a Pantropical distribution (Job 1990). In Brazil, it is recorded in the southeastern state of São Paulo, and in the northern states of Pará and Roraima (Gomes-Silva *et al.* 2012a; Gibertoni *et al*. 2015). However, *H. cacao* is morphologically similar to other *Hymenochaete* species, such as *H. villosa* (Lév.) Bres. (Job 1990), making its record in Brazil still uncertain and in need of a molecular evaluation, especially in the Amazon. *Fulvifomes rimosus* (Berk.) Fiasson & Niemelä has the type locality in Australia, and the lectotype is from Mauritius (Larsen 1990). Based on a phylogenetic analysis, the distribution of *F. rimosus* was restrict to the Mediterranean and Black Sea areas, Africa, Asia and Australia (Wu *et al.* 2022), and many specimens previously described as *F. rimosus* occurring in tropical to temperate areas do not correspond to lectotype (Hattori *et al.* 2014), thus records for Brazil need to be reassessed.

Even species from South America require a more detailed analysis before having their occurrence confirmed for the Amazon. For example, *Fomitiporia apiahyna* (Speg.) Robledo, Decock & Rajchenb. is restricted to *Araucaria* forests in the south and southeastern regions of Brazil (Alves-Silva *et al*. 2020). *Fomitiporia baccharidis* (Pat.) Decock, Robledo & Amalfi is otherwise restricted to high-altitude Andean montane forests in Ecuador and northwestern Argentina (Amalfi *et al*. 2014). *Fuscoporia neocallimorpha* (Gibertoni & Ryvarden) Y.C. Dai & F. Wu was previously recorded in the Amazon (as *Phellinus neocallimorphus* Gibertoni & Ryvarden) by Freire and Soares (2024). However, Soares *et al.* (2018), after analyzing the type material of *F. neocallimorpha* (URM 77584), concluded that it was a specimen of *Abundisporus subflexibilis* (Berk. & M.A. Curtis) Parmasto, and synonymized this species. Therefore, the record of *F. neocallimorpha* for the Amazon needs to be reassessed.

The order Hymenochaetales has many species with low variability in morphological characters which form species complexes, making species identification difficult (Alves-Silva *et al*. 2020). As a result, the delimitation and confirmation of the occurrence of many species in the Brazilian Amazon requires a detailed analysis that includes ecological and molecular data. To date, only five studies are known to have used a molecular and phylogenetic approach with specimens of Hymenochaetaceae collected in the Brazilian Amazon (Alves-Silva *et al.* 2020; Yuan *et al.* 2020; Lima *et al.* 2022; Oliveira *et al.* 2022; Wu *et al.* 2022). Greater knowledge about Amazonia fungi is essential to better assess their diversity, ecosystem roles and also to determine conservation strategies (Assis *et al*. 2022). Thus, it is necessary to expand collection efforts, especially in regions that are still little explored in the Amazon, as in the states of Maranhão, Tocantins, and parts of southern Pará and western Amazonas.

CONCLUSIONS

Our findings expand the understanding of the diversity and distribution of Hymenochaetaceae species in the Brazilian Amazon. The 45 valid species still represent an underestimated diversity, particularly in underexplored areas where more intensive surveys are necessary. Future studies integrating morphological, molecular, and ecological approaches will be essential to confirm records of doubtful species, especially parasitic species with specific hosts. This survey establishes a baseline for future research and highlights the importance of deepening knowledge about fungal diversity. Such efforts are crucial to support conservation strategies in response to ongoing global changes, such as habitat loss and deforestation, in the world's largest tropical forest.

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SUPPLEMENTARY MATERIAL

Mendes-Freire & Soares. Survey of the diversity of Hymenochaetaceae (Hymenochaetales, Basidiomycota) in the Brazilian Amazon

Table S1. Occurrence sites of Hymenochaetaceae fungi in the area of the Brazilian Amazon biome in eight federal states as registered in the surveyed literature.

State	Coordinates	Source
Acre	10°04′21.14″S, 67°37′39.64″W	Bononi (1992)
Acre	9°58′16″S, 67°48′40″W	Soares *et al.* (2018)
Acre	Undetermined location	Gomes-Silva *et al.* (2013)
Amapá	00°57′49.8″N, 51°36′31.3″W	Soares *et al.* (2014)
Amapá	00°57′49.8″N, 51°36′31.3″W	Soares *et al.* (2018)
Amapá	00°57′49.8″N, 51°36′31.3″W	Lima *et al.* (2022)
Amapá	00°53′44″N, 52°00′08″W	Xavier *et al.* (2018)
Amazonas	2°53′37.0″S, 59°58′22.95″W	Sousa (1980)
Amazonas	03°00′27.0″S, 059°53′59″W	Sousa (1980)
Amazonas	Undetermined location	Gomes-Silva *et al.* (2012b)
Amazonas	3°4′25″S, 60°0′20″W	Gomes-Silva *et al.* (2012b)
Amazonas	3°4′25″S, 60°0′20″W	Gomes-Silva *et al.* (2013)
Amazonas	7°30′22″S, 63°1′15″W	Gomes-Silva *et al.* (2013)
Amazonas	2°44′49″S, 66°46′1″W	Gomes-Silva *et al.* (2013)
Amazonas	02°35′29.0″S, 060°12′54.4″W	Silva *et al.* (2021)
Amazonas	03°00′27.0″S, 059°53′59″W	Silva *et al.* (2021)
Amazonas	2°02′52.7″S, 60°03′45.2″W	Oliveira *et al.* (2022)
Maranhão	2°42′21″S, 44°44′16″W	Yuan *et al.* (2020)
Mato Grosso	10°10′1″S, 59°27′32″W	Fidalgo (1968)
Mato Grosso	10°10′1″S, 59°27′32″W	Gomes-Silva *et al.* (2012b)
Mato Grosso	10°10′1″S, 59°27′32″W	Gomes-Silva *et al.* (2013)
Mato Grosso	9°30′49.04″S, 55°39′25.75″W	Alves-Silva *et al.* (2020)
Pará	00°38′29″S, 47°34′57″W	Sotão *et al.* (2003)
Pará	1°38′48″S, 51°20′36″W	Gomes-Silva *et al.* (2009)
Pará	1°38′48″S, 51°20′36″W	Sotão *et al.* (2009)
Pará	1°57′36″S, 51°36′55″W	Sotão *et al.* (2009)
Pará	1°38′48″S, 51°20′36″W	Martins-Júnior *et al.* (2011)
Pará	1°38′48″S, 51°20′36″W	Gomes-Silva *et al.* (2012a)
Pará	1°04′43.97″S, 57°02′44.49″W	Gibertoni *et al.* (2013)
Pará	1°45′57″S, 55°51′57″W	Gibertoni *et al.* (2013)
Pará	3°46′4″S, 49°40′22″W	Gibertoni *et al.* (2013)
Pará	1°57′36″S, 51°36′55″W	Medeiros *et al.* (2013)
Pará	1°38′48″S, 51°20′36″W	Yuan *et al.* (2020)
Pará	2°49′11.49″S, 54°17′56.64″W	Couceiro *et al.* (2022)
Pará	1°42′24.09″S, 51°27′34.3″W	Oliveira *et al.* (2022)
Pará	2°15′41.50″S, 48°18′53.27″W	Freire and Soares (2024)
Pará	2°39′16.00″S, 48°23′59.00″W	Freire and Soares (2024)
Pará	1°30′51.204″S, 48°2′29.160″W	Freire and Soares (2024)
Rondônia	9°15′S, 61°40′W	Capelari and Maziero (1988)
Rondônia	8°41′10.7″S, 63°52′05.5″W	Gomes-Silva *et al.* (2008)
Rondônia	8°41′10.7″S, 63°52′05.5″W	Gomes-Silva *et al.* (2009)
Rondônia	8°7′31″S, 63°3′3″W	Gomes-Silva *et al.* (2009)
Rondônia	8°41′10.7″S, 63°52′05.5″W	Gomes-Silva *et al.* (2012a)
Rondônia	8°7′31″S, 63°3′3″W	Gomes-Silva *et al.* (2012a)
Rondônia	8°45′43″S, 63°54′14″W	Gomes-Silva *et al.* (2013)
Rondônia	8°41′10.7″S, 63°52′05.5″W	Gomes-Silva *et al.* (2013)
Rondônia	8°7′31″S, 63°3′3″W	Gomes-Silva *et al.* (2013)
Rondônia	10°26′20″S, 62°27′59″W	Gomes-Silva *et al.* (2013)
Rondônia	8°7′31″S, 63°3′3″W	Yuan *et al.* (2020)
Rondônia	8°41′06.62″S, 63°52′01.16″W	Oliveira *et al.* (2022)
Roraima	2°58′48″N, 61°17′31″W	Gomes-Silva *et al.* (2013)
Roraima	1°48′57″N, 61°7′40″W	Gomes-Silva *et al.* (2013)
Roraima	3°24′0″N, 61°42′0″W	Gomes-Silva *et al.* (2013)
Roraima	Undetermined location	Gomes-Silva *et al.* (2013)
Roraima	01°30′36″N, 060°42′59″W	Silva *et al.* (2021)
Roraima	03°23′12.6″N, 061°41′24.3″W	Silva *et al.* (2021)

Table S2. List of 34 Hymenochaetaceae species recorded for the Brazilian Amazon in the surveyed literature, but not considered valid in the present study due to dubious or unconfirmed occurrences (see exclusion criteria in Material and Methods) and thus excluded from the updated occurrence list presented in here.

Species	Type locality
Coltricia cinnamomea (Jacq.) Murrill	Austria
Coltricia montagnei (Fr.) Murrill	France
Fomitiporella cavicola (Kotl. & Pouzar) T. Wagner & M. Fisch	Czechoslovakia
Fomitiporia apiahyna (Speg.) Robledo, Decock & Rajchenb.	São Paulo (Brazil)
Fomitiporia baccharidis (Pat.) Decock, Robledo &Amalfi	Ecuador
Fomitiporia calkinsii (Murrill) Vlasák & Kout	USA
Fomitiporia punctata (P. Karst.) Murrill	Norway
Fomitiporia robusta (P. Karst.) Fiasson & Niemelä	Finland
Fulvifomes fastuosus (Lév.) Bondartseva & S. Herrera	Singapore
Fulvifomes imbricatus L.W. Zhou	Thailand
Fulvifomes grenadensis (Murrill) Murrill	Grenada
Fulvifomes mangrovicus (Imazeki) T. Hatt.	Japan
Fulvifomes merrillii (Murrill) Baltazar & Gibertoni	The Philippines
Fulvifomes rimosus (Berk.) Fiasson & Niemelä	Australia
Fulvifomes robiniae (Murrill) Murrill	USA

Table S2. Continued

Species	Type locality
Fuscoporia callimorpha (Lév.) Groposo, Log.-Leite & Góes-Neto	Madagascar
Fuscoporia contigua (Pers.) G. Cunn.	probably in France
Fuscoporia gilva (Schwein.) T. Wagner & M. Fisch.	USA
Fuscoporia neocallimorpha (Gibertoni & Ryvarden) Y.C. Dai & F. Wu	Alagoas (Brazil)
Fuscoporia punctatiformis (Murrill) Zmitr., Malysheva & Spirin.	USA
Fuscoporia wahlbergii (Fr.) T. Wagner & M. Fisch	South Africa
Hydnoporia tabacina (Sowerby) Spirin, Miettinen & K.H. Larss.	Great Britain
Hymenochaete cacao (Berk.) Berk. & M.A. Curtis	India
Hymenochaete cinnamomea (Pers.) Bres.	Not located
Hymenochaete microcycla (Zipp. ex Lév.) Spirin & Miettinen	Java (Indonesia)
Hymenochaete pinnatifida Burt	USA
Hymenochaete rheicolor (Mont.) Lév.	India
Hymenochaete rubiginosa (Dicks.) Lév.	Great Britain
Phellinus nilgheriensis (Mont.) G. Cunn.	India
Phylloporia pectinata (Klotzsch) Ryvarden	India
Pyrrhoderma lamaoense (Murrill) L.W. Zhou & Y.C. Dai	The Philippines
Pyrrhoderma noxium (Corner) L.W. Zhou & Y.C. Dai	Malaysia
Tropicoporus melleoporus (Murrill) Salvador-Montoya & Drechsler-Santos	USA
Tropicoporus shaferi (Murrill) Y.C. Dai & F. Wu	Montserrat