

Xylobotryum portentosum (Mont.) Pat. (Xylobotryomycetes, Ascomycota): a rare fungal species newly found in Southeastern Brazil

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Abstract: *Xylobotrum portentosum* (Mont.) Pat. is a striking Neotropical fungal species but it has been reported only a few times from Southern Brazil (States of Paraná and Santa Catarina), found in remnants of Atlantic Forest. Herein we report the species for the first time from the Southeastern Region of Brazil (State of São Paulo). A brief description and color photographs of the fresh specimen are presented.

Keywords: didymospore; Neotropical funga; pyrenomycetes; xylarioid fungi.

Xylobotryum portentosum (Mont.) Pat. (Xylobotryomycetes, Ascomycota): uma espécie rara de fungo encontrada na Região Sudeste do Brasil

Resumo: *Xylobotrum portentosum* (Mont.) Pat. é uma espécie notável de fungo neotropical que foi registrada apenas poucas vezes para a Região Sul do Brasil (Paraná e Santa Catarina), encontrada em remanescentes de Mata Atlântica. Neste trabalho a espécie é reportada pela primeira vez para a Região Sudeste do Brasil (Estado de São Paulo). São apresentadas uma breve descrição e fotografias coloridas do espécime fresco.

Palavras-chave: didimosporo; funga neotropical; fungos xylarioides; pirenomicetos.

Introduction

Xylobotryum Pat. is a widely distributed genus found in warm areas (tropical and subtropical) worldwide (Müller & von Arx 1962, Rossman 1976, Ju & Rogers 1994). It is a curious taxa since species produce dark carbonaceous stromata which are similar to *Xylaria* species, but perithecia are naked and ascospores are two-celled (Trierveiler-Pereira et al. 2008). The genus position within Ascomycota was uncertain until recently, but molecular data support that it belongs to a distinct family, order and class – Xylobotryaceae Voglmayr & Jaklitsch, Xylobotryales Voglmayr & Jaklitsch and Xylobotryomycetes Voglmayr & Jaklitsch, respectively (Voglmayr et al. 2019).

Six species have been described for the genus (Robert et al. 2005), but only two are currently accepted: *X. portentosum* (Mont.) Pat. and *X. andinum* Pat. (Voglmayr et al. 2019). *Xylobotrum portentosum* have been reported from Central and South America (Guzmán & Piepenbring 2010), but in Brazil there are only a few records from the Southern Region: State of Santa Catarina (Möller 1901, Trierveiler-Pereira et al. 2008) and Paraná (Meijer 2006), all of them from the Atlantic Forest biome. The species is lignicolous and all Brazilian specimens were gathered in fern trees (*Cyathea* sp.).

In this manuscript we present information about a specimen of *X. portentosum* collected in the State of São Paulo, Brazil.

Material and Methods

The specimen was collected at Carlos Botelho State Park (Parque Estadual Carlos Botelho – PECB), located in the southern region from the State of São Paulo, Brazil (Figure 1). This conservation unit was created in 1982 and shelters more than 37,000 hectares of mountainous area of Atlantic Forest, with altitudes ranging from 50 to 975 meters above sea level. The vegetation is mainly montane and submontane rainforests (Lima et al. 2011).

Stromata were found growing on a dead fern tree lying on the ground (*Cyathea* sp.) and were photographed using digital camera. Samples were taken to the Mycological Studies Laboratory (LEMic) at Federal University of São Carlos, where macro and microscopic analysis were performed. Macroscopic analysis consisted of the observation of stromata and perithecia color, size and shape. For microscopic characterization, the perithecial content of dried specimen was removed with the aid of a histological needle after perithecia rehydration with 3% KOH, and mounted on glass slides with 1% floxin + 3% KOH, and Melzer reagent. Identification and morphological classification were done by consulting the specialized literature (Müller & von Arx 1962, Trierveiler-Pereira et al. 2008). Voucher is deposited at the Mycological Collection from the Herbarium SPSC (Federal University of São Carlos, Buri, São Paulo, Brazil), with duplicate at Herbarium SP-Fungi (Instituto de Pesquisas Ambientais, São Paulo, Brazil).



Figure 1. Geographic distribution of *Xylobotryum portentosum* in Brazil. Dots represent known records: Santa Catarina (SC), Paraná (PR), and São Paulo (SP – this study). Map elaborated by Amanda Prado-Elias.

Results

Xylobotryum portentosum (Mont.) Pat., Bull. Soc. Myc. France 16: 185. 1900.

Examined specimen: BRAZIL, SÃO PAULO: Sete Barras, Parque Estadual Carlos Botelho, Trilha da Figueira, $24^{\circ} 11' 40.9''$ S and $47^{\circ} 55' 16.9''$ W; 18.IV.2022; leg. L. Trierveiler-Pereira & J.M. Baltazar (SPSC; SP-Fungi 513077), on dead trunk of *Cyathea* sp.

Description: see Trierveiler-Pereira et al. (2008) and Voglmayr et al. (2019).

Diagnostic characters: The examined specimen presents unbranched, more rarely apically branched, erect, stipitate, black, stromata (Figure 2A–C), 1.5–5.5 cm tall, 0.2–0.6 cm in diam., becoming hollow; bearing crowded, conspicuous, naked, sessile, black perithecia over the stromatal surface, ca. 0.5 mm in diam, subglobose, apically papillate. Asci are bitunicate, cylindrical, long-stipitate, with apex not bluing in Melzer's iodine reagent, containing 8 uniseriate to irregularly biseriate ascospores; ascospores 1-septate, oblong-ellipsoid to fusoid, light brown to dark brown, smooth (Figure 2D), $9\text{--}13 \times 3\text{--}4.5 \mu\text{m}$, with longitudinal germ slits extending over the whole length of the ascospore, usually difficult to observe in light microscopy.

Taxonomic and morphological comments: Macro and microscopic features of the studied material match the description of Brazilian specimens presented by Trierveiler-Pereira et al. (2008), except that some stromata have branched, fertile apices (Figure 2B). *Xylobotryum andinum* is microscopically very similar to *X. portentosum* regarding ascospore characters, but it differs macroscopically due to its corymbose stromata (a cluster of naked perithecia whose lower stipes are proportionally longer so that the perithecia form a flat or slightly convex head). Moreover, *X. andinum* has a broader geographic distribution, including paleo and neotropical

areas. Color photographs of *X. andinum* are presented by Voglmayr et al. (2019).

Known distribution: Neotropical, with records from Brazil, Chile, Colombia, Costa Rica, Dominica, Ecuador, French Guiana, Guadeloupe, Guyana, Jamaica, Martinique, Nicaragua, Panama, Peru, and Puerto Rico (Voglmayr et al. 2019).

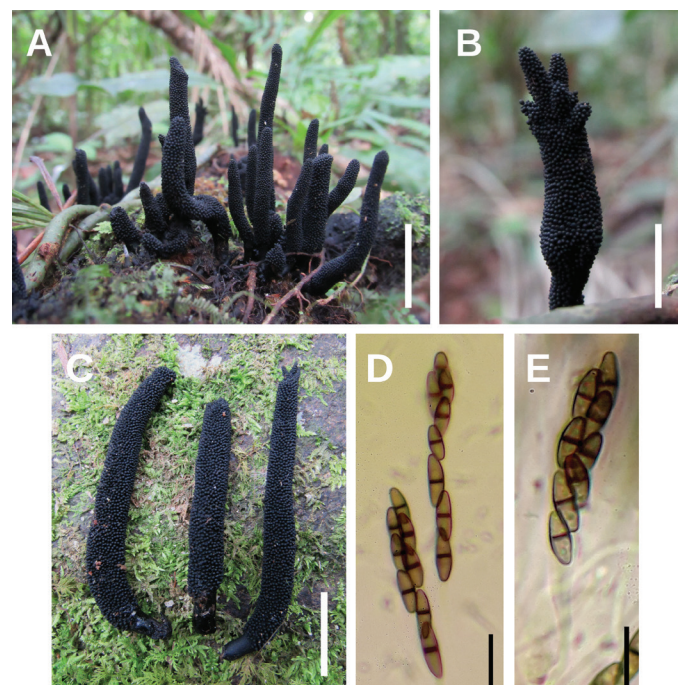


Figure 2. *Xylobotryum portentosum*. A. Stromata in situ. B. Stromata with branched fertile apex. C. Stromata ex situ. D, E. Ascospores within ascus. Scale bars: A, C = 3 cm; B = 1 cm; D, E = 10 μm . Photographs by Larissa Trierveiler-Pereira.

Discussion

When firstly reported from Brazil, the species was identified as *Trachyxlaria phaeodidyma* Möller (Möller 1901), but the synonym with *X. portentosum* was later proposed by Müller & von Arx (1962). *Xylobotryum rickii* (Theiss.) Lloyd, a name proposed for a Brazilian specimen collected in the State of Rio Grande do Sul, corresponds to a *Xylaria* species (Rossman 1976). In Brazil, *X. portentosum* is known from the Southern Region (Santa Catarina and Paraná) and herein we present the first record of the species from Southeastern Brazil, from the State of São Paulo (Figure 1). Here, it is important to emphasize that São Paulo is the Brazilian State with the better known mycodiversity, with record of 1,900 fungal species (BFG 2022).

In Brazil, the species has only a few reports from preserved areas of Atlantic Forest (dense ombrophilous forests). The authors have been collecting macrofungi for almost 20 years now in several areas of Atlantic Forest in Brazil (Southern, Southeastern and Northeastern regions) and have spotted the species only twice: once in April 25th, 2005 in Corupá, State of Santa Catarina (26°23'53.7"S, 49°20'55.3"W – voucher not preserved), and in São Paulo (present study), indicating that its occurrence is rare.

Considering that the Atlantic Forest is a biome much reduced compared to its original area (Rezende et al. 2018), and that in Brazil fungal species are not currently being considered in conservation policies, it would be interesting to evaluate the species conservation status and discuss conservation actions.

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Author Contributions

Larissa Trierveiler-Pereira: contributed to conceptualization; collection of the specimen; identification at field and laboratory and writing the original draft; review and editing the manuscript.

Juliano M. Baltazar: contributed to conceptualization; collection of the specimen; writing the original draft; review and editing the manuscript.

Conflicts of Interest

The author declare that they have no conflict of interest related to the publication of this manuscript.

Ethics

This study did not involve human beings and/or clinical trials that should be approved by one Institutional Committee.

Data Availability

<https://specieslink.net/col/SP-Fungi/> (Voucher: SP-Fungi 513077).

References

- BFG 2022. Brazilian Flora 2020: Leveraging the power of a collaborative scientific network. *Taxon* 71(1):178–198.
- GUZMÁN, G. & PIEPENBRING, M. 2010. Los hongos de Panamá. Introducción a la identificación de los hongos macroscópicos. Instituto de Ecología, Xalapa, Mexico.
- JU, Y.M. & ROGERS, J.D. 1994. Biological and developmental studies of *Xylobotryum andinum*. *Cryptogam. Bot.* 4:346–355.
- LIMA, R.A.F., DITTRICH, V.A. de O., DE SOUZA, V.C., SALINO, A., BREIER, T.B. & DE AGUIAR, O.T. 2011. Vascular flora of the Carlos Botelho State Park, São Paulo, Brazil. *Biota Neotrop.* 11(4):173–214. <http://dx.doi.org/10.1590/S1676-06032011000400018> (last access on 13/05/2022)
- MEIJER, A.A.R. de. 2006. Preliminary list of the macromycetes from the Brazilian state of Paraná. *Bol. Mus. Bot. Munic., Curitiba* 68:1–55.
- MÖLLER, A. 1901. Phycomyeten und Ascomyceten. Untersuchungen aus Brasilien. *Botanische Mittheilungen aus den Tropen* 9. Gustav Fischer, Jena, Germany.
- MÜLLER, E. & VON ARX, J.A. 1962. Die Gattungen der didymosporen Pyrenomyceten. *Beiträge zur Kryptogamenflora der Schweiz* 11(2):1–922.
- REZENDE, C.L., SCARANO, F.R., ASSAD, E.D., JOLY, C.A., METZGER, J.P., STRASSBURG, B.B.N., TABARELLI, M., FONSECA, G.A. & MITTERMEIER, R.A. 2018. From hotspot to hopespot: An opportunity for the Brazilian Atlantic Forest. *Perspect. Ecol. Conserv.* 16(4):208–214.
- ROBERT, V., STEGEHUIS, G. & STALPERS, J. 2005. The MycoBank engine and related databases. <https://www.MycoBank.org/> (last access in 12/05/2022)
- ROSSMAN, A.Y. 1976. *Xylobotryum andinum*, a tropical Pyrenomycete from Northern California. *Myxotaxon* 4(1):179–183.
- TRIERVEILER-PEREIRA, L., BALTAZAR, J.M. & LOGUERCIO-LEITE, C. 2008. *Xylobotryum portentosum* (Mont.) Pat. (Ascomycota): a second record from Brazil after a hundred years. *Nova Hedwigia* 87(1–2):169–174.
- VOGLMAYR, H., FOURNIER, J. & JAKLITSCH, W.M. 2019. Two new classes of Ascomycota: *Xylobotryomycetes* and *Candelariomycetes*. *Persoonia* 42:36–49.

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