First record of *Xylophallus xylogenus* (Phallaceae, Agaricomycetes) in Central Brazil: morphological notes and habitat observations

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Abstract

This study presents the first documented occurrence of *Xylophallus xylogenus* in the Central-West Region of Brazil, specifically in Itapaci, Goiás. Ten specimens were collected on April 17, 2025, from soil containing decomposing rice straw. The macroscopic and ecological characteristics matched previous descriptions of the species. This finding expands the known geographic distribution of this rare and poorly collected member of the Phallaceae and contributes to the ongoing documentation of Neotropical fungal diversity.

Keywords: *Xylophallus* genus, stinkhorn, tropical fungi, neotropical mycology, central Brazil, Phallaceae.

Primeiro registro de *Xylophallus xylogenus* (Phallaceae, Agaricomycetes) no Brasil Central: notas morfológicas e observações sobre o habitat

Resumo

Este estudo apresenta o primeiro registro documentado de *Xylophallus xylogenus* na Região Centro-Oeste do Brasil, especificamente em Itapaci, Goiás. Dez espécimes foram coletados em 17 de abril de 2025, em solo contendo palha de arroz em decomposição. As características macroscópicas e ecológicas corresponderam às descrições anteriores da espécie. Este achado amplia a distribuição geográfica conhecida desse raro e pouco coletado membro da família Phallaceae e contribui para a documentação contínua da diversidade de fungos neotropicais.

Palavras-chave: gênero *Xylophallus*, cogumelo fedorento, fungos tropicais, micologia neotropical, Brasil Central, Phallaceae.

1. Introduction

Xylophallus xylogenus (Figure 1) is a small, lignicolous species of the Phallaceae family that has historically been underreported, likely due to its minute size and the ephemeral nature of its basidiomata. First described by Montagne (1855) from specimens collected in French Guiana, the species has since been recorded in Costa Rica, Suriname, the French Antilles, Peru, and Brazil (Pernambuco). Recent taxonomic revisions by Trierveiler-Pereira & Silveira (2012) have synonymized *Phallus pygmaeus* with *X. xylogenus*, thereby clarifying the species' taxonomic identity and refining its morphological circumscription. These updates emphasize the importance of critical reexamination of historical taxa in tropical mycology and highlight the potential for overlooked diversity within the Phallaceae.

The morphological features of *X. xylogenus* are consistent with other members of the genus *Xylophallus*, including a small, often reddish to brownish basidioma, with a distinct odor characteristic of the stinkhorn group. The basidiomata are ephemeral, emerging rapidly and decaying within a short period, which contributes to the difficulty of finding this species in the field (Montagne, 1855; Trierveiler-Pereira; Silveira, 2012).

In 2012, Trierveiler-Pereira & Silveira conducted a comprehensive taxonomic revision that synonymized *Phallus pygmaeus* with *X. xylogenus*, consolidating the species' identity and clarifying its morphological boundaries. This taxonomic clarification not only reinforced the distinctiveness of *X. xylogenus* but also contributed to a deeper understanding of the diversity within the Phallaceae family (Trierveiler-Pereira; Silveira, 2012).

The species' rare occurrence in collections and its limited geographical distribution make it an important subject of study for understanding fungal diversity in the Neotropics. The discovery of *X. xylogenus* in new locations, such as the Central-West region of Brazil, contributes to the ongoing efforts to document and conserve the rich fungal biodiversity of the region (Pereira et al., 2025).

This paper contributes a new geographic record from the Cerrado transition zone in Central Brazil, offering morphological notes that reinforce previous descriptions while providing habitat and locality data for future biogeographic studies.

Figure 1. An individual of *Xylophallus xylogenus* was observed in its natural habitat within the leaf litter of the Brazilian Cerrado in 2025. Source: Authors, 2025.

2. Materials and Methods

2.1 Identification location and identification description

Ten basidiomata were collected on April 17, 2025, in the municipality of Itapaci, state of Goiás, Brazil (coordinates: -14.953513 and -49.550666). The specimens were found growing in clusters directly from soil enriched with decomposing rice straw in a domestic backyard. Although the vegetation surrounding the site is anthropic and altered, the substrate offered sufficient lignin-rich organic matter, resembling natural microhabitats of the species.

Macroscopic characteristics were recorded from fresh material. Observations include basidiomata size, structure, odor, and surface texture. Odor intensity and persistence were noted due to their diagnostic relevance in Phallaceae. Microscopic analysis is ongoing and will be described in a future study. Specimens are to be deposited in a Brazilian herbarium.

Here is a dichotomous key for the identification of *Xylophallus xylogenus*, based on its morphological and ecological characteristics:

2.2 Dichotomous key for Xylophallus xylogenus

Basidioma small, measuring between 2 to 10 cm in height, with reddish or brownish coloration... Go to 2

Basidioma larger than 10 cm in height or with other predominant colors... Not *Xylophallus xylogenus*

Basidioma with a typical stinkhorn shape, featuring a slender stipe and a gelatinous or mucous cap on top, emitting a characteristic odor... Go to 3

Basidioma with other characteristics (e.g., no odor or no slender stipe)... Not *Xylophallus xylogenus*

Basidioma with ephemeral life, lasting only a few hours or days, emerging in areas with decaying wood or organic matter (leaf litter, dead wood)... Go to 4

Basidioma persistent for longer periods, forming a robust structure that remains visible for more than a week... Not *Xylophallus xylogenus*

Habitat found in soils rich in organic matter, such as leaf litter or decaying wood; typically in disturbed areas like cerrado regions, tropical forests, or forest edges... Go to 5

Habitat in other types of substrate or ecosystems (e.g., pastures or acidic soils)... Not *Xylophallus xylogenus*

Odor characteristic, typical of fungi in the Phallaceae family, described as fetid or resembling decaying flesh... It is *Xylophallus xylogenus*

Odor absent or of a different nature... Not *Xylophallus xylogenus*

3. Results

3.1 Description

All ten specimens displayed features matching the description of *Xylophallus xylogenus* as revised by Trierveiler-Pereira & Silveira (2012):

Basidiomata are small (1.5–3 cm tall), erect, and grow gregariously from the substrate.

Immature forms are globose to ovoid, smooth, and light brown at the apex.

Volva yellowish, irregularly dehiscent, basal hyphal strands whitish and interwoven with the substrate.

Pseudostipe cylindrical, hollow, translucent white, ornamented externally with a fine reticulate pattern.

Gleba olive to grayish green, mucilaginous, and with a strong fetid odor similar to decomposing organic matter.

The collection site is not a natural forest remnant but rather a human-modified area. This highlights the ecological plasticity of *X. xylogenus* and supports the hypothesis that its occurrence may be underreported, primarily due to its small size and ephemeral basidiomata (Gómez & Gazis, 2006).

This record represents the first known occurrence of *X. xylogenus* in the state of Goiás and the Central-West macroregion (Figure 2). To date, all documented specimens of the species in Brazil have been found in the Atlantic Forest biome in the Northeast. This new finding significantly expands the known distribution of the species and underscores the importance of conducting more extensive fungal surveys, even in urban or modified environments.

Figure 2. Individuals of *Xylophallus xylogenus* in colonies in the natural leaf litter environment of the Brazilian Cerrado, 2025. Source: Authors, 2025.

4. Discussion

Xylophallus xylogenus is a small, lignicolous species of the family Phallaceae, characterized by its ephemeral basidiomata and its ecological role in decomposing plant material, primarily wood and organic debris in tropical and subtropical ecosystems. Historically, its small size and the brief existence of its fruiting bodies have contributed to the species being underreported in mycological surveys. The discovery of *X. xylogenus* in new regions, such as the Cerrado of Central Brazil, emphasizes its ecological plasticity and suggests that the species may be more widespread than previously thought, particularly in human-modified environments (Gómez; Gazis, 2006).

The ecological role of *X. xylogenus* within its habitat is closely tied to the process of wood decay, wherein it contributes to nutrient cycling by breaking down lignocellulosic materials. The species' presence in modified environments, such as those affected by agricultural practices or urbanization, highlights its potential adaptability to diverse ecosystems. This observation aligns with previous studies suggesting that many fungal species, especially those within the Phallaceae family, exhibit significant ecological plasticity, allowing them to thrive in disturbed environments (Trierveiler-Pereira; Silveira, 2012). This adaptability may partly explain the underreporting of the species, as its presence in anthropogenic areas might be overlooked due to its inconspicuous appearance and brief fruiting period.

In terms of geographical distribution, *X. xylogenus* was first described from French Guiana by Montagne (1855) and has since been recorded in various Neotropical regions, including Costa Rica, Suriname, the French Antilles, Peru, and Brazil (Pernambuco) (Montagne, 1855; Pereira et al., 2012). The recent finding of *X. xylogenus* in Goiás, located in the Central-West macroregion of Brazil, represents a significant extension of its known distribution, which has so far been concentrated in the Atlantic Forest biome (Pereira et al., 2025). This new occurrence reinforces the notion that the species may be more widely distributed across Brazil than previously recognized, further underlining the importance of expanding fungal survey efforts to less-studied regions such as the Cerrado and other biomes.

Taxonomically, *X. xylogenus* has been the subject of revision, particularly with the work of Trierveiler-Pereira & Silveira (2012), who synonymized Phallus pygmaeus with *X. xylogenus*, consolidating its taxonomic identity. This revision was critical for clarifying the morphological boundaries of the species, which can be challenging to delineate due to the variability in the appearance of basidiomata. The morphological features of *X. xylogenus* include small, reddish to brownish basidiomata, often measuring only a few centimeters in height, with a distinctive odor typical of the stinkhorn group (Trierveiler-Pereira et al., 2024; Pereira; Silveira, 2012). These

ephemeral structures emerge rapidly in the decaying wood or organic matter but last for only a short time, contributing to the difficulty of collecting specimens in the field.

Despite its small size and transient nature, *X. xylogenus* plays an important role in fungal biodiversity and decomposition processes. Its rarity in collections may be due to both the limited number of fungal surveys in tropical and subtropical regions and the species' brief fruiting period. As fungal biodiversity in these areas remains poorly documented, *X. xylogenus* serves as an important reminder of the underexplored fungal diversity in Neotropical ecosystems.

The recent discovery of *X. xylogenus* in the Central-West region of Brazil underscores the need for more extensive fungal surveys across a range of habitats, especially in anthropogenically altered environments. Fungal diversity, particularly in tropical and subtropical ecosystems, is often underappreciated in biodiversity assessments. The finding of *X. xylogenus* in disturbed areas such as the Cerrado suggests that human-modified environments could harbor previously unrecognized fungal species (Gómez; Gazis, 2006). This has significant implications for fungal conservation, as ecosystems subjected to land use changes are often overlooked in conservation planning.

The conservation of fungal diversity in these regions requires targeted efforts to survey and document species like *X. xylogenus*, especially given their role in ecosystem functioning. While fungi like *X. xylogenus* may not have immediate economic value, their contribution to decomposition and nutrient cycling is critical to the health of ecosystems.

5. Conclusions

This study confirms the presence of *Xylophallus xylogenus* in Central Brazil and provides morphological and ecological data to support its identification. The findings stress the importance of mycological research in non-traditional habitats and suggest that other rare taxa might also occur in overlooked or disturbed areas. Future work should include molecular confirmation of the specimens and additional ecological assessments to evaluate the conservation status of the species in its newly recorded location.

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7. Authors' Contributions

Tullyo Henrique Lima Machado: Identification, collection, and writing of the study. *Antonio Carlos Pereira de Menezes Filho*: Translation, species identification, description of fungal morphology. *Matheus Vinícius Abadia Ventura*: Collection of funds, identification, and writing of the study.

8. Conflicts of Interest

No conflicts of interest.

9. Ethics Approval

Not applicable.

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