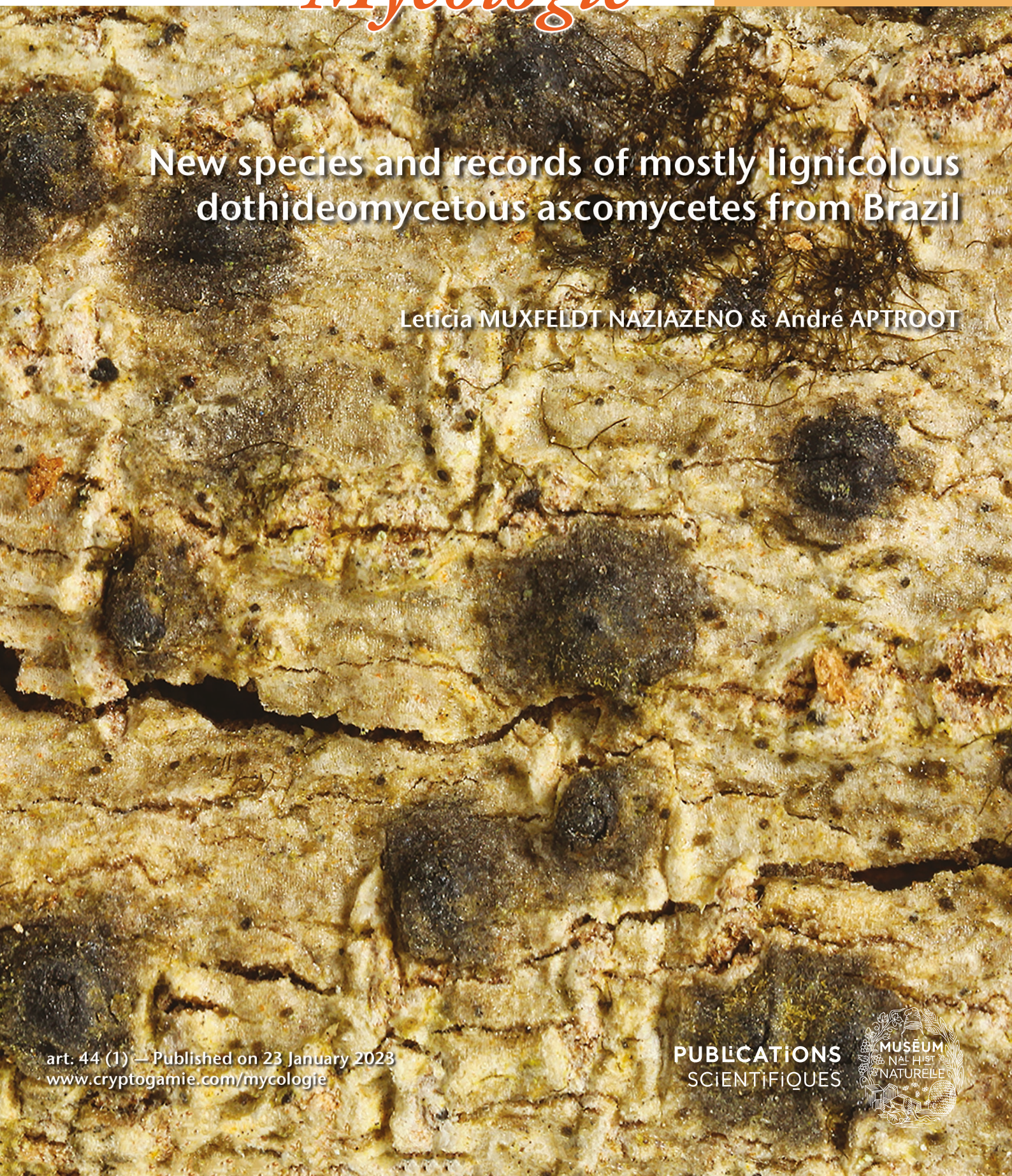
cryptogamie
Mycologie
2023 • 44 • 1

New species and records of mostly lignicolous dothideomycetous ascomycetes from Brazil

Leticia MUXFELDT NAZIAZENO & André APTROOT



art. 44 (1) — Published on 23 January 2023
www.cryptogamie.com/mycologie

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Cryptogamie, Mycologie est distribué en version électronique par / Cryptogamie, Mycologie *is distributed electronically by*:
- BioOne® (http://www.bioone.org/loi/crym)

Cryptogamie, Mycologie est une revue en flux continu publiée par les Publications scientifiques du Muséum, Paris
Cryptogamie, Mycologie *is a fast track journal published by the Museum Science Press, Paris*

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diff.pub@mnhn.fr / http://sciencepress.mnhn.fr
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ISSN (imprimé / *print*) : 0181-1584 / ISSN (électronique / *electronic*) : 1776-100

New species and records of mostly lignicolous dothideomycetous ascomycetes from Brazil

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Submitted on 1 June 2022 | Accepted on 8 November 2022 | Published on 23 January 2023

Muxfeldt Naziazeno L. & Aptroot A. 2023. — New species and records of mostly lignicolous dothideomycetous ascomycetes from Brazil. *Cryptogamie, Mycologie* 44 (1): 1-9. https://doi.org/10.5252/cryptogamie-mycologie2023v44a1. http://cryptogamie.com/mycologie/44/1

ABSTRACT
Nineteen mostly dothideomycetous lignicolous ascomycetes are reported from Brazil. One species, *Melomastia septemseptata* sp. nov., is newly described. It is corticolous in Cerrado. Twelve are new records to South America, one is new to Brazil and six are new records for the state of Mato Grosso do Sul. Most species were from the Cerrado biome but they are mostly cosmopolitan.

KEY WORDS
Mato Grosso do Sul, Dothideomycetes, new records, new species.

RÉSUMÉ
Espèce nouvelle et signalements nouveaux de Dothideomycètes lignicoles au Brésil.
Dix-neuf ascomycètes lignicoles, principalement Dothideomycètes, sont signalés au Brésil. Une espèce, *Melomastia septemseptata* sp. nov., est nouvellement décrite. Elle est corticole dans le Cerrado. Douze sont nouvellement signalées en Amérique du Sud, une est nouvelle au Brésil et six sont nouvelles pour l'état du Mato Grosso do Sul. La plupart des espèces ont été trouvées au Cerrado, mais elles sont dans la majorité cosmopolites.

MOTS CLÉS
Mato Grosso do Sul, Dothideomycètes, signalements nouveaux, espèce nouvelle.

INTRODUCTION

Currently there are around 65 000 ascomycete species known (Luz 2011). Brazil is the country with the highest recorded biodiversity in several plant and animal groups, including phanerogams (Forzza *et al*. 2010), butterflies (Sousa 2022) and birds (Pacheco *et al*. 2021). Ascomycetes have been studied in Brazil since the 19th century (e.g. Starbäck 1904). However, little attention has been paid so far to lignicolous dothidealean ascomycetes.

Dothideomycetes is the largest class of ascomycetes, currently encompassing more than 32 orders, 191 families, 1495 genera (242 genera *incertae sedis*) and over 19 000 known species (Hongsanan *et al*. 2020a, b; Wijayawardene *et al*. 2022). They were previously known as Loculoascomycetes. Many are cosmopolitan fungi, often saprobes with diverse lifestyles that can interact with a wide range of host/substrates, and occurring in terrestrial, freshwater, marine and extreme environments (Hyde *et al*. 2013). Members of this class usually have as main characteristics bitunicate or fissitunicate asci that emerge from an ascolocular development (i.e., in preformed locules within vegetative tissue, that represents the ascoma) (Schoch *et al*. 2009). The dispersal of the reproductive cells of Dothideomycetes, the ascospores, is done by rupturing the thick outer layer, the ectotunica, allowing the thinner inner layer (endotunica) to elongate in a "jack in a box" fashion. The elongated endotunica breaks off apically and releases the ascospores strongly through the opening of the ascoma. The ascospores can also be released into the air or under water. The type of hamathecium, a sterile hyphal tissue present between the asci, is the most accurate character used to demarcate main classification groups within Dothideomycetes (Nannfeldt 1932).

Study of Dothideomycetes contributes to the knowledge of the biodiversity. In addition, some species have properties like a strong action in wood decay or other ecological roles. So far, the wood-inhabiting Dothideomycetes have received only little scientific attention in Brazil. Only a few species were reported (see Starbäck 1904).

In February and March 2022, the authors collected lignicolous fungi in Cerrado vegetation in various places in Campo Grande (Mato Grosso do Sul, Brazil). In addition, some recent materials from other areas collected by the second author were studied. To our surprise, we could identify many specimens of mostly cosmopolitan species, many of which were known to us from previous work in Europe. Here we report many species new to South America, Brazil or the state of Mato Grosso do Sul. One species is new to science.

MATERIAL AND METHODS

Specimens were distinguished in the field by a Leuchtlupe with 365 nm UV and LED, collected using Opinel knives, and subsequently air dried in a room with air conditioning. We also incubated pieces of wood without visible fruiting bodies in a moist chamber, usually for three days at *c*. 25°C, in order to trigger the mycelia inside the wood to form fruiting bodies. Specimens with fruiting bodies were examined macroscopically with a SZX7 stereomicroscope and microscopical details were observed in hand sections under an Olympus BH2 compound microscope at 100, 400 and occasionally 1000 times magnification. Initially, all sections were observed in water, but often the following chemicals were added to enhance certain structures: Lugol's solution was applied for IKI, and 10% KOH in water for K. All specimens were air-dried after observation and are currently preserved in herbarium CGMS where they are held in paper packets at room temperature, with labels indicating the collecting locality, date, substratum, collection number and identification.

RESULTS

New species

Family Pleurotremataceae Walt.Watson
Genus *Melomastia* Nitschke ex Sacc.

Melomastia septemseptata sp. nov.
(Figs 1-4)

Holotype. — **Brazil**. Mato Grosso do Sul, Campo Grande, Vila Carlota, 3.III.2021, alt. 600 m, 20°29'S, 54°36'W, on tree bark, *A. Aptroot 82290* (holo-, CGMS; iso-, ABL).

MycoBank. — MB846359.

Description

Corticolous *Melomastia* with 7 to 11-septate ascospores.

Thallus corticolous, only visible as a whitish stain, not lichenized. Ascomata pseudothecioid, conical, 0.5-1.0 mm diam. Ostiole apical. Wall carbonized above, greenish black, but barely below the hamathecium, up to 50 µm thick. Paraphyses not branched, *c*. 2 µm wide. Ascospores 8/ascus, hyaline, thick-walled with lumina fusiform, 7(-11)-septate, (21-)25-30 × 6.5-8.0 µm diam. Pycnidia not observed.

Remarks

The specimen was found on living bark of a Cerrado tree. All known species of *Melomastia* (Li *et al*. 2022) occur saprophytic in marine, aquatic or dry terrestrial habitats. The number of septa in the ascospores in *Melomastia septemseptata* sp. nov. is seven to eleven. In most dry terrestrial representatives of *Melomastia* (e.g. *M. fusispora* W.L. Li, Maharachch. & Jian K. Liu, *M. oleae* W.L. Li, Maharachch. & Jian K. Liu, *M. sichuanensis* W.L. Li, Maharachch. & Jian K. Liu and *M. winteri* W.L. Li, Maharachch. & Jian K. Liu), the number of septa per ascospores is three. No previously known species of *Melomastia* was known to occur on living bark. The colouration of the fruiting body found in the *Melomastia* specimens ranges from dark brown to black in contrast to *M. septemseptata* sp. nov., which is dark green.

KEY TO SPECIES OF *MELOMASTIA* NITSCHKE EX SACC.

1. Ascospores 3-septate; lignicolous in terrestrial habitats .....
..... Majority of the species of *Melomastia* would key out; the distinction between most of which are unclear.
— Ascospores 7- or more septate 2

2. Corticolous in dry terrestrial environment ..... *M. septemseptata* sp. nov.
— Lignicolous in maritime and aquatic environments .....
Here several species key out which for a long time united in the genus *Dyfrolomyces* K.D.Hyde, K.L.Pang, Alias, Suetrong & E.B.G.Jones, one of which was previously classified in the genus *Saccardoëlla* Speg.

NEW RECORDS

Family AMPHISPHAERIACEAE G.Winter
Genus *Amphisphaeria* Ces. & De Not.

Amphisphaeria umbrina (Fr.) De Not.

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 83284*.

NOTES
New record for South America. For a description, see Wang *et al*. (2004).

Family HYPONECTRIACEAE Petr.
Genus *Exarmidium* P.Karst.

Exarmidium excellans (Rehm ex Sacc.) Aptroot

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 51431*.

NOTES
New record for South America. For a description, see Aptroot (1998).

Family HYSTERIACEAE Chevall.

NOTES
For descriptions of all Hysteriales and similar species, see Boehm *et al*. (2009).

Genus *Actidiographium* Lar.N.Vassiljeva

Actidiographium orientale Lar.N.Vassiljeva

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 84760*.

NOTES
New record for South America.

Genus *Anteaglonium* Mugambi & Huhndorf

Anteaglonium parvulum
(W.R.Gerard) Mugambi & Huhndorf

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 83259*.

NOTES
New record for South America.

Genus *Gloniella* Sacc.

Gloniella abietina Syd.

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Reserva Kadiweu, on wood, *Aptroot 85642.*

NOTES
New record for South America.

Genus *Gloniopsis* De Not.

Gloniopsis praelonga (Schwein.) Underw. & Earle

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 79908*.

NOTES
New record for Mato Grosso do Sul.

Genus *Hysterobrevium* E.Boehm & C.L.Schoch

Hysterobrevium mori (Schwein.) E.Boehm & C.L.Schoch

MATERIAL STUDIED. — **Brazil**. Pernambuco, Buique, Vale de Catimbau, on wood, *Aptroot, ISE 54623.*

NOTES
New record for South America.

Fig. 1. — Habitus of *Melomastia septemseptata* sp. nov. (holo-, CGMS). Scale bar: 5 mm.

Genus *Hysterium* Pers.

Hysterium angustatum Alb. & Schwein.

Material studied. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 81312*.

Notes

New record for Mato Grosso do Sul.

Genus *Psiloglonium* Höhn.

Psiloglonium simulans
(W.R.Gerard) E.Boehm, C.L.Schoch & Spatafora

Material studied. — **Brazil**. Pernambuco, Buique, Vale de Catimbau, on wood, *Aptroot, ISE 54493.*

Notes

New record for South America.

Family Lophiostomataceae Luerss.
Genus *Lophiostoma* Ces. & De Not.

Lophiostoma corticola
(Fuckel) E.C.Y.Liew, Aptroot & K.D.Hyde

Material studied. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 84482*.

Notes

New record for South America. For a description, see Aptroot (1998).

Family Melanommataceae G.Winter.
Genus *Melanomma* Nitschke ex Fuckel

Melanomma pulvis-pyrius (Pers.) Fuckel

Material studied. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 83281*.

FIG. 2. — Section through ascoma of *Melomastia septemseptata* sp. nov. (holo-, CGMS). Scale bar: 200 µm.

NOTES

New record for Mato Grosso do Sul. For a description, see Aptroot (1998).

Family MYTILINIDIONAEAE Kirschst.
Genus *Mytilinidion* Duby

Mytilinidion thujarum Feltgen

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 82334*.

NOTES

New record for Brazil.

Family ORBILIACEAE Nannf.
Genus *Orbilia* Fr.

Orbilia aureocrenulata Baral

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 83271*.

NOTES

New record for Mato Grosso do Sul. For a description, see Baral *et al*. (2020).

Family PATELLARIACEAE Corda
Genus *Rhytidhysteron* Speg.

Rhytidhysteron brasiliense Speg.

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 83272*.

NOTES

New record for Mato Grosso do Sul. For a description, see Yacharoen *et al*. (2015). The species is often synonymized with the type species of the genus, but Yacharoen *et al*. (2015) argue against this (q.v.) and prefer to keep the tropical material of this complex separate from the temperate material, based on morphological differences and polymorphisms in DNA sequences.

Family PHLEOGENACEAE Weese
Genus *Phleogena* Link

Phleogena faginea (Fr.) Link

MATERIAL STUDIED. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 78478*.

NOTES

New record for South America. For a description, see Szczepkowski *et al*. (2000). It is reported here even though it is now classified in the basidiomycetes, as it was long thought to be an ascomycete and is similar to Caliciales.

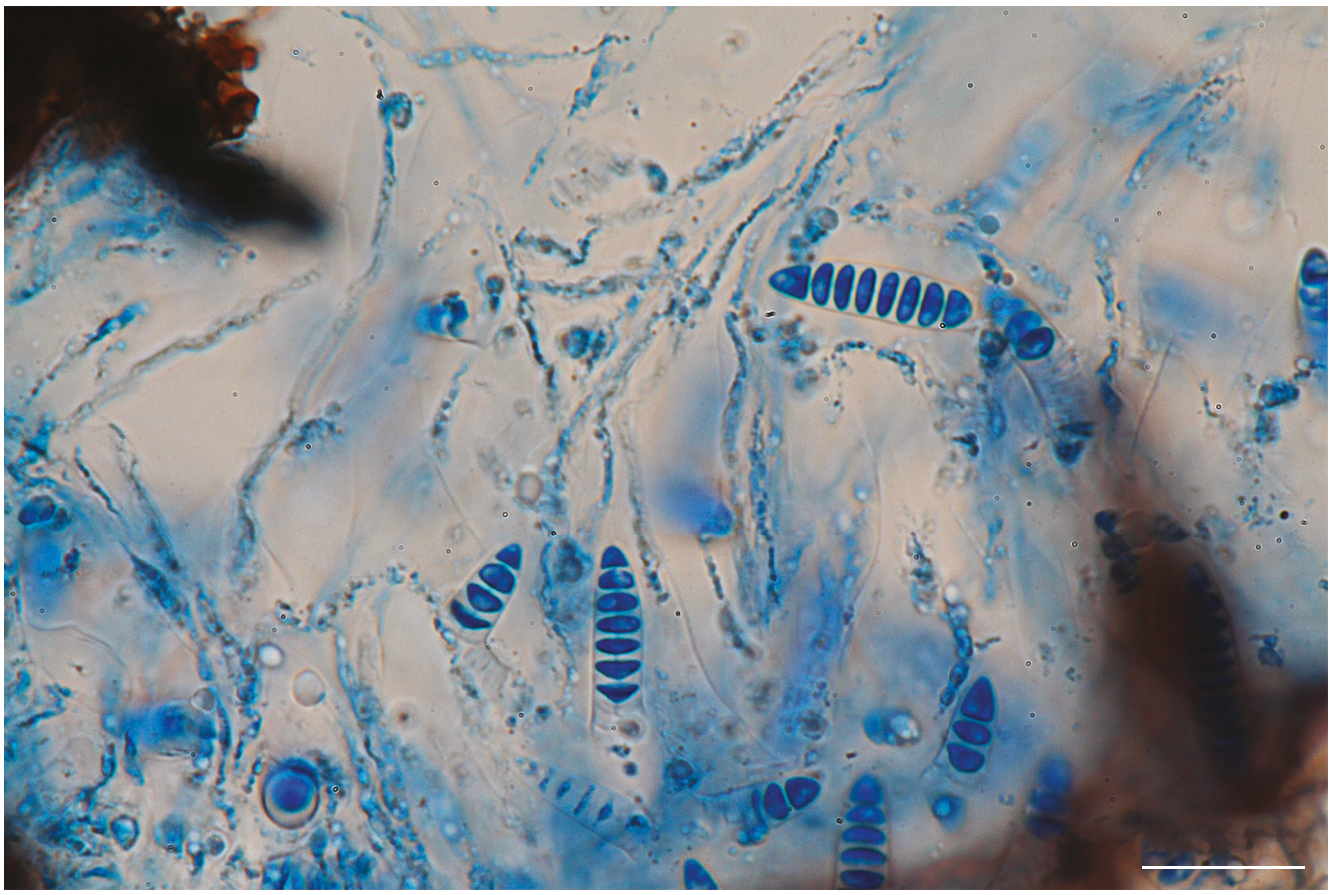

Fig. 3. — Section through ascoma of *Melomastia septemseptata* sp. nov. (holo-, CGMS). Scale bar: 20 µm.

Family Pleosporaceae Nitschke
Genus *Graphyllium* Clem.

Graphyllium caracolinense
D.A.C.Almeida, Gusmão & A.N.Mill.

Material studied. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 83264*.

Notes
New record for Mato Grosso do Sul.

Family Rhizodiscineae
Crous, Spatafora, Haridas & I.V.Grig.
Genus *Rhizodiscina* Hafellner

Rhizodiscina lignyota (Fr.) Hafellner

Material studied. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 83267*.

Notes
New record for South America. For a description, see Hafellner (1979).

Family Stictidaceae Fr.
Genus *Schizoxylon* Pers.

Schizoxylon albescens Gilenstam, H.Döring & Wedin

Material studied. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 78028*.

Notes
New record for South America. For a description, see Wedin *et al.* (2006).

Family Trematosphaeriaceae
K.D.Hyde, Y.Zhang ter, Suetrong & E.B.G.Jones
Genus *Trematosphaeria* Fuckel

Trematosphaeria confusa (Garov.) Boise & D.Hawksw.

Material studied. — **Brazil**. Mato Grosso do Sul, Campo Grande, UFMS Campus, on wood, *Aptroot & Muxfeldt 77869*.

Notes
New record for South America. For a description, see Aptroot (1998).

DISCUSSION

Even though only very few lignicolous Dothideomycetes were previously known from Mato Grosso do Sul, and relatively few were known from Brazil in general, they turned out to be not rare and quite species-rich. Within two months, during only a handful of excursions, 19 identifiable species were found. One species was even new to science. This suggests that with a more intensive collecting and identification effort, even more species could be found. The reason that this work was not done before is probably that it requires considerable knowledge of literature and characters, and is best done or at least guided by people with previous experience in this field.

The new species of *Melomastia* is significant in that it is a strictly bark-inhabiting species. However, it is likely not a saprobe, but rather a weak parasite of the tree as it shows some indication of altering the bark structure and colour. No associated algae were found, even after careful sectioning work (Figs 1-4). Future research on this species may reveal more details. It is however unlikely to be harmful to the tree, as only the bark is infected.

Among the known species of the genus *Melomastia*, the new species sticks out in several respects: it grows superficially on living tree bark in a dry terrestrial environment, while most species of this genus grow on decorticated wood, either in humid terrestrial habitats or in maritime environments. Morphologically, it fills the gap between the maritime and aquatic species that usually have multiseptated ascospores, and the dry terrestrial species that have few septa in the ascospores.

To our surprise, we could identify many specimens of seemingly cosmopolitan species, many of which were known to the first author from previous work in Europe. Note that final assignments of our Brazilian finds await molecular analyses to ascertain that they do not belong to distinct sibling species. Almost all species reported here occur on dead, decorticated wood of Cerrado trees; some however were found on worked timber or bark. There is no doubt that their ecological role is that of wood-decay. Most of the species reported here belong to the Hysteriales, which is clearly quite diverse in the Cerrado habitat. Other identified species belong to Amphisphaeriaceae, Hyponectriaceae, Lophiostomataceae, Melanommataceae, Orbiliaceae, Patellariaceae, Phleogenaceae, Pleosporaceae, Pleurotremataceae, Stictidaceae and Trematosphaeraceae.

Acknowledgements

We warmly thank Felix Schumm for making the illustrations. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES) – Finance Code 001. We are thankful to colleagues at UFMS and UFS, for helping with the logistics during the sampling expeditions.

Fig. 4. — Ascospores of *Melomastia septemseptata* sp. nov. (holo-, CGMS). Scale bar: 10 µm.

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Submitted on 1 June 2022;
accepted on 8 November 2022;
published on 23 January 2023.