

cryptogamie

Mycologie

2023 • 44 • 1

New species and records of mostly lignicolous
dothideomycetous ascomycetes from Brazil

Leticia MUXFELDT NAZIAZENO & André APTROOT

DIRECTEUR DE LA PUBLICATION / *PUBLICATION DIRECTOR*: Bruno DAVID
Président du Muséum national d'Histoire naturelle

RÉDACTEUR EN CHEF / *EDITOR-IN-CHIEF*: Philippe SILAR

ASSISTANTE DE RÉDACTION / *ASSISTANT EDITOR*: Chris LE COQUET-LE ROUX (myco@cryptogamie.com)

MISE EN PAGE / *PAGE LAYOUT*: Chris LE COQUET-LE ROUX

RÉDACTEURS ASSOCIÉS / *ASSOCIATE EDITORS*

Slavomír ADAMČÍK

Institute of Botany, Plant Science and Biodiversity Centre, Slovak Academy of Sciences, Dúbravská cesta 9, SK-84523, Bratislava (Slovakia)

André APTROOT

Laboratório de Botânica / Lichenologia, Instituto de Biociências, Universidade Federal de Mato Grosso do Sul, Avenida Costa e Silva s/n, Bairro Universitário, CEP 79070-900, Campo Grande, Mato Grosso do Sul (Brazil)

Cony DECOCK

Mycothèque de l'Université catholique de Louvain, Earth and Life Institute, Microbiology, Université catholique de Louvain, Croix du Sud 3, B-1348 Louvain-la-Neuve (Belgium)

André FRAITURE

Botanic Garden Meise, Domein van Bouchout, B-1860 Meise (Belgium)

Kevin D. HYDE

School of Science, Mae Fah Luang University, 333 M. 1 T.Tasud Muang District, Chiang Rai 57100 (Thailand)

Valérie HOFSTETTER

Station de recherche Agroscope Changins-Wädenswil, Dépt. Protection des plantes, Mycologie, CH-1260 Nyon 1 (Switzerland)

Sinang HONGSANAN

College of Life Science and Oceanography, Shenzhen University, 1068, Nanhai Avenue, Nanshan, ShenZhen 518055 (China)

Egon HORAK

Schlossfeld 17, A-6020 Innsbruck (Austria)

Jing LUO

Department of Plant Biology & Pathology, Rutgers University New Brunswick, NJ 08901 (United States)

Ruvishika S. JAYAWARDENA

Center of Excellence in Fungal Research, Mae Fah Luang University, 333 M. 1 T.Tasud Muang District, Chiang Rai 57100 (Thailand)

Chen JIE

Instituto de Ecología, Xalapa 91070, Veracruz (México)

Sajeewa S.N. MAHARCHCHIKUMBURA

Department of Crop Sciences, College of Agricultural and Marine Sciences, Sultan Qaboos University (Oman)

Pierre-Arthur MOREAU

UE 7144. Faculté des Sciences pharmaceutiques et biologiques. Université Lille Nord de France. F-59006 Lille (France)

Tian QING

Center of Excellence in Fungal Research, Mae Fah Luang University 333 M. 1 T.Tasud Muang District, Chiang Rai 57100 (Thailand)

Sylvie RAPIOR

Laboratoire de Botanique, Phytochimie et Mycologie / UMR -CNRS 5175 CEFE, Faculté de Pharmacie, 15, avenue Charles-Flahault, Université Montpellier I, BP 14491, 34093 Montpellier Cedex 5 (France)

Franck RICHARD

Université de Montpellier II, CEFE/CNRS Campus du CNRS, 1919, route de Mende, 34293 Montpellier Cedex 5 (France)

Naritsada THONGKLANG

Center of Excellence in Fungal Research, Mae Fah Luang University, 333 M. 1 T.Tasud Muang District, Chiang Rai 57100 (Thailand)

Xiang-Hua WANG

CAS Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, Chinese Academy of Sciences, Lanhei Road 132, Kunming 650201, P. R. (China)

COUVERTURE / *COVER*:

Extraits d'éléments de la Figure 1 / Extracts of the Figure 1

Cryptogamie, Mycologie est indexé dans / *Cryptogamie, Mycologie is indexed in*:

- Biological Abstracts
- Current Contents
- Science Citation Index
- Publications bibliographiques du CNRS (Pascal)

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

Les Publications scientifiques du Muséum publient aussi / *The Museum Science Press also publishes*: *Adansonia, Geodiversitas, Zoosystema, Anthropolozologica, European Journal of Taxonomy, Naturae, Comptes Rendus Palevol, Cryptogamie* sous-sections *Algologie, Bryologie*.

Diffusion – Publications scientifiques Muséum national d'Histoire naturelle

CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)

Tél.: 33 (0)1 40 79 48 05 / Fax: 33 (0)1 40 79 38 40

diff.pub@mnhn.fr / <http://sciencepress.mnhn.fr>

© Publications scientifiques du Muséum national d'Histoire naturelle, Paris, 2023

ISSN (imprimé / *print*): 0181-1584 / ISSN (électronique / *electronic*): 1776-100

New species and records of mostly lignicolous dothideomycetous ascomycetes from Brazil

Leticia MUXFELDT NAZIAZENO

André APTROOT

Universidade Federal de Mato Grosso do Sul, Instituto de Biociências, Laboratório de Botânica/Liquenologia, Avenida Costa e Silva, s/n, 79070-900, Campo Grande, MS (Brazil)
andreaptroot@gmail.com (corresponding author)

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>

KEY WORDS

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

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.

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 (Hongšan 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 fruit-

ing 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 pseudothecoid, 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 *Dyffrolomyces* 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 Catimbu, 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, Buíque, Vale de Catimbu, 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.

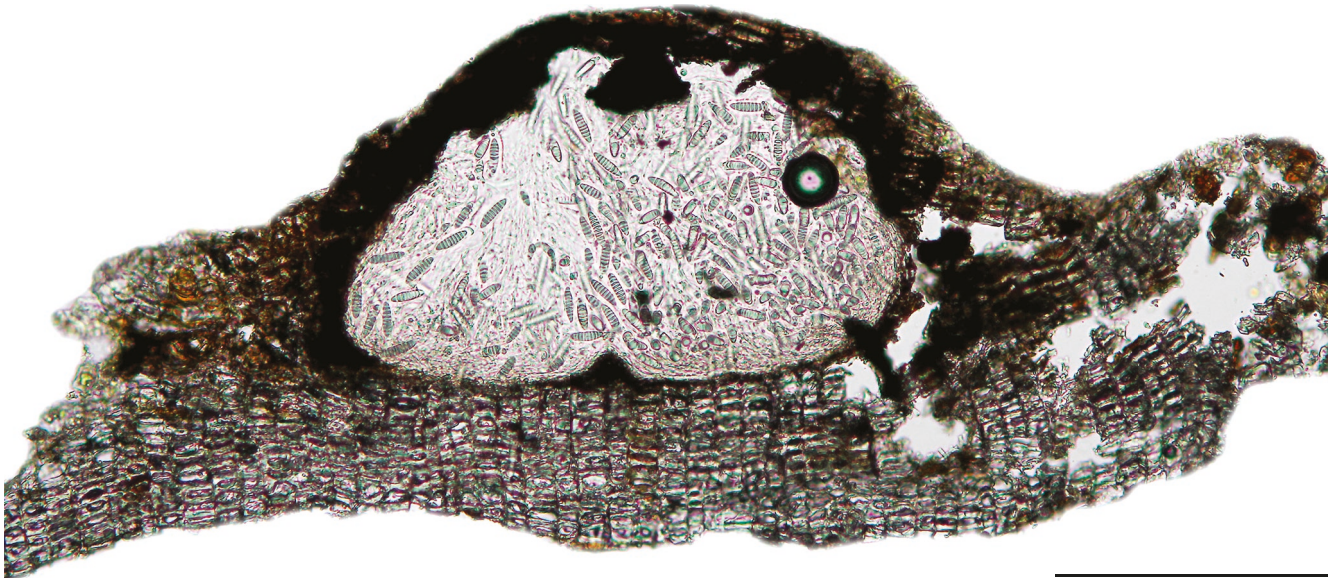


FIG. 2. — Section through ascoma of *Melomastia septemseptata* sp. nov. (holo-, CGMS). Scale bar: 200 µm.

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 ORBILIAEAE 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 *Rhytidhysterion* Speg.

Rhytidhysterion 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.

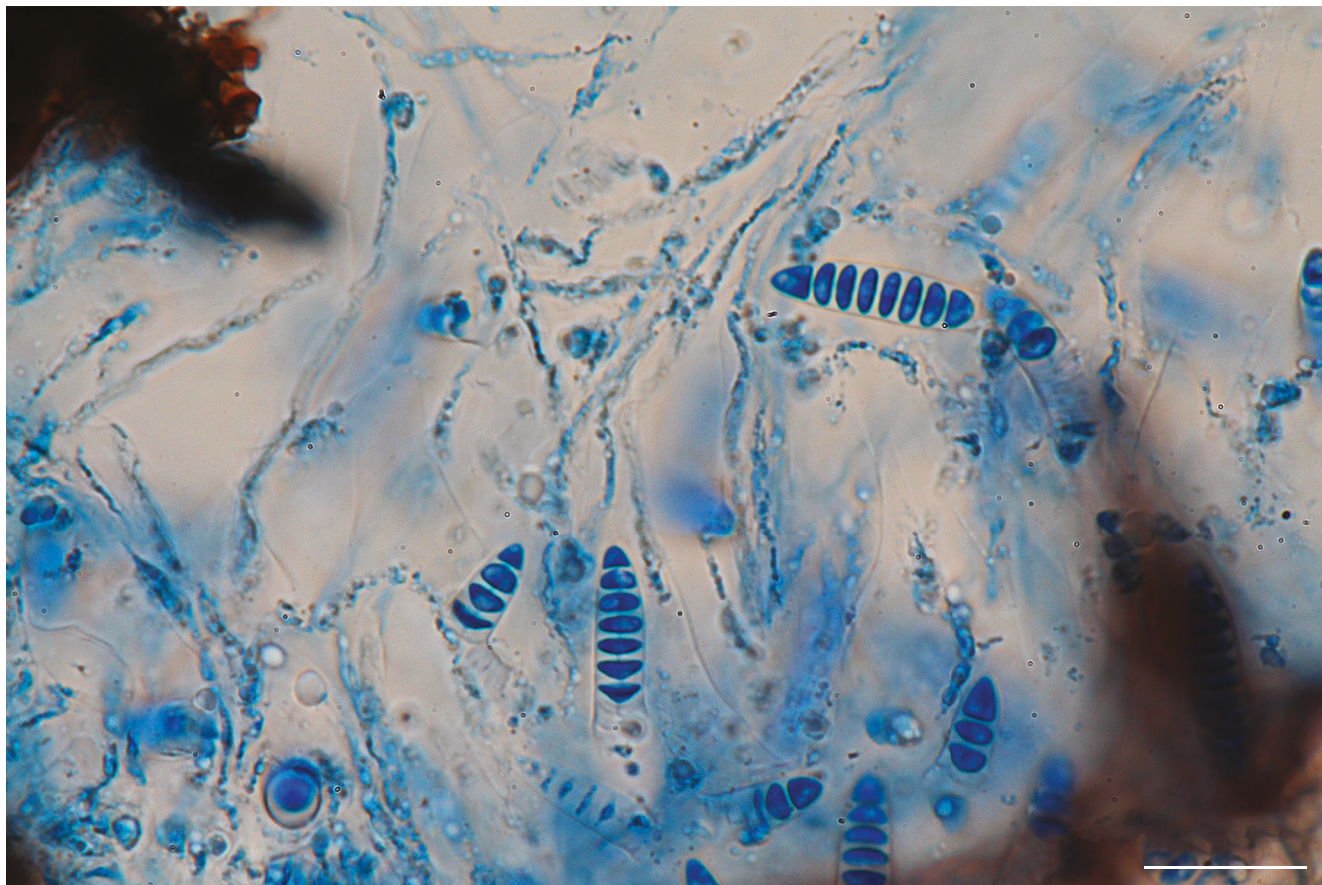


FIG. 3. — Section through ascoma of *Melomastia septemseptata* sp. nov. (holo-, CGMS). Scale bar: 20 µm.

Family PLEOSPORACEAE Nitschke
Genus *Graphyllum* Clem.

Graphyllum 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 Amphispheariaceae, 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.

REFERENCES

APTRoot A. 1995. — Redisposition of some species excluded from *Didymosphaeria* (Ascomycotina). *Nova Hedwigia* 60 (3–4): 325–379.



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

- APTRoot A. 1998. — A world revision of *Massarina*. *Nova Hedwigia* 66 (1–2): 89–162. <https://doi.org/10.1127/nova.hedwigia/66/1998/89>
- BARAL H. O., WEBER E. & MARSON G. 2020. — *Monograph of Orbiliomycetes (Ascomycota) based on vital taxonomy*. Part I + II. National Museum of Natural History, Luxembourg, 1752 p.
- BOEHM E. W. A., MUGAMBI G. K., MILLER A. N., HUHNDORF S. M., MARINCOWITZ S., SPATAFORA J. W. & SCHOCH C. L. 2009. — A molecular phylogenetic reappraisal of the Hysteriaceae, Mytiliniaceae and Gloniaceae (Pleosporomycetidae, Dothideomycetes) with keys to world species. *Studies in Mycology* 64: 49–83. <https://doi.org/10.3114/sim.2009.64.03>
- FORZZA R. C., LEITMAN P. M., COSTA A., CARVALHO JR. A. A. DE, PEIXOTO A. L., WALTER B. M. T., BICUDO C., ZAPPI D., COSTA D. P. DA, LLERAS E., MARTINELLI G., LIMA H. C. DE, PRADO J., STEHMANN J. R., BAUMGRATZ J. F. A., PIRANI J. R., SYLVESTRE L. DA S., MAIA L. C., LOHMANN L. G., PAGANUCCI L., SILVEIRA M., NADRUZ M., MAMEDE M. C. H., BASTOS M. N. C., MORIM M. P., BARBOSA M. R., MENEZES M., HOPKINS M., SECCO R., CAVALCANTI T. & SOUZA V. C. 2010. — *Catálogo de Plantas e Fungos do Brasil*. Andréa Jakobson Estúdio, Instituto de Pesquisas do Jardim Botânico do Rio de Janeiro, Rio de Janeiro, 2 vols.
- HAFELLNER J. 1979. — *Karschia*. Revision einer Sammelgattung an der Grenze von lichenisierten und nichlichenisierten Ascomyceten. *Beiheft zur Nova Hedwigia* 62: 1–248.
- HONGSANAN S., HYDE K. D., PHOOKAMSAK R., WANASINGHE D. N., MCKENZIE E. H. C., SARMA V. V., BOONMEE S., LÜCKING R., BHAT D. J., LIU N. G., TENNAKON D. S., PEM D., KARUNARATHNA A., JIANG S. H., JONES E. B. G., PHILLIPS A. J. L., MANAWASINGHE I. S., TIBPROMMA S., JAYASIRI S. C., SANDAMALI D. S., JAYAWARDENA R. S., WIJAYAWARDENE N. N., EKANAYAKA A. H., JEEWON R., LU Y. Z., DISSANAYAKE A. J., ZENG X. Y., LUO Z. L., TIAN Q., PHUKHAMSAKDA C., THAMBUGALA K. M., DAI D. Q., CHETHANA K. W. T., SAMARAKOON M. C., ERTZ D., BAO D. F., DOILOM M., LIU J. K., PÉREZ-ORTEGA S., SUIJA A., SENWANNA C., WIJESINGHE S. N., KONTA S., NIRANJAN M., ZHANG S. N., ARIYAWANSA H. A., JIANG H. B., ZHANG J. F., NORPHANPHOUN C.,

- SILVA N. I. DE, THIYAGARAJA V., ZHANG H., BEZERRA J. D. P., MIRANDA-GONZÁLEZ R., APTROOT A., KASHIWADANI H., HARISHCHANDRA D., SÉRUSIAUX E., ALUTHMUHANDIRAM J. V. S., ABEY Wickrama P. D., DEVADATHA B., WU H. X., MOON K. H., GUEIDAN C., SCHUMM F., BUNDHUN D., MAPOOK A., MONKAI J., CHOMNUNTI P., SUETRONG S., CHAIWAN N., DAYARATHNE M. C., YANG J., RATHNAYAKA A. R., BHUNJUN C. S., XU J. C., ZHENG J. S., LIU G., FENG Y. & XIE N. 2020a. — Refined families of Dothideomycetes: Dothideomycetidae and Pleosporomycetidae. *Mycosphere* 11 (1): 1553-2107. <https://doi.org/10.5943/mycosphere/11/1/13>
- HONGSANAN S., HYDE K. D., PHOOKAMSAK R., WANASINGHE D. N., MCKENZIE E. H. C., SARMA V. V., LÜCKING R., BOONMEE S., BHAT D. J., LIU N. G., TENNAKUN D. S., PEM D., KARUNARATHNA A., JIANG S. H., JONES E. B. G., PHILLIPS A. J. L., MANAWASINGHE I. S., TIBPROMMA S., JAYASIRI S. C., SANDAMALI D. S., JAYAWARDENA R. S., WIJAYAWARDENE N. N., EKANAYAKA A. H., JEEWON R., LU Y. Z., PHUKHAMSAKDA C., DISSANAYAKE A. J., ZENG X. Y., LUO Z. L., TIAN Q., PHUKHAMSAKDA C., THAMBUGALA K. M., DAI D. Q., SAMARAKOON M. C., CHETHANA K. W. T., ERTZ D., DOILOM M., LIU J. K., PÉREZ-ORTEGA S., SUIJA A., SENWANNA C., WIJESINGHE S. N., NIRANJAN M., ZHANG S. N., ARIYAWANSA H. A., JIANG H. B., ZHANG J. F., NORPHANPHOUN C., SILVA N. I. DE, THIYAGARAJA V., ZHANG H., BEZERRA J. D. P., MIRANDA-GONZÁLEZ R., APTROOT A., KASHIWADANI H., HARISHCHANDRA D., SÉRUSIAUX E., ABEY Wickrama P. D., BAO D. F., DEVADATHA B., WU H. X., MOON K. H., GUEIDAN C., SCHUMM F., BUNDHUN D., MAPOOK A., MONKAI J., BHUNJUN C. S., CHOMNUNTI P., SUETRONG S., CHAIWAN N., DAYARATHNE M. C., YANG J., RATHNAYAKA A. R., BHUNJUN C. S., XU J. C., ZHENG J. S., LIU G., FENG Y. & XIE N. 2020b. — Refined families of Dothideomycetes: orders and families incertae sedis in Dothideomycetes. *Fungal Diversity* 105: 17-318. <https://doi.org/10.1007/s13225-020-00462-6>
- HYDE K. D., JONES E. B. G., LIU J.-K., ARIYAWANSA H., BOEHM E., BOONMEE S., BRAUN U., CHOMNUNTI P., CROUS P. W., DAI D.-Q., DIEDERICH P., DISSANAYAKE A., DOILOM M., DOVERI F., HONGSANAN S., JAYAWARDENA R., LAWREY J. D., LI Y.-M., LIU, Y.-X., LÜCKING R., MONKAI J., MUGGIA L., NELSEN M. P., PANG, K.-L., PHOOKAMSAK R., SENANAYAKE I. C., SHEARER C. A., SUETRONG S., TANAKA K., THAMBUGALA K. M., WIJAYAWARDENE N. N., WIKKEE S., WU H.-X., ZHANG Y., AGUIRRE-HUDSON B., ALIAS S. A., APTROOT A., BAHKALI A. H., BEZERRA J. L., JAYARAMA BHAT D., CAMPORESI E., CHUKATIROTE E., GUEIDAN C., HAWKSWORTH, D. L., HIRAYAMA K., HOOG S. DE, KANG J.-C., KNUDSEN K., LI W.-J., LI X.-H., LIU Z.-Y., A. MAPOOK, A. MCKENZIE E. H. C., MILLER A. N., MORTIMER P. E., PHILLIPS A. J. L., RAJA H. A., SCHEUER C., SCHUMM F., TAYOR J. E., TIAN Q., TIBPROMMA S., WANASINGHE D. N., WANG Y., XU J.-C., YACHAROEN S., YAN J.-Y. & ZHANG M. 2013. — Families of Dothideomycetes. *Fungal diversity* 63 (1): 1-313. <https://doi.org/10.1007/s13225-013-0263-4>
- LI W. L., MAHARACHCHIKUMBURA S. S., CHEEWANGKON R. & LIU J. K. 2022. — Reassessment of Dyfiolomyces and four new species of *Melomastia* from Olive (*Olea europaea*) in Sichuan Province, China. *Journal of Fungi* 8 (76): 1-21.
- LUZ W. C. 2011. — *Micologia avançada: taxonomia de ascomycetos*. Vol. 2. Editora Revisão Anual de Patologia de Plantas, Passo Fundo, 400 p.
- NANNFELDT J. A. 1932. — Studien über die Morphologie und Systematik der nicht-lichenisierten inoperculaten Discomyceten. *Nova acta Regiae Societatis Scientiarum Upsaliensis*, Serie 4, 8: 1-368.
- PACHECO J. F., SILVEIRA L. F., ALEIXO A., AGNE C. E., BENCKE G. A., BRAVO G. A., BRITO G. R. R., COHN-HAFT M., MAURÍCIO G. N., NAKA L. N., OLMO F., POSSO S. R., LEES A. C., FIGUEIREDO L. F. A., CARRANO E., GUEDES R. C., CESARI E., FRANZ I., SCHUNCK F. & PIACENTINI V. DE Q. 2021. — Lista comentada das aves do Brasil pelo Comitê Brasileiro de Registros Ornitológicos – segunda edição. Zenodo: <https://doi.org/10.5281/zenodo.5138368>.
- SCHOCH C. L., CROUS P. W., GROENEWALD J. Z., BOEHM E. W. A., BURGESS T. I., GRUYTER J. DE, HOOG S. DE, DIXON L. J., GRUBE M., GUEIDAN C., HARADA Y., HATAKEYAMA S., HIRAYAMA K., HOSoya T., HUHNDOF S. M., HYDE K. D., JONES E. B. G., KOHLMAYER J., KRUYSS A., LI Y. M., LÜCKING R., LUMBSCH H. T., MARVANOVÁ L., MBATCHOU J. S., MCVAY A. H., MILLER A. N., MUGAMBI G. K., MUGGIA L., NELSEN M. P., NELSON P., OWENSBY C. A., PHILLIPS A. J. L., PHONGPAICHT S., POINTING S. B., PUJADE-RENAUD V., RAJA H. A., RIVAS PLATA E., ROBERTSE B., RUIBAL C., SAKAYAROJ J., SANO T., SELBMANN L., SHEARER C. A., SHIROUZI T., SLIPPERS B., SUETRONG S., TANAKA K., VOLKMANNN-KOHLMEYER B., WINGFIELD M. J., WOOD A. R., WOUTENBERG J. H. C., YONEZAWA H., ZHANG Y. & SPATAFORA J. W. 2009. — A class-wide phylogenetic assessment of Dothideomycetes. *Studies in Mycology* 64: 1-15. <https://doi.org/10.3114%2Fsim.2009.64.01>
- SOUSA E. S. 2022. — *Borboletas e Mariposas: Fauna de Lepidópteros do Bioma Cerrado*. EMBRAPA, Brasília, 250 p.
- STARBÄCK K. 1904. — Askomyceten der ersten Regnellschen Expedition. III. *Arkiv för Botanik* 2 (5): 1-22.
- SZCZEPKOWSKI A., KUJAWA A., BUJAKIEWICZ A., NITA J., KARASINSKI D., WOŁKOWYCKI M. & WILGA M. S. 2000. — *Phleogena faginea* (Pucciniomycotina, Atractiellales) in Poland – Notes on ecology and distribution. *Polish Botanical Journal* 53: 81-90.
- WANG Y. Z., APTROOT A. & HYDE K. D. 2004. — Revision of the genus *Amphisphaeria*. *Fungal Diversity Research Series* 13: 1-168.
- WEDIN M., DÖRING H. & GILSENSTAM G. 2006. — *Stictis* s. lat. (Ostropales, Ascomycotina) in northern Scandinavia, with a key and notes on morphological variation in relation to lifestyle. *Mycological Research* 110 (7): 773-789. <https://doi.org/10.1016/j.mycres.2006.04.010>
- WIJAYAWARDENE N. N., HYDE K. D., AL-ANI L. K. T., TEDERSOO L., HAELEWATERS D., RAJESHKUMAR K. C., ZHAO R. L., APTROOT A., LEONTYEV D. V., SAXENA R. K., TOKAREV Y. S., DAI D. Q., LETCHER P. M., STEPHENSON S. L., ERTZ D., LUMBSCH H. T., KUKWA M., ISSI I. V., MADRID H., PHILLIPS A. J. L., SELBMANN L., PLIEGLER W. P., HORVÁTH E., BENSCH K., KIRK P. M., KOLAŘKOVÁ K., RAJA H. A., RADEK R., PAPP V., DIMA B., MA J., MALOSSO E., TAKAMATSU S., RAMBOLD G., GANNIBAL P. B., TRIEBEL D., GAUTAM A. K., AVASTHI S., SUETRONG S., TIMDAL E., FRYAR S. C., DELGADO G., RÉBLOVÁ M., DOILOM M., DOLATABADI S., PAWŁOWSKA J., HUMBER R. A., KODSUEB R., SÁNCHEZ-CASTRO I., GOTO B. T., SILVA D. K. A., SOUZA F. A. DE, OEHL F., SILVA G. A. DA, SILVA I. R., BŁASZKOWSKI J., JOBIM K., MAIA L. C., BARBOSA F. R., FIUZA P. O., DIVAKAR P. K., SHENOY B. D., CASTANEDA-RUIZ R. F., SOMRITHIPOL S., LATEEF A. A., KARUNARATHNA S. C., TIBPROMMA S., MORTIMER P. E., WANASINGHE D. N., PHOOKAMSAK R., XU J., WANG Y., TIAN F., ALVARADO P., LI D. W., KUŠAN I., MATOČEC N., MAHARACHCHIKUMBURA S. S. N., PAPIZADEH M., HEREDIA G., WARTCHOW F., BAKHSI M., BOEHM E., YOUSSEF N., HUSTAD V. P., LAWREY J. D., SANTIAGO A. L. C. M. A., BEZERRA J. D. P., SOUZA-MOTTA C. M., FIRMINO A. L., TIAN Q., HOUBRAKEN J., HONGSANAN S., TANAKA K., DISSANAYAKE A. J., MONTEIRO J. S., GROSSART H. P., SUIJA A., WEERAKOON G., ETAYO J., TSURYKAU A., VÁZQUEZ V., MUNGA P., DAMM U., LI Q. R., ZHANG H., BOONMEE S., LU Y. Z., BECERRA A. G., KENDRICK B., BREARLEY F. Q., MOTIEJUNAITĖ J., SHARMA B., KHARE R., GAIKWAD S., WIJESUNDARA D. S. A., TANG L. Z., HE M. Q., FLAKUS A., RODRIGUEZ-FLAKUS P., ZHURBENKO M. P., MCKENZIE E. H. C., STADLER M., BHAT D. J., LIU J. K., RAZA M., JEEWON R., NASSONOVA E. S., PRIETO M., JAYALAL R. G. U., ERDOĞDU M., YURKOV A., SCHNITTTLER M., SHCHEPIN O. N., NOVOZHILOV Y. K., SILVA-FILHO A. G. S., LIU P., CAVENDER J. C., KANG Y., MOHAMMAD S., ZHANG L. F., XU R. F., LI Y. M., DAYARATHNE M. C., EKANAYAKA A. H., WEN T. C., DENG C. Y., PEREIRA O. L., NAVATHE S., HAWK-

SWORTH D. L., FAN X. L., DISSANAYAKE L. S., KUHNERT E., GROSSART H. P. & THINES M. 2022. — Outline of Fungi and fungus-like taxa – 2021. *Mycosphere* 13 (1): 53-453. <https://doi.org/10.5943/mycosphere/13/1/2>

YACHAROEN S., TIAN Q., CHOMNUNTI P., BOONMEE S., CHUK-ATIROTE E., BHAT J. D. & HYDE K. D. 2015. — Patellariaceae revisited. *Mycosphere* 6 (3): 290-326. <https://doi.org/10.5943/mycosphere/6/3/7>

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