

NEW OCCURRENCES OF ASCOMYCETES FOR SOUTH AMERICA AND THE NEOTROPICS

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The Raso da Catarina Ecological Station (ESEC Raso da Catarina) is a fully protected Brazilian conservation unit, located in the state of Bahia, the Caatinga biome. Systematic research on fungal taxonomy is still poorly performed in this area. In order to know the fungi of the phylum Ascomycota associated with the palm *Syagrus coronata* (Mart.) Becc. (licuri) two expeditions were carried out, one in August/2017 and the other in April/2018. Green and dry leaves attached to the plant and licuri litter were collected. The samples were analyzed at the UNEB-VIII Mycology Laboratory. After morphological characterization, some interesting species of Ascomycota were identified as *Phaeosphaeriopsis amblyospora* A.W. Ramaley and *Apharknessia eucalypti* Crous & Crous & M. J. Wingf. These taxa are documented, in this work, as new records for South America and neotropic, respectively. Description, comments, geographical distribution and illustrations are presented for the species.

Key words: diversity, fungi, taxonomy.

Novas ocorrências de ascomicetos para a América do Sul e Neotrópico. A Estação Ecológica do Raso da Catarina (ESEC Raso da Catarina) é uma unidade de conservação de proteção integral brasileira, localizada no estado da Bahia, bioma Caatinga. Pesquisas sistematizadas sobre taxonomia de fungos ainda são pouco realizadas nesta área. Com o objetivo de conhecer os fungos do filo Ascomycota associados à palmeira *Syagrus coronata* (Mart.) Becc. (licuri) foram realizadas duas expedições, uma em agosto/2017 e outra em abril/2018. Folhas verdes e secas presas a planta e serrapilheira de licuri foram coletadas. As amostras foram analisadas no Laboratório de Micologia da UNEB-VIII. Após caracterização morfológica algumas espécies interessantes de Ascomycota foram identificadas como *Phaeosphaeriopsis amblyospora* A.W. Ramaley e *Apharknessia eucalypti* Crous & Crous & M. J. Wingf. Esses táxons são documentados, neste trabalho, como novos registros para a América do Sul e neotrópico, respectivamente. Descrição, comentários, distribuição geográfica e ilustrações são apresentadas para as espécies.

Palavras-chave: diversidade, fungos, taxonomia.

Introduction

Brazil is a megadiverse country that harbors 20% of all of the known species on our planet as well as a wide variety of ecosystems (Brasil, 2018), including the dryland Caatinga, an exclusively Brazilian domain rich in biodiversity and endemism (Brasil, 2018) - although one of the least studied regions in that country (Leal et al., 2005).

The phylum Ascomycota comprises approximately 65.000 species, representing 60% of all known fungal taxa (Kirk et al., 2008). The group is cosmopolitan, and its species can be encountered with a wide variety of life forms and associated with many different organisms, including plants – with which they establish saprophytic, parasitic, endophytic, phytopathogenic, or symbiotic relationships (Webster & Weber, 2007).

Currently, 1881 ascomycete species are known to Brazil, but the real number is certainly much larger (Maia et al., 2015). The amplification of that known diversity will depend on intensifying research concerning the group, and here we focus on Ascomycota colonizing palm trees in Caatinga dryland vegetation.

In areas of the Raso da Catarina ecoregion, municipality of Paulo Afonso, Bahia Vitoria and collaborators have been dedicated to the study of Ascomycota fungi that colonizing plants of social and economic importance for region, contributing to the expansion of knowledge in a poorly studied place (Vitoria, Calvacanti and Bezerra 2016; Barbosa and Vitoria, 2019; Santos, Bezerra and Vitória 2019).

So, the present work aimed to characterized species of that phylum, contributing with increased completeness of the Fungal list for South America and the neotropics. Besides, the palms tree *Syagrus coronata* (Mart.) Becc. (licurí) is documented as a new host for the fungi.

Materials and Methods

Collections were undertaken in August/2017 and April/2018 in the Raso da Catarina Ecological Station (ESEC), in an area within the municipality of Paulo Afonso, Bahia State, Brazil (09° 39'05.9" S 038° 29'07.7" W, 602 m; 09°39' 05.1" S e 038° 29' 07.7" W, 611 m). Green leaves and dry leaves still attached to *Syagrus coronata* plants, as well as leaf litter from

around their bases, were collected for mycobiota analyses. The material was processed at MICOLAB-UNEB VIII (Mycology Laboratory: Didactic Collection, Fungus Herbarium and Fungal Culture Collection). The specimens were examined by direct observation and after treatment in a humid chamber. Topographic analyses were performed using a stereomicroscope. Fertile fragments of the fungal structures were removed using a thin needle (insulin injection type), mounted on slides with coverslips, and treated with the following reagents: cotton blue; 5% Melzer; and water. The fungal structures were then examined using a light microscope, and the species were identified by consulting the specialized literature. Testimonial material was deposited in MICOLAB-UNEB/VIII.

Results

The ascomycete *Phaeosphaeriopsis amblyospora* reported here is a new record for South America, and *Apharknessia eucalypti* a new record for the neotropical region.

1. *Apharknessia eucalypti* Crous & Crous & M. J. Wingf., in Marin-Felix et al., Stud. Mycol. 92: 51 (2018) Figure 1. A-C.

Description: Fungus on the host surface (Figure 1. A). Conidiomata not observed. Conidia 7.5 - 12.5 x 5 µm, light brown when young, becoming dark brown at maturity, ellipsoid to obovoid, smooth, with central guttule, catenulate, apex rounded, mucilaginous sheath not observed, visible on the surface as a brown fuzz (Figure 1. B-C).

Material examined: BRAZIL. BAHIA: Raso da Catarina Ecological Station (ESEC), Paulo Afonso, in green leaflets of *S. coronata*, 11.04.2018, col. P.Q. Rocha, 09° 39'05.9" S 038° 29'07.7" W, 602 m (MICOLAB-UNEB VIII 0108).

Commentary: The specimen found is similar in the measurement and morphology of the conidia, conidiophore and conidiogenic cells to *Apharknessia eucalypti*, this species differs from the other three valid species of the genus in that its conidia usually lack an

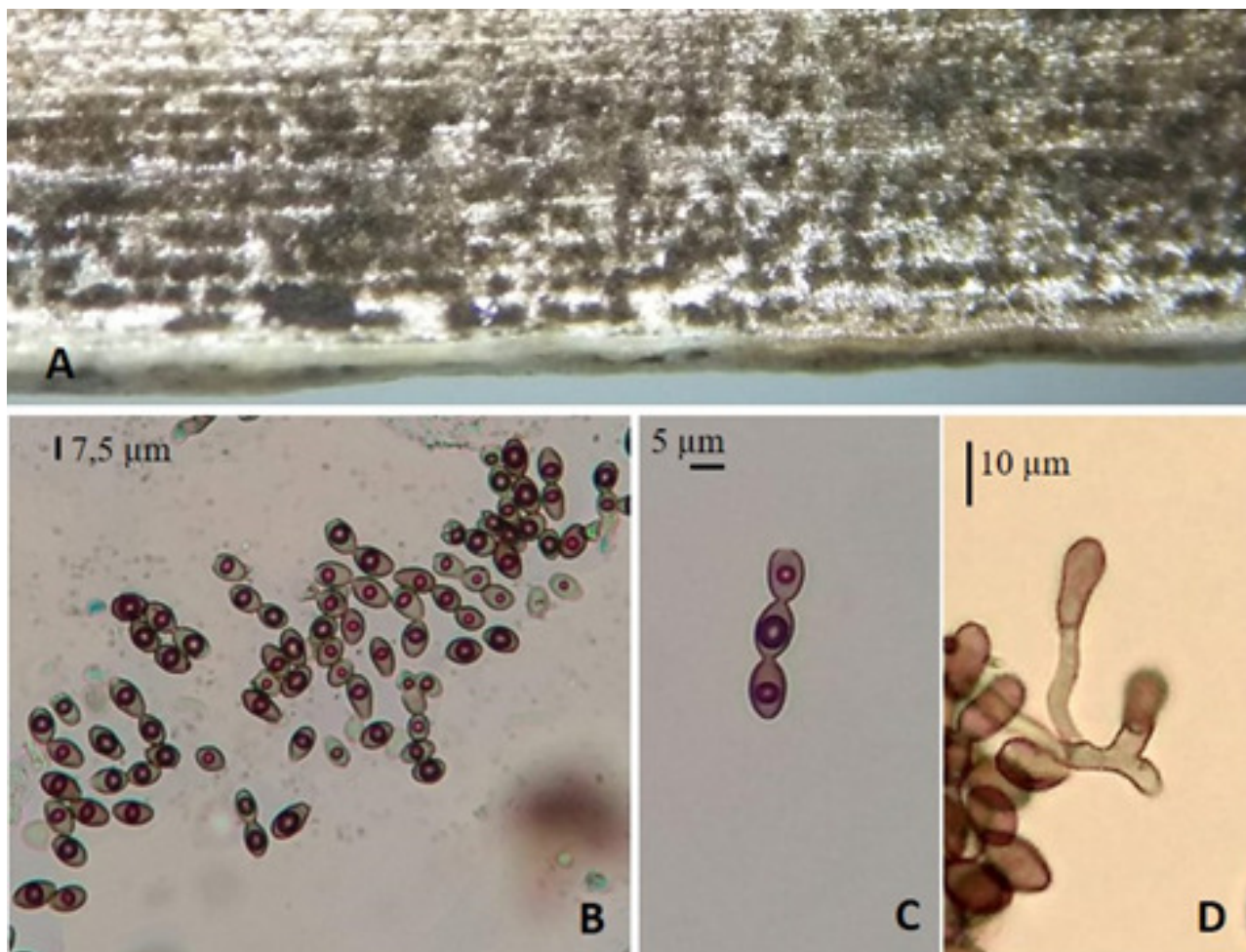


Figure 1 - *Apoharknessia eucalypti*. A. Conidiomata on surface of the host. B-C. Conidia. D. Conidiogenous cells and conidia.

apical appendage (Marin-Felix et al., 2019). It was not possible to observe conidiomata in the specimens examined, because the material was a little worn. This individual was collected once during this study, additional collections are needed to isolate this species and perform molecular characterization. Here, *A. eucalypti* was encountered as a phytopathogen on the green leaflets of the palm tree *S. coronata*, with its conidia were agglomerated on the leaf surface forming a dark fuzz.

2. *Phaeosphaeriopsis amblyospora* A.W. Ramaley [as 'amblyospora'], in Câmara, Ramaley, Castlebury & Palm, Mycol. Res. 107(5): 520 (2003) Figure 2. A-E

Description: Host surface (Figure 2. A).

Ascomata peritecial 240 x 300 µm, immersed to erumpent (Figure 2. B). Ascus (100-) 112.5 (-125) x 10 - 11.25 µm bitunicate, claviform, subpedicelate, 8-sporate, I⁻ (Figure 2. C-D). Ascospore 22.5 - 25 (-27.5) x 7.5 - 10 µm, pale brown when young, becoming golden brown at maturity, 4-5 septate, cylindrical, smooth, mucilaginous sheath present (Figure 2. E).

Material examined: BRAZIL. BAHIA: Raso da Catarina Ecological Station (ESEC), Paulo Afonso, in green leaflets of *S. coronata*, 30.08.2017, col. P.Q. Rocha, 09°39' 05.1" S e 038° 29' 07.7" W, 611 m (MICOLAB-UNEB VIII 0107).

Commentary: The genus *Phaeosphaeriopsis* houses 17 valid species (Species Fungorum, 2020). The

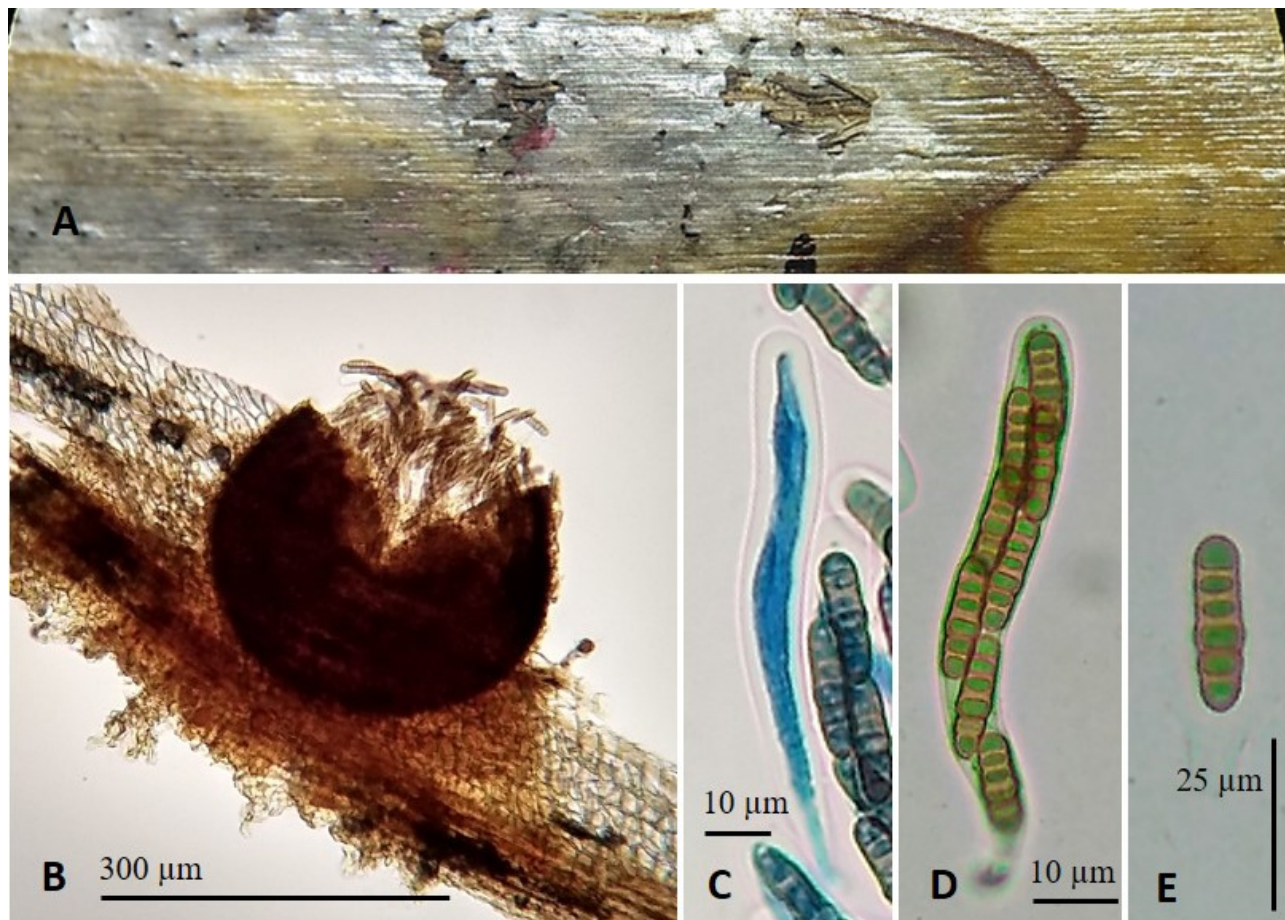


Figure 2 - *Phaeosphaeriopsis amblyospora*. A. Ascomata on surface of the host. B. Section of ascomata formed on licuri leaf. C-D. Ascus. E. Ascospore.

material was identified as *Phaeosphaeriopsis amblyospora* based on the work of Câmara et al. (2003), the material examined was morphologically selected and displayed with literature epithets, being similar to *P. amblyospora* in the morphology and measurement of ascoma, mites and ascospores. This individual was collected once during this study, additional collections are needed to isolate this species and perform molecular characterization. In the present study, this ascomycete was encountered as a phytopathogen on the green leaflets of *S. coronata*, associated with a leaf blotch having a dark border.

Discussion

The three valid species of the genus *Apharknessia* have been found in association with

Eucalyptus (Myrtaceae): *A. insueta* (B. Sutton) Crous & S.J. Lee. (a presumed pathogen) has been observed to cause spots on *Eucalyptus* leaves in Brazil, Colombia, Cuba and Mauritius (Marin-Felix et al., 2019), *A. eucalyptorum* Crous and M. J. Wingf. (supposedly endophyte) was isolated from *Eucalyptus pellita* F. Muell (Myrtaceae) leaves in Malaysia (Asia) (Crous et al., 2017) e *A. eucalypti* (supposedly endophyte) was isolated from *E. pellita* leaves incubated in humid chambers in Sabah, Malaysia (Marin-Felix et al., 2019). In the present study, the databanks and literature consulted did not contain any records of *A. eucalypti* for the neotropical region (SMML, 2018; Species Link, 2018), this thus being the first report. In addition, this fungus appears here as a pathogen and *S. coronata* is presented as a new botanical

host not only for this species but for the genus *Apharknessia*.

The genus *Phaeosphaeriopsis* counts on individuals recognized as saprobes or pathogens on various monocotyledons (Phookamsak et al., 2014). The species *P. amblyospora* was first found once in Colorado, United States of America (USA), on dead leaves of *Yucca baccata* (Asparagaceae) Torr. by Câmara et al. (2003), which is the only distribution and only host found for the known (SMML, 2018; Species Link, 2018). In this study, the databanks and literature consulted showed no records of *P. amblyospora* for South America (SMML, 2018; Species Link, 2018), this then representing its first record. Additionally, this species appears here as a pathogen and *S. coronata* is presented here as a new host for the fungus.

Conclusions

The data this study contribute to expansion of knowledge in order to better understand the geographic distribution of species of the phylum Ascomycota.

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Literature Cited

BARBOSA, R. L.; VITÓRIA, N. S. 2019. Fungos anamórficos da Ecorregião Raso da Catarina: *Aplosporella* (Botryosphaeriales) e *Stilbella*

(Hypocreales). Novos registros para o Brasil. *Agrotrópica* (Brasil) 31(2):109-122.

BRASIL. MINISTÉRIO DO MEIO AMBIENTE. 2018. Available at <<http://www.mma.gov.br/biomas/caatinga>> Accessed on 05 January 2018.

CÂMARA, M. P. et al. 2003. *Neophaeosphaeria* and *Phaeosphaeriopsis*, segregates of *Paraphaeosphaeria*. *Mycological research* 107(5):516-522.

CROUS, P. W. et al. 2017. Fungal Planet description sheets: 558-624. *Persoonia* 38:240-384.

KIRK, P. M. et al. 2008. *Dictionary of the Fungi*. 10ed. Wallingford, CABI. 759p.

LEAL, I. R.; TABARELLI, M.; SILVA, J. M. C. 2005. *Ecologia e conservação da caatinga*. 2ed. Recife, Ed. Universitária da UFPE. 822p.

MAIA, L. C. et al. 2015. Diversity of Brazilian fungi. *Rodriguésia* 66(4):1033-1045.

MARIN-FELIX, Y. et al. 2019. Genera of phytopathogenic fungi: GOPHY 2. *Studies in mycology* 92:47-133.

PHOOKAMSAK, R. et al. 2014. Revision of *Phaeosphaeriaceae*. *Fungal Diversity* 68(1): 159-238.

SANTOS, M. A. L.; BEZERRA, J. L.; VITÓRIA, N. S. 2019. *Phaeoseptum aquaticum* (Halotthiaceae): new record for American continent in a new host for Science. *Rodriguésia* (Brasil) 70.

SPEECH SYNTHESIS MARKUP LANGUAGE - SMML. 2018. Fungus-Host Distribution Database. Disponível em: <<http://nt.ars-grin.gov/fungalatabases/fungushost/fungushost.cfm>> Acesso em: 06 de dezembro 2018.

SPECIES LINK. 2018. Disponível em: <<http://www.splink.org.br/index?lang=pt>> Acesso em: 06 de dezembro 2018.

SPECIES FUNGORUM. 2020. Disponível em: <http://www.speciesfungorum.org/Names/Names.asp> Acesso em 20 de janeiro de 2020.

VITÓRIA, N. S.; CAVALCANTI, M. A. Q.; BEZERRA, J. L. 2016. Species of *Astrosphaeriella* and *Fissuroma* from palms:

new records for South America and Brazil. Nova Hedwigia Band 102 (1-2):129-140.

WEBSTER, J.; WEBER, R. 2007. Introduction to Fungi. 3ed. Cambridge University Press. 590p.

