



Original Paper

Spermosporella irenopsidis sp. nov. and *Spermatoloncha maticola*, parasitic on black mildew (*Irenopsis vincensii*) of rubber in Bahia, Brazil

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Abstract

A new species of the genus *Spermosporella* and a new record of *Spermatoloncha maticola* are reported parasitizing the black mildew (*Irenopsis vincensii*) on leaves of *Hevea brasiliensis* the Bahia, Brazil. Both species are described and illustrated and all *Spermosporella* species are compared.

Key words: fungicolous fungi, *Hevea brasiliensis*, Meliolales, taxonomy.

Resumo

Uma nova espécie do gênero *Spermosporella* e um novo registro de *Spermatoloncha maticola* são reportados parasitando o Mildio Negro (*Irenopsis vincensii*) em folhas de *Hevea brasiliensis* na Bahia, Brasil. Ambas as espécies são descritas e ilustradas, e todas as espécies de *Spermosporella* são comparadas.

Palavras-chave: fungos fungícolas, *Hevea brasiliensis*, Meliolales, taxonomia.

Introduction

In Brazil, commercial rubber *Hevea brasiliensis* (Willd. ex A.Juss.) Müll. Arg., is attacked by several pathogenic fungi. Among them, *Irenopsis vincensii* D.B. Pinho & O.L. Pereira causes black mildew disease of rubber. *Irenopsis vincensii* was reported and well documented by Pinho *et al.* (2014) in the Brazilian states of Espírito Santo and Pará having as heterotypic synonyms the binomials *Meliola heveae* Vincens and *Irenopsis heveae* Hansf.

During a survey of fungi on rubber trees, conducted in August 2016 in Michelin Plantations of Bahia, municipality of Igrapiúna, leaf samples were collected showing colonies of the black mildew (*I. vincensii*).

In the laboratory, it was found that *I. vincensii* colonies were parasitized by two fungicolous fungi, corresponding to *Spermatoloncha maticola* Speg. and a new species of the genus *Spermosporella* Deighton.

The genus *Spermosporella* is a known parasite of *Meliola* Fr. species in Africa, Asia and North America (Deighton 1969; Deighton & Pirozinsky 1972; Sutton 1973; Hawksworth 1981; McKenzie

1992; Hughes 1993; Matsushima & Matsushima 1995; Seifert & Gam 2011), but has not yet been recorded on the genus *Irenopsis* F. Stevens. Four species of the genus *Spermosporella* are known (Deighton 1969; Deighton & Pirozinsky 1972; Sutton 1973; Matsushima & Matsushima 1995) which differ morphologically from the species studied.

The monotypic species *Spermatoloncha maticola* has been reported in association with *Meliola clerodendricola* Henn. on leaves of *Ilex paraguariensis* A. St.-Hil. (yerba maté) in Argentina (Spegazzini 1908; Hawksworth 1981) and later it was found in Uganda on *Clerodendrum capitatum* (Willd.) Schumch. & Thonn. parasitizing the same species of *Meliola* (IMI 102852b).

Species of the Meliolales are subject to parasitism by several genera of fungicolous fungi. *Phaeostigme* Syd. & P. Syd; *Eriocercospora* Deighton, *Ramichloridium* Stahel ex de Hoog and *Spiropes* Cif. have all been reported from Brazil (Batista *et al.* 1966; Caliman 2015). However, there are no references to *Spermosporella* and *Spermatoloncha* associated with Meliolales in Brazil.

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Here, we describe a new species of the genus *Spermosporella* and report a new record of *Spermatoloncha maticola* associated with *Irenopsis vincensii* on *Hevea brasiliensis* leaves in Bahia, Brazil.

Materials and Methods

Leaf samples from the rubber tree clone CDC 312, colonized by a black mildew in a clonal garden located in Michelin Plantations of Bahia, Igrapiúna municipality, Bahia, Brazil, were collected in August 2016.

In the Fungal Diversity Laboratory, at the Cocoa Research Center (Cepec), municipality of Ilhéus, Bahia, the material was examined under a stereoscopic microscope (MOTIC SMZ-168). Reproductive and somatic structures of the fungi associated with the black mildew were morphologically characterized and photographed using a LeicaDM500 microscope coupled with a digital camera Sony Cyber-shot DSC-WX30. The measurements of the structures were performed using a calibrated ocular micrometer. For observation of intact mycelia, a modified Callan & Carris (2004) technique was used, with the cellulose acetate being replaced with fast drying colorless nail enamel (Risqué Technology), and followed by mounting in PVLG (polyvinyl alcohol + lactic acid + glycerol) (Hosagoudar & Kapoor 1985). The micrographs were done by camera lucida drawings, copied on drawing paper with India ink and scanned.

For taxonomic identification, keys and descriptions of genera and species of mycoparasitic fungi on Meliolales were consulted in the literature (Deighton 1969; Deighton & Pirozinsky 1972; Sutton 1973; McKenzie 1992; Matsushima & Matsushima 1995; Seifert & Gam 2011). Samples were deposited in the CEPEC-Fungi Fungarium (Ceplac, Ilhéus-Bahia, Brazil).

Results

Taxonomy

1. *Spermosporella irenopsidis* J.L. Bezerra, T. R. Santos, E.D. Luz sp. nov. Figs. 1; 2a-b
Mycobank 819220

Etymology: Referring to the host fungus *Irenopsis*.

Diagnosis: Colonies whitish, effuse. Mycelium of repent, hyaline, septate hyphae, 2–2.5 μm diam. Conidiogenous cells intercalary, continuous, 1-celled, ampulliform, 8–20 \times 4–8

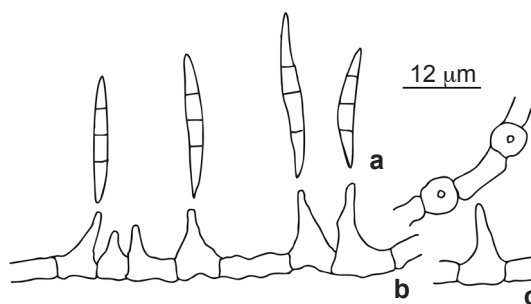


Figure 1 – *Spermosporella irenopsidis* – a. conidia; b. conidiogenous cells formed in the hyphae; c. conidiogenous cells.

μm . Conidia hyaline, smooth, fusiform, straight to slightly curved, 3-septate, attenuated at both ends, 24–32 \times 2–3 μm .

Whitish colonies, effuse, thin, overgrowing colonies of *I. vincensii*. Superficial mycelium composed of repent, hyaline, smooth, septate, branched hyphae, 2–2.5 μm in diam. Conidiogenous cells produced by intercalary growth in the hyphae; hyaline, unicellular, simple, smooth, ampulliform, measuring 8–20 \times 4–8 μm with an attenuated apical beak where the spores are formed. Scars not observed. Conidia hyaline, smooth, thin-walled, fusiform, straight to slightly bent, 3-septate, not constricted at the septa, 24–32 \times 2–3 μm , attenuated at both ends.

Material examined: Igrapiúna, Michelin Plantations of Bahia, on *Hevea brasiliensis* leaves (clone CDC 312). 29.07.2016, Santos *et al.* (CEPEC, Holotype 2483).

Spermosporella aggregata Deighton (Tab. 1) is the closest species to *S. irenopsidis* which is distinguished by having intercalary conidiogenous cells and not rostrate, recurved and constricted conidia.

2. *Spermatoloncha maticola* Speg., *Anal. Mus. Nac. Buenos Aires* t. XVII (1908) p. 139

Figs. 3; 4a-c

Colonies whitish, thin, overgrowing colonies of *I. vincensii*. Superficial mycelium composed of repent, hyaline, smooth, septate, branched, hyphae, 3–5 μm diam. Hyphal aggregates pseudo parenchymatous, irregular, 20–40 μm diam. with conidiogenous simple, hyaline, continuous, smooth, subglobose to angular, peripheral cells, 4–6 μm diam. Conidial scars not observed. Conidia hyaline, smooth, thick walled, obclavate, straight to slightly bent, 1-septate, not constricted at the septum, 26–56 \times 4–6 μm , attenuated towards the apex.

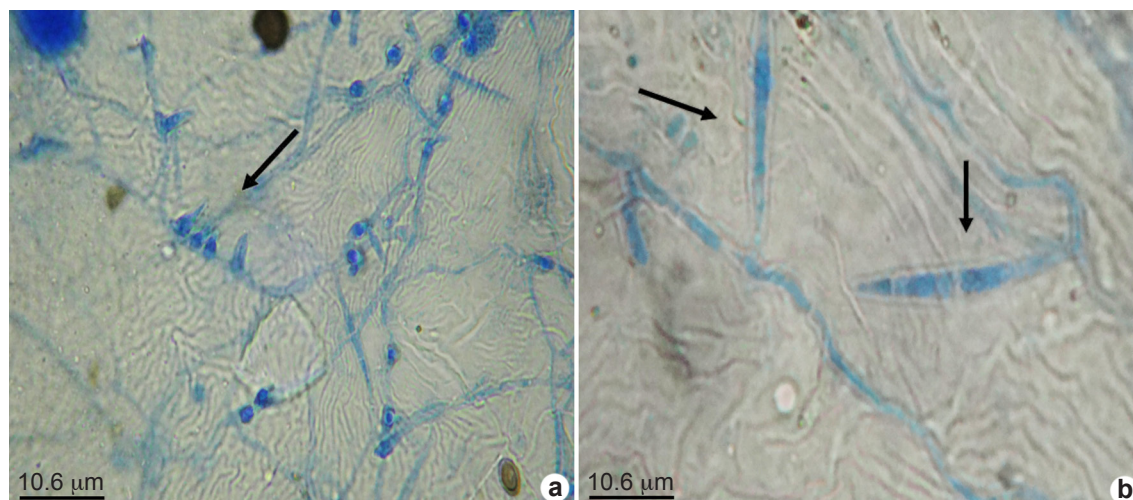


Figure 2 – *Spermosporella irenopsidis* – a. conidiogenous cells formed in the hyphae; b. conidia.

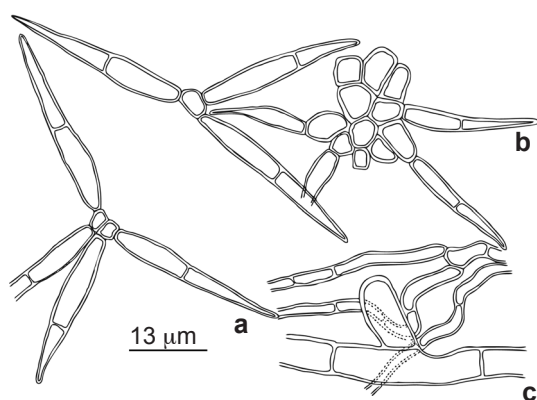


Figure 3 – *Spermatoloncha maticola* – a. conidia; b. hyphal aggregates and conidiogenous cells; c. hyphae of *S. maticola* contact hyphae of *Irenopsis vincensii*.

Material examined: Igrapiúna, Michelin Plantations of Bahia, on *Hevea brasiliensis* leaves (clone CDC 312). 29.VII.2016, Santos *et al.* (CEPEC 2484).

The examined material is scarce. The cylindrical conidiophores described by Spegazzini (1908) were not observed. This is the first report of *S. maticola* in Brazil, and *I. vincensii* is a new host of *S. maticola*.

Discussion

Spermosporella is biologically and morphologically very similar to *Annellosporella* P.R. Johnst. The two genera are distinguished by sympodial conidiogenesis in *Spermosporella* and percurrent-anellidic conidiogenesis in *Annellosporella*. Thus far, no molecular studies have been done with

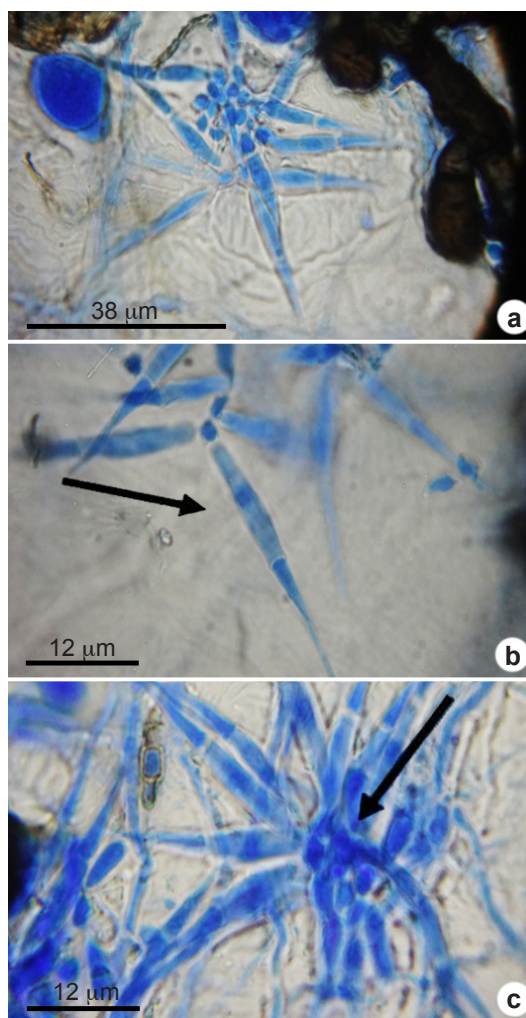


Figure 4 – *Spermatoloncha maticola* – a,b,c. conidia and hyphal aggregates.

the genera *Spermosporella* and *Spermatoloncha* and hence there are no DNA sequences available. Because neither of these genera have been cultured in vitro, DNA extraction depends on processing fungal fragments from fresh specimens. However, during the present study, attempts to extract DNA were unsuccessful.

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References

- Batista AC; Bezerra JL, Maia H da S & Garnier R (1966) Alguns hiperparasitas de Meliolaceae e outros Ascomycetes. *In*: Instituto de Micologia, Universidade do Recife 470 (Atas do Instituto de Micologia). Vol. 3. Universidade Federal de Pernambuco, Recife. Pp 10-30.
- Caliman ME (2015) Aspectos ecológicos e taxonômicos de *Prillieuxina winteriana* (Asterinaceae) e sua interação com *Annona muricata*. Dissertação de Mestrado. Universidade Estadual de Santa Cruz, Ilhéus. 60p.
- Callan BE & Carris LM (2004) Fungi on living plant substrata, including fruits. *In*: Mueller GM, Bills GF & Foster MS (eds.) Biodiversity of fungi-inventory and monitoring methods. Elsevier, Amsterdam. Pp 105-126.
- Deighton FC (1969) Microfungi IV: some hyperparasitic Hyphomycetes, and a note on *Cercospora uredinophila* Sacc. *Mycological Papers* 118: 1-41.
- Deighton FC & Pirozynski KA (1972) Microfungi V. More hyperparasitic Hyphomycetes. *Mycological Papers* 128: 1-110.
- Hawksworth DL (1981) A survey of the fungicolous conidial fungi. *In*: Cole GT & Kendrick B (eds.) Biology of conidial fungi. Vol. I. Academic Press, New York. Pp 171-244.
- Hosagoudar VB & Kapoor JN (1985) New technique of mounting Meliolaceous fungi. *Indian Phytopathology* 38: 548-549.
- Hughes SJ (1993) *Meliolina* and its excluded species. *Mycological Papers* 166: 1-255.
- Matsushima K & Matsushima T (1995) Fragmenta Mycologica - I. Matsushima. *Mycological Memoirs* 8: 45-54.
- McKenzie EHC (1992) Fungi of the Kermadec Islands. *Mycotaxon* 45: 149-170.
- Pinho DB, Honorato Junior J, Firmino AL, Hora Junior BT, Mizubuti ESG & Pereira OL (2014) Reappraisal of the black mildews (Meliolales) on *Hevea brasiliensis*. *Tropical Plant Pathology* 39: 89-94.
- Seifert KA & Gams W (2011) The genera of Hyphomycetes - 2011 update. *Persoonia* 27: 119-129.
- Sutton BC (1973) Hyphomycetes from Manitoba and Saskatchewan, Canada. *Mycological Papers* 132: 1-143.
- Spegazzini CL (1908) Hongos de layerba mate. *Anales del Museo Nacional de Historia Natural de Buenos Aires (Series 3)* 17: 111-141.

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