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## ***Alveariospora*, a new anamorphic genus from trichomes of *Dimorphandra mollis* in Brazil**

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**ABSTRACT** — A dematiaceous fungus associated with trichomes on leaflets of *Dimorphandra mollis* was collected during a survey of fungi associated with the genus *Dimorphandra* (*Fabaceae*). The host tree is endemic to the Brazilian Cerrado. Although widely distributed there, this plant has been neglected in mycological studies, since no fungus has ever been recorded in association with it. The new fungus produces large alveariform (skep or beehive-shaped), muriform, dictyosporous, distoseptate, verruculose conidia from large, thickened, dark washer-like conidiogenous loci. Among previously described anamorphic genera, this fungus is somewhat similar to *Annellophragmia*, *Annellosympodia*, *Briansuttonia*, *Dictyospiropes*, and *Veracruzomyces* as well as *Spiropes dictyosporus* but has some significant differences from those taxa. Hence, the new genus *Alveariospora* (type species: *A. distoseptata* sp. nov.) is proposed for this fungus.

**KEY WORDS** — fungal survey, taxonomy, tropical fungi

### **Introduction**

*Dimorphandra mollis* Benth. (*Fabaceae*: faveira, faveiro-do-cerrado, falso barbatimão) is a plant native to the Cerrado. This species is adapted to conditions of low rainfall, developing foliage, flowering, and fruiting in the wet season and losing its leaves in the dry season (Lorenzi 2002). The fruits are utilized to extract rutin and other glycoside flavonoids for the pharmaceutical industry (Ferreira et al. 2001; Lorenzi 2002). It has potential for exploitation as a source of gum for the food industry (Panegassi et al. 2000). Although *D. mollis* is a common component of the cerrado flora — an ecosystem that in recent decades has been intensively explored by Brazilian mycologists (e.g., Rezende & Dianese 2003, Dornelo-Silva & Dianese 2004, Hernández-Gutiérrez & Dianese 2009, Pereira-Carvalho et al. 2010) — no attention has been paid to the mycobiota of this host plant and no fungi have ever been recorded on *D. mollis*.

In July 2009, an exploratory survey of the mycodiversity of *Dimorphandra* spp. was initiated, and the first brief survey to the municipalities of Paraopeba and Caetanópolis (Minas Gerais, Brazil) has already yielded several fungi of interest. One interesting fungus, found colonizing *D. mollis* trichomes, is described and discussed herein.

### Material & methods

Samples of *D. mollis* foliage were collected, dried in a plant press, and taken to the lab. After examination, selected leaflets bearing fungus colonies were deposited in the local herbarium (Herbarium VIC). Isolations were attempted by direct spore transfer onto plates containing VBA medium (Pereira et al. 2003) with the help of a fine needle. Fungal structures were removed from fresh leaves and mounted in lactophenol. Observations, measurements, and illustrations were carried out with an OLYMPUS BX 51 light microscope fitted with a digital camera (EVOLT E330) and a drawing tube. Wherever possible, 30 measurements of each structure were taken.

### Taxonomy

*Alveariospora* Meir. Silva, R.F. Castañeda, O.L. Pereira & R.W. Barreto, **anam. gen. nov.**

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*Cellulae conidiogena*e primo *monoblasticae*, deinde *polyblasticae*, *indeterminatae*, cum, *cicatricibus* primo *apicalibus*, deinde *lateralibus*, *discoïdibus*, *protuberantibus*, *nigris*, *incrassatis*. *Conidia alveariformia*, *muriformia*, *distoseptata*, cum *appendicibus cellularibus*, *praedita*.

TYPE SPECIES: *Alveariospora distoseptata* Meir. Silva et al.

ETYMOLOGY: Latin, *alvearium*, meaning beehive, skep; and *spora*, meaning spores.

Anamorphic fungi. Colonies on the natural substrate effuse, hairy, brown, olivaceous or black. Mycelium partly superficial and immersed. Conidiophores distinct, single, unbranched, septate, brown or olivaceous, smooth. Conidiogenous cells integrated, terminal, at first with a single terminal conidiogenous locus, then indeterminate, polyblastic, with successive sympodial but rectilinear proliferation, rupturing the outer wall around each scar, resulting in a lateral displacement of scars, leaving conspicuous circumferential annular fringes of the torn wall. Conidiogenous loci evident, lenticular, protuberant, thickened and black, conidial secession schizolytic. Conidia solitary, ellipsoidal, oval to broadly navicular, dictyoseptate, distoseptate, verruculose or smooth, brown or dark brown, conspicuously cicatrized at the base, with a cellular, cylindrical or subulate, brown apical appendage.

*Alveariospora distoseptata* Meir. Silva, R.F. Castañeda, O.L. Pereira & R.W. Barreto, **anam. sp. nov.** PLATES 1–4

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Differs from *Spiropes dictyosporus* in hyphal conidiomata and distoseptate conidia.

TYPE: Brazil, Minas Gerais, Paraopeba, Floresta Nacional de Paraopeba, on trichomes of *Dimorphandra mollis*, 10 Jul. 2009, M. Silva & O.L. Pereira (**Holotype**, VIC 31399).

ETYMOLOGY: Latin, *distoseptata*, meaning distoseptate, having the individual cells each surrounded by a sac-like wall distinct from the outer wall.

Anamorphic fungus. Colonies on the natural substrate effuse, hairy, brown. Mycelium partly superficial and partly immersed, composed of septate, branched, smooth, brown hyphae. Conidiophores distinct, single, unbranched, erect, straight, 3–6-septate, dark brown, pale brown near the apex, smooth,  $120\text{--}160 \times 7\text{--}10 \mu\text{m}$ . Conidiogenous cells integrated, terminal,  $22\text{--}45 \times 6\text{--}10 \mu\text{m}$ , at first with a single terminal conidiogenous locus, then indeterminate, polyblastic, with successive sympodial but rectilinear proliferation, rupturing the outer wall around each scar, resulting in a lateral displacement of scars, leaving conspicuous circumferential annular fringes of the torn wall. Conidiogenous loci evident, lenticular, black,  $6\text{--}8 \mu\text{m}$  diam.,  $2\text{--}4 \mu\text{m}$  thick, 3–7 per conidiophore. Conidial secession schizolytic. Conidia solitary, ellipsoidal to broadly navicular, dictyoseptate, distoseptate, verruculose, brown,  $62\text{--}85 \times 26\text{--}45 \mu\text{m}$ , with a conspicuous protuberant, melanized, lenticular hilum at the base,  $7\text{--}8 \mu\text{m}$  diam.,  $3\text{--}4 \mu\text{m}$  thick, and with a cellular, cylindrical or slightly subulate, smooth terminal appendages,  $27\text{--}42 \times 2.5\text{--}4.5 \mu\text{m}$ , brown and pale brown to subhyaline at the end, sometimes surrounded by a hyaline, mucilaginous sheath. Teleomorph unknown. In culture, no conidial germination was observed, even after a period of four weeks.

COMMENTS — The pattern of ontogeny in *Alveariospora* can be classified as conidial development type 17 (Kirk et al. 2008) (holoblastic, delimitation by 1 septum, schizolytic secession, maturation by diffuse wall-building, percurrent enteroblastic conidiogenous cell extension, followed by conidial ontogeny by replacement apical wall-building; strongly melanized, each successive conidium seceding before the next percurrent elongation of the conidiogenous cell), but sometimes also holoblastic, sympodial proliferation occurring and two or more conidia are produced, a pattern of ontogeny classified as conidial development type 10 (holoblastic, regularly alternating with sympodial proliferation, maturation by diffuse wall-building and secession schizolytic).

The mode of rectilinear proliferation and the combination of conspicuous annular structures and thickened, darkened conidiogenous loci in *Alveariospora distoseptata* is very unusual and comparable only with *Annellophragmia* Subram. (Ellis 1971), *Annellosympodia* McTaggart et al. (McTaggart et al. 2007), and *Spiropes dictyosporus* Seifert & S. Hughes (Seifert & Hughes 2000). However, the last species, inhabiting a sooty mould in New Zealand, is characterized by synnematos conidiomata and euseptate conidia. *Annellophragmia* is differentiated by synnematos conidiomata and phragmosporous (but also distoseptate) conidia. *Annellosympodia* is characterized by its sporodochial

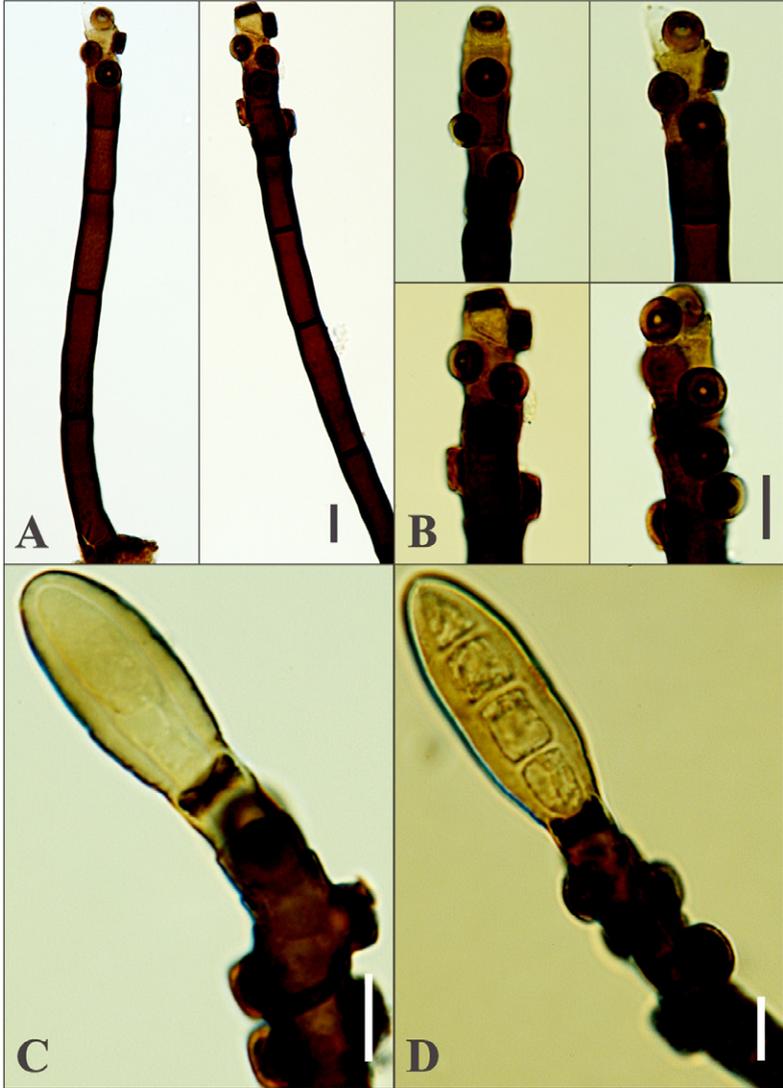


PLATE 1. *Alveariospora distoseptata*. Macronematous conidiophores with polyblastic conidiogenous cells (A); detail of protuberant lenticular loci on enteroblastic percurrent proliferations (B); initial conidial formation (C) and initial conidial septation (D). Bars: 10  $\mu$ m.

conidiomata with ampulliform, doliiform to obovoid conidiogenous cells, 0–1-euseptate conidia, and rhexolytic conidial secession. Among other known anamorphic genera, *Alveariospora* appears superficially similar to *Briansuttonia*

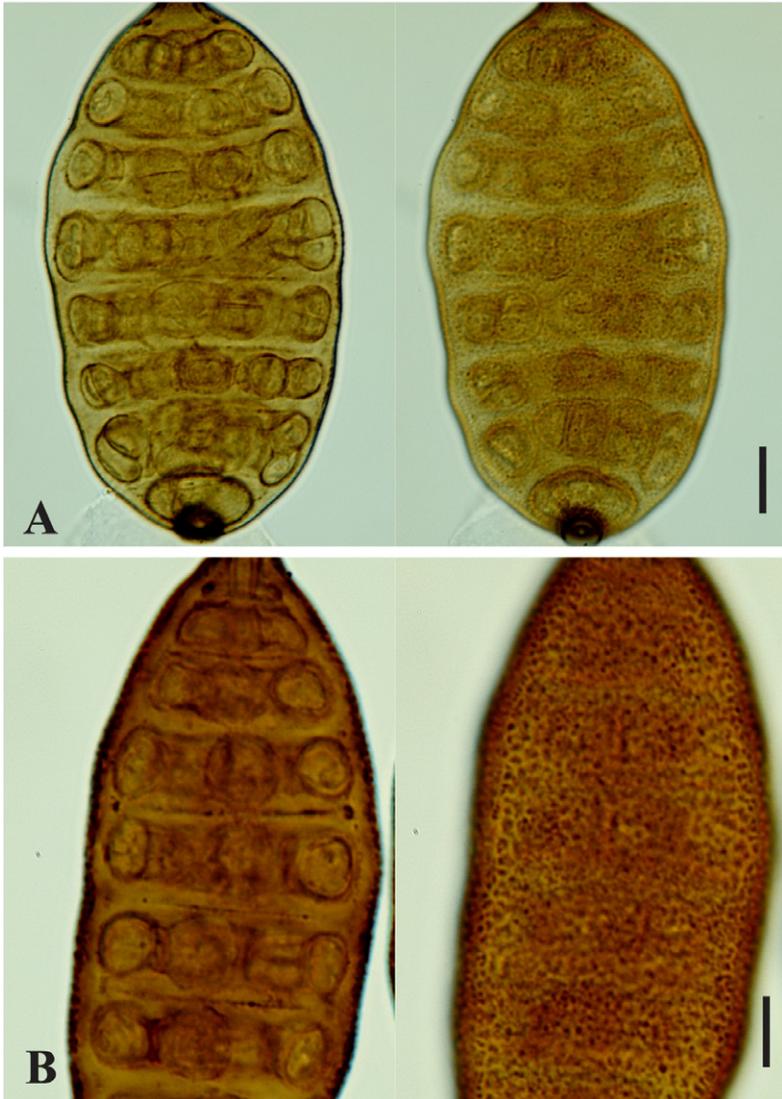


PLATE 2. *Alveariospora distoseptata*. Detail view of muriform, distoseptate conidia (left) with verruculose wall (right) on young yellowish conidia (A) and reddish-brown mature conidia (B). Bars: 10  $\mu$ m.

R.F. Castañeda et al. (Castañeda et al. 2004), *Dictyospiropes* M.B. Ellis (Ellis 1976), and *Veracruzomyces* Mercado et al. (Mercado-Sierra et al. 2002). *Briansuttonia* is characterized by monotretic, terminal, determinate or indeterminate with

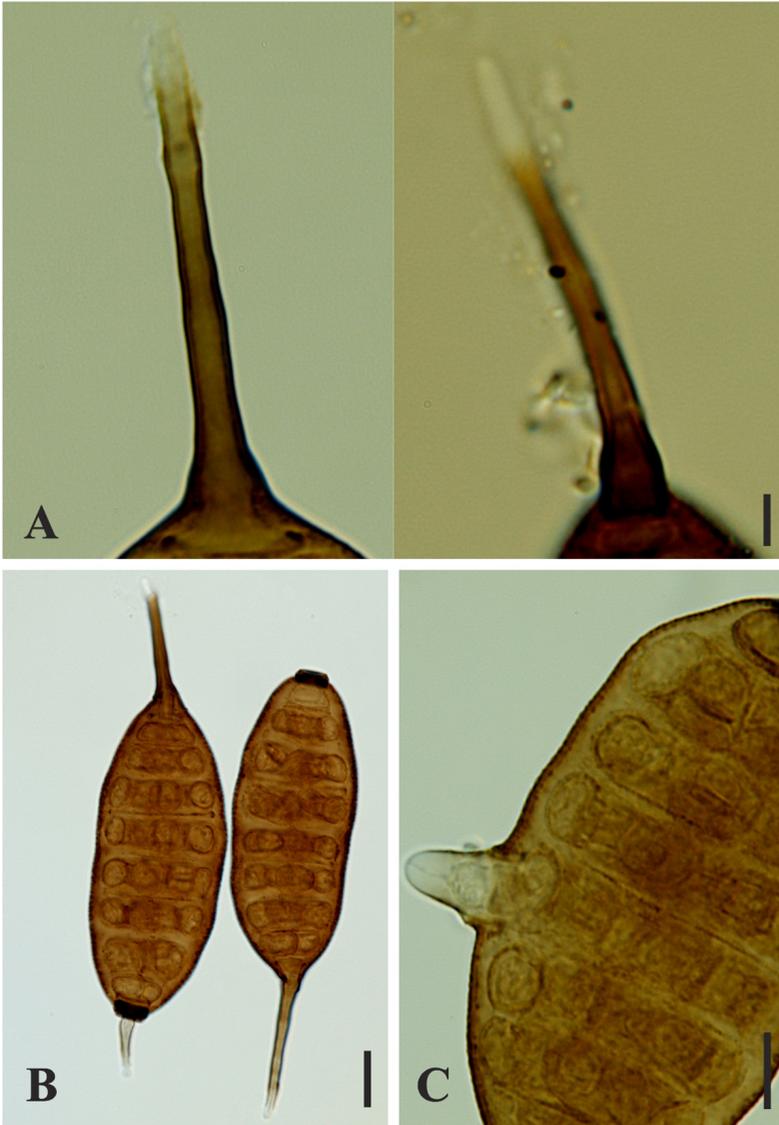


PLATE 3. *Alveariospora distoseptata*. Conidial appendage ends, sometimes surrounded by a hyaline, mucilaginous tunica (A); germination of the conidia, through hilum (B) and laterally through wall (C). Bars: A = 5  $\mu\text{m}$ ; B = 20  $\mu\text{m}$ ; C = 10  $\mu\text{m}$ .

enteroblastic percurrent conidiogenous cells. *Dictyospiropes* is quite distinct from *Alveariospora* by having polyblastic, sympodial conidiogenous cells with strongly melanized, lenticular conidiogenous loci lacking percurrent extensions,

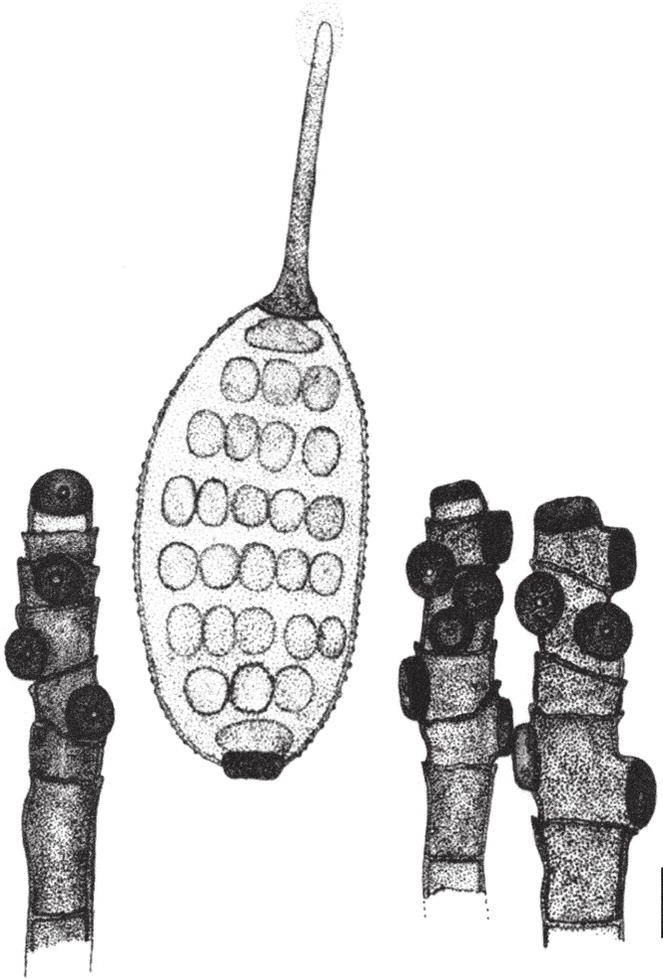


PLATE 4. Drawing of *Alveariospora distoseptata* conidia and conidiogenous cells. Bar: 10  $\mu$ m.

and euseptate-dictyoseptate conidia without strongly thickened and melanized basal hila. *Veracruzomyces* is clearly distinguished from *Alveariospora* by its monoblastic, percurrently proliferating conidiogenous cells without cicatrized conidiogenous loci.

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