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Goidanichiella cylindrospora sp. nov. from Connecticut, USA

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Abstract — A new hyphomycete species, *Goidanichiella cylindrospora* sp. nov., is described and illustrated following the examination of a specimen collected from Connecticut, USA. The history of the genus is reviewed and a comparison is made of the new taxon to other species of *Goidanichiella*. *G. cylindrospora* develops uniseriate heads and cylindrical to fusiform conidia, 4.3 – 6.3 × 1.5 – 1.9 µm.

Key Words — mitosporic fungi, taxonomy, type

Introduction

Two species of *Goidanichiella* G.L. Barron ex W. Gams are now known following the validation of the genus (Gams et al. 1990, Hyde et al. 2003). A specimen of *Goidanichiella* was collected on bark in early winter of 2006 from a mixed forest at the Connecticut Agricultural Experiment Station, Valley Laboratory in Windsor, Connecticut. The fungus differs in conidial size and shape from previously described species of *Goidanichiella*. A new species of *Goidanichiella* is described and illustrated.

Materials and methods

Conidiophores and conidia of the fungus were mounted in lacto-fuchsin (0.1 g acid fuchsin, 100 ml 85% lactic acid) (Carmichael 1955). Microscopic observations were made using Nomarski differential interference contrast optics. Attempts were made to isolate the fungus on Malt Extract Agar (MEA), containing 15 g malt extract broth (Difco), 15 g agar (Oxoid), 0.075 g

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chloramphenicol (Fisher), 750 mL distilled water, 0.75 mL trace metal solution [1.0 g $ZnSO_4 \cdot 7H_2O$, 0.5 g $CuSO_4 \cdot 5H_2O$, 100 mL distilled water], 1 mL 1N NaOH; and Corn Meal Agar (CMA), containing 12.75 g corn meal agar (Difco), 0.075 g chloramphenicol (Fisher), 750 mL distilled water. The plates were incubated at 25°C for four weeks.

Results

Goidanichiella cylindrospora D.W. Li & G.H. Zhao **sp. nov.** Figures 1–5

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Conidiophora, macronemata, erecta, simplicia vel ramosa, brunnea, 133–223 μm longa et 8.6–11.5 μm crassa. Vesicula globosa, subglobosa vel pyriforma, 18.1 – 25.3 ×16.1 – 21.8 μm. Phialidae ellipsoidae, ovatae, vel ampulliformae, pallide brunnae vel brunnae, 5.5 – 6.9 × 3.2 – 4.1 μm, collulo conspicuo praeditae. Conidia cylíndrica, clavata vel fusiforma, 4.3 – 6.3 × 1.5 – 1.9 μm, longa/crassa 2.4 – 4.8, in massam mucosam. Teleomorphosis ignota.

Holotypus BPI 877773 per De-Wei Li ex Quercus sp. (?) latrare, ad Windsor, Connecticut, USA de 12 December 2006.

Etymology: Referring to the cylindrical morphology of the conidia.

Conidiophores determinate, macronematous, solitary or in groups of 2-4, erect, simple or branched, straight or undulating, smooth, 3–7 (–14) septate, dark brown, 133 – 223 μm long and 8.6 – 11.5μm wide, swollen at the apex and forming a fertile vesicle (Figs 1–2).

Vesicles globose to subglobose, occasionally pyriform or clavate, (14.9–) 18.1 – 25.3 (–27.6) (mean = 21.7 ± 3.6, n = 16) × (14–) 16.1 – 21.8 (–23.3) (mean = 18.97 ± 2.87) μm, covered completely by phialides (Figs 3–4). Phialides determinate, discrete, ellipsoidal or ovoid, occasionally ampulliform, unicellular, smooth, pale brown to brown, borne directly on the vesicle and forming a dense palisade layer, (4.8–) 5.5 – 6.9 (–7.6) (mean = 6.2 ± 0.7, n = 30) × (2.5–) 3.2 – 4.1 (–4.4) (mean = 3.6 ± 0.4) μm, with conspicuous collarettes (Figs 3–4). Conidia unicellular, cylindrical, clavate, or fusiform, hyaline to pale brown, smooth, (3.9–) 4.3 – 6.3 (–8.5) (mean = 5.3 ± 1.0, n = 30) × (1.4–) 1.5 – 1.9 (–2.2) (mean = 1.7 ± 0.2) μm, ratio of length/width 2.4 – 4.8 (mean = 3.1), aggregating in slimy masses (Figure 5).

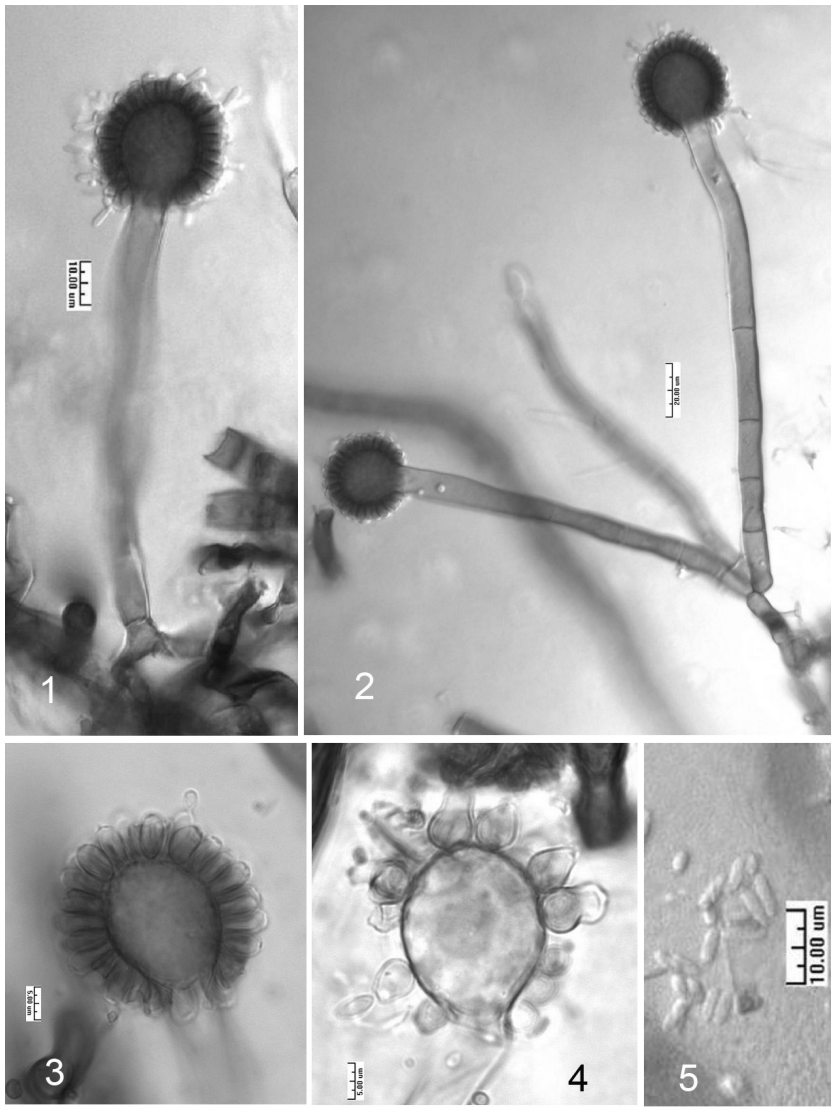
Teleomorph unknown.

Geographical distribution: Connecticut, USA.

Habitat: saprobic on bark of dead oak, *Quercus* sp. (?).

Specimen examined: UNITED STATES, Connecticut, Windsor, The Connecticut Agricultural Experiment Station, Valley Laboratory, 41°51' 00″N, 72°39' 30″W, on *Quercus* sp. (?) bark, 12 December 2006, De-Wei Li sp. nov., holotype (BPI 877773).

We were unable to isolate *G. cylindrospora* from the holotype collection despite several attempts using two culture media (MEA and CMA).



Figures 1-5. 1. Conidiophore, vesicle, phialides, and conidia. 2. Branched conidiophores, vesicles, phialides, and conidia. 3–4. Vesicle and phialides. 5. Conidia.

Scale bars: 1, 5 = 10 μm, 2 = 20 μm, 3–4 = 5 μm.

Discussion

The genus *Goidanichiella* was originally proposed as *Goidanichia* by Arnaud (1954) for *Goidanichia scopula* (Goid.) G. Arnaud (≡ *Scopularia scopula* Goid.)

(Barron 1968, Gams et al. 1990). However, Arnaud's *Goidanichia* was invalid because of the lack of a Latin diagnosis and illegitimate because the same name had been proposed earlier for a lichen-forming fungus, *Goidanichia* Tomas. & Cif. 1952 (Barron 1968). Although Arnaud wrote a replacement name, *Goidanichiella*, by hand on several reprints of his paper once he discovered the earlier homonym, Gams et al. (1990) regarded *Goidanichiella* as formally established by Barron in 1968.

Barron (1968) discussed *Goidanichiella* in relation to a fungus he isolated from soil in Ontario, Canada, that produced phialoconidia in slimy masses on pigmented *Aspergillus*-like conidiophores. He listed "*Goidanichiella*" *scopula* as type, provided a generic description, and noted that he had only once isolated "a *Goidanichiella* species" (which he did not formally describe). Barron noted that *Goidanichiella* was invalid without a Latin diagnosis but did not validate either genus or type species name. Matsushima (1975) likewise failed to validate the genus when proposing *Goidanichiella sphaerospora* Matsush. based on a culture from forest soil in Hokkaido, Japan.

When they validated the genus *Goidanichiella* G.L. Barron ex W. Gams, Gams et al. (1990) noted that *Goidanichiella scopula* was invalid and could not serve as type for a newly validated *Goidanichiella* because it was possibly synonymous with *Haplographium catenatum* (Preuss) Hol.-Jech. Because loss of the holotype of *Goidanichiella sphaerospora* prevented validation of that species name, Gams et al. elected to typify the genus with Barron's (1968) "*Goidanichiella* sp.," which they formally described as *G. barronii* W. Gams et al. They considered *Goidanichiella* to be monospecific at the time of validation.

Hyde et al. (2002) later described *G. fusiformis* (as '*fusiforma*') K.D. Hyde et al. from palm fronds in Thailand.

Our species has uniseriate vesicles and cylindrical conidia, 4.3 – 6.3 × 1.5 – 1.9 μm, which differ from currently recognized species of *Goidanichiella*. Conidia of *G. barronii* are globose and 3–4 × 2–3 μm, or allantoid and 4–6.5 × 1.4–2 μm (Gams et al. 1990), while conidia of *G. fusiformis* are fusiform and larger, 9–14 × 2–3 μm (Hyde et al. 2002). *Goidanichiella barronii* is biseriate, whereas *G. fusiformis* is uniseriate. Pending neotypification, *G. sphaerospora* may represent a fourth species (Gams et al. 1990) with biseriate vesicles, much broader conidiophores (12–20 μm) and subglobose to obovate conidia (2.5 μm in diam. or 3 × 4 μm) (Matsushima 1975).

Goidanichiella barronii is phylogenetically closely related to *Custingophora* Stolk et al. and *Knoxdaviesia* M.J. Wingf. et al. (Viljoen et al. 1999, Jacobs et al. 2005). However, *Goidanichiella* differs from the two genera by its aspergilloid conidiophores that lack subapical or apical proliferations. *Goidanichiella* differs from *Gliocephalis* Matruchot (Matruchot 1899) by its septate, dematiaceous conidiophore stipes (Jacobs et al. 2005).

Key to species of *Goidanichiella*

1. Metulae present, conidia bimorphic ..... *G. barronii*
   Metulae absent, conidia monomorphic 2
2. Conidia, relatively large, fusiform, 9–14 × 2–3 μm ..... *G. fusiformis*
   Conidia smaller, cylindrical or clavate, 4.3–6.3 × 1.5–1.9 μm ... *G. cylindrospora*

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