Goidanichiella cylindrospora sp. nov.
from Connecticut, USA

De-Wei Li¹ and Guihua Zhao²

dewei.li@po.state.ct.us

¹ The Connecticut Agricultural Experiment Station, Valley Laboratory
153 Cook Hill Road, Windsor, CT 06095 U.S.A.
zhao@guanghua2006@yahoo.com.cn
²Center of Biotechnology Research & Development,
Jiangsu College of Agriculture and Forestry, Jurong, Jiangsu, China

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
chloramphenicol (Fisher), 750 mL distilled water, 0.75 mL trace metal solution [1.0 g ZnSO$_4$·7H$_2$O, 0.5 g CuSO$_4$·5H$_2$O, 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 25ºC for four weeks.

Results

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

*Mycobank* MB 510597

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 cylindrica, clavata vel fusiforma, 4.3 – 6.3 × 1.5 – 1.9 μm, longa/crassa 2.4 – 4.8, in massam mucosam. Teleomorphosis ignota.

Holotyphus 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 – 11.5 μm 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).
**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.


Our species has uniseriate vesicles and cylindrical conidia, $4.3 - 6.3 \times 1.5 - 1.9 \, \mu m$, which differ from currently recognized species of *Goidanichiella*. Conidia of *G. barronii* are globose and $3-4 \times 2-3 \, \mu m$, or allantoid and $4-6.5 \times 1.4-2 \, \mu m$ (Gams et al. 1990), while conidia of *G. fusiformis* are fusiform and larger, $9-14 \times 2-3 \, \mu m$ (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 *Custinophora* 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*

Acknowledgments

The authors are very grateful to Drs. Keith Seifert, James Scott, Lorelei Norvell, and Shaun Pennycook for their critical review of the manuscript and suggestions for revision and to Dr. James LaMondia for reviewing the pre-submission manuscript. This work was funded partially through USDA Hatch Grant CONH00806.

Literature cited
