



The genus *Xylaria* (Xylariaceae) in the south of China—6. A new *Xylaria* species based on morphological and molecular characters

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Abstract

Xylaria fusispora, an undescribed species of *Xylaria* (Xylariales, Xylariaceae), is described and illustrated as a new species based on collections from Guizhou Province, China. Both morphology and phylogenetic analysis of nrDNA ITS sequences support the establishment of this new species. The fungus is characterized by its fusoid-equilateral ascospores and an ascus apical ring not bluing in Melzer's reagent. The differences between the new species and the related fungi are discussed.

Key words: Ascomycota; Molecular phylogeny; Sordariomycetous fungi; Taxonomy

Introduction

Xylaria Hill ex Schrank is a large, cosmopolitan genus of the Xylariaceae. About 300 species are accepted in the genus (Kirk *et al.* 2008), and most of them occur in the tropics or subtropics (Dennis 1956, 1957, 1958, Rogers 1984a,b, 1986, Rogers & Callan 1986, Rogers *et al.* 2008, San Martín & Rogers 1989, San Martín *et al.* 2001, Læssøe 1999, Ju & Rogers 1999, Ju & Hsieh 2007, Peršoh *et al.* 2009, Fournier *et al.* 2011). The members of this genus from southern China have close affinities with those of tropical Asia. During an investigation of the Xylariaceae in southern China, an undescribed species was collected. To determine its phylogenetic relationships among similar species of *Xylaria*, sequence analyses were performed based on ITS sequences.

Materials and methods

Morphological studies

The specimen studied is deposited at the Herbarium of the Institute of Mycology, Jilin Agricultural University (HMJAU). Cultures were obtained by placing the stromatal tissue with numerous ascospores on SME medium (Kenerley & Rogers 1976). The isolates were cultured on 9 cm plastic Petri dishes containing 2% Difco oatmeal agar (OA), and incubated at 23°C under 12 h fluorescent light. Microscopic features and measurements were taken from slide preparations mounted in water, 5% KOH and Melzer's reagent. The photographs of asci, ascus apical ring, ascospores and appendage were taken by using a VHX-600E microscope of the Keyence Corporation and bright field microscopy (BF). The photographs of stromatal surface were taken with a ZSA30w dissecting microscope equipped with a S70 Canon camera. The methods of collecting, preservation, identification, isolation and culture of the specimens follow Ju & Rogers (1999).

The phylogenetic analyses showed that *X. fusispora* formed a distinct lineage (Fig. 2). Both morphology and rDNA data confirmed that the Chinese material represents a new species in *Xylaria*. Phylogenetically, *X. fusispora* is closely related to the clade containing *X. cinerea* judging from the available data (Fournier *et al.* 2011). However, *X. cinerea* can be distinguished from *X. fusispora* by its apical apparatus bluing in Melzer's reagent, 3.5–4 µm high, and 2.5–3 µm broad, and smaller ascospores 13–17 × 5–6 µm (Fournier *et al.* 2011). *Xylaria venustula* Sacc. is also close to *X. fusispora* in the phylogenetic tree, but it can be separated by having an acutely pointed stromatal apex and smaller ascospores (10–)11–13 × 4–4.5 µm (Dennis 1961). Since sequences of most species of the genus are not available in GenBank, we rely mainly on morphological observations.

Xylaria fusispora somewhat resembles *X. apiculata* Cooke and *X. arbuscula* Sacc. in stromatal gross morphology, but *X. apiculata* has hirsute stromatal stipes, smaller ascospores 14.7–18.4 × (4.4–)6–6.6 µm, and the ascal apical ring bluing in Melzer's reagent (Rogers *et al.* 1987); and *X. arbuscula* differs by having ellipsoid-inequilateral, smaller ascospores (12–)13–17(–18) × 4–6 µm and with ascal apical ring bluing in Melzer's reagent, which is 3.5–5.5 µm high and 2.5–3 µm broad (San Martín & Rogers 1989, Hsieh *et al.* 2010).

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