First Report of Stem Rot on Asiatic Dayflower (Commelina communis L.) Caused by Sclerotium rolfsii in Korea

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(Received December 13, 2010. Accepted January 11, 2011)

Stem rot was found for the first time on the Asiatic dayflower plant (Commelina communis L.) in Korea. A detailed description of this Korean specimen is given, along with its rDNA internal transcribed spacer sequence. The fungus was identified as Sclerotium rolfsii Saccardo based on mycological characteristics and molecular data.

KEYWORDS: Commelina communis L., Sclerotium rolfsii, Stem rot

The Asiatic dayflower plant (*Commelina communis* L.), native throughout East Asia and northern parts of Southeast Asia, is an herbaceous annual plant in the dayflower family [1]. The plant is also cultivated for its dye in Japan and northern China [2]. Healthy plants with blue-colored flowers are shown in Fig. 1A.

Symptoms. A stem rot disease has been observed sporadically on Asiatic dayflower at moist, shady forest edges and roadsides in Geoje, Korea in 2010 (Fig. 1B). From late spring to summer, stems under the canopy are exposed to warm and highly humid conditions, which are favorable for the development of sclerotial stem rot. The disease developed mainly on the stems near the soil line. The disease started with small water-soaked lesions on the stem, which expanded and rotted. Numerous sclerotia were often produced on the surfaces of stems near the soil line. The heavily infected stems became rotted and blighted, and the plant eventually died (Fig. 1B).

Mycological characteristics. The freshly isolated pathogenic fungus grown on potato dextrose agar (PDA) was examined microscopically. Detailed microscopic examinations of a representative specimen were performed using a light microscope (Axioplan; Carl Zeiss, Jena, Germany). Small globoid sclerotia formed abundantly on the PDA after 10 days of mycelial growth (Fig. 1C). The sclerotia, which were relatively uniform in size (1~3 mm), were white at first and became dark brown gradually. The white mycelium had a typical clamp connection (Fig. 1D).

Pathogenicity tests. Inoculums were prepared with mycelial mats and mixed with autoclaved soil for pathogenic-

ity testing. Then, healthy *C. communis* plants were planted in pots with soil inoculums containing mycelial mats. The first symptoms appeared at 7 days after inoculation, and typical symptoms developed into water-soaking lesions. Then, white mycelia and sclerotia were observed on the rotted areas of stems (Fig. 1E). The causal pathogen was re-isolated from the lesions to confirm Koch's postulate.

Internal transcribed spacer (ITS) sequence analysis. The complete ITS rDNA region of the representative isolate was amplified and sequenced using the ITS1 (5'-TCCGTAGGTGAACCTGCGG-3') and ITS4 (5'-TCCTC-CGCTTATTGATATGC-3') primers as described by White et al. [3]. The resulting 684-bp sequence was deposited in GenBank (accession No. HQ420816). A phylogenetic analysis was performed using MEGA4 software (MEGA, Tempe, AZ, USA), with the neighbor-joining method and the Tajima-Nei distance model. Previously published ITS sequences of *Sclerotium rolfsii* strains were included for reference [4]. In the phylogenetic tree (Fig. 2), the representative isolate was placed within a clade comprising reference isolates of *S. rolfsii*.

Based on symptoms, mycological characteristics, molecular data, and pathogenicity to the host plant, this fungus was identified as *S. rolfsii* Saccardo [5]. A representative culture of *S. rolfsii* has been deposited with the Korean Agricultural Culture Collection (KACC 45483), National Academy of Agricultural Science, Rural Development Administration, Suwon, Korea. To our knowledge, this is the first report of the presence of *S. rolfsii* on Asiatic dayflower in Korea [6]. This disease is highly dependent upon weather conditions. Environmental conditions during the summer in Korea are similar to subtropical conditions, which are favorable for development of this disease. The recent occurrence of this disease suggests the possibility

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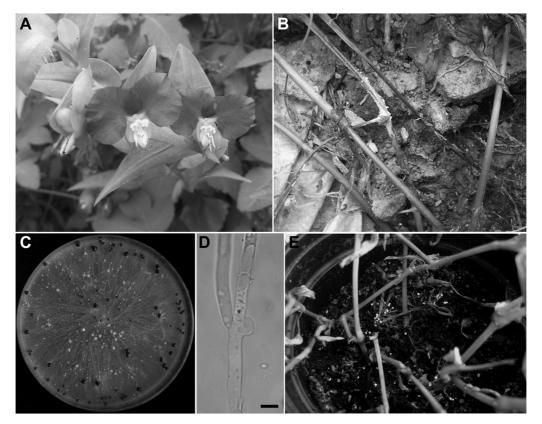


Fig. 1. Symptoms of stem rot on *Commelina communis* L. and mycological characteristics of the pathogenic fungus, *Sclerotium rolfsii*. A, Healthy plants; B, Typical field symptoms on stems and near the soil line; C, Mycelial mat and sclerotia grown on potato dextrose agar after 15 days; D, Clamp connection (scale bar = 10 μm); E, Symptoms after artificial inoculation.

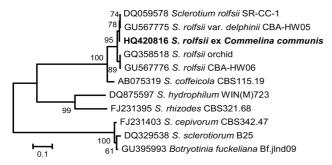


Fig. 2. Phylogenetic tree using internal transcribed spacer sequences showing closest known relatives of *Sclerotium rolfsii* including stem rot fungus infecting *Commelina communis* L. DNA sequences from the NCBI nucleotide database were aligned using ClustalW, and a phylogenetic tree was constructed using the neighbor-joining method and visualized with TreeView. Numbers above the branches indicate the bootstrap values. Bars indicate number of nucleotide substitutions per site. The present isolate infecting *C. communis* is marked in bold.

that S. rolfsii is spreading widely.

Acknowledgements

This work was conducted with the support of "Coopera-

tive Research Program for Agriculture Science & Technology Development (PJ007345)" Rural Development Administration, Korea.

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