Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Fusarium solani* Causing Leaf Sheath Rot of Bush Lily in China

Yue Sun, Rui Wang, Kaibin Qiao, Hongyu Pan, Fengting Wang, Yan Wang, and Jinliang Liu[†]

Department of Plant Protection, College of Plant Sciences, Jilin University, Changchun 130062, China

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Bush lily (*Clivia miniata*) is an important indoor flower. It is the city flower of Changchun City and has important ornamental and medicinal value in China where it is cultivated on an area of 125 hectares. During the summer of 2018, symptoms of a leaf sheath rot disease were observed on bush lily in 103 greenhouses in Changchun City, Jilin Province. The disease incidence ranged from 25 to 60% in 11 surveyed greenhouses. At the early stage, the diseased plants displayed symptoms as initial leaf sheath lesions. Progressively, whole leaves wilted, and even the plant ultimately died. Once a leaf exhibits leaf sheath lesions, the whole plant's ornamental value significantly drops. To identify the pathogen, symptomatic leaves were cut into pieces, surface sterilized, placed on potato dextrose agar (PDA), and incubated for 7 days at 25°C in the dark (Cao et al. 2013). *Fusarium* single-spore isolates were obtained from characteristic colonies (Leslie et al. 2006). Two single-spore isolates were selected for further study. The isolates were identified as *Fusarium* spp. based on microscopic morphology on PDA. *Fusarium*-like colonies were white to slightly yellow with abundant cottony mycelia. Single or two-celled (single septum) microconidia were reniform or oval and 8.0 to 9.6 × 4.0 to 6.0 µm in size. The elongated conidiophores bearing microconidia in monophialides were observed (Summerbell et al. 2002). Macroconidia were abundant, sickle shaped, and 18.8 to 34.8 × 6.4 to 6.8 µm, with one to three septa (Taylor et al. 2019). For molecular identification, five regions of ITS,

EF1-α, RPB1, RPB2, and β-tubulin genes were amplified and sequenced. Sequences of five different regions exhibited at least 97.98% similarity with the corresponding DNA sequences in the *Fusarium solani* species complex (see the supplementary materials for details). The phylogenetic analysis based on the EF1-α, RPB1, RPB2, and β-tubulin region sequences revealed that the isolated strain in this study was clustered with only *F. solani* species in the phylogenetic tree for each region. Based on morphological and molecular analysis, the isolated fungal strains were identified as *F. solani*. Pathogenicity was confirmed by injecting a conidial suspension (10⁶ spores/ml) of the isolated strains into surface-disinfested leaf sheaths of healthy 2-year-old potted plants. As a negative control, four plants were injected with sterilized water. All plants were kept in a greenhouse in controlled conditions: 26°C and 50 to 75% relative humidity. Similar rot symptoms were observed on the leaf sheaths in the inoculated plants 30 days after inoculation whereas the control plants remained asymptomatic. The fungi reisolated from the experimental plants were confirmed to be *F. solani* by morphology and sequence analyses, thus completing Koch's postulates. To the best of our knowledge, this is the first report of *F. solani* causing leaf sheath rot of bush lily in China, where this pathogen has been reported to cause rot diseases of other economically important ornamental plants such as *Phalaenopsis* and *Dendrobium* according to the U.S. National Fungus Collections (Farr and Rossman 2021). In recent years, other *Fusarium* species have been reported to cause rot diseases on bush lily, including *F. proliferatum* and *F. oxysporum* (Farr and Rossman 2021). This study will also provide critical information on the causal agent for growers to implement disease management strategies.

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[†]Indicates the corresponding author.
J. Liu; jliliu@jlu.edu.cn