Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Stemphylium lycopersici* Causing Leaf Spot on *Polygonatum kingianum* in China

Jianxin Chen,¹ Yuqian Wei,¹ Zejia Ly,¹ Qingli Han,¹ Yuan Zheng,² Huancheng Ma,² and Jianrong Wu^{1,2,†}

¹Key Laboratory of Forest Disaster Warning and Control in Universities of Yunnan Province, College of Biodiversity Conservation, Southwest Forestry University, Kunming 650224, China

²Key Laboratory of Biodiversity Conservation in Southwest China, State Forestry Administration, College of Biodiversity Forestry, Southwest Forestry University, Kunming 650224, China

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Polygonatum kingianum, a member of the Asparagus family, is valued in traditional medicine and as a vegetable food crop. In July 2019, more than 50% of *P. kingianum* growth was suppressed in several field nurseries in Simao, Mojiang, Jingdong, and Lancang County, Puer City, China. At the early stage of infection, symptoms manifested as a small circular brown spot. As the lesion matured, the spot gradually enlarged, forming an oval to irregular lesion with reddish-brown and dark green borders. In serious cases, the leaves were withered and became brittle with cracks. The infected plants were collected from six major fields. The tissues of diseased leaves were soaked in 75% ethanol for 10 s, 0.1% mercuric chloride for 2 min, rinsed with sterilized water, and placed on potato dextrose agar (PDA) at 25°C for 7 days. On PDA, four strains were isolated, and the colony was gray to dark yellowish-brown, flocculent, and regular with concentric growth rings. Strain PKLS06 produced a dark red to brown pigment in the agar medium. On lesions, the conidiophores were solitary or in fascicles, straight or slightly curved, brown, with a conical apex, and with three to five septa. The conidiogenous cells were pale brown and swollen at the apex. On PDA, spores were solitary, oblong, bluntly rounded or sometimes with a point at the apex, with two to five transverse septa and one to two longitudinal septa with

contractions at the main transverse septum. Morphological characteristics were consistent with published descriptions of *Stemphylium lycopersici* (Kee et al. 2018; Xie et al. 2019). For molecular identification, the rDNA internal transcribed spacer (ITS) and the glyceraldehyde-3-phosphate dehydrogenase (*gpd*) gene were amplified and sequenced (ITS accession nos. MW243098, MW243099, MW243100, and MW243101; *gpd* accession nos. MW246803, MW246804, MW246805, and MW246806) using published primers (Câmara et al. 2002; White et al. 1990). A phylogenetic tree was developed by maximum parsimony, maximum likelihood, and Bayesian inference. These four isolates fall into the *S. lycopersici* clade with strong support, and all isolates were distinguished clearly from other species. Pathogenicity tests were performed using these four isolates. Each isolate was cultured on PDA and shake-cultured in V8 juice broth (Nasehi et al. 2014). Conidia were resuspended in sterilized water (1×10^6 conidia/ml) and inoculated on intact leaves with the injury of 1-year-old *P. kingianum*. The plants were incubated at 25°C with a 12-h photoperiod and 90% humidity. A small spot began to appear after 3 days, and symptoms were similar to those observed in the nursery after 10 days. Interestingly, the pathogenicity of strain PKLS06 was relatively weaker. Control plants treated with sterile water showed no disease symptoms. Reisolated strains had the same morphological characteristics and the same ITS and *gpd* sequences as the original isolates, thus fulfilling Koch's postulates. *S. lycopersici*, an important pathogen, is widely distributed and can cause a variety of plant diseases. It is noteworthy that the disease was observed on a plant in the Asparagus family, as it expands the host range of *S. lycopersici*, which previously was reported to primarily infect plants in the Solanaceae. Based on the results presented above, *P. kingianum* is a new host plant of *S. lycopersici* in China. This disease is a threat for nursery production of *P. kingianum*, which could lead to a reduction in yields and economic losses.

References:

- Câmara, M. P. S., et al. 2002. Mycologia 94:660.
- Kee, Y. J., et al. 2018. Plant Dis. 102:445.
- Nasehi, A., et al. 2014. Plant Prot. 47:1658.
- White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.
- Xie, X. W., et al. 2019. Can. J. Plant Pathol. 41:124.

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[†]Indicates the corresponding author.
J. Wu; 1176279044@qq.com