Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Colletotrichum fioriniae* Causing Leaf Spot on *Schima superba* in the World

Qing-Hai Wang,^{1,2} Shan-Yi Kuang,² Yong-Chun Zeng,²
Xu-Juan Jiao,³ Yu-Mei Han,⁴ Jun-Wei Wang,⁵ Yi-Ji Peng,¹
Xing-Hong Liu,¹ and Yang Zhang^{2,†}

¹ Shandong Provincial Academy of Forestry, Jinan, Shandong 250014, China

² Key Laboratory of National Forestry and Grassland Administration for the Protection and Restoration of Forest Ecosystem in Poyang Lake Basin, Jiangxi Agricultural University, Nanchang, Jiangxi 330045, China

³ Yantai Forest Resources Monitoring and Protection Service Center, Yantai, Shandong 264001, China

⁴ Heze Bureau of Ecology and Environment, Cao County branch, Heze, Shandong 274417, China

⁵ Kunyushan Forest Farm, Yantai, Shandong 264100, China

Funding: This work was supported by the National Natural Science Foundation of China (31660190), Jiangxi Provincial Department of Science and Technology (20192BAB214019), the Agricultural Major Applied Technology Innovation Project in Shandong Province. Plant Dis. 106:2524, 2022; published online as <https://doi.org/10.1094/PDIS-10-21-2265-PDN>. Accepted for publication 14 February 2022.

Schima superba Gardn. et Champ. is a subtropical evergreen tree species naturally distributed mainly in China, Japan, and Vietnam. It is primarily planted for its timber and urban landscaping in China (Ni 1996). In September 2018, leaves with necrotic spots were observed on *S. superba* in Jiangxi Forest Breeding Center (28°57'19.52" N, 115°39'21.32" E), Jiangxi Province, China. The disease incidence was about 30%. Initially, spots were circular to semicircular, grayish-brown in the center with a dark brown margin, then expanded and eventually collapsed into sunken necrotic lesions. To identify the agent, diseased leaves were collected randomly. Pieces (5 × 5 mm) from the lesion borders were surfaced sterilized in 70% ethanol (30 s) and in 3% NaOCl (60 s) and rinsed three times in sterile water. The pieces were put on potato dextrose agar (PDA) and cultured at 25°C. Pure cultures were obtained by monospore isolation, and three isolates (MH-1, MH-2, MH-3) were used for morphological studies and phylogenetic analyses. On PDA, colonies were initially white and cottony, then became pinkish to deep pink at the center and pink on the reverse. Conidia were fusiform with acute ends, smooth walled, hyaline, and 13.7 to 18.5 × 4.6 to 6.1 µm (16.4 ± 1.3 × 5.3 ± 0.6 µm,

$n = 100$). Conidiophores were colorless to pale brown, smooth, and septate. Conidiogenous cells were colorless to pale brown, smooth, and cylindrical to ampulliform. The morphological characteristics fit the description of *Colletotrichum acutatum* J. H. Simmonds sensu lato (Damm et al. 2012). For accurate identification, genomic DNA of three isolates was extracted, and the internal transcribed spacer (ITS), actin (*ACT*), glyceraldehyde-3-phosphate dehydrogenase (*GAPDH*), beta-tubulin 2 (*TUB2*), and chitin synthase (*CHS-1*) were amplified and sequenced using the corresponding primers (Weir et al. 2012). The sequences were deposited in GenBank (ITS: MZ325946, MZ325947, MW584318; *ACT*: MZ399375, MZ419566, MW661171; *CHS-1*: MZ399376, MZ419567, MW661172; *GAPDH*: MZ399377, MZ419568, MW661173; *TUB2*: MZ399378, MZ419569, MW661174). Five loci were concatenated, and the aligned sequences (1,528 bp) were 99.89% homologous to ex-type *C. fioriniae* (Marcelino & Gouli) R. G. Shivas & Y. P. Tan CBS128517. Phylogenetic analysis using maximum likelihood showed that the isolates were clustered in the *C. fioriniae* clade with 100% bootstrap support. Based on the multilocus phylogeny and morphology, the isolates were identified as *C. fioriniae*. Pathogenicity tests were performed on 36 2-year-old seedlings of *S. superba*. Leaves were wounded slightly and inoculated with a drop of spore suspension (10⁶ conidia/ml). Sterile water was used on controls. All the tested leaves were covered with black plastic bags to keep them moist for 2 days. All seedlings were placed in a greenhouse (25°C, 12 h light/dark) for 10 days, and all inoculated leaves had typical symptoms. The controls were asymptomatic. The same fungus was reisolated from the lesions, fulfilling Koch's postulates. *Colletotrichum fioriniae* was described as a new species from *C. acutatum* s. l. (Shivas et al. 2009), and it was an important pathogen to plants such as *Pyrus* spp. (Pavlović et al. 2019) and *Morus alba* L. (Xue et al. 2019). This is the first report of the newly emerging disease of *S. superba* caused by *C. fioriniae* in the world, and its potential threat should be evaluated in the future. This study provided crucial information for epidemiologic studies and appropriate control strategies.

References:

- Damm, U., et al. 2012. Stud. Mycol. 73:1.
- Ni, J. 1996. J. Plant Resour. Environ. 5:28.
- Pavlović, Ž. M., et al. 2019. Plant Dis. 103:1032.
- Shivas, R., et al. 2009. Fungal Divers. 39:e122.
- Weir, B. S., et al. 2012. Stud. Mycol. 73:115.
- Xue, L. H., et al. 2019. Plant Dis. 103:2624.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: *Colletotrichum acutatum* complex, morphology, multi-gene phylogeny, pathogen identification, systematics

[†]Indicates the corresponding author.
Y. Zhang; zhangyang0558@jxau.edu.cn