Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Colletotrichum fioriniae* Causing Anthracnose on *Paeonia lactiflora* in Korea

Mi-Jeong Park,^{1,†} Ji-Hyun Lee,² Chang-Gi Back,¹ and Jong-Han Park¹

¹ Horticultural and Herbal Crop Environment Division, National Institute of Horticultural and Herbal Science, Rural Development Administration, Wanju 55365, Republic of Korea

² Postharvest Research Division, National Institute of Horticultural and Herbal Science, Rural Development Administration, Wanju 55365, Republic of Korea

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Paeonia lactiflora Pall. (Chinese peony) is an herbaceous perennial cultivated for cut flowers and grown as a garden plant. In Korea, the flower is widely used in bouquets. The root has been used in traditional medicine in East Asia, including Korea, China, and Japan. In mid-April 2019, canker symptoms were first observed on the stems and leaves of *P. lactiflora* ‘Sara’ in 10 farms in Gangjin, southern Korea; disease incidence was ~20 to 30%. The initial symptom was the occurrence of tiny, elliptical to irregular, slightly convex, red-brown spots of 1 to 2 mm. As the disease progressed, the lesions on the stems coalesced to form large sunken necrotic areas, resulting in cankers of 5 to 10 mm. This disease significantly reduced the aesthetic value of cut flowers after harvest. To isolate the causal agent, the infected plant tissues were disinfected with 1% NaOCl and 70% ethanol and then placed on PDA and incubated at 25°C for 7 days. White at first, gradually turning pinkish white to pale gray, cottony colonies were consistently isolated from the lesions. Ten fungal cultures with the same growth pattern were obtained from samples. One representative isolate was selected and deposited in the Korean Agricultural Culture Collection (KACC 48794). Setae were not observed. Appressoria were not produced in the slide culture. The conidia were hyaline, aseptate, and cylindrical, with one round and one slightly acute end, measuring 7.5 to 17.5 × 3.8 to 5 µm. The conidiophores were hyaline, septate, and up to 32.5 µm long. The morphological features of the fungal isolate corresponded with those of *Colletotrichum fioriniae* (Marcelino & Gouli) Pennycook (Damm et al. 2012; Pennycook 2017). For molecular-based identification of the fungus, sequences of seven genes (ITS rDNA, GAPDH, CHS-1, HIS3, ACT, TUB2, and CAL) were amplified by PCR and sequenced,

based on the methods of Damm et al. (2012). The resulting sequences were submitted to GenBank: MN960558 (ITS rDNA), MN974139 (GAPDH), MN974140 (CHS-1), MN974141 (HIS3), MN974142 (ACT), MN974143 (TUB2), and MN974144 (CAL). NCBI BLAST analysis showed that the sequences have 98 to 100% identity with those of *C. fioriniae* CBS 128517 (ex-type culture) in ITS rDNA (MH865005, 585/585 bp), GAPDH (JQ948622, 251/254 bp), CHS-1 (JQ948953, 280/282 bp), HIS3 (JQ949283, 381/386 bp), ACT (JQ949613, 241/243 bp), and TUB2 (JQ949943, 488/491 bp). The pathogenicity test was carried out for the *C. fioriniae* isolate on new green stems and leaves that emerged from 3-year-old roots of Chinese peony planted in pots. Aqueous spore suspension was prepared by inducing the formation of spores after scraping mycelia from 7-day-old PDA cultures with a sterilized blade. The spore suspension was sprayed on the stems. Plants treated with sterilized distilled water were used as controls. Three plants were used per treatment. The inoculated plants were covered with plastic bags to maintain high humidity for 48 h at 25°C. Small reddish brown spots appeared on the stems and leaves of the inoculated plants after 3 days, and they later enlarged to form extensive necrotic areas. The same fungus was reisolated from the lesions on the inoculated plant, fulfilling Koch’s postulates. The control plants showed no symptoms. Pathogenicity was tested twice, and consistent results were obtained. *C. fioriniae* has been reported in >110 plant species worldwide (Farr and Rossman 2020). However, the fungal pathogen is not known to infect any species belonging to the genus *Paeonia* (Farr and Rossman 2020). In Korea, *C. fioriniae* has been recorded as an anthracnose pathogen on *Lycium chinense*, *Prunus persica*, *Prunus salicina*, and *Solanum melongena*. *C. gloeosporioides* has been reported to cause anthracnose on Chinese peony in China (Zhang and Dai 2017). This is the first report of *C. fioriniae* causing anthracnose on *P. lactiflora*. Our study provides a better understanding of the disease on *P. lactiflora* for growers and lays a foundation for future studies on effective management of the disease.

References:

- Damm, U., et al. 2012. Stud. Mycol. 73:1.
 Farr, D. F., and Rossman, A. Y. 2020. Fungal Databases, Syst. Mycol. Microbiol. Lab., ARS, USDA. Retrieved March 10, 2020, from <https://nt.ars-grin.gov/fungaldatabases/>.
 Pennycook, S. R. 2017. Mycotaxon 132:149.
 Zhang, C. Q., and Dai, D. J. 2017. Plant Dis. 101:504.

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[†]Indicates the corresponding author.
 E-mail: mijpark@korea.kr (M.-J.P.)