Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Septoria Blotch of Passion Fruit Caused by *Septoria passifloricola* in Taiwan

Y. L. Dai,¹ C. C. Wang,² H. L. Lin,^{1,3,4} and C. L. Wang^{1,2,4,†}

¹ Master Program for Plant Medicine and Good Agricultural Practice, National Chung Hsing University, Taiwan

² Department of Plant Pathology, National Chung Hsing University, Taiwan

³ Department of Horticulture, National Chung Hsing University, Taiwan

⁴ Innovation and Development Center of Sustainable Agriculture, National Chung Hsing University, Taichung, Taiwan

Funding: Funding was provided by Ministry of Science and Technology, Taiwan (MOST 108-2313-B-005-033) and The Innovation and Development Center of Sustainable Agriculture from The Featured Areas Research Center Program within the framework of the Higher Education Sprout Project by the Ministry of Education (MOE) in Taiwan. Plant Dis. 105:700, 2021; published online as <https://doi.org/10.1094/PDIS-07-20-1571-PDN>. Accepted for publication 14 October 2020.

Passion fruit originated in South America and is cultivated in tropical and subtropical countries for the fresh market and juice processing. In Taiwan, healthy grafted seedlings of passion fruit have been used for replanting every year to minimize the impact of viral and root diseases. The grafted seedlings commonly used are purple passion fruit ‘Tainung NO.1’ (PPF, *Passiflora edulis* × *Passiflora edulis* forma *flavicarpa*) as scion and yellow passion fruit (YPF, *P. edulis* f. *flavicarpa*) as rootstock. In July 2016 and May 2018, a new leaf disease of passion fruit was observed in Taichung City and Nantou County on 2- to 3-month-old grafted passion fruit seedlings. About 17% of seedlings showed symptoms on leaves in a commercial greenhouse nursery. The infected leaves abscised earlier, causing reduced survival of grafted seedlings. The leaf lesions on YPF and PPF were round to irregular and white-grayish or light brown, and they were surrounded by dark green borders and obvious chlorotic halos. Fungal pycnidia were formed in the center of lesions and extruded long yellow-white conidial tendrils under high humidity. The presumed fungal pathogens were obtained by single-spore isolation. Six isolates from the two geographic regions with similar morphological characteristics on potato dextrose agar were obtained. To confirm the pathogenicity, YPF

seedlings were inoculated by dropping 10 µl of a conidial suspension of isolate PLS-S2 (10⁷ conidia/ml) on each inoculation site located on abaxial leaf surfaces that were either intact or wounded to form three pinpricks in a 4-mm area with a sterilized needle. Three plants were used in a treatment, and four leaves of each plant were inoculated. The inoculated plants were kept in plastic bags with high humidity for 3 days and grown in a walk-in growth chamber at 24°C with a 12-h light regime. The initial symptoms were punctate lesions that later enlarged to round, necrotic spots surrounded by yellow halos, which resembled symptoms in commercial greenhouse nurseries. About 44% of inoculation sites (*n* = 48) on intact leaves developed lesions at 28 days postinoculation (dpi), and 100% of inoculation sites (*n* = 72) on wounded leaves showed lesions at 21 dpi. No lesions developed on leaves with the water control. Pathogens reisolated from these lesions were morphologically identical to the inoculated fungus. Conidia were hyaline, filiform to cylindrical with one to three non-constricted septa, and mostly 9 to 30 × 1.0 to 2.3 µm. The morphological characteristics of the isolates were similar to *Septoria passifloricola* Punith (Cline 2006). Molecular identification was based on concatenated sequences of partial TEF1-α gene (accession nos. MK643056 to MK643061) and β-tubulin gene (accession nos. MK643050 to MK643055) for each of the six isolates. The BLAST search revealed that strain PLS-S2 was 100.0% identical (392 bp) to *S. passifloricola* CBS 129431 for the TEF1-α gene (KF253443.1) and 98.4% identical (311 bp) for the β-tubulin gene (KF252964.1). Phylogenetic analysis showed that PLS-S2 and five additional isolates clustered with reference strains of *S. passifloricola* (Verkley et al. 2013) in a well-supported clade (95% bootstrap value). Results suggested that the leaf disease of passion fruit in Taiwan was caused by *S. passifloricola*. This disease has been reported in Africa, India, Australia, New Zealand, the Caribbean, and South America (Cline 2006; Ploetz et al. 2003). If appropriate control actions are not taken, the disease may become a major leaf disease in nurseries in Taiwan.

References:

- Cline, E. 2006. Nomenclature fact sheets. ARS, USDA. <https://nt.ars-grin.gov/sbmlweb/fungi/nomensheets.cfm>
- Ploetz, R. C., et al. 2003. Page 413 in: Disease of Tropical Fruit Crops. CABI Publishing, Wallingford, U.K.
- Verkley, G. J. M., et al. 2013. Stud. Mycol. 75:213.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: passion fruit, Taiwan, *Septoria passifloricola*

[†]Indicates the corresponding author.

E-mail: C. L. Wang; clwang@nchu.edu.tw