Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Alternaria longipes* Causing Leaf Spot on Tea in China

Q. X. Yin, X. L. An, X. Wu, D. S. P. Dharmasena, D. X. Li, S. L. Jiang, Y. Wang, D. L. Wang, and Z. Chen[†]

Key Laboratory of Green Pesticide and Agricultural Bioengineering, Ministry of Education, Guizhou University, Guiyang, Guizhou, China

Funding: Funding was provided by National Key Research Development Program of China (2017YFD0200308) and its Post-subsidy project (2018-5262) and the National Natural Science Foundation of China (No. 21977023). Plant Dis. 105:4167, 2021; published online as <https://doi.org/10.1094/PDIS-07-20-1583-PDN>. Accepted for publication 3 June 2021.

Tea (*Camellia sinensis* [L.] O. Kuntze) has been widely planted in Guizhou Province in recent years, and the cultivation area in the region ranks first among all the provinces or cities in China. Leaf spot was an important disease of tea in Kaiyang county, Guizhou Province, which mainly damaged young leaves and shoots of tea and led to a huge loss of the production of tea. The spots initially presented as brown and round, and then the diameter of the spot was 4 to 6 mm during the later period, with the color of the center in the spot changing to white. Tea leaf spot always occurs in early spring in the region with 1,300 m altitude. From 2016 to 2019, disease incidence of leaves was estimated at 84 to 92%, and the disease severity on a plant basis was determined to be 64 to 76, depending on the field. To identify the causal agent of the foliar disease, pieces of the lesion margins were surface sterilized with 75% ethanol for 30 s, followed by 0.5% sodium hypochlorite for 5 min, rinsed with sterile water three times, placed on potato dextrose agar (PDA), and incubated in the dark at 25°C for 3 to 5 days. Hyphal tips from the margins of the growing colonies were successively picked and transferred to fresh PDA plates to purify the isolates. The result indicated that the isolates on PDA presented as initially round in form, with white mycelium. The reverse sides of the isolates first appeared light yellow on PDA. Conidiophores were dark brown, geniculate. Brown conidia, narrow

ovoid, 22.9 ± 4.5 μm long, 11.1 ± 1.7 μm wide, with four to eight transverse septa and with conspicuously ornamented walls. The gene of *glyceraldehyde-3-phosphate dehydrogenase* (*GAPDH*) (Berbee et al. 1999) and the *Alternaria allergen 1* (*Alt a 1*) (Hong et al. 2005) of three strains were amplified, sequenced, and deposited in GenBank. Maximum parsimony phylogenetic analysis based on concatenated sequences of combined *GAPDH* (1 to 583) and *Alt a 1* (588 to 1,065) indicated that the strain AXLKY_2019_010 was identical to reference *Alternaria longipes* strain EGS 30-033, and the clade was supported by 96% bootstrap values. According to Koch's postulates, the tea leaves were inoculated with PDA plugs with actively growing mycelia using the methods of puncture, cut, and unwounded under laboratory conditions and natural conditions. Slight yellow spots were gradually formed after 2 days postinoculation on the inoculated leaves, and the color of the center of the spot changed to be white. With the prolonging of inoculation time, the size of the lesion became slightly enlarged. PDA plugs without mycelia were used as a control, and the control group showed no symptoms. The same isolates were consistently reisolated from inoculated leaves. *A. longipes* can cause leaf blight of carrots in Israel (Vintal et al. 2002), leaf spot of potato in Pakistan (Shoaib et al. 2014), and leaf spot of *Atractylodes macrocephala* in China (Tan et al. 2012). To our knowledge, this is the first report of *A. longipes* causing leaf spot on tea in China, and our findings will be useful for its management and for further research.

References:

- Berbee, M. L., et al. 1999. Mycologia 91:964.
- Hong, S. G., et al. 2005. Fungal Genet. Biol. 42:119.
- Shoaib, A., et al. 2014. Plant Dis. 98:1742.
- Tan, G. Y., et al. 2012. Plant Dis. 96:588.
- Vintal, H., et al. 2002. Plant Dis. 86:186.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: *Camellia sinensis*, *Alternaria longipes*, morphological characterization, multi-locus sequences analyses, pathogenicity

[†]Indicates the corresponding author.
Z. Chen; gychenzhuo@aliyun.com