Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Alternaria alternata* Causing Leaf Spot on Kidney Bean in China

YaZhong Jin,^{1,2} YaNan Xiong,¹ ChangJian Xu,³ JinLi Ren,¹ YongXia Guo,^{2,3,4,†} YuHu Zuo,^{2,3,4,†} YouLi Zhang,^{2,3,†} and XueQing Geng^{5,†}

¹ College of Horticulture and Landscape Architecture, Heilongjiang Bayi Agricultural University, Daqing, Heilongjiang, China

² National Coarse Cereals Engineering Research Center, Daqing Heilongjiang, China

³ College of Agronomy, Heilongjiang Bayi Agricultural University, Daqing Heilongjiang, China

⁴ Heilongjiang Provincial Key Laboratory of Crop Pest Interaction Biology and Ecological Control, Daqing Heilongjiang, China

⁵ School of Agriculture and Biology, Shanghai Jiao Tong University, Shanghai, China

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Kidney bean (*Phaseolus vulgaris* L.), also known as common bean, dry bean, or French bean, is one of the most valuable and highly nutritious legume crops cultivated and consumed worldwide (Blair et al. 2012; Choudhary et al. 2018). It is an important edible food and one of the most economically important vegetable crops in China. It is widely grown in Heilongjiang Province in China. In July 2020, leaf spot symptoms were found on old and new leaves of kidney bean plants in experimental fields in Zhaozhou County (N45°42′ 20.16″, E125°15′ 58.63″), Daqing City, Heilongjiang Province, China. The field had a disease incidence of approximately 20%. The leaf spot is conducive to onset at high temperatures and humidity, and spreads very quickly after rainy days, so it potentially is a large risk to the development of the kidney bean industry. In its early occurrence phase, infected leaves showed a yellowish halo in which the middle mesophyll lost its green color. Then, the yellow halo turned brown, and the middle leaf tissue of the halo appeared brown; ultimately the whole leaf had many brown spots. To isolate the pathogen, diseased tissue (5 × 5 mm) was

excised from the margins of individual lesions from the leaves of diseased plants with typical symptoms, and was disinfected with 75% ethanol for 10 s followed by 2% NaClO for 3 min and then washed five to eight times with sterile water. Then, the samples were transferred to potato dextrose agar (PDA) plates and incubated. After 5 to 7 days of incubation at 25°C (Wei et al. 2018), the mycelia were dark green with white margins in obverse and dark in reverse. Conidiophores were light brown with 2 to 4 septa and obclavate, 17.5 to 44.0 × 6.5 to 14.5 μm, with a short beak, and with 1 to 5 transverse septa and 0 to 2 longitudinal septa, light brown to olive-brown. Based on morphological features and the sporulation pattern, the pathogen had characteristics similar to those described for *Alternaria alternata* (Fr.) Keissl. (Zhou et al. 2014), being identified as *A. alternata*. To confirm pathogenicity, the isolates were cultured on PCA for 7 days to prepare conidial suspensions with a final concentration of 1 × 10⁸ spores/ml. Five potted kidney bean plants were sprayed with conidial suspensions, and five control potted plants were sprayed with sterile distilled water, in which these potted kidney bean plants were treated after wiping each leaf surface with 75% ethanol and washing each leaf with sterilized distilled water five times. These plants were incubated in an artificial growth chamber at 26 to 28°C with a 12 h light/dark photoperiod, with 85% relative humidity. After 3 days, yellowish halo lesions appeared on the inoculated plants, and pale lesions with distinct dark brownish red borders on kidney bean leaves were observed after 8 days, but no lesions were observed on the control leaves. Pathogenicity tests were repeated three times. The internal transcribed spacer (ITS) region of rDNA was amplified and sequenced with primers ITS1/ITS4. BLAST analysis of the sequences showed 100% sequence identity with a pathogenic *A. alternata*, and the nucleotide sequence of the ITS region was submitted to GenBank under accession MZ951052. In China, there are no detailed records about the causal agent of this disease on kidney bean in a paper in Chinese. To our knowledge, this is the first confirmed report of leaf spot caused by *A. alternata* on kidney bean in China.

References:

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[†]Indicates the corresponding authors.

Y. Gu; gyxia@163.com, Y. Zuo; zuoyhu@163.com,

Y. Zhang; 441722471@qq.com, and X. Geng; xqgeng@sjtu.edu.cn