Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Powdery Mildew Caused by *Erysiphe astragali* on *Gueldenstaedtia stenophylla* in China

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Gueldenstaedtia stenophylla is a traditional Chinese medicinal plant with great commercial value. It contains heat-clearing and detoxifying ingredients and is used to treat various forms of inflammation, such as festering inflammation, carbuncles, malignant boils, and diarrhea (Li et al. 2008; Wang et al. 2012; Wei et al. 2007; Yin et al. 2015). During September and October 2017, powdery mildew symptoms were observed on *G. stenophylla* in Baishi Mountain (37°46'N; 127°27'E) in Baoding city, Hebei province, China. Based on our investigation, the disease incidence was 20 to 30%. Powdery mildew appeared as small white colonies on leaves and petioles. The small colonies coalesced to form large colonies with abundant sporulation on abaxial leaf surfaces. Conidiophores were 76.5 to 114.1 µm (average 97.6 µm, $n = 100$) long, contained one foot cell followed by two cells and one conidium, and were produced by superficial hyphae. Conidia were 33.3 to 50.7 × 8.4 to 11.6 µm (average 46.7 × 9.8 µm, $n = 100$), hyaline, single, cylindrical to ovoid, and lacked fibrosin bodies. The germ tube emerged from the lateral sides or apex of germinating conidia. No cleistothecia were found. To confirm the morphological identification, the internal transcribed spacer (ITS) region and the 28S ribosomal RNA (rRNA) gene fragment were amplified by primers ITS1/ITS4 (ITS1, 5'-TCCGTAGGTGAACCTGCGG-3'; ITS4, 5'-TCCTCCGCTTATTGATATGC-3') and NL1/NL4 (NL1, 5'-

GCATATCAATAAGCGGAGGAAAAG-3'; NL4, 5'-GGTCCGTGTTTCAA GACGG-3') (Kageyama et al. 1997; Mitchell et al. 1994; Novicki et al. 2003) and generated sequences of 647 bp (GenBank accession no. MK473380) and 631 bp (MN710415), respectively. NCBI BLAST analysis showed that the ITS sequence had 99% similarity to that of *Erysiphe astragali* isolates from *Astragalus* sp. in Ukraine and Iran (LC010055 and AB104515) (Kowsar et al. 2014), and the 28S ribosomal RNA (rRNA) sequence showed 99% similarity with those of *E. astragali* (GenBank nos. LC010052.1, LC010055.1, and LC010028.1), confirming the identity of the pathogen. To complete Koch's postulates, spore suspensions (1×10^5 conidia/ml) made from the fungi on diseased plants with abundant sporulation were inoculated to eight healthy plant leaves by spraying, and five water-inoculated plants were controls. All plants were placed in a greenhouse with 16 to 22°C temperature and 50 to 60% relative humidity. Each treatment was performed with two independent replicates. Typical powdery mildew colonies developed on inoculated plants 7 to 15 days postinoculation, which were morphologically identical to those originally observed on the diseased plants, whereas the control plants remained symptomless. *E. astragali* has been recorded on *Astragalus* sp. (Papilionoideae) in many European countries, including Switzerland, France, Belarus, Russia (Rostov), and the United Kingdom (Braun et al. 2000; Jones et al. 2007), indicating that *E. astragali* is a common threat to *Astragalus* sp. in Europe. To the best of our knowledge, this is the first report of powdery mildew on *G. stenophylla* (Papilionoideae) caused by *E. astragali*. This study extends the host range of *E. astragali*. Voucher specimens are available at the Henan Key Laboratory of Crop Molecular Breeding and Bioreactor, Zhoukou, China.

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The author(s) declare no conflict of interest.

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