Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Powdery Mildew Caused by *Blumeria graminis* f. sp. *bromi* on *Bromus catharticus* in China

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Bromus catharticus, rescuegrass, is a brome grass that has been cultivated for herbage production and has been widely naturalized in many provinces of China, including Henan province. During April and May 2020, powdery mildew was found on leaves of *Br. catharticus* on the campus of Henan Normal University, Xinxiang city (35.3°N; 113.9°E), Henan Province, China. Abundant white or grayish irregular or coalesced circular powdery colonies were scattered on the adaxial surface of leaves, and 70% of the leaf areas were affected. Some of the infected leaves were either chlorotic or senescent. About 60% of the observed plants showed powdery mildew symptoms. Conidiophores ($n = 25$) were $32 \times 45 \times 7$ to $15 \mu\text{m}$ and composed of foot cells and conidia (mostly six conidia) in chains. Conidia ($n = 50$) were 25 to 35×10 to $15 \mu\text{m}$, on average $30 \times 13 \mu\text{m}$, with a length/width ratio of 2.3. Chasmothecia were not found. Based on these morphologic characteristics, the pathogen was initially identified as *Blumeria graminis* f. sp. *bromi* (Braun and Cook 2012; Troch et al. 2014). *B. graminis* mycelia and conidia were collected, and total genomic DNA was extracted (Zhu et al. 2019). The rDNA internal transcribed spacer (ITS) region was amplified with primer

pairs ITS1/ITS4. The amplicon was cloned and sequenced. The sequence (574 bp) was deposited into GenBank under accession number MT892940. BLASTn analysis revealed that MT892940 was 100% identical to *B. graminis* f. sp. *bromi* on *Br. catharticus* (AB000935, 550 of 550 nucleotides) (Takamatsu et al. 1998). Phylogenetic analysis of MT892940 and ITS of other *B. graminis* ff. spp. clearly indicated least two phylogenetically distinct clades of *B. graminis* f. sp. *bromi* and that MT892940 clustered with the Takamatsu vouchers. Leaf surfaces of five healthy plants were fixed at the base of a settling tower and then inoculated by blowing conidia from diseased leaves using pressurized air. Five noninoculated plants served as controls. The inoculated and noninoculated plants were maintained separately in two growth chambers (humidity, 60%; light/dark, 16 h/8 h; temperature, 18°C). Thirteen to 15 days after inoculation, *B. graminis* signs and symptoms were visible on inoculated leaves, whereas control plants remained asymptomatic. The pathogenicity assays were repeated twice with the same results. The observed signs and symptoms were morphologically identical to those of the originally infected leaves. Accordingly, the causal organism of the powdery mildew was confirmed as *B. graminis* f. sp. *bromi* by morphological characteristics and ITS sequence data. *B. graminis* has been reported on *Br. catharticus* in the United States (Klingeman et al. 2018), Japan (Inuma et al. 2007), and Argentina (Delhey et al. 2003). To our best knowledge, this is the first report of *B. graminis* on *Br. catharticus* in China. Because hybridization of *B. graminis* ff. spp. is a mechanism of adaptation to new hosts, *Br. catharticus* may serve as a primary inoculum reservoir of *B. graminis* to infect other species (Menardo et al. 2016). This report provides fundamental information for the powdery mildew that can be used to develop control management of the disease in *Br. catharticus* herbage production.

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