Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Powdery Mildew Caused by *Golovinomyces ambrosiae* on *Bidens pilosa* in China

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Bidens pilosa L. (Spanish needle) is a wild, flowering plant of Asteraceae, that is grown in gardens, fields, roadsides, and riverbanks in Fuzhou, China. It is also used in traditional folk medicine for a broad range of ailments in China. In March 2019 and 2020, hundreds of *B. pilosa* growing along the roadsides and gardens in the districts of Minhou and Jinshan were observed to be severely affected by a powdery mildew with approximately 80% disease incidence. Symptoms appeared as circular to irregular small white, powdery patches, typically on the adaxial sides of leaves, and progressed to coalescent colonies on the leaves. As the disease developed, the infected leaves became wilted and senesced. Mycelia on leaves were superficial, and solitary appressoria were slightly to distinctly nipple-shaped. Conidiophores were erect, 120 to 230 × 10 to 12 μm, and produced two to five conidia in chains with a sinuate outline. Foot cells were erect, cylindrical, and 60 to 110 μm long. Conidia were hyaline, ellipsoid to barrel-shaped, 26 to 40 × 18 to 24 μm, and devoid of distinct fibrosin bodies. Germ tubes were long and produced at the perihilar position of the conidia. No chasmothecia were observed. Morphological characteristics overlapped with *Golovinomyces ambrosiae*, *G. cichoracearum*, and *G. spadiceus* (Braun and Cook 2012) on hosts within the Asteraceae tribe Heliantheae (Takamatsu et al. 2013). For molecular identification, ITS and IGS regions as well as partial LSU of two representative collections (MJU-IM019 and MJU-IM020) were amplified

using ITS1/ITS4, IGS-12a/NS1R, and LSU1/LSU2 primers (Carbone and Kohn 1999; Scholin et al. 1994; White et al. 1990), respectively. The resulting sequences were deposited in GenBank (ITS: MW965777, MW965778; LSU: MW965787, MW965788; IGS: MW981256, MW981257). A BLAST search revealed 99 to 100% sequence similarity to *G. ambrosiae* sequences (KX987303, AB769421, AB077689, AB769426, AB077643, and AB769425). Phylogenetic analysis of ITS, LSU, and IGS also grouped obtained sequences within the *G. ambrosiae* complex (Qiu et al. 2020). Pathogenicity was confirmed through inoculation by gently pressing infected leaves onto leaves of five healthy, potted, young *B. pilosa* plants, and five noninoculated plants served as controls. All plants were maintained in a greenhouse at 25 ± 2°C. Inoculated plants developed symptoms after 7 to 10 days, whereas the control plants remained symptomless. The morphology of the resulting fungus on inoculated plants was identical to that originally observed on diseased plants. *Podosphaera* spp. have been reported on *B. pilosa* (Farr and Rossman 2021) from North America, Africa, and Asia. To our knowledge, this is the first report of powdery mildew caused by *G. ambrosiae* on *B. pilosa* in China and Asia. Wild populations of *B. pilosa* may be the primary source of powdery mildew inoculum for commercial Asteraceae members and may warrant consideration in the control of this disease.

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