Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Powdery Mildew Caused by *Podosphaera xanthii* on *Ixeris denticulata* in China

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Ixeris denticulata (Houtt.) Stebb is an annual herbaceous plant in the family of Asteraceae, which is native to Europe or central Asia. This plant is widely distributed in China and is commonly used for edible and medicinal purposes. In February 2019, typical symptoms of powdery mildew were observed on 70% of *I. denticulata* plants on the campus of Hainan University (20°3'25" N; 110°19'4" E) in Haikou, Hainan Province, China. White, superficial mycelia and conidia covered the leaf surfaces of affected plants, resulting in leaf curling, discoloration, and defoliation. Hyphal appressoria were nipple-shaped and solitary. Conidiophores were straight, cylindrical, 109 to 259 × 9 to 16 µm ($n = 50$), and produced three to five immature conidia in chains with a crenate outline. Foot cells were cylindrical, straight or sometimes constricted at the basal septum, and 30 to 62 µm long ($n = 100$). Conidia were ellipsoid-ovoid to doliform, 23 to 33 × 15 to 23 µm ($n = 100$), with a length/width ratio of 1.1 to 1.9, with well-developed fibrosin bodies, and produced germ tubes from the lateral position. Based on these morphological characteristics, this pathogen was provisionally identified as *Podosphaera xanthii* (Braun and Cook 2012). The teleomorph was not detected. A specimen was deposited in the Hainan University Plant Pathology Herbarium as HNID-18. To confirm identification, genomic DNA was extracted from mycelium and conidia collected

from a single leaf using a fungal DNA kit (Omega Bio-Tek, U.S.A.). The rDNA internal transcribed spacer (ITS) region and 28S rDNA were amplified with the primer pairs ITS1 and ITS4 (White et al. 1990) and sequenced directly. The resulting 577-bp sequence was deposited in GenBank (accession no. MT739423). The GenBank BLAST analysis of the ITS sequence showed 100% similarity with *P. xanthii* on *Bidens* sp. from Thailand (LC270780), as well as with *P. xanthii* from *Eclipta prostrata* (MT260063) and *Cyanthillium cinereum* (MN203658) from China. Additionally, the 28S rDNA region was amplified using the primer pairs NL1 and NL4 (O'Donnell 1993, accession no. MT739424). The amplicon was sequenced in both directions and shared 100% similarity with *P. xanthii* (MK357436, LC371333, and MH137264). To fulfill Koch's postulates, five healthy potted plants of *I. denticulata* were inoculated by gently pressing a powdery mildew-infected leaf onto 15 young leaves. Five noninoculated plants served as controls. All plants were maintained in a greenhouse at 24 to 30°C, 70% relative humidity, and a 16-h photoperiod. After 7 days, inoculated leaves showed signs and symptoms of powdery mildew, whereas no signs or symptoms were observed on the control plants. The fungus observed on the inoculated plants was identical morphologically to that on the originally infected leaves. Powdery mildew of *I. chinensis* caused by *Golovinomyces sonchicola* has been reported previously from Korea (Choi et al. 2014). Recently, *P. xanthii* was also shown to infect *Ixeridium dentatum* in Korea (Lee and Nguyen 2019). To our knowledge, this is the first record of *P. xanthii* infecting *I. denticulata* in China. We are concerned that the pathogen will cause severe damage and affect the yield and quality of the host, and even pose a threat to *I. denticulata* in the future.

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