Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Podosphaera aphanis* Causing Powdery Mildew on Wild Blackberry Species (*Rubus* Species) in Mexico

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Funding: This research was financially supported by the Secretary of Research and Graduate of the National Polytechnic Institute (Instituto Politécnico Nacional), project SIP20201117. Plant Dis. 106:1749, 2022; published online as <https://doi.org/10.1094/PDIS-05-21-0932-PDN>. Accepted for publication 18 July 2021.

Wild blackberry species (*Rubus* spp. L.; Rosaceae) represents an invaluable source of genes for the generation of new varieties, but they also serve as a primary source of disease inoculum. During April of 2020, symptoms of powdery mildew were observed on four populations of wild blackberry species located in the states of Chiapas (16°59'11"N, 92°59'07"W; 16°47'08"N, 92°31'05"W) and Michoacán (19°37'17"N, 100°08'59"W; 19°29'25"N, 101°32'54"W), Mexico. Signs of the pathogen were white powdery masses mainly on the top of new shoots. Symptoms included yellowing, necrosis, and early defoliation of the plants. Hyphae were thin-walled, hyaline, smooth, and 4.0 to 9.0 mm wide. Appressoria were indistinct to nipple-shaped. Conidiophores ($n = 30$, 75 to 225 $\times$ 10.5 to 13.5 μ m) were straight and unbranched with cylindrical foot cells ($n = 30$, 31.5 to 158 $\times$ 8 to 13.5 μ m), straight, somewhat widening upwards, followed by one to three shorter cells. Conidia ($n = 100$; 25.5 to 38.5 $\times$ 9.5 to 22.5 μ m) were catenulate, ellipsoid-ovoid to doliform, containing fibrosin bodies (in 3% KOH). Germ tubes ($n = 30$, 13.5 to 40.5 $\times$ 4.5 μ m) emerged laterally and were unbranched with

slightly swollen tips. Chasmothecia were not found. Morphological characters of the fungus in all samples corresponded to the previous descriptions of *Podosphaera aphanis* by Braun and Cook (2012) and Stevanović et al. (2021). Voucher specimens were deposited in the Department of Agricultural Parasitology Herbarium at the Chapingo Autonomous University under accessions UACH421, UACH423, UACH425, and UACH426. To confirm the species identification, the internal transcribed spacer of one sample was amplified using the primers ITS5 (White et al. 1990) and P3 (Kusaba and Tsuge 1995) and sequenced. The sequence was deposited in GenBank (accession no. MW988591). A phylogenetic analysis using Bayesian inference and maximum likelihood was performed (Hernández-Restrepo et al. 2018) and included other *Podosphaera* species (Takamatsu et al. 2010). The sequence from the isolate UACH426 clustered with the strain MUMH1871 of *P. aphanis*, forming a definite clade, and remained as a sister taxon of *P. pannosa*. Pathogenicity was verified through inoculation by gently dusting conidia from one powdery mildew patch onto leaves of five healthy blackberry plants of each species. The same number of noninoculated plants served as controls. All plants were maintained in a greenhouse at 25 to 30°C with 75% relative humidity. All inoculated plants developed powdery mildew symptoms after 12 days, whereas no symptoms were observed on noninoculated plants. The fungus recovered from the inoculated plants was morphologically identical to that originally observed on diseased blackberry plants, demonstrating the pathogenicity of the fungus. Based on morphological data and phylogenetic analysis, the fungus was identified as *P. aphanis*. This fungus has been reported to cause powdery mildew on blackberry plants in Serbia (Stevanović et al. 2021). This is the first report of *P. aphanis* causing powdery mildew on wild blackberry species in Mexico according to Farr and Rossman (2021). The primary source of inoculum of powdery mildew for commercial plantings is wild blackberry plants from non-cultivated areas and may warrant control of wild populations.

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The author(s) declare no conflict of interest.

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Keywords: fungi, fruit, small fruits, pathogen detection

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