Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Powdery Mildew on *Leucophyllum frutescens* Caused by *Podosphaera xanthii* in Mexico

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Funding: This research was financially supported by the National Council of Science and Technology of Mexico (CONACYT), project INFRA-2019-302117, and the Autonomous University of the West (UAdeO), project PIFIP-2019. Plant Dis. 105:706, 2021; published online as <https://doi.org/10.1094/PDIS-06-20-1368-PDN>. Accepted for publication 1 October 2020.

Leucophyllum frutescens (Scrophulariaceae family), commonly known as Texas sage or cenizo, is an evergreen shrub native to southwestern United States and northern Mexico. This plant is commercially sold as a native, drought-tolerant ornamental. During the spring of 2019 and 2020, typical symptoms of powdery mildew were found on cenizo plants growing as ornamentals in urban areas in the municipality of Ahome, Sinaloa, Mexico. Disease incidence was 95% from a sampled population of 120 plants. Initial symptoms of powdery mildew developed as irregular white colonies on upper leaf surfaces, which expanded as infections progressed. In severe infections, leaves became distorted, exhibiting premature defoliation. Microscopic examination showed nipple-shaped appressoria. Conidiophores ($n = 30$) were hyaline, cylindrical, erect, 89.4 to 134.2 μm long, and forming catenulent conidia. Foot cells were cylindrical, 35.7 to 65.3×10.2 to 13.5 μm , followed by one to three shorter cells. Conidia ($n = 100$) were hyaline, ellipsoid to ovoid, 27.9 to 40.5×13.8 to 18.9 μm , containing distinct fibrosin bodies. Germ tubes were simple to forked and laterally produced from the middle of conidia. Chasmothecia were not

found during the sampling period on the infected leaves. Based on morphological characteristics, the fungus was identified as *Podosphaera xanthii* (Braun and Cook 2012). A voucher specimen (accession no. FAVF219) was deposited in the Herbarium of the Faculty of Agronomy of El Fuerte Valley at the Autonomous University of Sinaloa (Juan Jose Rios, Sinaloa, Mexico). To further confirm the identification, total DNA was extracted, and the internal transcribed spacer (ITS) region was amplified by PCR using the primers ITS5/ITS4 (White et al. 1990) and sequenced. The resulting 503-bp sequence (GenBank accession no. MT624793) had 100% coverage and 100% identity to those of *P. xanthii* (MT568609 to MT568611, MT472035, MT309699, MT250855, and MT242593). A phylogenetic tree using the maximum parsimony and maximum likelihood methods and including published ITS sequences for *Podosphaera* species was obtained. Phylogenetic analyses revealed that the ITS sequence from isolate FAVF219 was grouped into a clade with *P. xanthii*. Pathogenicity was demonstrated by gently dusting conidia from infected leaves onto 50 leaves of five healthy plants. Five noninoculated plants served as controls. All plants were covered with polyethylene bags for 48 h to maintain high humidity and were maintained in a greenhouse at temperatures ranging from 20 to 35°C. All inoculated plants developed similar symptoms to the original observations after 19 days, whereas no symptoms of powdery mildew were observed on control plants. The fungus present on the inoculated plants was morphologically identical to that originally observed on diseased plants, fulfilling Koch's postulates. This fungus has been reported infecting members of the Cucurbitaceae in Mexico (Farr and Rossman 2020; Félix-Gastélum et al. 2017). However, to our knowledge, this is the first report of *P. xanthii* causing powdery mildew on a member of Scrophulariaceae, specifically *L. frutescens*, in Mexico and worldwide. Further studies for monitoring and control strategies of powdery mildew on Texas sage are required.

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The author(s) declare no conflict of interest.

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Keywords: Erysiphales, pathogenicity, morphology, phylogeny

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