

Disease Notes

Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Powdery Mildew Caused by *Podosphaera xanthii* on the Invasive *Verbena brasiliensis* in Texas

N. C. Luecke,[†] T. Adams, and K. M. Crawford

Department of Biology and Biochemistry, University of Houston, Houston, TX 77204

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Brazilian verbena (*Verbena brasiliensis*, family Lamiaceae) is a highly invasive plant found throughout the southern portion of the United States. As suggested by its name, it originates in South America but has prospered in the United States due to its highly ruderal growing pattern and its ability to tolerate drought and disturbance. During the summer of 2019, 64 *V. brasiliensis* plants were growing in the University of Houston's temperature-controlled greenhouse (Houston, TX). Eight plants exhibited symptoms of powdery mildew infection on the stems and adaxial surface of the leaves. White circular powdery colonies with high numbers of aerially dispersing spores were observed on leaves, seemingly uncorrelated with leaf age. Upon examination, chlorosis of leaf tissue was detected in areas of infection. Conidiophores ($n = 25$) were on average 210 μm in length and produced six to nine conidia in true chains. Base cells of conidiophores branched from hyphae forming right angles and averaged 35 μm long at the base. Conidia were hyaline, ovate, and measured 28 to 31 \times 19 to 21 μm . These structures are typical of the powdery mildew oidium anamorph of the genus *Podosphaera*. No chasmothecia were observed within colonies. The morphological characteristics and measurements were consistent with those of *Podosphaera xanthii* (Braun and Takamatsu 2000). Pathogenicity was confirmed by gently rubbing symptomatic *V. brasiliensis* leaves onto healthy leaves of *V. brasiliensis* plants (Lee 2013). Fifteen plants were inoculated, and five remained uninoculated to serve as negative controls. Inoculated plants developed powdery mildew symptoms between 6 and 12 days (averaging 10 days), whereas all controls remained disease-free.

DNA was extracted from fungal tissue from the original plant, inoculum sample, and the newly infected leaves. The internal transcribed region was amplified using the ITS1f and ITS4 primers (White et al. 1990). Three samples (one from the original plant, the inoculum, and the reisolated fungi) were sequenced and identified using NCBI BLAST, and the resulting sequences were deposited in GenBank (MN818562, [inoculum], MN818563 [reisolate], and MN818564 [original]). All three sequences had 98.7% similarity to the *P. xanthii* on Brazilian verbena reported in South Korea (accession no. KJ472787) (Cho et al. 2014). All three samples were amplified using the mating-type primer sets and PCR protocol described in Brewer et al. (2011). All three samples were determined to be MAT1-1-1 based on positive and negative control used for MAT1-1-1 and MAT1-2-1. Positive controls included DNA from confirmed isolates from MAT1-1-1 and MAT1-2-1, and negative controls were sterile water. *P. xanthii*, a common powdery mildew species, has been reported on a large range of important agricultural hosts, especially cucurbits (McCreight 2006). This is the first formal report of *P. xanthii* in Texas as well as the first report on Brazilian verbena in the United States. Although we did not explicitly measure the pathogen's effect on host fitness, infection may result in a reduction in the plant's invasiveness. Because Texas is a large producer of cucurbits, this pathogen could impact agriculture in the state. Given the invasive nature of *V. brasiliensis* in areas of high disturbance, such as agricultural fields and restored prairies, this discovery has broad importance for both agriculture and the ecological conservation of native species.

References:

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[†]Indicates the corresponding author.

E-mail: ncluecke@central.uh.edu (N.C.L.)