



First report of powdery mildew caused by *Erysiphe pisi* on *Parkinsonia aculeata* in Mexico

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During February of 2022, symptoms of powdery mildew were found on 14% of 179 samples of mexican palo verde plants (*Parkinsonia aculeata*) in Ahome, Sinaloa, Mexico. White fungal colonies were observed on both sides of infected leaves. Hyphal appressoria were slightly to multi-lobed. Conidiophores were erect and cylindrical. Foot-cells were cylindrical, straight to somewhat curved measuring 16.5–41 × 5.5–8.5 µm, followed by 1–2 shorter cells. Conidia were ellipsoid-cylindrical, measuring 26–41 × 12–18 µm. Chasmothecia were not observed. The morphology of the fungi was consistent with those of *Erysiphe pisi* (Schmidt and Braun 2020). A voucher specimen (accession no. FAVF651) was deposited at the Faculty of Agriculture of the Autonomous University of Sinaloa (Mexico). The internal transcribed spacer (ITS) region, and part of the 28 S (LSU) region were amplified using the primers PM5/ITS4 and NL1/TW14 (Mori et al. 2000), respectively. The sequences were deposited in GenBank under accession numbers ON314580 and ON314806. Sequences comparisons in the GenBank showed 99% identity with sequences of *E. pisi* (ITS; LC009890) and *E. trifoliorum* (LSU; MT380914). A concatenated phylogenetic analysis using Maximum Likelihood confirmed the identity of isolate FAVF651 as *E. pisi*. Pathogenicity was demonstrated by gently dusting conidia from infected leaves onto leaves of 20 healthy mexican palo verde plants. Ten non-inoculated

plants served as controls. Inoculated and non-inoculated plants were separated and maintained in a greenhouse at 25–35 °C. After 12 days, all inoculated plants developed the same powdery mildew symptoms observed in natural infections, but none of the control. *Erysiphe pisi* was recovered from inoculated plants, thus fulfilling Koch's postulates. *Erysiphe* sp. has been recorded on *P. aculeata* in Florida and California, USA (Farr and Rossman 2022); however, this is the first report of *E. pisi* causing powdery mildew on *P. aculeata* in Mexico and worldwide.

Data Availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Compliance with ethical standards

Conflict of interest All authors declare no conflict of interest.

Human and animals rights No human or animal was involved in this research by the authors.

References

- Farr DF, Rossman AY (2022) Fungal Databases, Syst. Mycol. Microbiol. Lab., Online publication. ARS, USDA. Retrieved May 25, 2022
- Mori Y, Sato Y, Takamatsu S (2000) Evolutionary analysis of the powdery mildew fungi using nucleotide sequences of the nuclear ribosomal DNA. Mycologia 92:74–93. <https://doi.org/10.1080/00275514.2000.12061132>
- Schmidt A, Braun U (2020) Asexual morphs of powdery mildew species (Erysiphaceae) – new and supplementary morphological descriptions and illustrations. Schlechtendalia 37:30–79

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