

Disease Note

Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Fusarium falciforme* Causing Root Rot and Wilt on Strawberry in Sinaloa, Mexico

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In Mexico, strawberry production has great economic importance for the local and export markets as the country is the main strawberry supplier to the United States (SIAP 2020). In 2022, strawberry plants with yellowing and wilting leaves, root rot and wilting, necrosis of vascular bundles, and small fruits symptoms were observed in different commercial fields in the north-central Mexican state of Sinaloa, causing yield losses of about 10%. Typical *Fusarium* sp. colonies were recovered from all samples. They produced abundant white aerial mycelium with cream to orange pigment and branched septate hyphae (Leslie and Summerell 2006). A total of 18 monosporic isolates were obtained by serial dilutions. The 18 isolates grown for 10 days on carnation leaf agar produced hyaline microconidia with 0 to 2 septa, measuring 9.2 to 15.4 by 4.5 to 6.5 μm ($n = 40$), and hyaline macroconidia with three septa that measured 28.4 to 53.5 by 4.5 to 9 μm ($n = 40$). Chlamydospores were not observed. A fragment of the translation elongation factor 1- α (EF1- α) gene was amplified by polymerase chain reaction (PCR) using the primer pair EF-1/EF-2 (O'Donnell et al. 1998) from two monosporic isolates. The sequences were registered in the NCBI GenBank under accession numbers OR878541 and OR878543 (FRESIN178 and FRESIN194). BLASTn queries of NCBI GenBank identified the sequences as *Fusarium falciforme* with 98 and 100% similarity to accession numbers OQ262968 and DQ246941, respectively. The Fusarium ID database also identified the sequences as *F. falciforme*, a member of the *F. solani*

species complex (FSSC). Phylogenetic analysis revealed the partial EF1- α sequences grouped with *F. falciforme*. A pathogenicity test was performed on 30 strawberry plants (cv. Cabrillo) grown in sterile vermiculite. The plants were inoculated by immersing roots in 20 ml of a conidial suspension (1×10^5 conidia/ml) of the isolate FRESIN194. Twelve uninoculated plants served as the control. All plants were grown for 60 days under greenhouse conditions (28 to 35°C). The assay was repeated two times. After 50 days, symptoms of root rot and wilting leaves like those observed in the field were observed. Uninoculated control plants did not develop symptoms. The fungus was reisolated from necrotic tissues of the inoculated plants and identified as *F. falciforme* by sequencing the EF1- α gene and morphological characteristics, thus completing Koch's postulates. *F. falciforme* has been reported as the causal agent of root rot, stem rot, and wilt of tomato, chickpea, onion, common bean, and maize in Mexico (Díaz-Nájera et al. 2021; Douriet-Angulo et al. 2019; Felix et al. 2022; Tirado-Ramírez et al. 2018; Vega-Gutiérrez et al. 2019). To our knowledge this is the first report of *F. falciforme* causing root rot and wilt on strawberry in Sinaloa, Mexico. This result provides useful information for the development and implementation of disease control strategies to mitigate damage caused by *F. falciforme*.

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