



## First report of occurrence fusarium wilt on cyclamen caused by *Fusarium oxysporum* in Iran

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Cyclamen (*Cyclamen persicum*) is one of the best flowers for winter pots and it is also popular during winter in Iran. During January to May 2021, cyclamen wilt and damping off disease was commonly observed in all cyclamen producing greenhouses of Golzare-Bala region, Pakdasht city, Tehran province, Iran. The symptoms of disease initiate in one side of the plant, by old leaves chlorosis, stunting, and observing brown or black streaks in the vascular system of tuber. Subsequently, symptoms spread to the whole plant and finally the entire plant wilts and dies. Overall, the incidence of the cyclamen wilt with tuber vessels necrosis in 14 greenhouses was in the range of 10–48% (average 14%) during May 2021. To find the causal pathogen, the necrotic vessel' tissues of the surface sterilized infected tubers were cultured on the Potato Dextrose Agar (PDA) and Water Agar 2%. According to the morphological characters, 100% of the isolated fungi were similar to *Fusarium oxysporum* (Leslie and Summerell 2006). Briefly, colony growth on PDA was flat and round with pale white to pink colour after 7 days' incubation at 25 °C and 12 h photoperiod. Macroconidia were fusiform with 2–3 transverse septum, by dimension of 27.8 to 42.5 × 7.7 to 9.6 µm. Microconidia were abundant, oval to ellipsoid (6.9 to 15 × 3.7 to 5.5 µm). Terminal chlamydospores were observed in 8–14 µm. In addition, BLAST analysis of the tef1-α region (O'Donnell et al. 2010) of isolate MOLMB1397 (GenBank accession No. OM386842)

showed 100% homology with reference isolate of *F. oxysporum*. In addition, pathogenicity test of five isolates (10<sup>5</sup> spores per g potting mix), were done on 20-week-old cyclamen young plants (Halios F1) under greenhouse condition at 12 replicates. Totally, between 34 and 68% of the infected plants showed wilt and vessel necrosis symptoms similar to those observed previously and *F. oxysporum* was re-isolated from them. According to pathogenicity test and morphological identification followed by phylogenetic analysis, the isolate MOLMB1397 was identified as *F. oxysporum* f. sp. *cyclaminis*. Finally, it is the first report of *F. oxysporum* f. sp. *cyclaminis* form Iran (Farr and Rossman 2022), as the main causal agent of cyclamen wilt and damping off.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s42161-023-01315-2>.

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