



# First report of pistachio die-back and canker disease caused by *Paecilomyces maximus* in Turkey

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Received: 30 December 2021 / Accepted: 7 May 2022

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**Keywords** Die-back and canker disease · Pistachio · *Paecilomyces maximus*

In July 2021, die-back and canker symptoms were observed on approximately 7% of pistachio (*Pistacia vera* L.) trees in a commercial orchard in Siirt province, southeastern Turkey. Symptoms included wilting, dieback of twigs and branches, necrosis and darkening of bark and wood tissues, gummosis, and canker lesions. Fifteen wood portions from diseased branches of 5 trees were surface sterilized in 1% sodium hypochlorite for 2 min, placed onto potato dextrose agar and incubated in dark at 23 °C. Cultures were initially white, gradually turning yellow to brown. Conidiophores were verticillate or irregularly branched with divergent whorls of 2–6 phialides. Phialides with inflated basal portion produced olive-brown conidia in chains. Conidia were ellipsoidal to cylindrical with truncate ends and  $2.97\text{--}5.15 \times 2.25\text{--}3.10\text{ }\mu\text{m}$  in size. Chlamydospores were smooth walled, globose, weakly pigmented and  $3.2\text{ }\mu\text{m}$  in size. Those morphological features matched those of *Paecilomyces maximus* (syn. *Paecilomyces formosus*) (Houbraken et al. 2020). Identity of a representative isolate was confirmed by sequencing of the rDNA internal transcribed spacer region (ITS) and  $\beta$ -tubulin gene (White et al. 1990; Glass and Donaldson 1995). Sequences were deposited in GenBank (ITS OM019316;  $\beta$ -tubulin OM048107) and proved to 99% match in BLAST searches with *P. formosus* sequences (ITS, FJ389927;  $\beta$ -tubulin, MF175900). Phylogenetic analysis with concatenated sequences further confirmed the identification. To fulfill Koch's postulates, 5 mm mycelial plugs from actively growing colony margins were applied to same-size bark wounds in the center of 6 branch segments of 40 cm. Control

plants were inoculated with sterile PDA plugs. After 5 weeks of incubation at 23 °C in moist chambers, only pathogen-inoculated branches showed necrotic lesions with a mean size of 14 cm. The fungus was re-isolated and re-identified. To our knowledge, this is the first report of pistachio die-back and canker disease caused by *P. maximus* in Turkey.

## Declarations

**Ethical statement** This article does not contain any studies with human participants or animals.

**Conflict of interest** All authors declare that they have no conflict of interests.

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