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DISEASE NOTES

First Report of Bristlecone Fir Branch Canker in California Caused by *Diplodia mutila*

L. Sims, **D. Schmidt**, and **M. Garbelotto**, Environmental Science, Policy, and Management Department, University of California, Berkeley 94720; and **M. Uhler** and **J. Dahl**, Eastbay Regional Parks, Oakland, CA 94605.

ABSTRACT

Branch and trunk cankers associated with copious resinosis were observed on trees from two bristlecone fir (*Abies bracteata* (D. Don) Poit.) groves planted outside of their native range. The trees originated from seeds collected in 1938 near the summit of Cone Peak (1,524 m elevation) in Monterey County, CA, and were planted in 1947 in Contra Costa County, CA, in a botanical garden (250 m elevation). Symptoms were first noted in the southern grove (299 m^2) in 1987, and subsequently in the northern grove (239 m^2) in 1997. Symptoms were examined and sampled in January 2016. Resinous cankers were present both on the larger diameter branches (3.8 to 5.3 cm) and on the main trunks, but they were absent in smaller branches (0.5 to 3.8 cm) and on volunteer saplings. Cankered branches, dying and dead, had chlorotic and dead foliage distal to the cankers. Isolations were made on malt extract agar (MEA) medium from pycnidia embedded either in the foliage or from inner bark cankers. The internal transcribed spacer region (ITS) of the rDNA operon was amplified and sequenced using the ITS1F-ITS4 (Gardes and Bruns 1993; White et al. 1990) primers. The fungus was identified based both on genus-level morphological characteristics, and on 100% ITS sequence match to the ex-epitype accession of *Diplodia mutila* (Fr.) Mont. (GB KJ361837, Alves et al. 2014). Pathogenicity of one isolate (GenBank accession no. KX094986) was tested by wounding and inoculating attached branches (four replicates on each tree including controls) of three 69-year-old and one 5-year-old bristlecone fir trees. Inoculations were performed by placing under the 1-cm-diameter bark wound, a 7-day-old MEA medium plug colonized by mycelium, or for the control, MEA-only. Inoculations were then covered with wax, Parafilm, and foil tape. Seven weeks post inoculation, cankers were evident and associated with small pockets of resinosis. The pathogen was reisolated from the outer edge of all cankers. No symptoms formed around MEA-only control inoculations, nor was the pathogen isolated from these. Cankers on larger diameter branches (4.1 to 5.3 cm) were larger (avg. canker size 42.3

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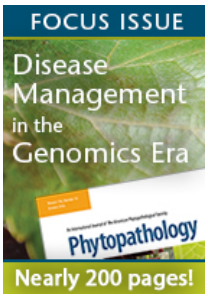

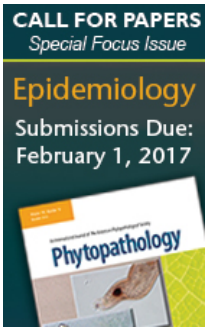

mm^2; *P* = 0.0457) than those (avg. canker size 18.2 mm^2) on smaller diameter branches (1.9 to 2.1 cm). This result is in agreement with the fact that natural cankers were only observed on larger branches. *D. mutila* has been reported from both angiosperms and gymnosperms including apple (*Malus* spp. Mill.), ash (*Fraxinus* spp. L.), poplar (*Populus* spp. L.), Port-Orford-cedar (*Chamaecyparis lawsoniana* (A. Murray) Parl.), and yew (*Taxus baccata* L., Alves et. al 2006; Phillips et al. 2013). However, this is the first report of *D. mutila* causing bristlecone fir branch canker a significant disease of large branches and trunks of *A. bracteata.*

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Citation