Disease Note

Diseases Caused by Fungi and Fungus-Like Organisms

Dothiorella sarmentorum Causing Canker and Branch Dieback of English Walnut in Maule Region, Chile


1 Laboratorio de Patología Frutal, Departamento de Producción Agrícola, Facultad de Ciencias Agrarias, Universidad de Talca, Talca, Maule 3460000, Chile
2 Department of Plant Pathology, University of California, Davis, CA 95616, U.S.A.
3 Facultad de Agronomía e Ingeniería Forestal, Pontificia Universidad Católica de Chile, Vícuña Mackenna 4860, Santiago, Chile

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English walnut (Juglans regia) cv. Chandler is the most cultivated tree nut in Chile, grown on 43,734 ha. In Maule Region, central Chile, English walnut plantings have expanded over an additional 7,000 ha in the last 5 years. During a routine orchard survey in 2019, branch and twig dieback of walnut plantings have expanded over an additional 7,000 ha in the last 5 years. During a routine orchard survey in 2019, branch and twig dieback symptoms were observed in two commercial orchards in San Rafael, 10 years old and Longaví, 12 years old in the Maule Region, with incidences of 45 and 65% of affected trees, respectively. Symptomatic branch samples (n = 15) were collected from the two commercial orchards, transported to the laboratory in a cooler, surface sterilized in 96% ethanol for 3 s, and briefly flamed. A cross-section of symptomatic branches revealed brown to dark brown, wedge-shaped wood cankers. Small (5 mm) pieces of wood from the edge of cankered tissues were placed on potato dextrose agar (PDA, 2%) amended with 0.005% tetracycline, 0.01% streptomycin, and 0.1% Igepal CO-630 (PDAm) (Díaz and Latorre 2014) and incubated at 25°C for 5 days in the dark. Pure cultures were obtained by transferring a hyphal tip from growing colonies to fresh PDA media. Each fungal isolate was recovered from a single diseased branch (47%). Seven isolates (Dsar-1 to Dsar-7) developed dark to olive brown, fast-growing colonies with scarce aerial mycelium after 7 days at 25°C on PDA. These isolates showed a dark-olive color on the reverse side of Petri dishes and developed abundant, aggregated, and dark-brown pycnidia after 15 days at 25°C. Conidia were hyaline and aseptate, dark brown, one septe, with a brown wall, ovoid with a broadly rounded apex and truncated base (17.5–) 19.5 ± 1.2 (−22.0) × (7.6–) 8.9 ± 0.6 (−10.1) μm (n = 30). These isolates were tentatively identified morphologically as Dothiorella sp. (Phillips et al. 2005). Molecular identification was performed using ITS1/ITS4 and EF1-728R/EF1-986R primers (Dissanyake et al. 2015; White et al. 1990) of the internal transcribed spacer (ITS1-5.8S-ITS2) region and part of the translation elongation factor (EF1-α) genes, respectively. A MegaBLAST search in GenBank showed a 100% similarity to isolate CBS 115038, the ex-type of Dothiorella sarmentorum. The sequences were added to GenBank (OM161950 to OM161956 for ITS; OM177188 to OM177194 for EF1-α). Pathogenicity of two isolates (Dsar-2 and Dsar-7) was tested in the orchard on fresh pruning wounds on attached branches of English walnut trees cv. Chandler. A second pathogenicity test was done on fresh pruning wounds in 1-year-old rooted cuttings (n = 15) (40 cm of long) of English walnut cv. Chandler. Each pruning wound was inoculated with 40 µl of conidial suspension (10^7 conidia/ml). Sterile distilled water was used as a control treatment. Both pathogenicity tests were repeated once. After 7 months for attached branches and 4 months for rooted plants, necrotic streaks with mean lengths of 81.3 and 44.5 mm, respectively, were observed below the inoculated pruning wounds. No necrotic streaks were observed in any of the control wounds. D. sarmentorum was 100% reisolated from symptomatic tissues of inoculated branches and molecularly identified (EF1-α), fulfilling Koch’s postulates. Recently, D. sarmentorum has been reported causing English walnut dieback in Spain (López-Moral et al. 2020). To our knowledge, this is the first report of D. sarmentorum causing canker and branch dieback of English walnut in Chile. Further studies are needed to know the impact and extent of canker and branch dieback of walnut in commercial orchards in the Maule Region, central Chile.

References:

The author(s) declare no conflict of interest.

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