Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Dactylonectria alcacerensis*, *Dactylonectria macrodidyma*, and *Ilyonectria liriiodendri* Associated with Black Foot Disease of Grapevine in Argentina

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Black foot is a fungal disease that affects young vines and planting material in countries where grapevines are cultivated. During the 2018 grape-growing season, symptoms of reduced vigor, short internodes, leaf chlorosis, root rot, and necrosis at the base of plants were observed in vines between 2 to 10 years old from 400 ha of vineyards in the Mendoza and Salta regions. A total of 30% of the vineyards of cultivars Malbec, Cabernet Sauvignon, and Aspirant Bouchet and rootstocks 101-14 Millardet et de Grasset and 1103 Paulsen had vines with disease symptoms. Vines had 15% disease incidence and 30% disease severity. These symptoms have been described as characteristic of black foot, caused by *Cylindrocarpon*-like asexual morph fungi. Isolations were made from roots and basal parts of 30 symptomatic plants. Fragments of advanced necrotic tissue were washed with running water, surface sterilized with 70% alcohol for 20 s and 2% NaOCl solution for 4 min, and rinsed in sterile distilled water twice. These fragments were placed onto potato dextrose agar (PDA) and incubated at 25°C in the dark for 10 days to isolate fungal pathogens. Fifty colonies resembling black foot disease pathogens were subcultured onto fresh PDA in order to obtain single spore cultures. The isolates developed buff to cinnamon and dark brown, felty mycelium. Colonies subcultured in synthetic nutrient agar produced hyaline, cylindrical, straight and/or slightly curved, one to three septate

(35.6 × 5.3 μm) macroconidia and abundant, hyaline, ellipsoidal, zero to one septate (12.5 × 6.0 μm) microconidia. Cultures and conidia morphological characteristics were similar to those of *Ilyonectria* or *Dactylonectria* genera (Cabral et al. 2012a; Lombard et al. 2014). DNA sequence analysis of the partial histone H3 gene was obtained for isolates INTA SC1 (*I. liriiodendri*), INTA LC2 (*D. alcacerensis*), and INTA LC1 (*D. macrodidyma*) and deposited in GenBank (accession nos. OK338901, OK338900, and OK338899, respectively). A BLAST search was conducted against type specimens. Sequences showed high similarity (99 to 100%) to the sequences of *Ilyonectria liriiodendri* (Halleen, Rego & Crous) Chaverri & Salgado (GenBank accession no. JF735509), *Dactylonectria alcacerensis* (A. Cabral, Oliveira & Crous) L. Lombard & Crous (GenBank accession no. JF735630), and *Dactylonectria macrodidyma* (Halleen, Schroers & Crous) L. Lombard & Crous (GenBank accession no. JF735647). Pathogenicity tests were conducted under greenhouse conditions on 1-year-old rooted Malbec canes using the three isolates. Ten rooted cuttings with pruned roots were immersed in a suspension of 10⁶ conidia ml⁻¹ of each isolate for 60 min (Cabral et al. 2012b), and control cuttings were immersed in sterile distilled water. They were immediately planted in pots and kept in a greenhouse at 25 to 30°C. Symptoms developed on all inoculated plants 4 months after inoculation and consisted of necrotic lesions of the roots and base of the canes, with a reduction in root biomass. Plants did not develop aerial symptoms. All fungi were reisolated only from necrotic lesions of the roots and base of inoculated canes, fulfilling Koch's postulates. No symptoms were observed on control plants. To our knowledge, this is the first report of *I. liriiodendri*, *D. alcacerensis*, and *D. macrodidyma* associated with black foot disease of grapevine in Argentina. Black foot disease reduces the viability of planting material and young vines, and this report will assist with monitoring the distribution of the disease and developing management recommendations for nurseries and grape growers in Argentina.

References:

- Cabral, A., et al. 2012a. Fungal Biol. 116:62.
- Cabral, A., et al. 2012b. Phytopathol. Mediterr. 51:340.
- Lombard, L., et al. 2014. Phytopathol. Mediterr. 53:340.

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