Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Halo Blight on Hop Caused by *Diaporthe humulicola* in New York

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Plant Dis. 107:216, 2023; published online as https://doi.org/10.1094/PDIS-01-22-0202-PDN. Accepted for publication 25 May 2022.

In late July and August 2015, foliar disease was observed in three hop (*Humulus lupulus*; unknown cultivars) yards in Ontario, Otsego, and Putnam counties, New York (NY). Disease incidence ranged between 70 and 90% of plants, and up to 25% of the leaves per plant were affected. Leaf symptoms were large, necrotic patches with a chlorotic halo (2 to 10 cm diam.). Leaves and dry, easily shattered cones were placed at high humidity for 10 days. Pycnidia were abundant in leaf lesions that extruded conidia. Pycnidia were also observed on cone bracts and bracteoles. Fifteen isolations were made from each yard by placing a pycnidium onto 2% water agar + 0.02% (w/v) ampicillin. Colonies were hyphal tipped and transferred to potato dextrose agar (PDA) before incubation at 20°C with a 12-h photoperiod. Colonies on PDA had flat mycelia and were white to cream in color. The isolation frequency was 100%. To induce sporulation, five isolates were grown on PDA with autoclaved alfalfa stems for 7 to 10 days. Alpha conidia were hyaline and oval with obtuse ends. Mean alpha conidial dimensions were (n = 20): 9.1 × 3.4 µm (BE1; Ontario Co.); 11.8 × 3.8 µm (BE34; Ontario Co.); 9.6 × 4.1 µm (BE10; Ontario Co.); 10.2 × 3.7 µm (BE52; Otsego Co.); and 10.3 × 3.6 µm (BE69; Putnam Co.). Beta conidia were not observed. DNA was extracted and PCR performed to amplify the internal transcribed spacer (ITS) region (primers ITS1/ITS4; White et al. 1990), translation elongation factor 1-α (*TEF*; EF1-728F/EF1-986R; Carbone and Kohn 1999), a partial region of β-tubulin (*TUB*; Bt2a/Bt2b; Glass and Donaldson 1995), a partial region of histone 3 (*H3*; CYLH3F/H3-1b; Crous et al. 2004), and calmodulin (*CAL*; CAL-228F/CAL2Rd; Groenewald et al. 2013) genes. For all NY isolates, sequence similarity was >99% to *Diaporthe humulicola* CT2018-3 for the ITS region, and *TEF*, *HIS*, and *CAL* genes. Sequence similarity to CT2018-3 for the *TUB* region ranged from 86.96% (BE-1) to 96.15% (BE-10). Analyses with the ITS, *TEF*, *CAL*, and *HIS* sequences supported our identification of the NY isolates as *D. humulicola*. Sequences were deposited in GenBank (OM370960 to OM370984). For pathogenicity testing, BE-34 and BE-69 were grown on PDA + autoclaved alfalfa stems at room temperature and a 12-h photoperiod for 10 days. Conidia were harvested by flooding the plate with sterile water. Conidial concentration was quantified, and the inoculum suspension diluted to ~5×10^5 (+0.01% polysorbate-20)/ml. Five cv. Cascade plants were sprayed with inoculum until run-off and covered with a plastic bag for 72 h. Noninoculated control plants were sprayed with 0.01% polysorbate-20 and bagged. Plants were placed in a misting chamber and exposed to alternating 25°C light/18°C dark with a 16 h photoperiod. Mist was applied for 1 h daily. Necrotic lesions like the field specimens were observed on all inoculated plants after 28 days with no symptoms on control plants. Diseased leaves were detached and placed in a humid chamber for 2 days, and pycnidia observed in lesions. The reisolation frequency of *D. humulicola* was 100%. Conidia from the isolates had similar morphology to the original isolates. This is the first report of halo blight caused by *D. humulicola* on hop in NY. Halo blight has been reported on hop and associated with significant yield loss through cone shattering in Michigan (Higgins et al. 2021), Connecticut (Allan-Perkins et al. 2020), and Quebec, Canada (Hatlen et al. 2022). Research is needed to determine if management is warranted.

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The author(s) declare no conflict of interest.

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Keywords: etiology, fruit, fungi, tree fruits

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