About the cover for April 2012

ISSN: 0191-2917

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Editor-in-Chief: Mark L. Gleason
Published by The American Phytopathological Society

April 2012, Volume 96, Number 4
Page 583
http://dx.doi.org/10.1094/PDIS-12-11-1039

Disease Notes

Sclerotinia Wilt of Hop (*Humulus lupulus*) Caused by *Sclerotinia sclerotiorum* in the Pacific Northwest United States

S. M. Kropf, **M. L. Putnam**, **M. Serdani**, and **M. C. Twomey**, Department of Botany and Plant Pathology, Oregon State University, Corvallis, 97331; **J. L. Woods**, Department of Crop and Soil Science, Oregon State University, Corvallis, 97331; and **D. H. Gent**, USDA-ARS, Forage Seed and Cereal Research Unit and Department of Botany and Plant Pathology, Oregon State University, Corvallis 97331

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In June 2009, wilted hop bines were observed in a yard in Marion County, OR. The wilt was associated with a stem rot that occurred ~1 m from the ground near the point where bines are tied together for horticultural purposes. Samples of affected stems were submitted to the Oregon State University Plant Clinic. White hyphae and large, black sclerotia were present on the stems, with a clear delineation between healthy and diseased tissue. The pathogen was identified as *Sclerotinia sclerotiorum* based on morphological characters. In June 2011, bine wilting was observed on the same farm but in a different hop yard (cv. Nugget) ~10 km from the 2009 occurrence. Affected plants had upward curled leaves with necrotic margins or wilted bines that were severed at the soil line. Wilted bines tended to have smaller diameters than bines with foliar symptoms only. Of 100 plants examined, 75% displayed some foliar symptoms and 66% had at least one bine that was wilted. Yield loss was estimated at 10 to 20% due to bine wilting before cone development. Unlike the 2009 occurrence, wilted bines did not display aerial signs of *S. sclerotiorum*. Rather, water-soaked lesions covered in white, cottony mycelium were apparent on affected stems 2.5 to 5 cm below the soil surface, some bearing large, irregularly shaped sclerotia. Isolations made onto potato dextrose agar yielded isolates with rapid growth rates and morphological characters consistent with *S. sclerotiorum* (1). DNA was extracted (2) and pathogen identity was confirmed by PCR amplification and sequencing of the internal transcribed spacer regions from isolates SS001 and SS002 as described before (4). The amplicons were sequenced bidirectionally and consensus sequences were 100% similar to *S. sclerotiorum* (GenBank No. AAGT01000678.1). Two nucleotide polymorphisms were present that differentiated the sequences from those of 12 *S. trifoliorum* accessions in GenBank that could be aligned (2). Greenhouse assays utilizing a toothpick inoculation procedure (3) were conducted to fulfill Koch's postulates. Stems of five 4-week-old hop plants of cv. Agate were pierced with a toothpick colonized with *S. sclerotiorum*. Five control plants were similarly inoculated with toothpicks without the fungus. Inoculated plants developed symptoms similar to those observed in the field within 11 days; four of five plants inoculated with isolate SS001 and two of five plants inoculated with isolate SS002 completely wilted. *S. sclerotiorum* was reisolated from all inoculated plants but not the control plants. To our knowledge, this is the first report of Sclerotinia wilt on hop in Oregon or the Pacific Northwest (1), where nearly all commercial hop production occurs in the United States. The disease appears to be localized to a limited number of yards, although given the widespread distribution and host range of *S. sclerotiorum*, it is plausible that the disease may occur in other yards. Recurrent outbreaks and spread of the disease among yards on the affected farm suggests that Sclerotinia wilt has the potential to become a perennial problem on hop and efforts to limit the introduction of *S. sclerotiorum* into other yards are warranted.

References: (1) D. H. Gent. Page 32 in: Compendium of Hop Diseases and Pests. The American Phytopathological Society, St. Paul, MN, 2009. (2) E. N. Njambere et al. Plant Dis. 92:917, 2008. (3) M. L. Putnam. Plant Pathol. 53:252, 2004. (4) T. J. White et al. PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, 1990.