Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Spot Blotch Caused by *Bipolaris sorokiniana* on Winter Rye in Kentucky

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The Kentucky distilling industry ranks as one of the state's largest industries and continues to expand. In 2017, it was responsible for approximately \$235 million in state and local tax revenues (Coomes and Kornstein 2019). Rye (*Secale cereale* L.) grains are a vital component for production of some distilled spirits. Although winter rye is produced on relatively few hectares in Kentucky, a recent initiative has supported expanding production to help meet the growing demand of local distilleries. University of Kentucky winter rye research field trials were visited in Caldwell and Logan counties, KY, in May 2018, and in Fayette County in May 2019. Leaves were collected that had dark brown, oval to irregular-shaped lesions with definite margins and yellow halos. Symptoms were present on approximately 50 to 80% of the flag leaves, with severity ranging from 5 to 30% of the flag leaf area affected. Leaves were surface-disinfested by soaking in a 2% NaOCl solution for 1 min and rinsed twice in sterilized water and then placed in a humidity chamber (plastic bag with moist paper towels) at room temperature (~24°C) to induce fungal sporulation. Seventeen single-spore isolates were obtained and stored at -80°C in 15% glycerol solution. Isolates were grown on potato dextrose agar under 12 h light/dark cycles for 5 days. Colonies were gray to black. Conidia that formed were mostly straight or slightly curved, dark olivaceous brown, 3 to 7 septate, and 41.0 to 90.4 × 15.2 to 29.3 µm. Based on the symptoms observed on the collected leaves and these morphological characteristics similar to those described by Chang and Hwang (2000) and Manamgoda et al. (2014), the fungus was tentatively identified as *Bipolaris sorokiniana* (Sorokin) Shoemaker. The sequence of internal transcribed spacer

regions (ITS) and glyceraldehyde 3-phosphate dehydrogenase (GAPDH) were used to identify three isolates (18Bs004, 18Bs111, and 19Bs064) using primer ITS1/ITS4 (White et al. 1990) and GPD1/GPD2 (Berbee et al. 1999), respectively. The sequences were deposited in GenBank with accession numbers MT457817, MT457818, and MZ066635 for ITS sequences and MZ073644 to MZ073646 for GAPDH sequences. BLAST searches with ITS and GAPDH sequences matched 100% identity (344/344 bp and 515/515 bp for ITS and GAPDH, respectively) to *B. sorokiniana* (MT254731 and MH844813, respectively). To prove pathogenicity, a conidial suspension (1×10^5 conidia/ml) was used to inoculate 15-day-old cultivar Serafino winter rye plants in the greenhouse. Leaves of eight plants were inoculated with 50 ml of the conidial suspension using a spray bottle. Plants were covered with a transparent plastic bag for 48 h, and symptoms were observed 10 days after inoculation. Leaf lesions, similar to those described above, were present on all inoculated plants, but no symptoms were observed on noninoculated control plants. *B. sorokiniana* was reisolated from symptomatic leaves and the identity of the pathogen was confirmed based on the morphology previously described. To our knowledge, this is the first report of spot blotch caused by *B. sorokiniana* on winter rye in Kentucky, but *B. sorokiniana* has been reported on rye in the neighboring state of Virginia (Roane 2009). Kentucky produces approximately 150,000 and 4,000 ha of winter wheat (*Triticum aestivum*) and winter barley (*Hordeum vulgare*) annually, respectively, which are both known hosts of *B. sorokiniana* (Kumar et al. 2002). An isolate of *B. sorokiniana* from rye was reported by Ghazvini and Tekauz (2007) to be less virulent on barley differential lines. Further research is needed to better understand spot blotch distribution, susceptibility in winter rye cultivars, and potential yield and quality loss implications in winter rye production and end use. It is unknown how susceptible various winter rye cultivars grown in Kentucky are to spot blotch.

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