Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Potato Stem Canker Caused by *Rhizoctonia solani* AG-2-2IIIB in Heilongjiang Province, China

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Rhizoctonia solani is an important soil-borne pathogenic fungus, causing disease in several important crops worldwide. Symptoms of *R. solani* infection are attributed to various plant diseases, such as damping off, root rot, stem cankers, crown rot, and blights (Ogoshi 1996). In potato, *R. solani* has been associated with black scurf and stem cankers, causing qualitative and quantitative damage to infected crops (Djébali and Belhassen 2010). Isolates of *R. solani* AG3 have been reported as the predominant cause of stem canker on potato (Carling 1996), and the same results were also obtained in the cities of Harbin and Suihua in Heilongjiang Province, China (Yang et al. 2017). During the summer of 2019, diseased potato plants (cv. Youjin-885) with symptoms typically associated with stem canker were found in Jiamusi City of Heilongjiang Province in northeast China, where potatoes are grown widely. Stem pieces (5 mm long) were taken from the margins of healthy and diseased tissues and were surface sterilized with 70% ethanol for 30 s and 0.5% NaClO for 1 min, rinsed three times with sterile distilled water, and placed on PDA at 25°C in the dark. After incubation for 48 to 72 h, hyphae tips resembling *Rhizoctonia* were microscopically examined for morphological characteristics and were transferred to fresh plates of PDA. Characteristics of the observed isolate were typical of *R. solani* Kühn, which include among others hyphal branching at right angles, a septum near the branching point, and a slight constriction at the branch base. Hyphal cells were also determined to be multinucleate by staining with 1% safranin O and 3% KOH solution (Bandoni 1979). Meanwhile, PCR amplification and DNA sequencing of

the ITS region of the rDNA was performed by using the universal primers ITS1/ITS4 (White et al. 1990) and the AG-2-2IIIB specific primers (see supplementary materials for PCR results and primer sequences) described by Carling et al. (2002). The resulting sequences that were amplified with the ITS1/ITS4 primers (GenBank MT258822) and the AG-2-2IIIB specific primers (GenBank MT679722) showed >98 and 100% identity to those of >10 AG-2-2IIIB isolates in GenBank, respectively. Based on morphological characteristics and molecular analysis, the isolate was identified as *R. solani* AG-2-2IIIB. Koch's postulates were carried out to prove the pathogenicity. Disease-free minitubers (cv. Favorita) of 10 to 20 g were allowed to sprout at room temperature for 10 days. They were then planted into autoclaved soil in a plastic pot (4 liter capacity), placed in a greenhouse at 18 to 27°C (night/day) with 50% RH and watered as required. The pots were inoculated by 7-mm-diameter mycelial plugs (from one PDA Petri plate) over the minituber, which was then covered with potting mix. Control pots were inoculated with sterile PDA. Each treatment consisted of 10 plants, and the experiment was repeated three times. After 3 weeks, plants were removed and assessed for disease. Typical stem cankers were observed on plants grown in pots inoculated the mycelial plug, but control plants remained disease-free. Moreover, *R. solani* AG-2-2IIIB was reisolated consistently from symptomatic stems, and the identity of the reisolates was confirmed by the above mentioned morphological and molecular analyses. To our knowledge, this is the first report of AG-2-2IIIB causing disease on potatoes in Heilongjiang Province, the main potato-producing area of China. Potato black scurf caused by *R. solani* AG-2-2IIIB has been reported in Inner Mongolia Autonomous Region (Tian et al. 2011). Although it is not considered a major potato disease in Heilongjiang Province, with the recent rapid development of the potato industry, it can become a major problem due to the high risk of soil-borne infection and disease dispersal with regard to seed potato transportation across China. The information presented in this note will assist in developing management strategies for this disease.

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