First Report of Rhizoctonia solani AG2-1 on roots of wheat in Kazakhstan

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In June 2019, approximately 20 tillers of wheat (*Triticum aestivum* L.) were sampled at the ripening stage (Feekes scale 11) from four different fields in Almaty, Kazakhstan. Brown lesions (3-5 mm in length) were present on the roots of sampled plants, with 20% incidence. To determine the causal agent, diseased roots were surface disinfected in sodium hypochlorite solution (1%) for 3 min, rinsed triple with sterile distilled water, air-dried in a laminar flow hood, and plated onto one-fifth strength potato dextrose agar (PDA) supplemented with 50 ppm chloramphenicol. After three days, the hyphal fragments that developed from the sections were transferred to fresh PDA and incubated at 23°C with 12-h photoperiod for 7 days to obtain pure cultures. Brown pigmented fungal colonies with a constriction at the base of hyphal branches, septa near the branching point, and right-angled branching resembling *Rhizoctonia solani* were observed. The identification anastomosis group (AG) of a representative isolate for each field was conducted by sequencing the internal transcribed spacer (ITS) region of rDNA with the universal primers ITS4 and ITS5 (White et al. 1990). The resulting sequences of 693 bp length were deposited in GenBank (accession nos. MW898143:MW898146). These sequences were 100% identical to the isolate 8Rs of *R. solani* AG2-1 (accession no. AF354063). To confirm the pathogenicity of the four isolates, the colonized wheat kernels method described by Demirci (1998) was used to inoculate a sterile potting mix containing peat, vermiculite, and soil (1:1:1 by v/v/v) into which wheat (cv. Seri) was planted. Control pots were inoculated with sterile wheat kernels using the same procedure. Wheat plants were left to grow for four weeks under controlled environmental conditions with a 23°C temperature regime. During the period that the plants remained in the glasshouse, the typical light regime was 16 h. Brown lesions were observed on the roots of plants in the inoculated pots whereas no symptoms were observed on plants grown in the control pots. *R. solani* was consistently reisolated from symptomatic plants, thereby confirming Koch's postulates. To our knowledge, this is the first report of *R. solani* AG2-1 on roots of wheat in Kazakhstan. *R. solani* AG2-1 isolates have been previously reported to be a weak pathogen to wheat (Roberts and Sivasithamparam 1986; Sturrock et al. 2015; Jaaffar et al. 2016; Özer et al. 2019). We suggest further studies are required to characterize the impact of *R. solani* AG2-1 in wheat. Considering crop rotation, the selection of non-host crops to this AG group is important to pathogen management, by reducing the amount of inoculum in the soil.

References

Demirci, E. 1998. Plant Pathology 47:10–15. https://doi.org/10.1046/j.1365-3059.1998.00214.x

Jaaffar, A. K. et al. 2016. Phytopathology 106:459–473. https://doi.org/10.1094/PHYTO-09-15-0208-R

Roberts, F. A., and Sivasithamparam, K. 1986. Netherlands Journal of Plant Pathology 92:185–195. https://doi.org/10.1007/bf01977685

Özer, G., et al. 2019. Plant Disease 103(8):2132–2132. https://doi.org/10.1094/PDIS-02-19-0388-PDN

Sturrock, C. J., et al. 2015. Frontiers in Plant Science 6:461. https://doi.org/10.3389/fpls.2015.00461

White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego. https://doi.org/10.1016/B978-0-12-372180-8.50042-1

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