First report of *Rhizoctonia solani* AG 4 HG-I causing damping off and wirestem of white cabbage in Turkey

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In 2017, white cabbage (*Brassica oleracea* var. *capitata* f. *alba* L.) plants showing damping off and wirestem symptoms were collected to identify the causal pathogen from six fields in the Central Black Sea Region of Turkey. Approximately 10% of plants in the fields were affected. Infected tissues were superficially disinfected for 1 min in 1% NaOCl and transferred to Petri dishes containing Potato Dextrose Agar (PDA). The fungal colonies similar to those of *Rhizoctonia* spp. characteristically having septa near the branching point, obvious right-angled branching and constrictions at the base of hyphal branches were isolated from the samples. Six representing cultures were stained with 0.5% safranin O and 3% KOH and observed at ×400 magnification to determine the number of nuclei per cell. All isolates were identified as *Rhizoctonia solani* Kühn and had multinucleate cell compartment with 4 to 9 nuclei. The identification of anastomosis group (AG) of the isolates was performed by sequencing of the internal transcribed spacer (ITS) region. The result of analyzing the ITS sequences of the isolates using BLAST algorithm, the sequences (accession Nos. MN106336–41) were 99% identical to *R. solani* AG 4 HG-I sequence (AB000018) in GenBank. For pathogenicity assay, the roots of three-week-old seedlings

of white cabbage cv. Yalova-1 (five replicates) were inoculated with *R. solani* AG 4 HG-I-infested wheat kernels (Turkkan et al. 2018). Typical symptoms appeared on all inoculated seedlings, similar to those observed originally in the field, one week after inoculation. No symptoms were observed on control plants treated with sterile wheat kernels. The pathogen was re-isolated to fulfill Koch's postulates. To our knowledge, this is the first report of *R. solani* AG 4 HG-I causing damping off and wirestem of white cabbage in Turkey.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Research involving human participants and/or animals The authors declare that no human participants and animals were involved in this study.

Informed consent This manuscript is new and not being considered elsewhere. All authors have approved the submission of this manuscript.

Reference

Türkkan M, Erper I, Kılıçoğlu MÇ, Yazıcıoğlu E, Özcan M (2018) Characterization and pathogenicity of *Rhizoctonia* spp. isolated from kiwifruit in the middle and eastern Black Sea region of Turkey. J Phytopathol 166:761–774

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