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SHORT COMMUNICATTION

First report of *Rhizoctonia solani* Kühn ag 4 causing root and basal rot of sweet basil (*Ocimum basilicum* L.) in Bulgaria

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Abstract

Symptoms of root and basal stem rot were observed on individual basil (*Ocimum basilicum* L.) plants in July and August 2018 and 2019 in household kitchen gardens in the Bulgaria. All symptomatic plants irreversibly wilted, withered and eventually died. Eight fungal isolates obtained from symptomatic basil plants were identified as *Rhizoctonia solani* Kühn on the basis of colony morphology and microscopic observation of their morphological characteristics. The isolates were assigned to anastomosis group 4 (AG 4) of *R. solani* according to hyphal anastomosis reactions with tester isolates. Pathogenicity of each individual isolate was confirmed in pot experiments with artificially inoculated basil plants, c. Genovese. To the best of our knowledge, this is the first report of root and basal rot disease caused by R. solani AG 4 on basil (*O. basilicum*) in Bulgaria and elsewhere.

Key words: basil, *Rhizoctonia solani*, anastomosis group 4 (AG 4), pathogen, root and basal stem rot

A severe root and basal stem rot of basil (*Ocimum basilicum* L.) was detected in July and August 2018 and 2019 in two household kitchen gardens, both located at a relatively large distance from each other: one in the village of Aleksandrovo, Lovech District, central northern Bulgaria and the other in the village of Ludogortsi, north-eastern part of the country. Disease symptoms were observed on approximately 35%-60% of basil plants, including dry root rot and large necrotic areas on the lower stems, which might first appear at or just below the soil surface. Large parts of the stems decayed, turned light brown and dry looking. All symptomatic plants irreversibly wilted, withered and eventually died. Following the standard procedures, small tissue segments (2-3 mm) were cut from the respective plant parts, surface sterilized by dipping in 70% ethanol for 60 s, rinsed three times with sterile distilled water, then blotted dry between two sterile filter papers and placed on 90 mm Petri plates containing nonselective media such as Oatmeal (OA), Potato Dextrose (PDA) or Water agar (WA). Plates were incubated at 25-26˚C in the dark for 10 to 14 days. *Rhizocto-*

nia spp. isolates were readily obtained from all examined plants with disease symptoms. Using widely accepted taxonomic references by Sneh et al. (1991), all eight isolates were identified as *Rhizoctonia solani* Kühn on the basis of colony morphology and microscopical characteristics of mycelia. Incubated on PDA, the different isolates yielded light brown to brown colonies with moderate or abundant mycelium. Seven of the isolates produced light brown or dark brown sclerotia either scattered within the colony, or formed in central and/or peripheral patterns. Microscopic observations revealed septate hyphae, 5.25 to 6.82 µm wide, tending to branch at 90º angle, although acute-angle branching often occurred. Characteristically of *R. solani*, branches were slightly curved, had a constriction at the point of origin, and both the main and branching hyphae formed a septum near the branching junction. According to hyphal anastomosis reactions between each basil isolate paired on 2% WA in Petri plates with a tester isolate of different anastomosis groups (AGs): AG 1, AG 2-1, AG 2-2, AG 3, AG 4, AG 5, AG 6 or AG 8, all basil isolates of R. solani were assigned to AG 4 (Anderson, 1982; Ogoshi, 1996). More than 70% of the observed hyphal fusions between our isolates and the AG 4 tester isolate showed C2 type or perfect anastomosis reaction. For pathogenicity test, all *Rhizoctonia* spp. isolates were cultured for 10 days in Petri plates on OA at 25-26 °C in the dark. When cultures filled the plates, the content of each plate was mixed with 1 L of sterilized soil which was then placed in individual pot. Each pot was planted with three 25-day-old basil plants, cultivar Genovese. Four replicate pots were used for each isolate. Six pots prepared identically, but without pathogen served as a control. Development of symptoms on the inoculated basil plants was tracked for two-month period. The infected plants exhibited basal stem rot, identical to those observed in the field. The observed symptoms were consistent with Rhizoctonia basal rot caused by *R. solani* in basil (*Ocimum basilicum* L.), diagnosed in Italy in 1997 (Garibaldi et al., 1997). The inoculated pathogens were reisolated from symptomatic plants, thereby fulfilling Koch's postulates. None of the control plants developed symptoms of the disease. The pathogenicity test was carried out twice with similar results. *Rhizoctonia solani* has been reported as a causative agent of root and/or stem base necrosis of basil (*Ocimum basilicum* L.) in the literature from several countries including Italy (Tamietti & Garibaldi, 1989; Gullino et al., 1998; Minuto et al., 2005), Israel (Gamliel & Oded Yarden,1998), Iran (Sanei and Razavi, 2018) and Egypt (Abdel-Wahed, 2019). Yet, no particular AG of the pathogen has been specified in these papers. In Bulgaria, an identical disease caused by *R. solani* AG 4 on sweet basil c. Sweet has been first diagnosed in 2002 (Vatchev, unpublished data). To the best of our knowledge, this is the first report of root and basal rot disease caused by R. solani AG 4 on basil (*O. basilicum*) in Bulgaria and elsewhere.

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