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FIRST REPORT OF ROOT AND LOWER STEM ROT CAUSED BY *DRECHSLERA SOROKINIANA* ON EINKORN IN BULGARIA

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Abstract

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In July 2014, severe root and stem base rot was observed on einkorn wheat (*Triticum monococcum* L.) crops grown commercially in the region of Slivnitsa (Western part of Bulgaria). *Drechslera* spp. isolates were readily obtained from all examined plants with disease symptoms as well as from symptomless root tissues and einkorn stubble. All obtained isolates were identified as *Drechslera sorokiniana* (Sacc.) Subram. and Jain (syn. *Bipolaris sorokiniana* (Sacc.) Shoemaker) by microscopic observation of their morphological characteristics and showed additionally identical characteristics to known isolate of *D. sorokiniana* previously obtained from diseased wheat (*Triticum aestivum* L.) plants. Pathogenicity of all *D. sorokiniana* isolates was confirmed both in *in vitro* tests on germinating einkorn wheat seeds and in pot experiments with growing einkorn plants. Previously, the pathogen has been largely established on various cereal crops in Bulgaria. To the best of our knowledge, this is the first report of *D. sorokiniana* as a pathogen on root and lower stem plant parts of einkorn wheat in Bulgaria.

Key words: stem rot; einkorn wheat; stubble, root tissues

In July 2014, severe root and stem base rot was observed on einkorn wheat (*Triticum monococcum* L.) crops grown commercially in the region of Slivnitsa (Western part of Bulgaria). Isolations of potential pathogens were made from sections of the roots and basal stems of diseased einkorn plants at the stage of ripening (BBCH 85-89), as well as from the stubble after harvest. Following the standard procedures, small pieces (2-3 mm) were cut from the respective plant parts and after surface sterilization were placed on nonselective media such as oatmeal (OA), potato dextrose (PDA) or water (WA) agar in Petri plates. Plates were incubated at 25-26°C in the dark for 7 to 10 days. *Drechslera* spp. isolates were readily obtained from all examined plants with disease symptoms as well as from symptomless root tissues and einkorn stubble.

Observations on colony morphology and growth of all *Drechslera* isolates were made on WA, OA and PDA. Colonies were velvet-like, dark olive and plane with dark olive reverse side (Morejon et al., 2006). The fungus grew most rapidly on OA, reaching a diameter of 8.5 to 9.0 cm for 14 days of incubation at 25-26°C, following by PDA (4.8 to 5.6 cm) and WA media (2.6 to 3.0 cm in diameter). All obtained isolates were identified as *Drechslera sorokiniana* (Sacc.) Subram. and Jain (syn. *Bipolaris sorokiniana* (Sacc.) Shoemaker (Sivanesan, 1990) by microscopic observation of their morphological characteristics. Conidiophores were short, unbranched, brown to dark brown, septate, erect, single or clustured. Conidia were brown to olivaceous brown in color, straight or slightly curved, with average size of 16 x 66 μm, divided with three to seven transverse septae. Conidia reflected the light and gave the colony a shiny appearance (Raza et al., 2014). All our isolates corresponded in morphology to the descriptions of *D. sorokiniana*. Further,

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microscopic characteristics of these newly obtained isolates were compared with and showed identical characteristics to known isolate of *D. sorokiniana* previously obtained from diseased wheat (*Triticum aestivum* L.) plants and identified by I. Karadjova (unpublished data).

Pathogenicity of all *D. sorokiniana* isolates was initially tested *in vitro* on germinating einkorn seeds (Bulgarian population) placed on OA in Petri plates and inoculated with five 6 mm in diameter agar blocks, cut from the growing edge of a pure culture of the tested isolate. Plates were incubated at 25-26°C for 10 days and the pathogenicity was demonstrated by the ability of the fungus to cause dark-brown to black necrotic lesions on roots and other developed plant parts. Additionally, the pathogenicity of each isolate was tested in vegetation pots each containing 1 L sterilized soil artificially inoculated with pure culture of the fungus developed on OA in Petri plate (for 14 days at 25-26°C) and sown with 10 einkorn wheat seeds. Four replicate pots were used for each of the tested isolates. The development of symptoms was tracked for two-month period. Diseased plants exhibiting symptoms identical to those observed on naturally infected plants were observed in each inoculated pot. In both pathogenicity tests the inoculated pathogens were consistently re-isolated from symptomatic tissues, thereby fulfilling Koch's postulates. None of the noninoculated control plants developed symptoms of disease.

D. sorokiniana is a soil and seed borne pathogen of wheat, barley and other small cereal grains and grasses causing severe seedling blight, common root rot, black point diseases, head blight, foliar blight (spot blotch). Because of the high yield losses caused by the fungus it has considered the most important pathogen of wheat in warmer areas of the world (Dubin and Ginkel, 1991; Raza et al., 2014). Many cereal crops have been reported as hosts of *D. sorokiniana* world wide; among them wheat, barley (*Hordeum vulgare* L.), oat (*Avena sativa* L.), sorghum (*Sorghum bicolor* L.), maize (*Zea mays* subsp. *mays* L.) and einkorn wheat (Iftikhar et al., 2009). The pathogen has been largely established on cereal crops in Bulgaria (Navushtanov, 1979).

To the best of our knowledge, this is the first report of *D. sorokiniana* as a pathogen on root and lower stem plant parts of einkorn wheat in Bulgaria.

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