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First report of *Fusarium oxysporum* Schlecht. emend. Snyder and Hansen causing wilt of lettuce in Bulgaria. Short Communicattion

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Abstract

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Lettuce plants (*Lactuca sativa* L.) showing symptoms of yellowing and wilting of folliage, stunting and death of the plants were observed in a commercial greenhouses situated near Sadovo (Sauth Central Bulgaria) in April, 2019. Roots, stems and leaves of the symptomatic plants decayed and turned reddish brown. All isolates obtained from symptomatic plants were identified as *Fusarium oxysporum* Schlecht. emend. Snyder and Hansen by microscopic observation of their morphological characteristics (3-4-septate macroconidia – 25.2-30.5 µm x 3.1-4.6 µm, 1-2-septate microconidia – 6.2-9.0 µm x 2.8-4.5 µm and abundant chlamydospore formation). Pathogenicity of all isolates was confirmed on lettuce cultivar Grand Rapids in pot experiments with artificially inoculated soils. Seedlings grown in inoculated soils showed wilting and root rot symptoms, identical to those observed on naturally infected plants. The inoculated pathogens were consistently reisolated from symptomatic tissues. To the best of our knowledge, this is the first report of *F. oxysporum* infecting lettuce in Bulgaria.

Keywords: lettuce; *Fusarium oxysporum;* pathogen; yellowing; wilting; root rot; stem rot

Introduction

Wilt of lettuce attributed to *Fusarium oxysporum* Schlecht. emend. Snyder and Hansen was reported in Asia (Matuo and Motohashi, 1967), North America (Hubbard, 1993), Europe (Garibaldi, 2002) and Sauth America (Malbrán et al., 2014). The aim of this study was to determine the causal agent of lettuce (*Lactuca sativa* L.) wilt in a commercial greenhouses situated near Sadovo (Sauth Central Bulgaria) in April, 2019.

Materials and Methods

Symptoms of yellowing and wilting of foliage, stunting and death of the plants were observed. Roots, stems and leaves of the symptomatic plants decayed and turned reddish brown. Isolations of potential pathogens were made from sections of the tissues of diseased lattice plants. 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 media in Petri plates. Plates were incubated at 25-26˚C in the dark for 7 to 10 days. *Fusarium* spp. isolates were readily obtained from all examined plants with disease symptoms as well as from tissues of symptomless lettuce plants. The isolates were identified by microscopic observation of their morphological characteristics.

Results and Discussion

The isolates of *Fusarium* spp. formed white to pale orange spore mass and pale yellow to pink-red pigment where the colony contacts the agar. Microscopic observations revealed hyaline macroconidia 25.2-30.5 µm long and 3.1-4.6 µm wide having a distinctive foot-shaped basal cell. Macroconidia were slightly curved, 3- to 4-septate, rarely in sporodochia. Oval one-celled or having 1-2 septa microconidia, 6.2-9.0 µm x 2.8-4.5 µm in size were also present. After two weeks of cultivation hyaline, thick walled, intercallary or terminal chlamydospores were abundant, single or in pairs (Leslie and Summerell, 2006; Blancard et al., 2006). Based on cultural and morphological characteristics, all isolates were identified as *F. oxysporum*.

For pathogenicity test, all *F. oxysporum* isolates were cultured for 7 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 1L of sterilized soil which was then placed in individual pot. Each pot was planted with five lettuce seeds, cultivar Grand Rapids. Six replicate pots were used for each isolate. Six pots prepared identically, but without pathogen served as a control. The experiment was carried out twice. Two to three weeks after emergence seedlings grown in inoculated soils showed wilting and root rot symptoms, identical to those observed on naturally infected plants. The inoculated pathogens were consistently reisolated from symptomatic tissues, thereby fulfilling Koch's postulates. None of the control plants developed symptoms of the disease.

Conclusions

Fusarium oxysporum Schlecht. emend. Snyder and Hansen was identified as the disease-causing agent of wilt outbreak in lettuce (*Lactuca sativa* L.) in Bulgaria.

To the best of our knowledge, this is the first report of *F. oxysporum* infecting lettuce in the country.

References

Blancard, D., Lot, H. & Maisonneuve, B. (2006). A color atlas of diseases of lettuce and related salad crops. Academic Press. An imprint of Elsevier. INRA Editions, 375.

Garibaldi, A., Gilardi, G. & Gullino, M. L. (2002). First report of *Fusarium oxysporum* on lettuce in Europe. *Plant Disease*, *86 (9),*1052-1052.

Hubbard, J. C. (1993). A new wilt disease of lettuce incited by *Fusarium oxysporum* f. sp. *lactucum* forma specialis nov. *Plant Disease*, *77(7),* 750.

Leslie, J. & Summerell, B. (2006). The fusarium laboratory manual. Blackwell Publishing, 388.

Malbrán, I., Mourelos, C. A., Mitidieri, M. S., Ronco, B. L. & Lori, G. A. (2014). Fusarium wilt of lettuce caused by *Fusarium oxysporum* f. sp. lactucae in Argentina. *Plant Disease*, *98(9),* 1281.

Matuo, T. & Motohashi, S. (1967). On *Fusarium oxysporum* f. sp. *lactucae* n. f. causing root rot on lettuce. *Transactions of the Mycological Society of Japan*, *32,* 13-15.

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