DISEASE NOTES

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First Report of *Fusarium acuminatum* Causing Garlic Bulb Rot in Serbia

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Garlic (*Allium sativum* L.) is an important crop, mostly cultivated in Vojvodina Province, Serbia, on an area of 7,596 ha. During 2016, rotted garlic bulbs occurred in several storages of Vojvodina Province (Novi Sad, Bač, Vrbas). Infected bulbs appeared to be softened, spongy, and covered with white or reddish fungal growth. Deep lesions formed on the cloves became dry and small over time. Symptomatic bulbs were sampled from January to June in 2016. To isolate the causal organism, cloves were separated from the bulbs, surface disinfested in 1% NaOCl for 2 to 3 min, rinsed with sterilized distilled water three times, and then dried on sterile filter paper under aseptic conditions. Pieces of infected clove tissues (3 to 4 mm) were cut and plated onto potato dextrose agar (PDA) amended with 300 mg/liter streptomycin sulfate. Plates were incubated at 26°C in the dark. Seven days later, *Fusarium* colonies were recognized morphologically and 21 isolates were subcultured in PDA using a single spore technique. For pathogenicity test, cloves of the garlic cultivar Bosut were surface sterilized in 0.5% NaOCl for 60 s, rinsed in four changes of sterile water, and wounded to a depth of 4 mm using a 1-mm diameter probe (Palmero et al. 2012). Each of the 7-day-old fungal isolates were inoculated into five wounded cloves and incubated in a

growth chamber at 25°C for 3 weeks. For each isolate, another set of five cloves were inoculated with sterile PDA as control. Only the fungal isolate (JBL539), which formed a fast-growing (7 cm in 6 days), abundant, pale ochraceous, whitish-pink and partly carmine aerial mycelium, was found to be pathogenic. This isolate also produced dark to blood-red pigmentation in agar, later amber with a dark tan color at the edge of PDA, which is typical of *Fusarium acuminatum* (Gerlach and Nirenberg 1982). Macroconidia were abundant, slender, equilaterally curved with elongated apical cell and pedicellate basal cell, mostly three to five septate (rarely 0 to 1 septate), measuring 32 to 44 × 3.5 to 4.7 µm. The fungus formed globose to subglobose chlamydospores, mostly in pairs, chains, or clusters. Microconidia were not observed. Based on the colony morphology and the description of fungal structures, the isolated fungus was identified as *F. acuminatum* (Ell. & Kellerm) (Gerlach and Nirenberg 1982). Total genomic DNA was extracted from mycelium of the 21 isolates and the EF-1α region was amplified by PCR with the primer pair EF1 and EF2 (Geiser et al. 2004). The EF sequence of JBL539 was deposited in GenBank (KX752419) and showed 99% identity with several *F. acuminatum* sequences (e.g., EF531698, KP868658, KJ194170). Stanković et al. (2007) reported that *F. acuminatum* and *F. equiseti* were isolated from onion, whereas *F. proliferatum*, *F. oxysporum*, and *F. solani* were detected on both onion and garlic in Serbia. Recently, *F. tricinctum* has been described as a new pathogen of garlic in Serbia (Ignjatov et al. 2017), which, unlike *F. acuminatum* (JBL539), has pyrifom microconidia and falcate, strongly curved macroconidia, with a well-marked foot cell. Nucleotide sequence differences were found when the sequence of the EF-1α region of *F. acuminatum* was compared with those of *F. tricintum*, separating those two species and diverse clusters. Our report on this economically important pathogen provides a basis for epidemiological studies and supports other efforts toward the development of effective disease management strategies for this pathosystem.

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