Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Rubbery Rot of Potato Caused by *Geotrichum candidum* in the United States

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Rubbery rot of potato caused by *Geotrichum candidum* Link is characterized by symptoms of damp, flaccid tubers that feel rubbery when squeezed (Humphreys-Jones 1969), similar in consistency to potato diseases such as pink rot (caused by *Phytophthora erythroseptica*) and Pythium leak (caused by species of *Pythium*). In November 2019, several symptomatic tubers of potato variety ‘Ciklamen’ that had been held in storage since harvest and originated from an overhead-irrigated, sandy-loam production field in Bingham County, Idaho, were submitted to the University of Idaho for diagnosis. Shipping-point inspection records indicated 4 to 9% of tubers were affected. External symptoms included irregularly shaped, randomly located sunken black-colored lesions on more severely affected rubbery-textured tubers. When cut, internal affected tissue developed a greyish appearance after several minutes. Lens-shaped cavities were apparent in two of the tubers, indicating an advanced infection. A sour-milk smell accompanied the sample. To isolate the pathogen, pieces of tuber tissue approximately 5 mm in diameter were collected from margins of symptomatic areas and surface sanitized in sodium hypochlorite (2%) for 2 min, rinsed twice in sterile water, and plated onto tap water agar amended with penicillin G (0.2 g/liter) and streptomycin sulfate (0.8 g/liter). After 3 days at 21°C, colonies having distinct creamy white mycelia, a sweet, juniper-like odor, and hyaline hyphae were consistently associated with diseased tissue. Cylindrical to oval-shaped arthroconidia ranged in size from 6.6 to 11.0 × 3.2 to 5.9 µm (mean = 8.4 × 4.7, *n* = 21), within dimensions as reported by Carmichael (1957). No other pathogens including species of *Pythium* and *Phytophthora* were recovered from the sample. Pure cultures were obtained by transferring hyphal tips to potato

dextrose agar (PDA) plates. Species identity was confirmed via rDNA ITS sequencing using primers ITS5/4 (White et al. 1990). DNA extraction and PCR conditions were as previously described (Woodhall et al. 2013). Resulting sequences (NCBI accession nos. MT893312 and MT893315) shared 99.4% identity with *G. candidum* accession KY103453.1 in GenBank. To confirm pathogenicity, 10 tubers (cv. Ciklamen) were inoculated by placing a 10-mm² plug of PDA fully colonized with *G. candidum* on the tuber surface, and 10 tubers were mock inoculated with sterile PDA plugs. After 27 days at 21°C in a dew chamber, eight of the 10 inoculated tubers exhibited a rubbery texture and fluid leaking from tubers when cut, with two tubers also exhibiting a gray internal discoloration and the distinctive smell. Control tubers did not exhibit any symptoms. Isolations were attempted from four symptomatic tubers, and *G. candidum* was successfully recovered from three tubers, thus fulfilling Koch’s postulates. The disease has been reported sporadically in the United Kingdom (Humphreys-Jones 1969) and Korea (Kim et al. 2011), and the fungus occurs worldwide (Carmichael 1957). The fungus causes a tomato rot in the United States (Bourret et al. 2013; Pritchard and Porte 1923), and potatoes with rubbery rot originating from Australia were intercepted at a U.S. port (Farr and Rossman 2020); however, the disease has not to our knowledge been documented on potato grown in the United States. Because symptoms may be confused with pink rot and Pythium leak, it is critical for producers to obtain a correct diagnosis to facilitate appropriate management strategies.

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