Title First report of *Phytophthora nicotianae* on bulb onion in the United States

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Abstract

Phytophthora nicotianae (synonym *P. parasitica*) Breda de Haan was isolated from recently harvested onion bulbs (*Allium cepa*) in cold storage from a commercial field in southern New Mexico. Deteriorating, water-soaked tissue from the center of four bulbs was plated onto water agar and incubated at room temperature. After 72 h, cultures of *Phytophthora* (identified by the presence of coenocytic hyphae and papillate sporangia) were isolated and transferred to V8 agar amended with ampicillin (250 mg/liter), rifampicin (10 mg/liter), and pimaricin (0.2% wt/vol). Isolates were identified as *P. nicotianae* based on morphological characteristics and DNA analysis. Sporangia were sharply papilliate, noncaducous, and ovoid to spherical. The average sporangium size was 45.9 × 39.9 µm with a length-to-width ratio of 1.15. Clamydospores, both terminal and intercalary, were spherical to ovoid and averaged 37.2 × 35.2 µm (2). PCR from whole-cell extracts was performed on four cultured isolates from the infected onion tissue using previously described primers ITS4 and ITS6, which amplify the 5.8S rDNA and ITS1 and ITS2 internal transcribed spacers (1,4). A band of approximately 890 bp was amplified and directly sequenced (GenBank Accession No. HQ398876). A BLAST search of the NCBI total nucleotide collection revealed a 100% similarity to multiple *P. nicotianae* isolates previously sequenced (1). To confirm the pathogenicity of the isolates, onion seedlings were inoculated with 25 ml of *P. nicotionae* zoospore solution (15,000 zoospores/ml). Necrosis of leaf tissue and seedling death was observed 5 days postinoculation. *P. nicotianae* was reisolated from the infected onion seedlings and the ITS region was sequenced to confirm its identity. *P. nicotianae* was previously reported in bulb onion from Australia, Taiwan (Formosa), and Zimbabwe (Rhodesia) (2). *P. nicotianae* was reported on bunching onions (*A. fistulosum*) in Hawaii in 1989 (3). Onions are an important crop in New Mexico with a total production value of 47 million dollars in 2008 (NM Agriculture Statistics 2008). This discovery of a potentially significant postharvest disease poses a threat to the onion industry in New Mexico. To our knowledge, this is the first report of *P. nicotianae* in bulb onion in the United States and the first report of *P. nicotianae* in New Mexico on any crop.