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DISEASE NOTES

First Worldwide Report of a Strawberry Fruit Rot Disease Caused by *Phytophthora capsici* Isolates

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ABSTRACT

Strawberry (*Fragaria* × *ananassa* Duch.) is an important cash crop in subtropical Brazil. Strawberry 'Oso Grande' fruits showing deterioration and white mold (~5% incidence) similar to that induced by *Phytophthora* species were collected in two of five sprinkler-irrigated fields during surveys in Brazlândia-DF, Brazil, in May 2010. Microscopic analyses of five *Phytophthora* isolates from strawberries revealed coenocytic mycelia, absence of chlamydospores, and papillated, pyriform sporangia with long pedicels. Sporangial measurements (n = 50 for each isolate) were 52.7 (32 to 55) × 32.6 (27 to 37) µm and 49.9 (37 to 58) × 30.4 (26 to 35) µm and oogonia (n = 50) were 31.1 (28 to 36) µm and 30.8 (26 to 38) µm. All isolates grew on V8 medium at 35°C. All morphological characteristics were in agreement with those of *P. capsici* (Erwin and Ribeiro 1996). Isolates were paired with standard *P. capsici* A1 and A2 mating type testers on V8 medium. All isolates produced oospores only with the A2 isolates. Ten 'Oso Grande' fruits were inoculated (at 1/3 maturity) with all isolates, employing toothpicks infested with mycelium and sporangia. 'Oso Grande' plants with intact mature fruits were also sprayed with zoospore suspensions of all isolates (2×10^4 zoospores/ml) until run-off. Fruit rot was observed 6 days after inoculation (25°C and 12 h photoperiod) in all assays and *P. capsici* was reisolated, fulfilling Koch's postulates. All isolates were also able to induce crown rot in seedlings of *Capsicum annuum* 'Ikeda,' but not in young transplants of 'Oso Grande,' employing standard inoculation assays (Reifschneider et al. 1992). Two isolates from strawberries (Pmo-06 and Pmo-07) were characterized via sequencing of the internal transcribed spacer (ITS) region. DNA was extracted from pure colonies using a CTAB-based procedure (Boiteux et al. 1999). Genomic DNA was employed as template in PCR assays with the ITS-1

(5′-TCCGTAGGTGAACCTGCGG-3′) and ITS-4 (5′-TCCTCCGCTTATTGATATGC-3′) primers (White et al. 1990). BLAST alignments of Pmo-06 (KT818609) and Pmo-07 (KT818610) sequences (~750 bp) displayed 100% identity among them and 99 to 100% identity with other *P. capsici* isolates (e.g., DQ464056). Phylogenetic analyses showed that the strawberry isolates grouped together within a cluster composed by *P. capsici* isolates from a wide range of hosts. The presence of *P. capsici* isolates on strawberry can be explained by the close proximity to affected squash and bell-pepper fields, which might function as continuous sources of inoculum to nearby strawberry fields, increasing the selection pressure toward isolates pathogenic to this crop. This is the first report of *P. capsici* causing strawberry fruit rot under natural conditions. Although occurring at low incidence, it is possible that this disease is underestimated since the symptoms are similar to those induced by other *Phytophthora* species (Maas 1998).

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