Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Cucumber Fruit Rot Caused by *Fusarium incarnatum* in Mexico

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Cucumber (*Cucumis sativus* L.) is an important vegetable crop for Mexico, which is the fifth highest producer of this crop worldwide. In November 2019, a fruit rot disease characterized by the presence of white mycelial growth at both ends of the fruit was observed with an incidence of approximately 30% in a greenhouse production area in Sinaloa State (geographical coordinates: 24°35'25" N, 107°26'21" W). Culture of small disinfected sections from cucumber lesion edges was carried out on potato dextrose agar (PDA) medium at 27°C for 7 days. Colonies had profuse aerial mycelium that was initially white and became beige with age, and light orange sporodochia were eventually produced. Macroconidia had three to five septa and were slightly curved and tapered at the apex with a foot shape at one end and measured $25.4 \pm 2.5 \times 2.8 \pm 0.3$ µm. Microconidia were fusoid in form mostly with two to four septa and measured $15.7 \pm 2.04 \times 2.4 \pm 0.25$ µm ($n = 100$). The morphological characteristics of this fungal isolate were similar to those of *Fusarium incarnatum* (Leslie and Summerell 2006). To confirm the species identification, the internal transcribed spacer (ITS) region, calmodulin (CAL), β-tubulin (B-tub), and translation elongation factor 1-α (TEF1-α) genes were amplified and sequenced from two representative isolates: FPM01 and FPM02. These sequences were submitted to GenBank with accession numbers MT387313 and MT387314 for the ITS region, MT410503 and MT410506 for CAL, MT410502 and MT410505 for B-tub, and MT410504 and MT410507 for TEF1-α for the FPM01 and FPM02 isolates, respectively. BLASTn analysis of the sequences showed

between 99.33 and 100% identity with *F. incarnatum* sequence accession numbers MH865893, LN901598, AB587036 and MK328877, which corresponded to strains CBS 130313, ITEM 6748, MAFF 236521, and FIAD-1, respectively. Further BLAST searches in the *Fusarium*-ID database indicated that these sequences had between 99.76 and 100% identity with sequences of the *F. incarnatum-equiseti* species complex (FD_01682, FD_01640, and FD_01643). To fulfill Koch's postulates, healthy cucumber fruits were disinfected with 1% NaOCl for 1 min and then washed with distilled water. Ten nonwounded cucumber fruits were spray inoculated with a conidial suspension (1×10^3 conidia/ml), and five fruits wounded with a sterilized needle were inoculated with mycelial discs (6 mm) at three sites each. Distilled water and PDA medium discs were used as controls. All fruits were placed into plastic bags with 80% relative humidity and incubated at 25°C for 3 days. At 24 h after inoculation (hai), a soft rot symptom was observed at the fruit poles on nonwounded fruits and around the inoculated area of wounded fruits, and white mycelial growth was observed at 48 hai for both cases. All inoculated fruit showed similar symptoms to those observed initially in the field, and the control fruits remained healthy. The cultures obtained from tissues of inoculated fruits were similar to those from the initially obtained isolates, thus confirming pathogenicity. Recently, *F. incarnatum* has been reported in China, causing fruit rot in muskmelon (Cao et al. 2019) and peach (Zhang et al. 2020) and crown rot and leaf spot in cucumber (Gao et al. 2020; Mao et al. 2020). To our knowledge, this is the first report of cucumber fruit rot caused by *F. incarnatum* in Mexico.

References:

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