Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Charcoal Rot Caused by *Macrophomina phaseolina* on Potato Tubers in Mauritius

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Charcoal rot, caused by *Macrophomina phaseolina*, is an important disease in tropical and subtropical regions that affects a broad range of host plants, including potato (*Solanum tuberosum* L.). In this crop, charcoal rot can reduce the marketable quality of tubers (Arora 2012) and cause yield losses up to 88% (Somani 2007). During a survey of a potato field of 'Spunta' cultivar in Goodlands, Mauritius (20°02'28.2"S, 57°39'30.4"E), approximately 10% of tubers with gray pigmentation around the lenticels and small water-soaked spots with white dots were observed. These symptoms later advanced to dark brown to black patches on the skin surface, all conforming to typical symptoms of charcoal rot (Arora and Khurana 2004). Fragments of infected and adjacent healthy tissue were cut, thoroughly washed with tap water, surface sterilized for 30 s with 1% sodium hypochlorite (25% bleach), placed on chloramphenicol-amended potato dextrose agar (PDA), and incubated for 5 days in the dark at 25 ± 2°C. From all the inoculated plates, only fast-growing, dark brown, gray to black *Macrophomina*-like colonies grew, and several monosclerotial isolates were obtained with uniform morphological features. Following staining with cotton lactophenol dye using the clean slide technique, the isolate 449G-19/M exhibiting typical characteristics of *M. phaseolina* (Arora and Dhurwe 2019) and forming flattened, globose, black sclerotia with an average diameter of 180 µm ($n = 50$) was selected and used for further characterization. Identification was confirmed by sequencing of the ITS region of rDNA. Total DNA was extracted directly from the mycelium

using a DNeasy Plant Mini Kit (Qiagen, Hilden, Germany), following the manufacturer's instructions. PCR amplification and sequencing were performed with primers ITS1-F (Gardes and Bruns 1993) and ITS-4 (White et al. 1990). The nucleotide sequence of the isolate 449G-19/M (accession no. MW301138) shared 98.28 to 99.80% similarity with over 70 *M. phaseolina* isolates in GenBank (99.18% with isolate from *Zea mays*, accession no. KF531825 [Phillips et al. 2013]). Pathogenicity was tested on 20 healthy tubers, which were initially disinfected with 2% sodium hypochlorite for 1 min and individually placed in pots (20 cm ø) containing sterile substrate. Ten tubers were inoculated by placing colony fragments of 7-day-old cultures of the isolate 449G-19/M near each tuber. Similarly, 10 tubers inoculated with sterile PDA served as a negative control. The plants were maintained in greenhouse conditions, watered daily, and assessed for the presence of symptoms 8 weeks postemergence. All inoculated tubers exhibited charcoal rot on progeny tubers, whereas control plants remained symptomless. Koch's postulates were fulfilled successfully and the fungus recovered from the inoculated plants. Although *M. phaseolina* was previously observed in Mauritius on groundnut, resulting in preemergence rot and collar rot (Anonymous 1962), to our knowledge, this is the first report demonstrating charcoal rot on potato tubers caused by *M. phaseolina* in Mauritius. As the sclerotia can remain in the soil for long periods of time (Arora and Khurana 2004) and with prevailing conditions of global warming, charcoal rot may be a threat for potatoes and other local crops (Somani et al. 2013). This study will sensitize agricultural extension officers on this new disease and calls for routine surveillance to safeguard this crop.

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