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## First Report of *Fusarium oxysporum* f. sp. *cubense* (Foc) Tropical Race 4 associated with Panama disease of banana outside Southeast Asia

Panama disease of banana, is among the most destructive plant diseases. Race 1 of Foc ravaged 'Gros Michel'-based export trades until the cultivar was replaced by resistant Cavendish cultivars. However, a new variant of Foc, tropical race 4 (TR4), was identified in Southeast Asia and has spread throughout the region. Cavendish clones are the most important in subsistence and export production, and there is a huge concern that TR4 will move into Africa and Latin America. In Jordan, Cavendish bananas are produced on 1,000-1,500 ha. In 2006, symptoms of Panama disease were observed in these plantations and seven isolates were recovered from infected xylem. All examined monospore isolates were placed in VCG 01213, which contains only strains of TR4. Total DNA was extracted from six isolates and PCR analyses were performed, which confirmed their identity as TR4. Subsequently, one of the isolates (JV11)

was analyzed for pathogenicity. Root-wounded 10 week-old plants were inoculated by dipping of the Cavendish cv. Grand Naine. Sets of three plants were each treated with either JV11 or two TR4 controls (II-5 from Indonesia and one from The Philippines; both were diagnosed as TR4 by PCR and pathogenicity analyses). Control sets were either treated with race 1 or water. Plants inoculated with JV11 and TR4 controls produced typical symptoms of Panama disease. After 4 weeks, tissue was collected from all plants and plated on Komada's medium. TR4 was directly confirmed by PCR, either directly from symptomatic plants or from isolates that were recovered from these plants. Nothing was reisolated from race 1 inoculated plants and water controls. This is the first report of TR4 affecting Cavendish outside Southeast Asia. It is its northernmost outbreak, and represents a dangerous expansion of this destructive race.

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