Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (TR4) Causing Banana Wilt in the Island of Mayotte

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Fusarium oxysporum f. sp. *cubense* (*Foc*) is a fungus that causes Fusarium wilt of banana (*Musa* spp.). The fungus is divided into three races and 24 vegetative compatibility groups (VCGs), of which VCG 01213/16, commonly known as *Foc* tropical race 4 (*Foc* TR4), is of particular concern. *Foc* TR4 severely affects Cavendish (AAA) bananas, which make up about 50% of all bananas produced globally, as well as many varieties susceptible to the other races of *Foc*. The pathogen was restricted to Southeast Asia and Australia until 2012, after which it has been detected in the Middle East, Mozambique in Africa, and Colombia in South America (Viljoen et al. 2020). Here we report the first detection of *Foc* TR4 in the French department of Mayotte, located in the Indian Ocean. In September 2019, leaf yellowing and wilting symptoms were observed in individual plants of the banana subgroups Silk (AAB) (cv. Kissoukari) and Bluggoe (ABB) (cv. Baraboufaka). The symptomatic individuals were found in private gardens in the village of Poroani in southwest Mayotte (World Geodetic System [WGS] 12° 53' 31.83" S, 45° 8' 30.98" E). When the pseudostems of symptomatic plants were split open, dark red to brown vascular discoloration was observed. Pseudostem tissue samples were collected and identified as *Foc* TR4 with the real-time PCR assay developed by Aguayo et al. (2017). Sections of the pseudostem samples were surface sterilized and used to isolate the fungus on potato dextrose agar (PDA) medium. Isolates were identified as *F. oxysporum* based on cultural and morphological characteristics as described in Leslie and Summerell (2006), which included fluffy aerial

mycelia on PDA and the presence of short monophialides conidiogenous cells bearing microconidia arranged in false heads. Abundant chlamydospores were also produced on synthetic nutrient-poor agar medium. Single-spored isolates were used to develop *nit* mutants for VCG testing (Correll 1991; Puhalla 1985). The isolates were confirmed as VCG 01213/16 because formation of heterokaryons was obtained with the *nit* mutants of the universal *Foc* TR4 tester. Two VCG 01213/16 isolates were then selected for pathogenicity testing by inoculating 2-month-old tissue culture-derived Cavendish plants, using the method described by Viljoen et al. (2017). After 10 weeks, the *Foc* TR4-inoculated plants produced wilting symptoms and internal rhizome discoloration typical of Fusarium wilt. *F. oxysporum* was reisolated from the inoculated plants and identified as *Foc* TR4/VCG 01213/16 by PCR (Dita et al. 2010; Matthews et al. 2020), thereby fulfilling Koch's postulates. Local authorities have destroyed the infected plants and have undertaken an extensive survey to determine the distribution of *Foc* TR4 on the island. Three additional positive cases, identified with the real-time PCR assay of Aguayo et al. (2017), were found in the localities of Koungou ([WGS] 12° 44' 03"S, 45° 12' 08" E) and Bouéni ([WGS] 12° 54' 25"S, 45° 04' 43" E). These included infected Cavendish banana (AAA) plants (cv. Kontriké). This is the first time that *Foc* TR4 has been found on a banana variety other than Cavendish when newly detected in a country. Considering the proximity of Mayotte to other islands of the Comoros archipelago, Madagascar, and the East African coast, where banana is considered an important staple, this report describes a serious threat to banana production and the livelihoods of people in the region.

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