

Soil Characterization of Cavendish Banana Farms Infected and Non-infected with FOC TR4 in Davao del Norte, Southern Philippines

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Keywords

Davao del Norte, FOC TR4,
Cavendish banana farms,
Philippines, soil characterization

Abstract

In Mindanao, hectares of Cavendish banana farms are threatened by Panama disease caused by the soil-borne fungus *Fusarium oxysporum* f. sp. *cubense* (FOC) Tropical Race 4 (TR4), which cannot be controlled using fungicides and fumigants. FOC TR4 has the capacity to survive for decades in the soil. Hence, it threatens the million-dollar banana export industry and the livelihoods of people who depend on it. In this study, we determined the physical, chemical, and biological properties of soil from an FOC-infected and an FOC-free banana farm in Sto. Tomas, Davao del Norte, Philippines. Both farms vary in their physical characteristics as indicated in the soil textural analysis. In both farms, magnesium and zinc are more than the standard level, organic matter is below standards, and the soil pH is slightly acidic. We observed two bacteria colonies from the infected soil sample and one colony from the uninfected sample. However, we did not observe the fungi *Fusarium oxysporum* and *Ralstonia solanacearum* in the samples but found *Penicillium* sp. Root growth status was observed to be comparable in both infected and non-infected soils. In terms of plant parasitic nematodes, we found high populations of *Helicotylenchus* sp. in the roots and low populations of *Radopholus* sp., *Meloidogyne* sp., and *Hoplolaimus* sp. We also did not detect organophosphate, carbamate, pyrethroid, and glyphosate chemicals in both soil samples. The very low soil organic matter may imply suppression of soil organic dynamics. It may play a crucial role on the persistence of FOC TR4 in the soil.