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The Influence of Banana Cultivars on Pathogenic and Non-Pathogenic *Fusarium oxysporum*

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Abstract

Fusarium oxysporum f. sp. *cubense* (Foc) is a devasting soil-borne pathogen of banana. Monocultures are often blamed for the widespread epidemics of Foc. One option to reduce the vulnerability caused by genetic uniformity could be the use of banana cultivar mixtures. The use of different cultivars can have a positive effect if they curtail inoculum pressure or foster beneficial microorganisms, such as non-pathogenic *Fusarium oxysporum* (np-Fox). We studied the influence of four banana cultivars with different levels of Foc resistance on Foc race 1 (FocR1) and np-Fox strains. Cultivar (cv.) Silk (AAB) is highly susceptible to FocR1, cv. Prata (AAB) is moderately susceptible, and cvs. Ouro Colatina (AA) and Dwarf Cavendish (AAA) are both resistant. Tissue culture plantlets were grown in autoclaved soil inoculated with (1) the pathogen, (2) a combination of three np-fox strains or (3) the pathogen combined with the np-fox strains. After 65 days, root colonization by the different strains was quantified by qPCR, while the soil population was assessed by dilution plating. Root colonization by FocR1 of the highly susceptible cv. Silk was higher than of the other cultivars. Likewise, only cv. Silk provoked an increase of FocR1 population in soil. Cv. Prata, although showing internal symptoms similar to those of cv. Silk, did not increase FocR1 in soil and had lower root colonization by FocR1. Cv. Ouro Colatina had the lowest root colonization by FocR1, and, when inoculated with np-Fox, was the only cultivar that caused an increase of np-Fox in soil. The presence of np-Fox delayed the disease and reduced root colonization by FocR1 in all cultivars. This study suggests that inoculum pressure in soil could be reduced by the use of different cultivars. Also additional traits, such as the stimulation of np-Fox in soil by cv. Ouro Colatina, could be useful to manage the disease. Further research is needed to reveal if the positive effect on inoculum pressure and np-fox can be observed when the cultivars are planted in a mixture.?

Keywords: Banana, cultivars, Fusarium oxysporum *f. sp.* cubense, non-pathogenic fusarium oxysporum

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