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Effect of the Application of Antagonistic Fungi with Different Modes of Action for the Control of *Radopholus Similis* in Banana

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Abstract

Paecilomyces lilacinus strain 251 (PL251) and the non-pathogenic *Fusarium oxysporum* strain 162 (Fo162) are well known as biocontrol agents of a range of plant parasitic nematodes. *Paecilomyces lilacinus* is mainly an egg pathogen of sedentary stages of nematodes and the non-pathogenic fungal endophyte Fo162 induces systemic resistance in different host plants. Therefore, the two biocontrol agents with different modes of action were tested for additive or synergistic effects in their potential to control *R. similis* when co-applied to protect young banana plants. The biocontrol fungal Fo162 were applied to banana plantlets (cv. ‘Grand naine’) on the germination tray one and three weeks before transplanting. PL251 was incorporated to a sterilized field soil:sand (1:1) mixture, 6 days before transplanting. The final concentrations of the antagonists were 1×10^8 and 6×10^6 cfu g⁻¹ soil of Fo162 and PL251, respectively. Both treatments were inoculation with 1000 *R. similis* per plant. Banana plants were harvested 14 days after nematodes inoculation. None of the treatments affected root and shoot weight of the banana plants. When applied alone, both biocontrol agents significantly reduced the number *R. similis* per root. The combination of Fo162 and PL251 resulted in a penetration rate that was significantly lower compared to the inoculated control and Fo162 alone, respectively, but not different from PL251 alone. Determination of the rate of root colonisation by Fo162 revealed that in absence of the nematode, the percentage colonized root tissue was significantly reduced due to the application of PL251, but no differences were found when plants were inoculated with *R. similis*. To further investigate the interactions between these two biocontrol agents, dual culture in-vitro assays were conducted. In none of the assays negative interactions were found. These preliminary data indicate a potential to combine these biocontrol agents for increased control of *R. similis* on banana.

Keywords: Antagonist fungi, biocontrol, endoparasite nematode, Fo162, PL251