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Molecular Dissection of the Systemic Defense Response in Banana against *Radopholus similis* Infection Induced by Beneficial *Fusarium oxysporum* Strains

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Abstract

The burrowing nematode *Radopholus similis* causes the so-called toppling disease to banana plants and is a major problem in banana producing areas worldwide. It was recently shown that systemic resistance against *R. similis* can be induced, when the root system of banana plants is colonized with specific stains of non-pathogenic, endophytic *Fusarium oxysporum*. This offers a biological pest management alternative to the use of highly toxic nematicides commonly used for nematode control. However, not all non-pathogenic *oxysporum* strains show the ability to elict this type of systemic resistance in banana. One objective of our research is the early identification of promising *F. oxysporum* strains by means of phylogenetic analysis, which can accelerate the screening process for benefical isolates, by eliminating time consuming screenhouse bioassay. Although *F. oxysporum* has been identified as elicitors of the systemic induced resistance, the exact mechanism responsible for the induction is not yet known. Therefore another research goal is to elucidate the exact mode of action responsible for the induction of the systemic resistance in the banana plant on the molecular level. Analysis of the in planta-accumulation of salicylic acid, jasmonic acid, NPR1 and PR protein coding transcripts will serve as markers to determine whether Induced Systemic Resistance (ISR) or Systemic Acquired Resistance (SAR) are playing a role in the induced plant defense response and whether they are similar to that found on model plant species. The output of this research must lead to improving the biological pest management of nematodes in banana cropping systems.

Keywords: Banana, biological pest management, endophyte, *Fusarium oxysporum*, induced resistance, *Radopholus similis*

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