



Tropentag, September 17-19, 2014, Prague, Czech Republic

“Bridging the gap between increasing knowledge and decreasing resources”

Mode-of-Action of Fungal Endophytes in Controlling the Root-Knot Nematode Infection in Tomato

CATHERINE WANJA BOGNER¹, BEYENE ZWEDIE¹, GEORGE KARIUKI², ALEXANDER SCHOUTEN¹,
FLORIAN M. W. GRUNDLER¹

¹University of Bonn, Inst. Crop Sci. and Res. Conserv. (INRES) - Molecular Phytomedicine, Germany

²Kenyatta University of Agriculture and Technology, Dept. of Agriculture, Kenya

Abstract

Vegetable production has become increasingly significant in the coastal humid tropics of East Africa, in which tomato (*Solanum lycopersicum*) is one of the most important and appreciated crops. Plant parasitic nematodes, especially root-knot nematodes pose a major problem to the tomato production. The use of habitat-adapted endophytic fungi may provide a safe, efficient, reliable and affordable approach to control root-knot nematodes.

Green house biocontrol experiments aimed at screening tomato (cv. Moneymaker) against the root-knot nematode *Meloidogyne incognita* were carried out using 26 isolates, 21 of them having been newly isolated from tomato in Kenya and characterised to the genus or species level. In particular, isolates from the genera *Trichoderma* and *Fusarium* significantly reduced nematode gall formation and egg densities by 20 to 50% when compared to the non-inoculated control. This indicated that these isolates can also affect the development of the nematode after a successful infection. The two isolates that tended to perform best were selected for further screening of 'AVRDC–The World Vegetable Center' and favourite Kenyan tomato varieties.

In order to gain a deeper understanding of the induced defense responses in the plant, leading to this reduction in nematode infection, specific tomato mutants that are impaired in the jasmonic acid or salicylic acid mediated defense pathways were tested for responses against nematodes after endophyte inoculation. Also, the expression of several marker genes and the accumulation of specific marker enzymes, indicative for particular induced defense responses were followed in the presence and absence of endophytes and nematodes. Also, the effect of specific fungal metabolites on *M. incognita* and the initiation of induced defense responses in tomato was studied.

Keywords: Endophytic fungi, fungal metabolites, induced defense responses, jasmonic acid or salicylic acid, Plant parasitic nematodes, several marker genes, tomato