

## **088 - Infection structures on the leaves of Satsuma mandarin pre-treated with some effective rhizobacteria after inoculation with *Diaporthe citri***

**Yun Jung Ko, Yong Chull Jeun**

Jeju National University, South Korea

Citrus melanose caused by *Diaporthe citri* is one of the main diseases which instigate the use of chemical pesticides in cultivating Satsuma mandarin in Jeju. As an alternative strategy, biological control using microorganism has been sustained since last decade. In this study, the possibility of disease control using rhizobacteria against citrus melanose was investigated. Over 100 rhizobacteria were isolated from the rhizosphere of annual plants in Halla Mountain. Some of them such as THJ609-3, MRL 408-3 and TRH423-3 showed suppression of disease severity in the leaves of Satsuma mandarin after inoculation with the melanose pathogen not only in the green house test but also in the field test. The microscopical observation using a fluorescence microscope showed that number of conidia was decreased on the leaves of Satsuma mandarin pre-treated with rhizobacteria. Furthermore, scanning electron microscopical observations revealed some hyphae of melanose pathogen were attached by the rhizobacteria on the leaves of Satsuma mandarin indicating direct antagonistic effect of the rhizobacteria to the melanose pathogen. Based on these results it is suggested that the rhizobacteria may be useful as biological agents to protect citrus melanose on Satsuma mandarin.

## **091 - Impact of *Trichoderma harzianum*, *Paecilomyces* sp. and their secondary metabolites on suppressing *Fusarium graminearum***

*Auswirkungen von Trichoderma harzianum, Paecilomyces sp. und deren Sekundärmetabolite auf die Unterdrückung von Fusarium graminearum*

**Abbas El-Hasan, Tobias Krahl, Frank Walker, Jochen Schöne, Ralf Vögele**

Institute for Phytomedicine (360a), University of Hohenheim, 70599 Stuttgart, Germany

*Fusarium graminearum* (teleo. *Gibberella zeae*) is the causal agent of several destructive cereal crops diseases worldwide. In the absence of high levels of resistance to *F. graminearum* within commercial wheat cultivars, and due to the downsides of chemical fungicides application, development of an alternative strategy to maintain populations of the pathogen at low levels is by application of biocontrol agents (BCAs). In the present study we have evaluated the potential of two isolates of *Trichoderma harzianum* (T23 and T16), an isolate of *Paecilomyces* sp. and their secondary metabolites in suppressing *F. graminearum* *in vitro*. The results obtained from dual culture and volatile metabolites assays showed that in the presence of either *T. harzianum* or *Paecilomyces* sp, mycelial growth of *F. graminearum* was considerably inhibited. Microscopic examination has also demonstrated that the BCAs were capable to parasitize fusarial mycelia.

Following the bioautographic investigations using culture filtrates of *T. harzianum* and *Paecilomyces* sp. isolates revealed that several antifungal secondary metabolites had been excreted. The active metabolites were isolated, fractionated and purified by TLC and preparative-HPLC. Two previously identified active metabolites, namely 6-pentyl- $\alpha$ -pyrone (6PAP) and viridiofungin A (VFA), from extracts of isolate T23, two metabolites (F116 and F416) from extracts of isolate T16 and one metabolite (FP2) from extract of *Paecilomyces* sp. exhibited pronounced fungitoxic activity in bioautography and disk diffusion assays against *Cladosporium* sp. and *F. graminearum*, respectively.

When the metabolites were amended in PDB containing conidia suspension of *F. graminearum*, conidia germination and elongation of germ tubes were substantially retarded. In the presence of 200  $\mu\text{g}\cdot\text{ml}^{-1}$  of 6PAP or FP2 germination of conidia was completely diminished. Similar doses of the