IDENTIFICATION OF GENETIC DETERMINANTS INVOLVED IN THE INTERACTION BETWEEN TOMATO AND THE BENEFICIAL ORGANISM TRICHODERMA SPP.

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In the past few years several formulations of biopesticides based on fungal and bacterial antagonists have been introduced in the world market, mainly designed for organic farming but also for alternative, low input methods of disease management. Among the best characterised fungal antagonists are those belonging to the genus Trichoderma, that have developed the ability to directly interact with both plants and plant pathogens. During Trichoderma-plant interaction the antagonist can trigger systemic and localised resistance to pathogens as well as promote plant growth and development.

Using tomato as a model system, we have compared several genotypes treated with either T. atroviride P1 or T. harzianum T22 in terms of several biometric parameters. The results clearly demonstrate that all the considered parameters, including seed germination, plant development, tolerance to pathogens and specific gene expression, respond differentially to the interaction with Trichoderma in a plant genotype-depending way.

To identify the main genetic plant determinants involved in the processes of biocontrol and plant growth promotion by Trichoderma strains a subtractive hybridization approach has been adopted. RNA was extracted from in vitro-grown non Trichoderma-treated tomato plantlets (driver, Control plants) and from plantlets grown in the presence of T. harzianum T22 (tester, T22-treated plants) and used to construct subtractive libraries following the suppression subtractive hybridisation (SSH) procedure.

As a result of the screening 265 clones were identified. Differential expression of the clones was studied by dot blot analysis, revealing that 27% of clones were differentially up regulated. Sequence analysis showed that most of the clones were homologous to well-characterised genes involved in stress and disease response. However, about 22% of the clones matched nucleotide sequences annotated as unknown proteins. The expression of some of the isolated tomato genes was also confirmed by Real Time PCR.