Text
To date, the screening of most microbial biocontrol agents has been conducted *in vitro* thereby restricting our ability to predict biocontrol behaviour in planta. Here we developed a novel approach, non-destructively capturing plant immune-biosensor output (via gene-based reporter system) in real-time for screening of beneficial microbes with plant immunity inducing properties. We focused on biocontrol agents capable of suppressing disease caused by destructive necrotrophic fungal pathogens such as *Sclerotinia sclerotiorum* and *Rhizoctonia solani*, both for which limited host resistance exists. Searching transcriptomic databases for genes of the model plant *Arabidopsis thaliana* responsive to necrotrophic fungi and to beneficial microbes, we identified the *GLUTATHIONE S-TRANSFERASE PHI7* (*GSTF7*) gene. We designed a *GSTF7:luciferase* reporter system in stably transformed Arabidopsis for non-destructive observation of *GSTF7* expression in planta, and used this system to screen in high-throughput a collection of candidate microbes. We identified a *Streptomyces* isolate which protected plants against *S. sclerotiorum* and *R. solani*, but not against a bacterial pathogen. Treatment of plants with either the *Streptomyces* culture or its cell-free fermentation extract induced a range of stress and defense related genes and hormone signaling pathways. Our study demonstrates that *GSTF7* is a suitable marker for the rapid and preliminary screening of beneficial microbes for crop protection.

EVIDENCE OF CROSS-PROTECTION BETWEEN GEMINIVIRUSES IN TOMATO AND THE ESCAPE PHENOTYPE OF THE INVASIVE RECOMBINANT TOMATO YELLOW LEAF CURL VIRUS -IS76

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Text
Whereas cross protection was extensively studied and applied in plant protection strategies (PPS) with RNA viruses, this phenomenon was rarely reported with ssDNA viruses of the family Geminiviridae. Using tomato yellow curl virus (TYLCV), a worldwide economically important tomato geminivirus belonging to the genus Begomovirus, we formally demonstrated the existence of cross protection in geminiviruses. When a TYLCV clone is inoculated in susceptible tomato plants already infected with a mutated version of the clone (8 CG deletion in the intergenic region), its accumulation is at least 100 times lower than its accumulation in non-pre-infected plants. The protection effect persists at least two months after superinfection and was also observed in isogenic plants carrying the resistant gene Ty-1, irrespective of the super-inoculation mode, mediated by agrobacterium or the whitefly vector Bemisia tabaci. As TYLCV is not mechanically transmitted, cross protection is not easily implementable in PPS. However, as of now, it sheds new light on the unusual fitness of TYLCV-IS76, a TYLCV recombinant that easily superinfect TYLCV infected plants in spite of its high nucleotide identity with TYLCV (98 %). Indeed, considering that another TYLCV recombinant, exhibiting the same recombination pattern and the same genetic distance with TYLCV, is unable to establish an infection in tomato plants already infected with TYLCV, TYLCV-IS76 seems to exhibit a cross-protection escape phenotype.

SYMBIOTIC COMPATIBILITY BETWEEN ORYZA SATIVA AND ARBUSCULAR MYCORRHIZAL FUNGI GENOTYPES IMPACTS RICE'S