

RELEVANCE OF THE PLANT GENOTYPE FOR BIOCONTROL TOOLS BASED ON RESISTANCE INDUCTION

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Downy mildew caused by *Plasmopara viticola* is a serious disease of grapevine, and its control is based on the intense application of chemical fungicide. We previously showed that *Trichoderma harzianum* T39 (T39) and benzothiadiazole-7-carbothioic acid S-methyl ester (BTH) reduce downy mildew severity in the Pinot Noir grapevine variety by enhancing plant resistance. However, the effect of the plant genotype on the resistance induction mechanisms was not yet analyzed in grapevine. The aim of this study was to characterize the physiological and molecular properties of the T39-induced resistance in different grapevine varieties used for table and wine grape production, in order to further optimize the use of this agent for downy mildew control. Rooted cutting from 14 grapevine varieties were grown under greenhouse conditions. T39 conidia, BTH and water (control) were applied to grapevine leaves and *Plasmopara viticola* sporangia were then inoculated. Here we show that T39 treatment significantly reduces downy mildew symptoms in the different grapevine varieties. However, different levels of T39 efficacy were observed: T39 efficacy was particularly high in Negroamaro plants, but it was lower in Primitivo than in Pinot Noir plants, indicating that the plant genotype is a key determinant of T39-induced resistance. Moreover, the efficacy of resistance activated by BTH was higher than T39 and was not affected by the grapevine genotype. Gene expression analysis of four defence marker genes confirms the complex effect of the plant genotype on the molecular mechanism activated by pathogen inoculation and by T39 treatment in different varieties. In Pinot Noir and Primitivo varieties, T39-induced resistance is based on a dual effect: direct induction of *PR-2* and *PR-4* genes and enhanced expression of these genes after pathogen inoculation. Correlation between gene expression and T39 efficacy was observed in Primitivo and Pinot Noir plants, but more complex regulation or additional defence genes are implicated in the T39-induced resistance in the variety Sograone and Negroamaro. Grapevine varieties have different reaction to the same stimuli, indicating that specific receptors are probably involved in the regulation of the plant response. The evidence reported here suggests that a good resistance inducer should be applied on a highly responsive cultivar in order to maximize the effect of the biocontrol agent.