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Poster Communication Abstract – PH.61

FUNGAL TERPENOIDS BIOSYNTHESIS AND INDUCTION OF PLANT DEFENSE RESPONSES IN THE BENEFICIAL INTERACTION BETWEEN TRICHODERMA GAMSII T6085 AND WHEAT ROOTS

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Trichoderma, root colonization, plant defence priming, terpene synthases

Trichoderma gamsii T6085 has been investigated for many years as biocontrol agent against Fusarium Head Blight (FHB) of wheat. The beneficial effects of T6085 rely not only on its ability to reduce the growth of the FHB causal agents, but are likely related to its endophytic behavior as well as to its ability to induce host resistance. Root colonization by Trichoderma spp. triggers an exchange of molecular signals involving Secondary Metabolites (SMs), that promote substantial changes in both the plant and the fungal physiology. T6085 is a rich producer of SMs. Its genome contains a great number of terpene synthase (TS) genes, responsible of the biosynthesis of terpenoid compounds acting as chemical messengers in Trichoderma-host interactions. In order to assess changes on TSs gene expression in T6085 as well as its ability to induce plant defence responses, a co-culture of T6085 and wheat was made on PDA. After 3 days of interaction with wheat seedlings, T6085 was able to colonize the internal layers of the roots and to prime plant defence responses. Up-regulation of PR1 and PAL1 genes indicates a local SA-JA dependent signalling, while that of PGIP2 suggests that the activation of plant defences could occur through the accumulation of oligogalacturonides presumably released by the activity of T6085 polygalacturonases. In addition, a significative reprogramming in terpenoid biosynthesis occurs in the fungus during root colonization. The highest difference was found in the Trichodiene synthase (TRI5)-encoding gene, which is embedded in a cluster enclosing other six genes whose co-expression was also validated. This suggests that the interaction with the roots induces in T6085 the biosynthesis of an unknown trichodiene-derived compound which could be involved in the establishment of a beneficial relationship with wheat roots.