A different point of view of plant-bacterial interactions: RNA-Seq analysis of a PGP bacterial endophyte colonizing rapeseed plants

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Abstract: Some microbes are important players in plant’s fitness, contributing to their nutrients acquisition and protection against diverse biotic and abiotic stresses. Despite the vast knowledge acquired during the last decades about the effects in plants of plant growth promoting (PGP) bacteria, apart from those of the legume-rhizobial interactions, not much is known about the response of bacteria to the interaction with plant. With the aim to decipher the transcription profile of a non-rhizobial strain in its interaction with the plant, a PGP Pseudomonas strain isolated from Brassica napus roots and capable to protect the plant against biotic and abiotic stresses was inoculated onto rapeseed seedlings. Eleven days post-inoculation, we obtained the RNA-Seq profile of bacterial cells colonizing the seedlings’ roots. RNA from free living cells was used as control. Our analyses allowed us to identify 1378 bacterial genes differentially expressed (log2 fold change > 2; adjusted p value < 0.05). Most overexpressed genes in the interaction are related to biofilm formation, bacterial immunity and infection and bacterial survival to antimicrobial compounds -likely excreted by the plant-. However, genes implicated in PGP traits which had been previously demonstrated in vitro for this strain, appeared to be not significantly overexpressed, suggesting a latter PGP action in the interaction. Based on this RNA-Seq experiment, our results shed light into bacterial mechanisms to effectively colonize plant roots, to survive to plant defense mechanisms as well as to promote plant immunity.

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