10th IWGTD, Reims, 4-7 juillet 2017 in *Phytopathologia Mediterranea* 56 (3) 513-588

***Yacoub A***, ***Magnin N***, ***Gerbore J***, ***Bruez E***, Compant S, Ezra D, Gramaje D, Karaffa E, Mugnai L, **Rey P**
(2017) Grapevine and trunk pathogen transcriptomic changes induced by the root biocontrol agent *Pythium oligandrum*.

*Pythium oligandrum* is an Oomycete whose strains naturally colonize grapevine roots in the Bordeaux region as well as in other countries such as Austria, Hungary, Italy, Israel and Spain.

Following root colonization with *P. oligandrum* alone, grape-genome microarray analyses showed significant changes in the grapevine root transcriptome. Whereas the expression of several transcripts would suggest that the plant sets up defense systems against the Oomycete, certain similarities with symbiotic microorganism/ root interactions were also observed, the main one being the stimulation of subtilases. *P. oligandrum* is used as a potential biocontrol agent against various pathogenic fungi of plants, including Esca.

Greenhouse assays showed that the necrosis caused by the Esca pathogen *Phaeomoniella chlamydospora* were significantly reduced (40–50%) when *P. oligandrum* colonized the root system of vine cuttings. In order to characterize the mechanisms occurring during this tri-partite interaction, the global transcriptomic grapevine responses at stem level were analyzed, using *Vitis vinifera*-microarrays and RNAseq. Microarray analyses showed that *P. oligandrum* induced a few changes on the plant transcriptome, and also primed the plant responses in presence of the pathogen. Some similarities with Induced Systemic Resistance (ISR) were detected, with specificities at the induction of genes related to jasmonate pathway enzymes and to ethylene-responsive transcription factors.

To the best of our knowledge, this result represents the first dataset presenting high-throughput analyses in order to investigate transcriptional changes in the wood tissues of a perennial species induced by a biocontrol agent inoculated at root level. Analysis of the *P. chlamydospora* RNA messenger (mRNA), showed that several genes related to secondary metabolite synthesis, transcription factors implicated in pathway regulations, and certain Carbohydrate Active enZymes (CAZymes), were modulated, when *P. oligandrum* colonized the roots. These results showed that root inoculation with *P. oligandrum* probably induced indirect stress on *P. chlamydospora* transcriptomic responses.