

THE ROLE OF CRZ1 IN SYNCHRONIZING LIPID METABOLISM, OXYLIPIN SYNTHESIS AND FUMONISIN PRODUCTION

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Fusarium verticillioides (Fv) is the main maize (*Zea mays*) pathogen, able to produce fumonisins (FB1 and FB2), dangerous mycotoxins for human health. Our previous studies relate the fumonisin production with the lipid metabolism and suggest the presence of a common transcription factor that possibly allowed their coordination: i.e. Calcineurin- Responsive Zinc Finger 1 - CRZ1. To understand the nature of this coordination of so different metabolic pathways in *F. verticillioides*, we generated a set of mutant strains (*crz1D*; *crz1-C*) and tested these under artificial infection of maize seedlings. HPLC-MS/MS analysis demonstrated that the fatty acids and oxylipins content is severely altered by the deletion of the G.O.I. Every fatty acid (FAs; C24:0 and C18:1 made exception) and oxylipin analysed was present at lower amount in the deletion mutant compared to the WT strain; this suggests an important involvement of CRZ1 in the regulation of lipid metabolism during the pathogenic growth of *F. verticillioides* in maize seedling. Intriguingly, even fumonisins (B1 and B2) synthesis is drastically hampered in the *crz1D* strain compared to WT at 14 days after inoculation; it's possible to argue that CRZ1, controlling FA synthesis, generates the proper conditions for producing oxylipins, essential factors in modulating FB synthesis. Furthermore, qRT-PCR analysis of the same infected maize proves that the absence of *crz1* leads to an imbalance expression of the fatty acid related genes validating the results obtained with the HPLC- MS/MS analysis. We suggest here that CRZ1, being present upstream of the lipid pathway, acts as the main switch of all response mediated by fatty acids (e.g. mycotoxins synthesis), and, not by chance, is often referred as a master regulator.