

P43 –Can nitrogen nutrition affect the grapevine resistance to downy mildew?

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Abstract

Downy mildew (caused by *Plasmopara viticola*) is a disease that strongly affect grapevine. To date, the use of fungicide is still the most effective way to prevent the spreading of the pathogen. However, concerns about the safety and the environmental impact of the fungicides make the search of new solutions an urgent problem. Nitrogen nutrition can be one of this. Indeed, *P. viticola*, that lack of some nitrogen related pathways, can take advantage of plant nitrogen. In this work, we hypothesized that *P. viticola* could suffer the absence of nitrogen, making the susceptible Pinot Noir cultivar less susceptible to the pathogen. Pinot noir plants were grown in hydroponic solutions with five different nitrogen concentrations (0, 0.05, 1, 2 and 5 mM) and leaf nitrogen content, photosynthetic performance, *P. viticola* sporulation and gene expression of four nitrogen-related genes (VvLBDIc3, VvLBDIf5, VvLBDIIa3 and VvLBDIIb2) were estimated at three different time points. Leaf nitrogen content, photosynthetic performance and disease severity were reduced at the 0 mM treatment. Nitrogen treatments modulated the expression of genes analysed. VvLBDIc3, VvLBDIf5 and VvLBDIIa3 were overexpressed at low nitrogen concentrations, suggesting a role during nitrogen starvation. While, VvLBDIIb2 was underexpressed at low nitrogen concentrations. A correlation between disease severity and gene expression has been highlighted. These data demonstrated that decrease in nitrogen content can have a positive impact on the incidence of downy mildew, stressing the importance to manage the vineyard nitrogen nutritional status and suggesting an appropriate use of fertilizers, with a beneficial impact for environment and human health.

Keywords: *Plasmopara viticola*, leaf nitrogen content, photosynthetic performance, disease severity, LBD genes.