Pathogen defense in plants – transcriptional regulation of the promoter from *Vitis vinifera* PR10

Moser T.[1], Merz P.[2], Bogs J.[2] , Zyprian E.[1]

[1] Julius-Kühn-Institut, Institut für Rebenzüchtung Geilweilerhof, 76833 Siebeldingen
[2] Dienstleistungszentrum ländlicher Raum Rheinpfalz, Studiengang Oenologie und Weinbau, 67435 Neustadt
Email of corresponding author: tina.moser@jki.bund.de

Erysiphe necator (synonym Uncinula necator [Schw.] Burr) causes Powdery Mildew of grapes and is one of the major pathogens in viticulture. It was introduced to Europe in the 19th century from North America. The European grape *Vitis vinifera ssp. vinifera* is highly susceptible to this ascomycete fungus. Since then it is unavoidable to spray the plants with high amounts of fungicides. These treatments can be reduced by breeding of resistant cultivars. It has become increasingly common to use molecular markers correlated with traits of interest, like pathogen resistance for efficient marker-assisted breeding. However, a deeper understanding of the knowledge about defense mechanisms in the plants would highly improve the development and efficiency of the usage of resistance-correlated markers.

To unravel the molecular mechanisms of plant defense, differential gene expression studies were carried out previously using a resistant and susceptible genotype, respectively, inoculated with *Erysiphe necator*. It could be shown that the candidate gene pathogenic-related protein 10 (PR10) is 50-fold up regulated in the resistant cultivar and only weakly in the susceptible (< 3-fold). In this work the promoter of PR10 was cloned from both a resistant and susceptible genotype to get an idea about transcription factors that regulate the expression of PR10. The fragments were sequenced, analysed for *cis*-regulatory motifs *in silico* and linked to a luciferase reporter gene. The constructs were then tested in a transient grapevine transformation assay in combination with different transcription factors which had also been shown to be differentially regulated in the resistant cultivar after inoculation with *Erysiphe necator*. In these studies the promoter of PR10 appears to be activated by WRKY33, ethylene-responsive transcription factor 5 (ERF5) and CZF1/ZFAR1.