

P47 – Adaptation of *Plasmopora viticola* isolates against defense mechanisms conferred by different resistance genes in grapevine

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Abstract

The grapevine breeding for disease resistance is a strategy to promote the viticulture sustainability worldwide. Due the perennial nature of grapevine, it is essential that the genetic resistance should be durable. However, biotrophic pathogens with a mixed reproduction systems associated with heterotalism, such as *Plasmopara viticola*, the causal agent of grapevine downy mildew, have a high evolutionary potential that confers a strong capacity to overcome resistance mechanisms. Thus, the main aim of this work was to evaluate the level of adaptation of *P. viticola* populations to resistant grape varieties/genotypes carrying different combinations of R-Gene alleles in Santa Catarina state, Brazil. For this purpose, *P. viticola* inocula were collected from two sites of the State (Curitibanos and Urussanga) in the year of 2021. The inoculum was composed of a mixture of sporangia sampled at the end of the grapevine cycles, from hosts containing the R-alleles *Rpv3*, *Rpv10*, *Rpv1+3*, *Rpv3+10*. The sporangia suspension was prepared from each population and used in cross inoculations using leaf discs of the susceptible variety Cabernet Sauvignon and a panel of ten cultivars/genotypes containing different R-alleles combinations (*Rpv3.1*, *Rpv3.1+3.2*, *Rpv3.1+3.3*, *Rpv1+3.1*, *Rpv10*, *Rpv10+3.3*, *Rpv10+3.1+3.3*, *Rpv12* and *Rpv12+3.1*). At six days after cross-inoculation (dai), disease severity, resistance level (OIV 452-1 descriptor) and sporulation incidence were evaluated; at 7 dai, sporangia production was measured. The data obtained were subjected to analysis of normality and variance, followed by the Freedman, Dunn's and Tukey tests. The *Rpv12* allele was the most effective source of resistance, limiting completely the sporulation of the pathogen. *Rpv10* allele was also highly efficient, and no additive effect was observed when combined with the *Rpv3* allele. In addition, an erosion of the resistance conferred by *Rpv3* allele was observed, manifested as a dense sporulation as Cabernet Sauvignon. However, when *Rpv3* was combined with *Rpv1*, a high level of resistance was generally observed. Isolates collected from Curitibanos and Urussanga were able to sporulate in host carrying *Rpv1+3*, and *Rpv3+10*, bringing concerns about the durability. This knowledge is fundamental for the definition of breeding strategies for the release of grapevine varieties with durable resistance.

Keywords: disease resistance, plant breeding, PIWI, durability