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Scouting downy and powdery mildew susceptibility genes: a diversity study in *Vitis spp*

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World viticulture is continually threatened by both known and emerging pathogens. Until now, the investigation on resistance loci/genes has been the main trend to understand the interaction between grapevine (*Vitis spp.*) and mildew causal agents. Dominantly inherited gene-based resistance has shown to be race-specific in some cases, not to confer total immunity and to be potentially overcome within a few years. Recently, on the footprint of research conducted on Arabidopsis and barley, genes associated to downy (DM) and powdery (PM) mildew susceptibility have been discovered also in the grapevine genome.

In the present work, in order to find new sources of broad-spectrum recessively inherited resistance against pathogens five susceptibility genes were re-sequenced (Illumina, 1000X depth) in 96 grapevine accessions including wild, vinifera and hybrid individuals. The scouted genes were *VvDMR6-1*, *VvDMR6-2*, *VvDLO1*, *VvDLO2* involved in susceptibility to DM and *VvMLO7* associated with susceptibility to PM. These genes were mapped on the reference genome and analysed to identify polymorphisms and haplotypes using dedicated software to study the mutation impact. Preliminary results showed 10 mutations affecting the *VvMLO7* protein structure (high-medium impact) dispersed in 75% of accessions; in particular, one Single Nucleotide Polymorphisms (SNPs) led to premature stop codons. Moreover, 70% of the accessions showed a total of 13 SNPs in *VvDMR6-1* and 11 in *VvDMR6-2* impacting their coding and amino acid sequences. Finally, 12 mutations were detected in the *VvDLO1* coding sequence in 37 individuals, whereas the *VvDLO2* sequence appeared much more conserved with only one SNP identified in four accessions. These findings will be validated taking advantage of several reliable parentages. Prior haplotype function confirmation, the final results will corroborate genomic-assisted breeding programs for resistance to biotic stresses.

Keywords: DLO, DMR, MLO, resistance, SNP