

## GENOME WIDE ASSOCIATION ANALYSIS OF PHENOLOGY RELATED TRAITS IN VITIS VINIFERA L

BOLOGNESI G.\*, CRESPIAN M.\*\*\*, BROCCANELLO C.\*, DELFINO P.\*, MORA R.\*, MARINI M.\*, GARDIMAN M.\*\*\*, GIUST M.\*\*\*, TOMASI D.\*\*\*, BELLIN D.\*

\*) Department of Biotechnology, University of Verona, Verona, Italy

\*\*) CREA Research Centre for Viticulture and Enology, Conegliano (TV), Italy

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Grapevine (*Vitis vinifera* spp. *vinifera*) is an important crop cultivated all over the world. Like other crops, grapevine is susceptible to climate change, in particular to the increase of temperatures, that may advance the date of phenological stages with a loss in quality of the fruit final product. Therefore, the understanding of the genetic determinants driving the phenological stages of flowering, veraison and the interval between them, represents an interest target for the development of grapevine cultivars adapted to the changing environment.

Here we conducted a GWAS analysis with the final aim of identifying SNPs significantly associated to flowering time, veraison time and to the interval among them.

A germplasm collection (CREA-VE in Susegana, Treviso, Italy) including 649 grapevine cultivars, representing 365 unique genotypes, was considered. All cultivars were phenotyped for flowering time and veraison time for 11 years. Traits distribution was inspected and eventually corrected. The trait flowering-veraison interval was derived and treated in a similar way as others. For the analysis we have built a dataset including 6679 SNPs. These were either recovered from literature or integrated in the frame of this study, by DNA genotyping using the *Vitis*18K SNPChip.

MLM analysis conducted independently for the three phenological traits identified a list of few significantly associated SNPs. Among the three traits flowering time yielded the highest number of associated SNPs. For each trait SNPs consistently associated across more years were found.

Moreover partially overlapping SNPs associated both to veraison time and flowering-veraison time interval were found. Interestingly most of the associated SNPs co-localized with QTL regions already known either for flowering or veraison traits in grapevine. Putative candidate genes underlying such regions and their possible involvement in the regulation of the phenological stages in grapevine are discussed.