

PHENOTYPIC PLASTICITY IN *VITIS VINIFERA*: HOW ENVIRONMENT SHAPES WINE

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Phenotypic plasticity can be defined as a re-programming of the genome in response to changes in the environment, resulting in new, different phenotypes. Plastic responses range from morphological modifications to drastic changes in physiology, life history and behaviour, depending on the environment the organism faces.

Phenotypic plasticity has been deeply studied in plants, both for its agronomical significance as well as its ecological and evolutionary implications. However, the mechanisms determining plastic changes are still largely unknown especially for plants cultivated in open fields, where the simultaneous challenge of different environmental signals leads to complex responses in terms of gene expression, metabolic rearrangements and epigenetic mechanisms.

Vitis vinifera spp is one of the most plastic plants known, a single genotype being able to produce berries with different quality, thus different wine qualities, depending on the micro-environment where it is cultivated. Moreover, plastic responses in grapevine are one of the causes of excellent-to-poor wine vintages.

In order to better understand dynamics of phenotypic plasticity in *Vitis vinifera*, we studied the behaviour of a single genotype, the clone 48 of the cultivar Corvina, in different environments. Therefore, we sampled berries of three developmental stages (veraison, pre-ripening and ripening), during three consecutive years (2006, 2007 and 2008). These were obtained from eleven different vineyards in Valpolicella, Soave and Bardolino, the three most important areas for local wine production in Verona. Transcriptome will be studied using Nimblegen microarray platform and differential gene expression will be correlated with central micro-environmental and agricultural features like type of soil, altitude and orientation of rows, type of breeding, age of vineyards and type of rootstock. Furthermore, transcriptomic as well as metabolomic data will be analysed in light of chemical-physical characteristics of wines produced in the above-mentioned vineyards, in the attempt to create a direct link between grapevine plasticity norms and the multitude of wine quality facets.