Proceedings of the Joint Meeting AGI-SIBV-SIGA
Assisi, Italy – 19/22 September, 2011
ISBN **978-88-904570-2-9**

Poster Communication Abstract – 6A.43

THE GIBBERELLIC ACID RESPONSE OF DIFFERENT *VITIS VINIFERA* CULTIVARS DURING FRUIT SET

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Gibberellin, gibberellic acid, inflorescence, fruit set, Vitis vinifera

Bunch rot caused by mildews may lead to severe losses at harvest especially in the case of rainy seasons. For this reason, practices have been implemented to achieve berry thinning which allows to obtain aerated clusters also in cultivars with dense bunches that retain high humidity. The most common practice consists of treatments with gibberellins (GAs) at the moment of flowering (anthesis), which results in a reduction of fruit set and consequently produces looser bunches. GA treatments however have very different effects on different grapevine cultivars: the reduction of fruit set remains limited in the family of Pinot, where it is compensated by harvesting of healthier grapes, but results to be dramatic in other cultivars such as Sauvignon Blanc, with excessive yield's loss and effects persisting even in the years successive to the treatment.

Gibberellins (GAs) are plant hormones that regulate growth and influence various developmental processes, including germination, dormancy, stem elongation, flowering and fruit set. All known gibberellins are synthesized by the terpenoid pathway and then modified by several GA oxidases until they reach their biologically-active form. The two main active GAs synthesized in plants are GA1 and GA4, although it is yet not clear which form is mainly regulating developmental processes in grapevine inflorescences. Active GAs are eventually deactivated by modifications into inactive gibberellin forms. The pool of active gibberellins is maintained both by regulation of their biosynthetic pathway involving GA13, GA20 and GA3 oxidases, and their modifications through GA2 oxidases. Active gibberellins in plants are sensed by GID proteins (Gibberellin-insensitive-Dwarf), and the GA response is regulated mainly through a family of repressors of gene expression: the DELLA proteins. In the presence of the GA signal, GID interacts with DELLA proteins and direct them to proteolysis.

This work aims to characterize the molecular response to GAs of *Vitis vinifera* inflorescences from the cultivars Pinot Gris and Sauvignon Blanc, which show very different fruit set reduction in response to GA treatment.

We set up a analytical method to determine endogenous concentrations of several gibberellin species in grapevine inflorescences of the two cultivars, which allows us to detect up to nine different GAs starting from a methanolic extract separated by reverse phase UPLC chromatography coupled with a mass spectrometer.

In addition, this works aims to characterize the family of grapevine GA oxidases in terms of gene structure, gene expression and activity, and to determine whether their expression levels are different in the two cultivars following treatment with GA3.

Here, the most up-dated results of these investigations will be presented.