SOCIETA' ITALIANA GENETICA AGRARIA

S. I. B. V.

FEEDING THE PLANET: PLANT SCIENCE AND BREEDING FOR THE FUTURE OF AGRICULTURE

JOINT CONGRESS
SIBV - SIGA

8-11 SEPTEMBER 2015
MILANO
University of Milano

PROGRAMME

POSTER LIST

Tipologia ~~OTHER~~? Conference abstract

Proceedings of the Joint Congress SIBV-SIGA
Milano, Italy – 8/11 September, 2015
ISBN **978-88-904570-5-0**

Poster Communication Abstract – 1.22

METABOLIC AND TRANSCRIPTIONAL PROFILING OF TRANSGENIC MICROVINE PLANTS AND FRUIT OVEREXPRESSING *VvDXS1*

DALLA COSTA L.*, EMANUELLI F.*, TRENTI M.*, LORENZI S.*, YU X.*, MOSER S.**, LARCHER R.**, MALNOY M.*, GRANDO M.S.*

*) Research and Innovation Centre, Fondazione Edmund Mach (FEM), Via E. Mach 1, 38010 San Michele all'Adige (Italy)
**) Technology Transfer Centre, Fondazione Edmund Mach (FEM), Via E. Mach 1, 38010 San Michele all'Adige (Italy)

microvine model system, gene transfer, isoprenoids

Muscat aroma is one of the most appreciated primary flavors in grapevine (*Vitis vinifera* L.) playing an essential role in high-quality winemaking as well as in table grape consumption. In fact, its enhancement and improvement is one of the main goals of grapevine breeding programs. The chloroplast localized methyl erythritol phosphate (MEP) pathway produces the common precursors of monoterpenes, diterpenes, carotenoids, the prenyl chains of chlorophyll and plastoquinones, and some sesquiterpenes. In this pathway the central metabolic intermediates pyruvate and glyceraldehyde-3-phosphate are diverted towards isoprenoid biosynthesis by 1-deoxyxylulose 5-phosphate synthase (DXS). *VvDXS1* was reported as a positional candidate gene for Muscat flavor having been co-localized with a major QTL for the monoterpenoid contents in grapevine berries. A missense mutation (K284N) was associated with muscat flavored grape varieties and its functional effect was then proven in transgenic tobacco adopting a reverse genetics approach. Here the same strategy was applied in grapevine using the microvine, a model system based on the *Vvgai1* mutant allele that confers a dwarf stature, short generation cycles and continuous flowering, and is suitable for rapid genetic studies in small controlled environments. *Agrobacterium tumefaciens* mediated gene transfer experiments successfully generated independent microvine lines overexpressing both the mutated (N284) and non-mutated forms (K284) of *VvDXS1* which didn't show pleiotropic phenotypes compared to the wild type plant and produced mature fruits around 300 days after *ex-vitro* acclimatization.

Transcriptional and metabolic profiling of transformed plant lines in various organs and tissue types, including the berry, were consistent with an increased flux in the MEP pathway resulting from the DXS activity.