



A novel grapevine color locus regulates anthocyanin pigmentation of vegetative organs in response to UV-B

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The 8th International Workshop on Anthocyanins

Montpellier (France)

16-18/09/2015



Thursday September 17th

09h00 - 11h40 SESSION 1- Biosynthesis and Genetics

Chairs: Dr. Kevin DAVIES & Dr. Nicole HUGHES

09h00- New plant breeding techniques for bio-sustainable production of natural colors in black carrot.

H. BRINCH-PEDERSEN and I. B. HOLME

09h20- Multiple copies of a simple MYB-binding site confer trans-regulation by flavonoid-related R2R3 MYBs.

R. ESPLEY, C. BRENDOLISE, C. BUTTS, K. LIN-WANG, T. MCGHIE, C. BAVA, S. TOMES, R. HELLENS, and A. ALLAN

09h40- Evidence of common genetic control of anthocyanin and flavonol content and composition in mature grapes.

G. MALACARNE, S. LORENZI, E. COLLIER, J. BATTILANA, M. TROGGIO, U. VRHOVSEK, F. MATTIVI, M. GRANDO, C. MOSER, and L. COSTANTINI

10h00- Purple yeast: reconstruction of anthocyanin pathway in yeasts – bottlenecks and challenges.

S. MARTENS

10h20 - 11h00 Coffee break

Chairs: Dr. Richard ESPLEY & Dr. Nobuhiro SASAKI

11h00- A novel grapevine color locus regulates anthocyanin pigmentation of vegetative organs in response to UV-B.

J.T. MATUS, E. CAVALLINI, R. LOYOLA, J. HÖLL, L. FINEZZO, J. BOGS, G.B. TORNIELLI, A. AGEORGES, and P. ARCE-JOHNSON

11h20- *In planta* anthocyanin degradation by a vacuolar class III peroxidase in *Brunfelsia calycina* flowers.

G. ZIPOR, P. DUARTE, I. CARQUEIJEIRO, R. OVADIA, P. TEPPER-BAMNOLKER, D. ESHEL, Y. LEVIN, A. DORON-FAIGENBOIM, M. SOTTOMAYOR, and M. OREN-SHAMIR

A novel grapevine color locus regulates anthocyanin pigmentation of vegetative organs in response to UV-B

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The color of grapevine berries relies on the allelic condition of a major locus on chromosome 2 harboring at least two functional R2R3-MYB genes; *MYBA1* and *MYBA2*. These transcription factors control different steps of the anthocyanin-specific branch within the phenylpropanoid pathway. The simultaneous occurrence of transposon insertions, deletions and/or point mutations in these genes are responsible for the un-pigmented phenotype of most white-skinned grapes but red pigmentation found in vegetative organs of these cultivars suggests the presence of additional regulators. We previously performed a genome-wide analysis of the R2R3-MYB family in grapevine showing that those genes related to flavonoid synthesis had expanded in number. These tandem and segmental duplication events were specific to the anthocyanin, proanthocyanidin (PA) and C2 motif repressor clades, but excluded other closely related groups such as the flavonol or thricome clades. The following presentation describes a cluster in chromosome 14 containing three *MYBA*-closely related genes. Their ectopic expression in grapevine, followed by transcriptomic analysis showed that these genes activate several flavonoid genes promoting the specific accumulation of anthocyanins. Transient gene reporter assays showed they share many targets with *MYBA1/A2*, but largely differ in activating the synthesis of tri-hydroxylated anthocyanins. In contrast to *MYBA1*, these genes seem to form part of the intrinsic response of grapevine to UV-B radiation. These results demonstrate the involvement of two distinct loci in a tissue-specific regulation of anthocyanin synthesis in grapevine.

Keywords: grape, ultraviolet radiation, leaves, MYB.