



Seminar



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Elucidating the physiological and genetic origin of grape seedlessness

Seedlessness is greatly appreciated by consumers of fresh and dry grapes. While stenospermocarpic seed abortion is the usual source of commercial seedless cultivars, parthenocarpic development of fruits in the absence of fertilization has also been selected in some raisin cultivars. To elucidate the origin of parthenocarpy we compared Corinto Bianco parthenocarpic and Pedro Ximenez somatic variant lines. Histochemistry, genetic and transcriptomic analyses identified that meiotic defects in Corinto Bianco lead to seedlessness by impeding the development of viable gametes and occasionally, to seeds with polyploid embryos developed from unreduced gametes. On the other hand, while the SDI locus was mapped as the major determinant of grape stenospermocarpy, the underlying sdi mutation remained unknown. After fine-mapping the locus by studying recombinant individuals in two segregating populations, by RNA-seq comparison of F1 segregants we identified candidate mutations in two genes within the fine-mapping interval. Targeted genotyping of the two genes in a collection of 124 grapevine cultivars showed that only the single-nucleotide-variant causing the Arg-197-Leu substitution in the seed VviAGL11 gene was fully linked to stenospermocarpy. The concurrent postzygotic variation identified for this missense polymorphism and seedlessness phenotype in seeded somatic variants of Sultanina stenospermocarpic cultivar strongly supports the causal effect of this mutation as the major origin of seedless grapes.

Room 6302 – Palazzo della ricerca e della conoscenza
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