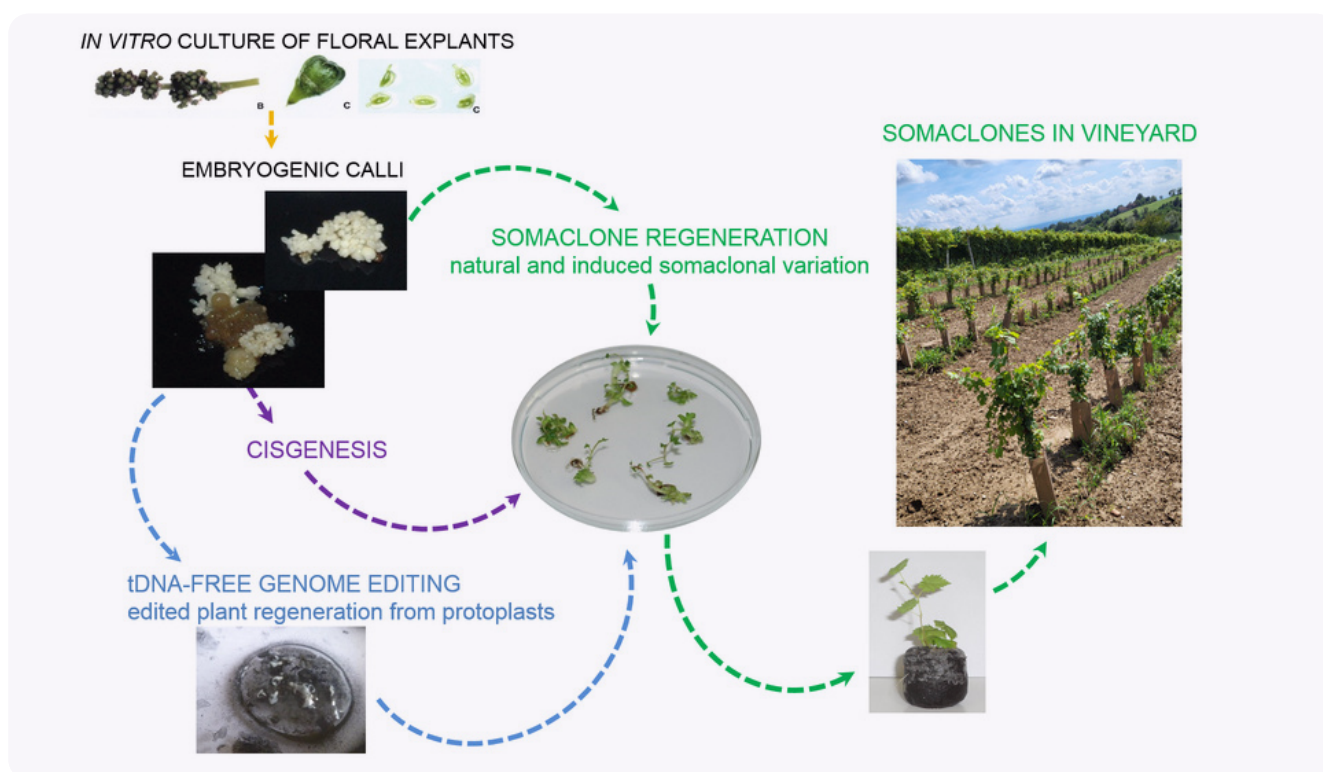


PRACTICE ABSTRACT - N°5

Innovative breeding approaches in grapevine: how to do in practice?

The Shield4Grape project introduces safer and sustainable approaches against fungal/oomycete pathogens exploiting the production of new resilient grapevine genotypes. At the CNR-IPSP and CREA-VE Institutes, the researchers have developed two grapevine genetic improvement platforms leveraging on New Genomic Techniques (NGTs) and innovative approaches. The platforms rely on the in vitro culture of thousands of floral explants collected every year in the field from different *Vitis vinifera* L. cultivars and rootstock genotypes. The in vitro culture is aimed at producing embryogenic callus, a dedifferentiated tissue harbouring the competence to regenerate new individuals through a process called somatic embryogenesis. In fact, when cultured on particular nutritional media, the embryogenic callus generates somatic embryos that will develop in new plants.



Thanks to this procedure, NGTs can be applied to grapevine. Embryogenic callus is used for cisgenesis, a process by which resistance genes can be transferred from different Vitisspecies to *V. vinifera* cultivars, and genome editing. The latter technique has the potential to originate improved genotypes, identical to the mother plant except for the desired modified trait, and without the integration of foreign DNA. It therefore offers an excellent opportunity for the genetic improvement of traditional wine grape genotypes. The possibility to regenerate grapevines from somatic embryos (somaclones) has also the advantage to allow the exploitation of somaclonal variability (SV). Culture protocols addressed to orient the establishment of SV, favouring the regeneration of plant lines with increased tolerance to drought stress and fungal diseases, have been developing within the S4G project. Furthermore, compared to other genetic improvement techniques (NGTs and traditional breeding), somaclones can be planted in the vineyard without any legislative restrictions, thus representing an approach of immediate practical application.

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PROJECT KEYWORDS

- # Pest/disease control in plants
- # Genetic resources
- # Outdoor horticulture and woody crops (incl. Viticulture, olives, ornamentals)
- # Biodiversity and nature
- # AKIS, incl. Advice, training, on-farm demo, interactive innovation projects

