

Europe's 'most cherished' grape varieties threatened by deadly diseases. CRISPR can help save them

How the latest breeding techniques are saving the taste of our most cherished grape vine varieties.

European Seed (ES): Could you tell me a bit more about your project?

Michele Morgante (MM) [Full Professor at the Laboratory of Plant Genomics of the University of Udine, Italy]: We started 21 years ago at the University of Udine with a program to create new wine grapevine varieties resistant to powdery and downy mildew through traditional breeding, i.e., crossing and selection.

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We crossed elite wine grape varieties such as Merlot, Cabernet Sauvignon, Sauvignon Blanc with so called introgression lines, i.e., resistant varieties that were the result of several rounds of backcrosses with elite *Vitis vinifera* varieties following an initial cross with wild species from America and Asia that carried the disease resistance genes.

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An additional opportunity is offered also by genome editing technologies such as CRISPR/Cas9. Resistance to fungal pathogens in plants can be achieved not only by deploying resistance genes that recognize the arrival of the pathogen and prevent its spreading, but also by inactivating susceptibility genes, i.e. plant genes that are needed for the pathogen to enter plant cells.

One of them, a susceptibility gene to powdery mildew, has been identified in grapevine and precise editing could be used to inactivate it and obtain powdery mildew resistant varieties.

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