EXTENDED ABSTRACT

Evaluation of new fem grapevine varieties resistant to the main fungal diseases

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ABSTRACT

Context and purpose of the study - The genetic improvement of grapevines at the Edmund Mach Foundation (FEM) has evolved significantly since its inception, and its philosophy on sustainable viticulture through crossbreeding techniques aligns with the urgent need to reduce chemical use in agriculture. Initial breeding efforts concentrated on enhancing agronomic and qualitative traits, while more recent initiatives have focused on developing disease-resistant varieties and improving resilience to climate change challenges such as late frost, sunburn and early ripening, with special attention to the market trends i.e., sparkling wines.

Material and methods – The strategy employed by FEM include controlled crossings (i) between hybrid genotypes to create parental super-donors with stacked resistance loci and (ii) between super-donors and *Vitis vinifera* cultivars, to introduce resistance traits against the major biotic stresses. The program has utilized optimized marker-assisted selection (MAS) and phenotyping protocols coupled with multi-year agronomic surveys, grape quality evaluation and wine tastings.

Results - Over the years, FEM has successfully registered eight new grape varieties noted for their organoleptic qualities, late ripening, tolerance to gray mold, and resistance to downy mildew, powdery mildew and, in some cases, black rot. In parallel, several disease resistant super-donors have been selected and recurrently employed both for institutional crossbreeding goals and for co-developing programs with external entities. Under the hat of the EU GrapeBreed4IPM project, four collaborations across Italy are ongoing to leverage parental super-donors to enhance élite varieties of regional interest: Corvina, Sangiovese, Lambrusco e Verdicchio. The derived F1 evaluation is ongoing relatively to agronomic, disease resistance, climate resilience, and oenological performance.

Finally FEM, contributing to the EU OSCAR program, meets the goal of reducing chemical inputs while maintaining high-quality wine production.