Session 4 (1): Biotic Stress

Keynote lecture

Improving biotic stress resistance in grapevines: What's the path forward?

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Abstract

Grapevine breeding for biotic stress resistance is a valuable strategy to embrace the principles of the European Green Deal, which will be one of the strongest drivers of the Agrifood research sector in the next decades. Grapevines are challenged by a range of diseases and pests, causing economic losses, and requiring often costly approaches to mitigate damage. Public interest in reducing the use of chemicals is a related challenge, along with climate change. All these aspects converge upon the urgent need for sustainable viticulture. The *Vitis* gene pool provides vast resources for the development of genetic resistance in rootstock and scion cultivars, but the search is not yet exhausted. According to BrAPI, germplasm consists of wild/acquired accessions as well as breeding products (breeding selections and cultivars). The enhancement of the entire germplasm is a crucial step. This is expressed in fingerprinting and high-throughput genotyping as well as phenotyping for disease and pest resistance, even in retroactive mode on traditional breeding products and acquired accessions. In fact, classical breeding approaches have made great strides in the development of cultivars with adaptive traits. Recent access to 'omic technologies, coupled with advanced phenotyping tools, has further facilitated the identification of useful loci, along with rapid trait introgression from wild species. Moreover, marker technologies (mainly accessible microsatellite-based systems) are now used in Marker-Assisted Selection to stack multiple loci/genes for the same trait into a single superior genotype. It would be relevant to phenotypically test these "stacked" genotypes in controlled lab settings as well as in different challenging environments worldwide. This effort would represent a step forward in terms of understanding genotype (loci) - pathogen (races) interaction. Genomic technologies will finally impact germplasm characterization, enabling the identification of candidate resistance genes and thereby facilitating "Breeding by Design" approaches.

Keywords: disease and pest resistance, genotyping, germplasm, marker-assisted breeding, phenotyping, *Vitis* spp.