Genetic and Grapevine improvement
New opportunities for the profession

At the middle of the 19th century, two pests originating from USA (Powdery and downy mildew) have conducted to spray grapevines, first with the "bordelaise mixture" then with synthetic phytosanitary products. Other parasites are also synonyms of losses either for yield (virus, phytoplasmes, by ex.) or berry quality and so for wines (botrytis). Modern methods in viticulture have permitted to drastically reduced the use of insecticides (phytoseiid as mite predators, pheromones), herbicides (controlled under grassing, soil management techniques) and for fungicides, even in this case, methods have been less performing (prophylaxis, better controlled sprays, disease forecast models, etc.).
At the moment, the winegrower is submitted to a high pressure from the consumer side who considers that phytosanitary products are poisons for environment and health. Even small traces are suspected to be carcinogenic, mutagenic or other sicknesses. However, pesticide residues present in wines are largely under the values for Maximum Residue Limits (MRL) and NOAEL (No Observed Adverse Effect Limit) but we are here in the irrational domain.
Other agricultural practices are developed like agricultural farming or biodynamic but beyond the fact that they use copper, which is not without consequences for environment, nobody knows at the moment if the development of such practices on hundred or thousand hectares is possible, without being damageable for the economy and the quality of the wine industry.
Traditionally in agronomy, one can use genetic to control. In a simplified manner, the use of resistant species conducts to integrate in the agronomical species the resistant gene(s) through sexual crossing. For grapevine, resistances to fungal diseases are known in Vitis and Muscadinia under genus, but the obtained crossing (hybrids), very popular during the first half of the twentieth century, have been forsaken, even prohibited in France (foxy or bitumen aromas for produced wines, and even, in some case, with high concentrations in methanol, Noah cultivar by ex.). Some countries have still continued (Switzerland, Germany) hybridization programs by backcrossing obtained hybrids with *V. vinifera* cultivars in order to introduce resistance characteristics in a genetic background being essentially from *vinifera* origin. Such cultivars have been developed with success in Germany and Switzerland.
It is now 18 months that grapevine genome has been sequenced. Grapevine has been the 4th plant being sequenced. The discovery of its more than 30000 genes is a determinant tool to understand genome variability, organization and functioning. It is also a tool to identify disease resistance genes or genes responsible for berry quality and also to obtain associated molecular markers. It also a potential source of genes for modern techniques of genetic transformation.
What new knowledge will be brought by this new tool for grapevine improvement? What are the new strategies that are permitted? What are the works in progress and when they will be issued to bring new cultivars? What is the place of grapevine genetic transformation in these strategies? It is all questions that this conference will try to answer?

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