

 **P.20 - Selection pressures exerted by different combinations of grapevine resistance QTLs on *P. viticola***

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All the traditional grapevine varieties used in Europe are very susceptible to downy mildew which causes dramatic damage to leaves and to bunches. Breeding for resistant varieties is an alternative to the intensive applications of fungicides used to control this disease. A lot of resistance sources are available in the *Vitacea* family. But few of them have been well studied for the genetic determination of resistance. The strategy for creating new varieties with a long term resistance (more than 30 years) is to combine genes or QTLs to avoid the overcoming of the resistance factors by the pathogen. The practical application of pyramiding QTLs by using molecular markers was investigated in a pseudo-F1 progeny. This population derived from a cross between two partially resistant parents (a BC4 from *Muscadinia rotundifolia* and "Regent", a German variety obtained by different crosses between American resistant *Vitis* species). *Rpv1* is a major resistance QTL derived from *Muscadinia rotundifolia*. Another resistance QTL has been described in "Regent". The parents and about 40 genotypes of the F1 population have been planted in 2 locations in France (INRA Bordeaux and Colmar) for several years. Among these genotypes, four genotypic combinations carrying +/- resistance QTLs have been characterized with flanking molecular markers. One of the parents, the BC4 from *Muscadinia rotundifolia* has been planted in Hungary for several years. The resistance to downy mildew of all the 40 genotypes and the parents (in France) and of the parent derived from *Muscadinia rotundifolia* (in Hungary) will be evaluated with visual notations using the same scale. For each location, isolates of *Plasmopara viticola* will be collected on the four genotypic combinations, on both parents and on susceptible controls. Genotyping of the isolates will be performed using microsatellites and SNP markers. We expect to have a better knowledge about the effect of different combinations of QTLs on *Plasmopara viticola* populations in different geographic contexts. These data would help us to do an efficient breeding in order to ensure that the resistance will be efficient and durable in the vineyard.