



# Genomic analysis of the factors influencing the localization of recombination events and the segregation of genetic determinants of quality in an interspecific context in the genus *Vitis*

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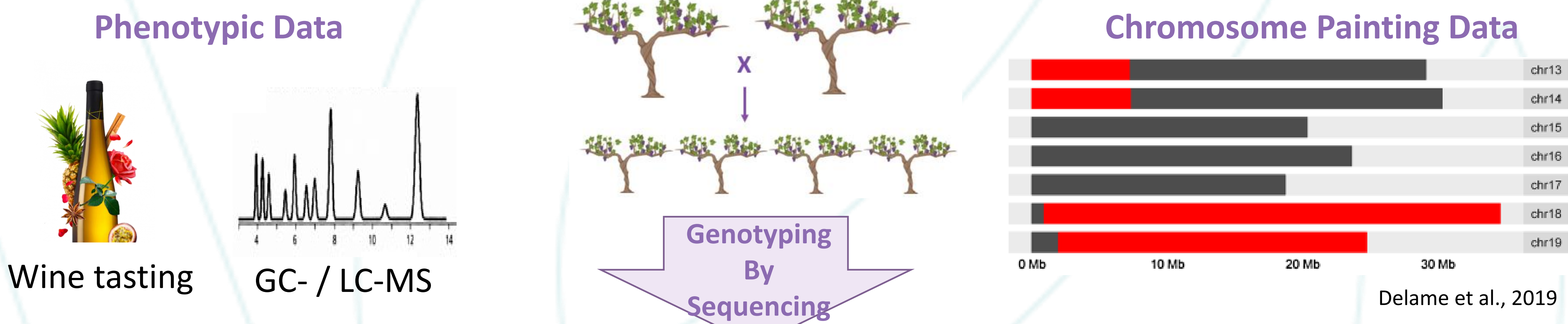
## Context

In France, viticulture is the **second largest consumer of pesticides**, particularly fungicides. A breeding program initiated in 2000 at INRAE Colmar led to the registration of **11 grapevine varieties** carrying resistance genes to **downy and powdery mildew**, reducing fungicide use from ~12 to only **1–2 treatments per year**. However, selection has mainly focused on **disease resistance**, while **grape and wine quality traits** were not directly targeted. The aim of my PhD project is to study whether quality related **Quantitative Trait Loci (QTLs)** and resistance QTLs are genetically linked and to understand how meiotic recombination could be leveraged to combine all traits of interest in the frame of the breeding programs.

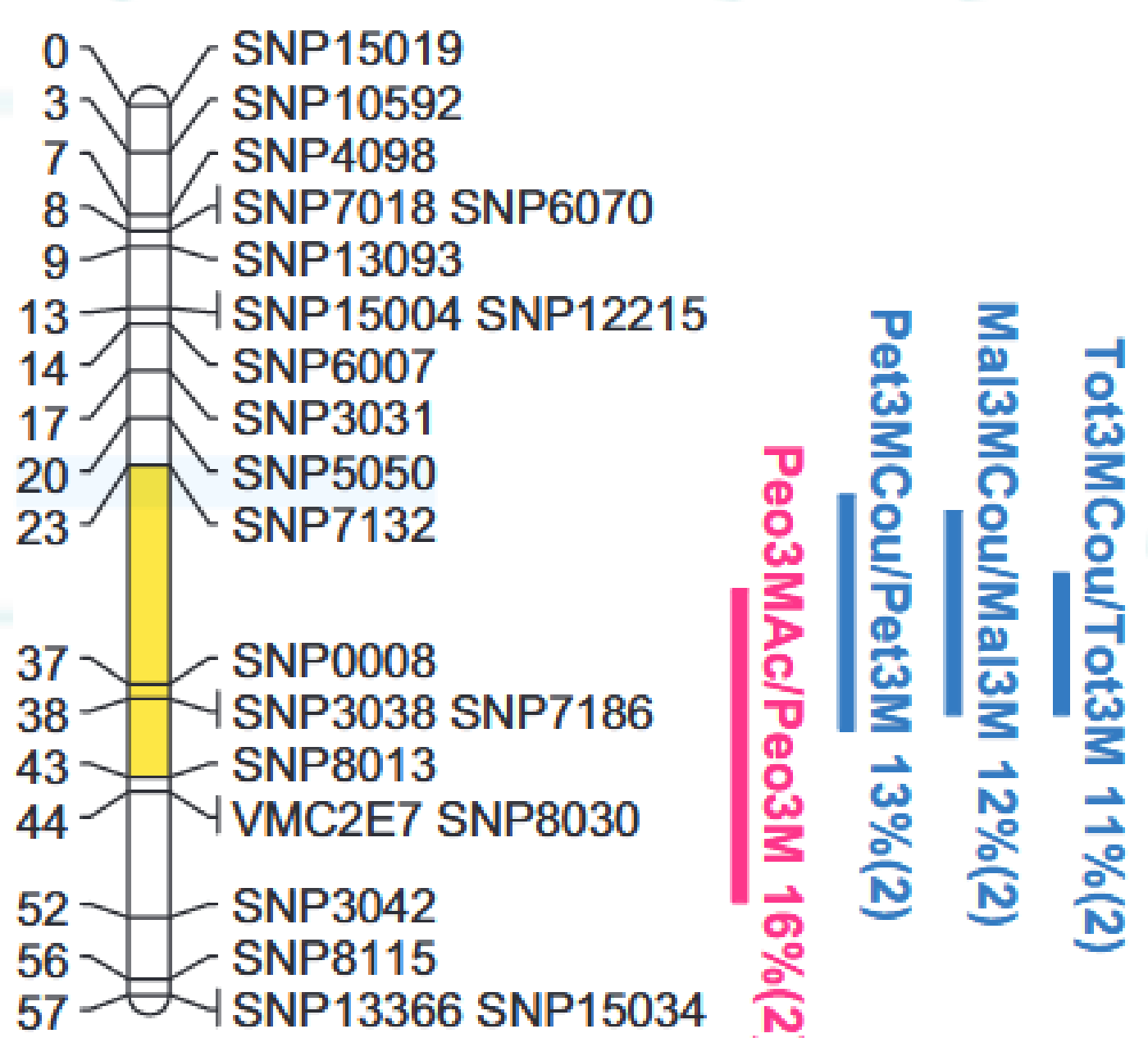
## Axis 1 : Identification of linkage between quality and resistance QTLs

## Axis 2 : Identification of genomic factors influencing interspecific recombination

### Interspecific Grapevine Populations

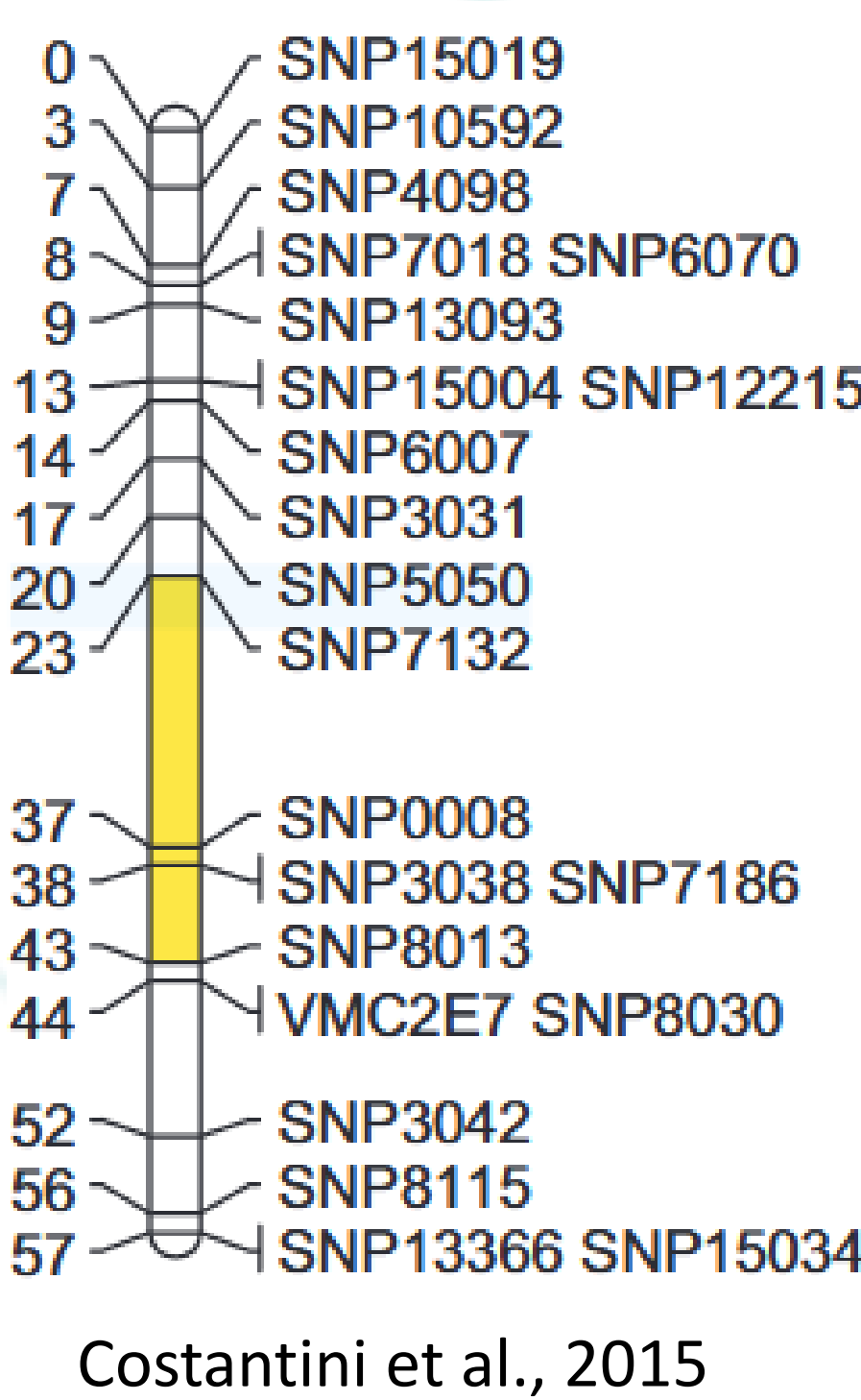


### QTL Detection

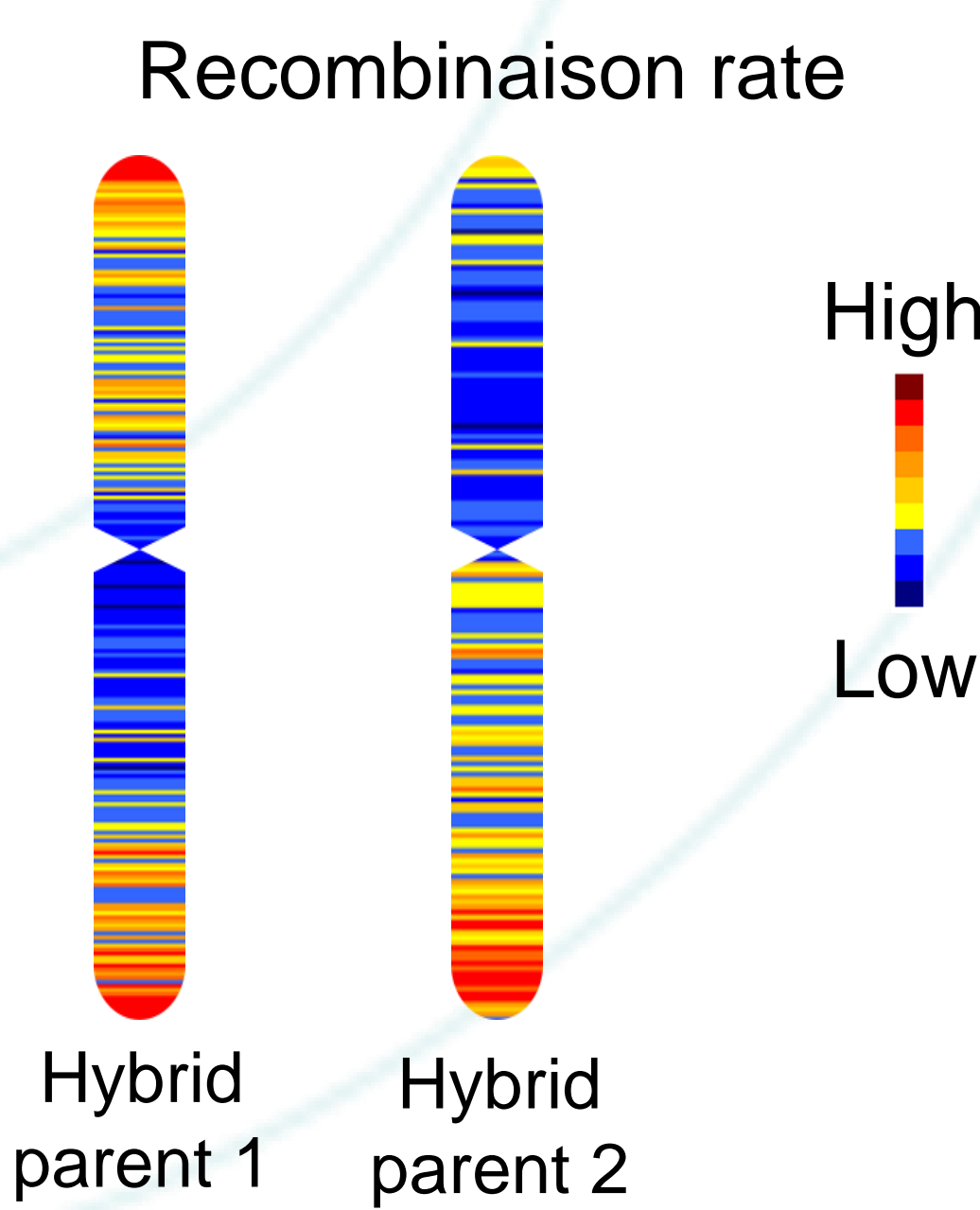


Colocalisation of quality and resistance QTLs ?

### High-density Genetic Maps



### Characterization of recombination hot- and coldspots



Putative factors influencing recombination:  
- Chromosome structure  
- Parental haplotype divergence

## Perspectives

Long-read sequencing of hybrid parental genomes will enable their *de novo* diploid phased assembly, allowing the precise detection of structural variants (e.g., inversions) that are often missed with short-read data.

Costantini, L., Malacarne, G., Lorenzi, S., Troggio, M., Mattivi, F., Moser, C., Grando, M.S., 2015. New candidate genes for the fine regulation of the colour of grapes. J. Exp. Bot. 66, 4427–4440. <https://doi.org/10.1093/jxb/erv159>  
Delame, M., Prado, E., Blanc, S., Robert-Siegwald, G., Schneider, C., Mestre, P., Rustenholz, C., Merdinoglu, D., 2019. Introgression reshapes recombination distribution in grapevine interspecific hybrids. Theor. Appl. Genet. 132, 1073–1087. <https://doi.org/10.1007/s00122-018-3260-x>

