

## Classical and modern plant breeding

### Classical:

- Selection: selectively propagating plants with desirable characteristics and eliminating the others
- Crossing: interbreeding of closely or distantly related individuals to create new crop varieties with desirable characteristics. Introduce individuals with different levels of variation in the trait of interest (hence different genes) to create a new variety that ensures its desirability and genetic variation.
- Inbreeding: crossing plants with themselves

### Modern:

- Marker-assisted selection (MAS): individual lines are selected based on QTL, which are detected through linkage mapping or GWAS.
  - o Based only on the QTL of a certain trait
  - o Given only a part of the individual's genome
  - o Can be of a limited use to analyse the traits under complex genetic control (polygenic traits such as resistance)
- Genomic selection (GS): using all the available high-quality markers (throughout the genome of an individual) to model the performance of an individual
  - o Exploring the magnitude of collaborative effects between many genes from all QTL that are related to the traits of interest
  - o Suitable for trait with complex inheritance