

# Grafting and hybridization of grapevines

Many perennial crops, which are crops that live for multiple years, are improved through grafting and hybridization. A single plant, such as a grapevine, becomes a composite of different grapevines that have been fused through grafting and cross-fertilized through hybridization. This enhances crops and makes them more suitable for local growing conditions.

Grafted grapevine structure

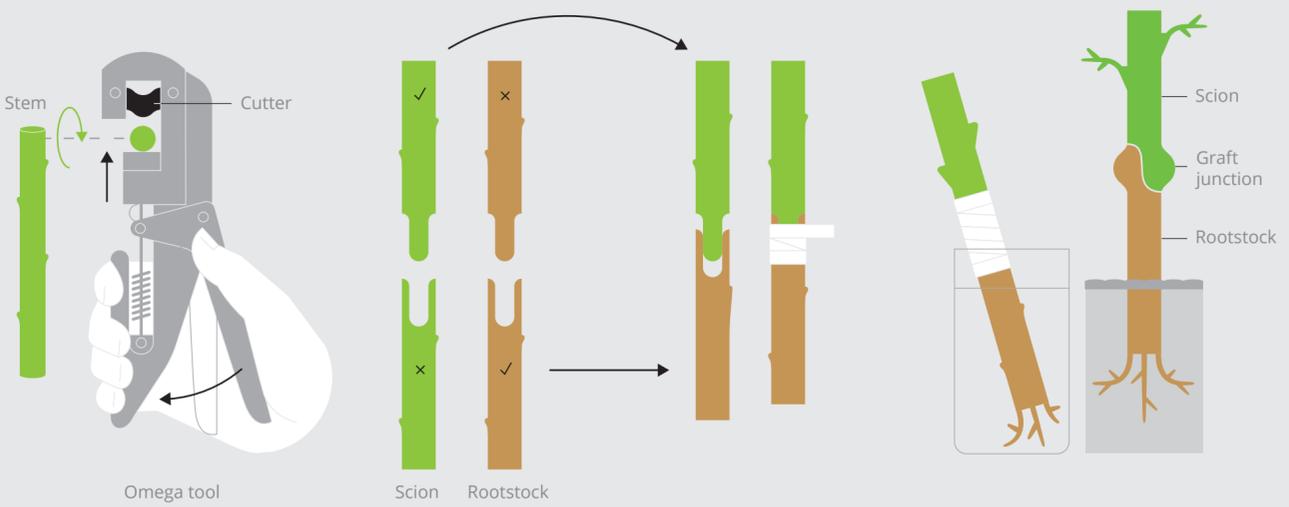


The **scion** is the top part of a grafted plant. It includes the stem, leaves, flowers, and fruits.

The **rootstock** is the lower part of a grafted plant. It includes the lower stem and root system.

## Grafting

Grafting is an ancient horticultural technique that surgically joins the stem, leaves, and flowers of one plant (the scion) to the lower stem and roots of another (the rootstock).



**1**  
A tool cuts the stem into the desired shape for joining.

**2**  
This cutting process is completed for the scion and rootstock.

**3**  
The cuts match perfectly and are tied together to fuse.

**4**  
When the roots germinate, the grafted plant can be planted.

## Hybridization

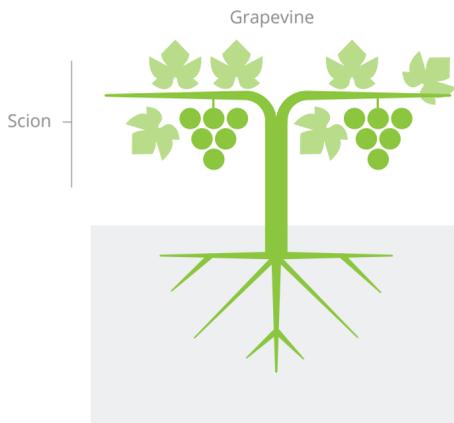
A hybrid is the result of hybridizing or cross-pollinating two different grapevine species or grapevine varieties. Hybridization of different species is used to generate both scions and rootstocks.

### Scion target

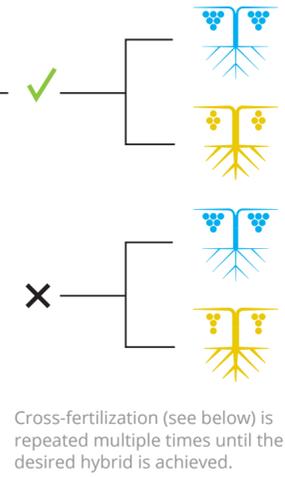
Some hybrids are developed to improve the scion by looking for traits like better fruit, aromatic quality, or frost tolerance.



Wild European grapevines are crossed with North American species to create hybrid scions like 'Chambourcin', 'Norton', 'Chardone', and 'Vignoles'.



The desired hybrid is replicated by cuttings, each of which is genetically identical to the original hybrid.



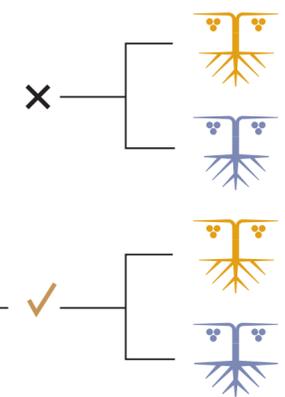
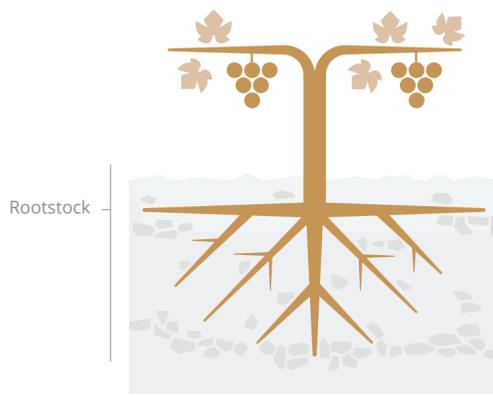
Cross-fertilization (see below) is repeated multiple times until the desired hybrid is achieved.

### Rootstock target

Hybrid rootstocks are generated by crossing wild species with tolerance to drought, disease, and soil types.

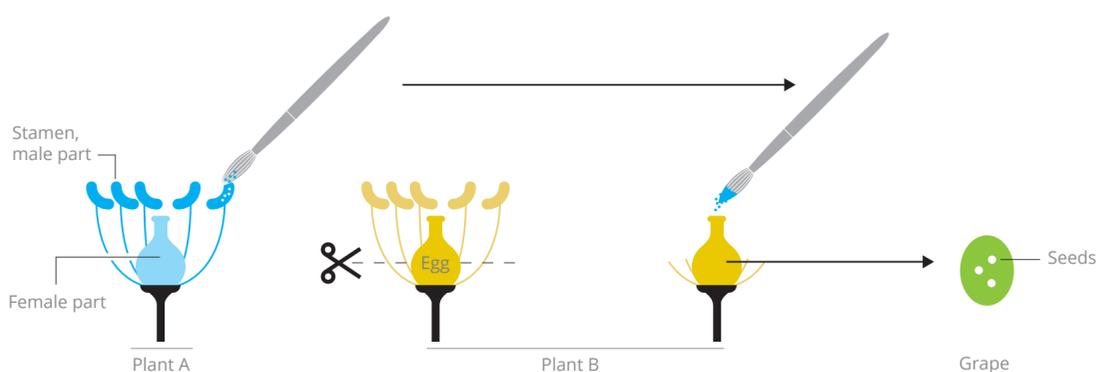


At least three native North American grapevine species are used in hybrid rootstocks.



## Cross-fertilization

The product of cross-fertilization is a hybrid plant that carries the genetic material of both of the parents. In many plants including most grapevines, cross-fertilization can happen between different species.



**1**  
Pollen is taken from the stamen of Plant A.

**2**  
Male parts are removed from Plant B to prevent self-pollination.

**3**  
Plant B is fertilized using pollen from Plant A.

**4**  
The seeds from the resulting fruit are hybrids and grow from them.