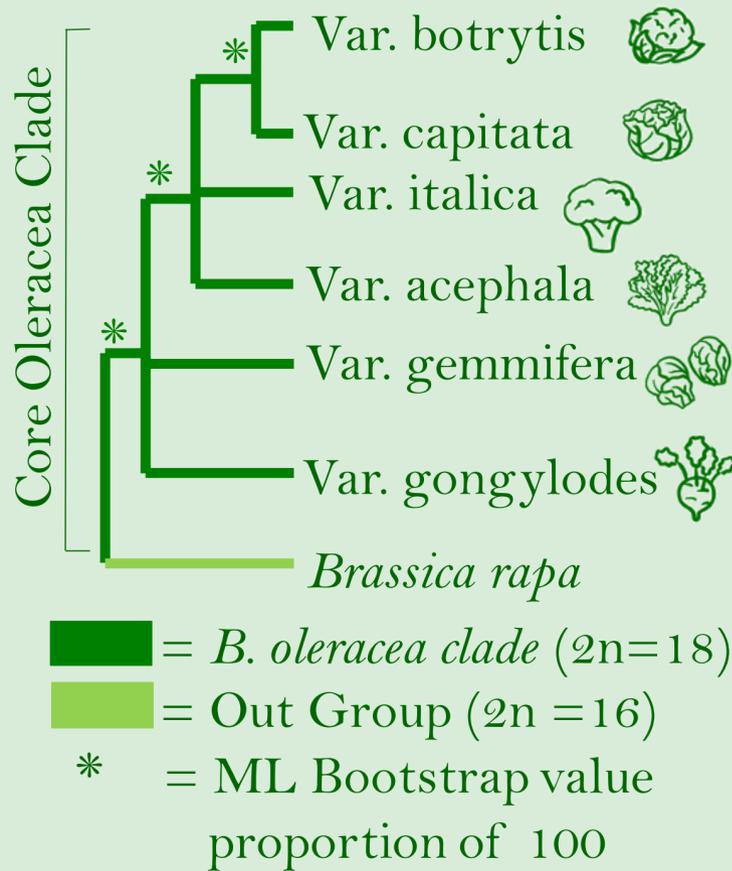


# WILD MUSTARD

## HOW ARTIFICIAL SELECTION AND PLANT BREEDING CREATED MULTIPLE VARIETIES FROM ONE SPECIES

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### WHAT IS IT?

*B. Oleracea* lives for two years. In the first year, it develops large leaves, and in the second year, it produces large yellow flowers. It originated in the northeastern region of the Mediterranean about 3 Mya, and its ancestors spread throughout Europe (Arias et al., 2014).

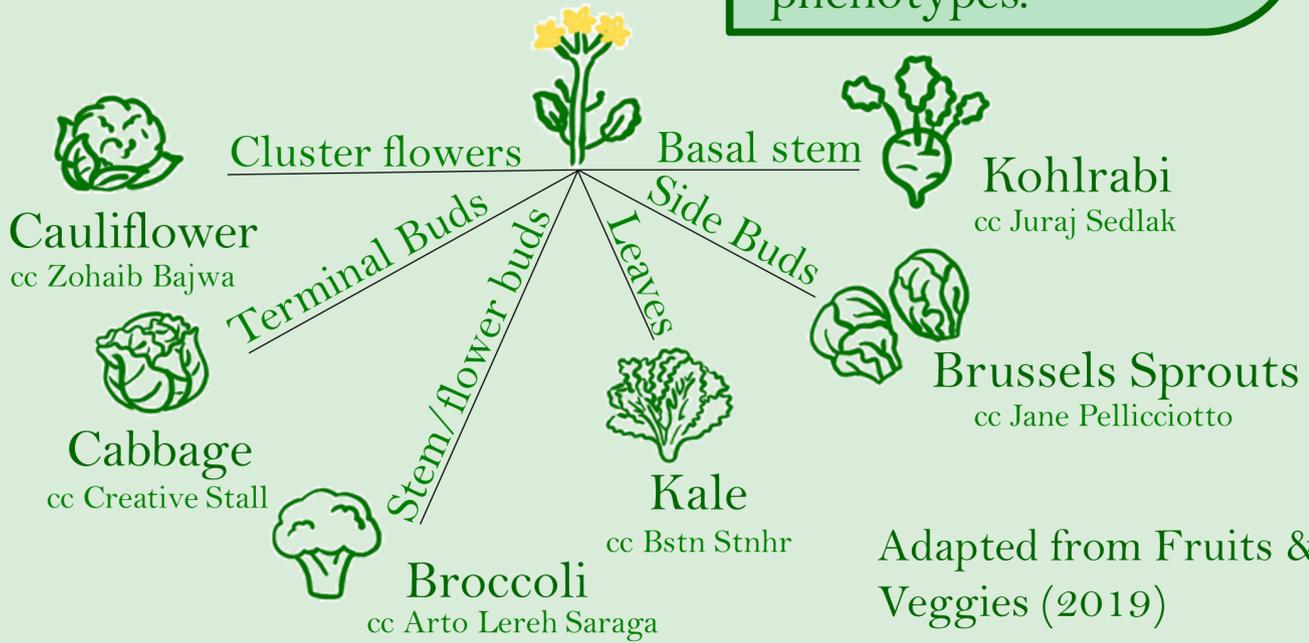
Adapted from Liming and Hong (2017)

### HOW DID IT DIVERSIFY?

The high genetic variations originated in *B. oleracea* when an ancient Brassica ancestral tripled its genome. It allowed for multiple genetically distinct cultivars from this one plant. These cultivars are interfertile since they belong to the same species resulting in hybrids like brusselkale.

### HOW DID VARIETIES COME ABOUT?

First, *B. oleracea* had mutations due to random mistakes in the genome. Then, humans artificially select desired traits by breeding those mutant plants together, resulting in differences in phenotypes.



### EXAMPLES

**Cauliflower:** Curd formation is linked to low levels of the flowering promoting genes, which prevents the blooming of flowers and enhances the formation of buds. (Sheng et al., 2020).

**Broccoli:** Hollow stem formation is linked to locus QHS.C09-2. This trait is not solely genetically heritable but also affected by environments resulting in Brassica crops having plasticity (Yu et al., 2019).

**Cabbage:** A male-sterile mutant was identified in a cabbage line controlled by a single dominant gene. This mutant has been used to breed male-sterile cabbages (Liang et al., 2016).

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Liang, J., Ma, Y., Wu, J., Cheng, F., Liu, B., & Wang, X. 2016. Map-based cloning of the dominant genic male sterile MS-CD1 gene in cabbage (*Brassica oleracea*). *Theoretical and Applied Genetics* 130: 71–79.

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Yu, H., Wang, J., Zhao, Z., Sheng, X., Shen, Y., Branca, F., & Gu, H. 2019. Construction of a high-density genetic map and identification of loci related to hollow stem trait in broccoli (*Brassica oleracea* L. *Italica*). *Frontiers in Plant Science* 10.