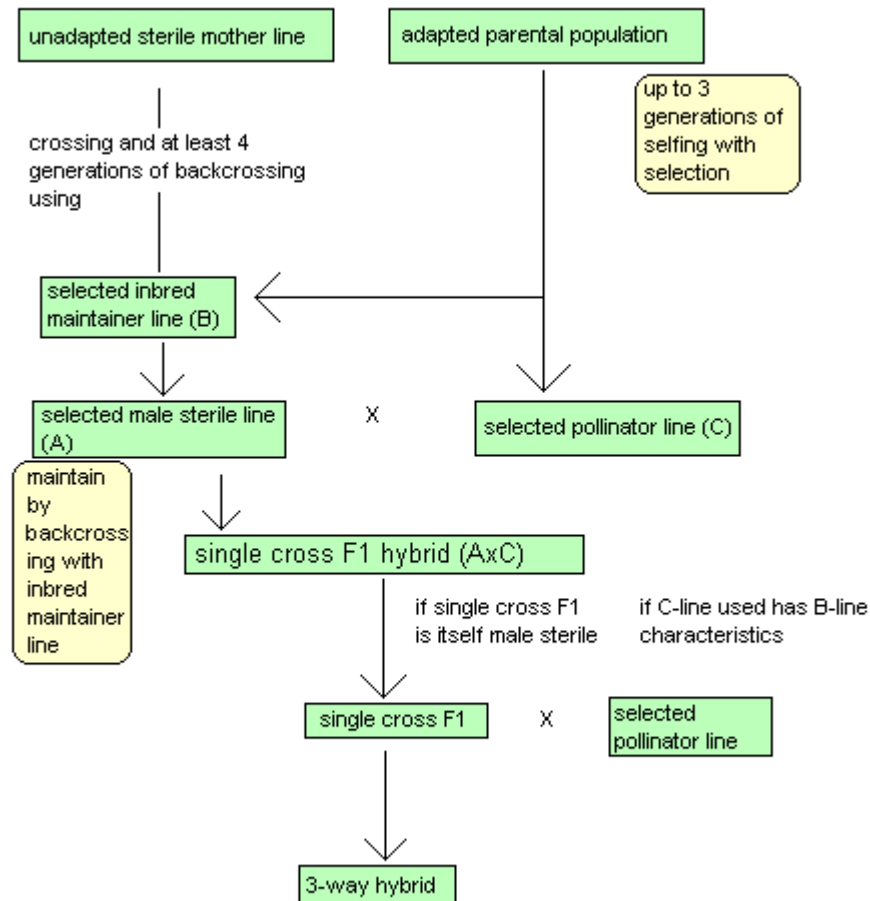


Hybridization



Hybridization of onion 1



Picture 1: F1 hybrid scheme for onion breeding

To obtain a new hybrid a system needs to be followed (see picture 1). First a male sterile line needs to be obtained which can be pollinated by a fertile pollinator. Sterility is due to a cytoplasmic sterility. In Europe we have the T-cytoplasm responsible for this sterility. In America they have S-cytoplasm, both have been found in old onion varieties.

Important is to preserve the sterile A-line. This is done by crossing a fertile line with the sterile line in a cage and collecting the seed. This seed (A-line) is sown and the bulbs are collected and planted. When they flower sterility can be checked. When sterility is 100% or at least high, the used fertile plant can be used as maintenance-line (B).

The fertile plant is self-pollinated and will also be propagated. The ability to maintain the sterile line is due to the fact that this fertile plant has different fertile plasma and a gene, which contains sterility.

This cycle needs to be repeated to obtain full sterility and to bring properties from the B-line to the sterile motherline (A). This is called a A –and B-line.

The maintenance line can not be self-pollinated too often because inbreeding-depression can occur by showing reduced growth or no possibility to flower. A population can be used more often if maintenance is working well.

When the maintenance line is crossed with the male sterile line mass selection is carried out to obtain an adapted male sterile.

For pollination in a hybrid any fertile line can be used. To obtain a suitable sterile line together with a suitable maintenance line can sometimes form a slow process.

In Rijnsburger types we know in Holland a lot of B-lines occur. And it is not a problem to form couples. But it is a lot of work. In other types like Wolska from Poland and short-day material the percentage is low and it is a slow and hard trial to obtain couples.

Summarizing: De sterile motherlines are derived from old open pollinated varieties and it takes patience to create a good motherline. Every cycle takes two years. No laboratory-trials are used. With a lot of “breeders-eye” the selecting is done. As pollinators flies, and bees are used depending on the size of cage.