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# Hybridization

In order to produce improved varieties, the F1 hybrid is selfed or crossed with yet other parent or one of the parents in the previous cross.

This method of hybridization based crop improvement is called hybridization method or selfing technique.

Methods of hybridization.

- Pedigree method
- 2. Bulk method
- 3. Back cross method.

# Pedigree Method

The word pedigree refers to a line of ancestors selection of a improved variety from a line of ancestors established from F1 individuals is known as pedigree method.

 It is widely used to improve self pollinated crops. It is best suited to improve visible phenotypic characters in plants.

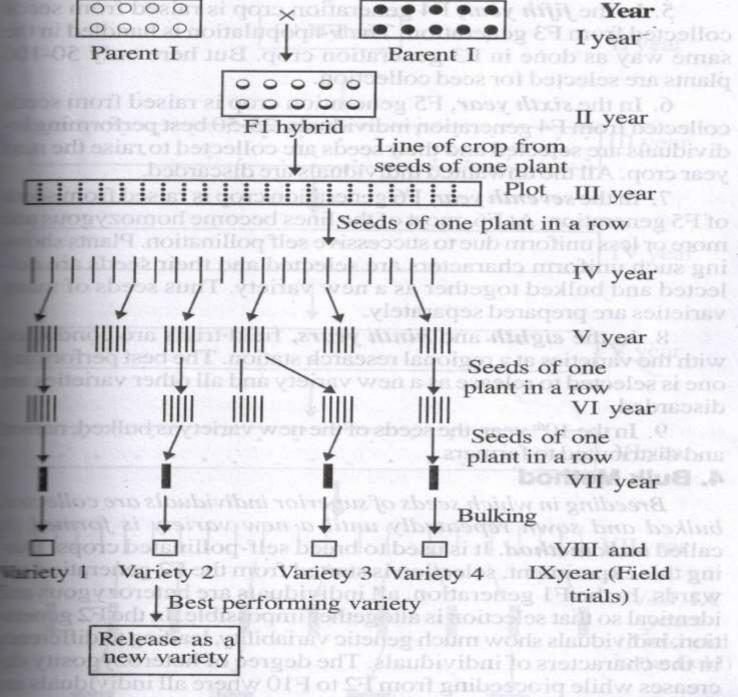


Fig.6.3: Pedigree method of plant breeding.

### Pedigree advantages

- Easier to select families eliminate bad plants early
- 2. Select types you want- discard others
- Look back on several years data
  - a. Computer use essential
  - b. Disease, insect, plant type
- 4. Screen characters in greenhouse and field
- 5. Plant breeders can practice their art
- 6. Plant breeders can practice their science
- 7. Excellent for highly heritable traits (seed size/shape, disease, insect, height, maturity)

## Pedigree Disadvantages

- 1. Costly-time, labor-space-\$\$\$\$
- 2. Space planting not the same as farmers

## Bulk Method

- Breeding in seeds of superior individuals are collected, bulked and sown repeatedly until a new variety is formed, is called Bulk Method.
- It is used to breed self pollinated crops.
- During this, selection started from the F2 generation onwards.
  In the F1 generation, all the individuals are heterozygous and identical so that the selection is altogether impossible.
- In the F2 generation individuals show much genetic variability, leading to difference in the characters of individual.

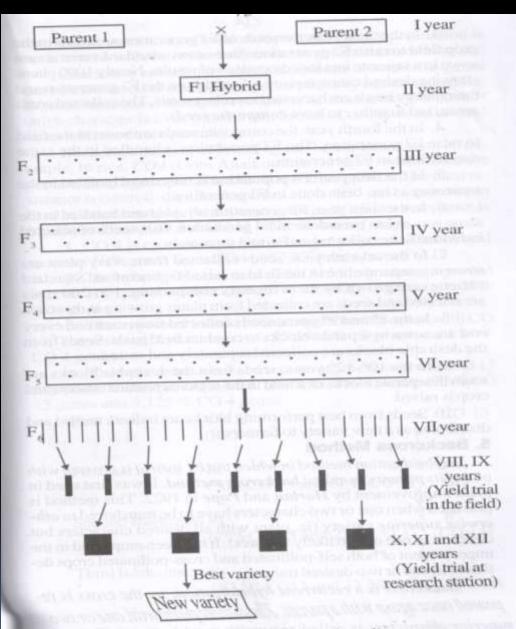


Fig.6.4: Bulk method of plant breeding.

### **Advantages**

- Less record keeping
- Easy to handle large numbers
- Natural selection effective (winter-hardiness, disease/insect resistance)
- Little effort needed (cheap)

### Disadvantages

- Selected may not be high yielding
- Environment changes each year
- Little use of plant breeding skills

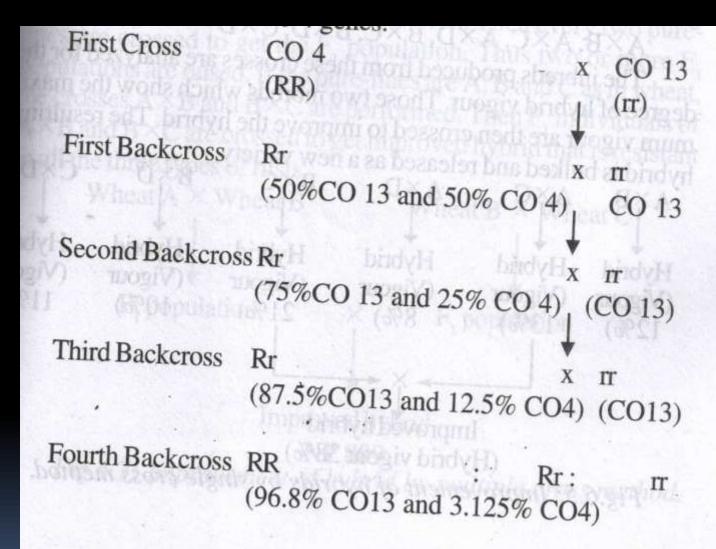
# **Back Cross Method**

 Hybridization method in which the F1 hybrid is crossed with one of its parents is called bark cross method.

 Harlass & pope in 1922. this method is practised when one or two characters have to be transferred to otherwise superior variety.

- Back cross is a recurrent hybridization ie. The cross is repeated once again with a parent.
- The parent plant with one or two superior characters is called recurrent parent or recipient & the inferior plant is called donor parent.
- The F1 population is back crossed with the recurrent parent to get an improved variety

#### CO4 - Blast resistance and CO13 - Blast sensitive



### Advantages

- Predicted results little testing needed
- Independent of environment
- Fast can use multiple populations/year
- Requires small populations

#### Disadvantages

- Little recombination
- Ineffective for traits with low heritability