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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.

1. **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.

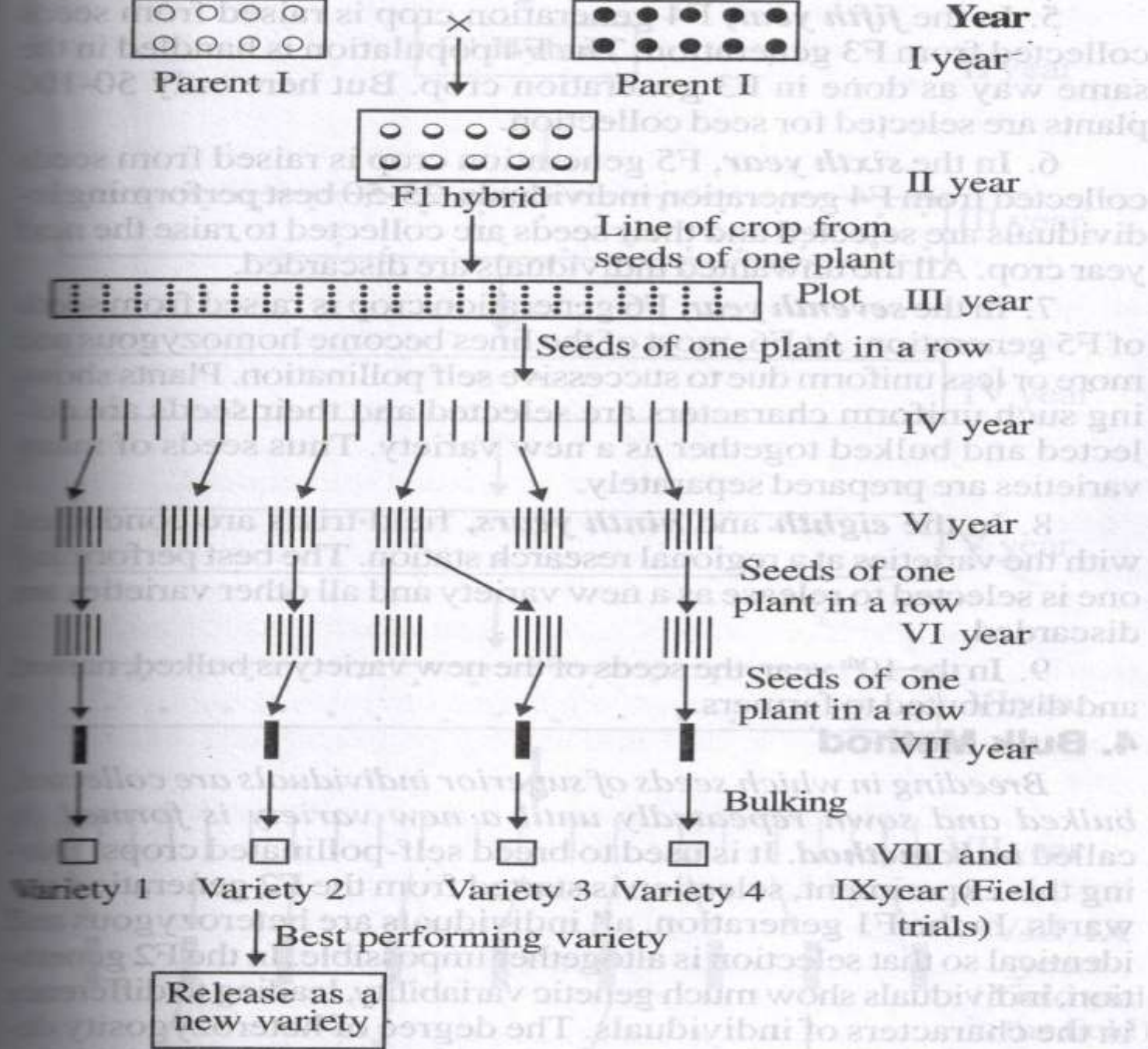


Fig.6.3: Pedigree method of plant breeding.

Pedigree advantages

1. Easier to select families – eliminate bad plants early
2. Select types you want- discard others
3. 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
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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.



Advantages

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



Disadvantages

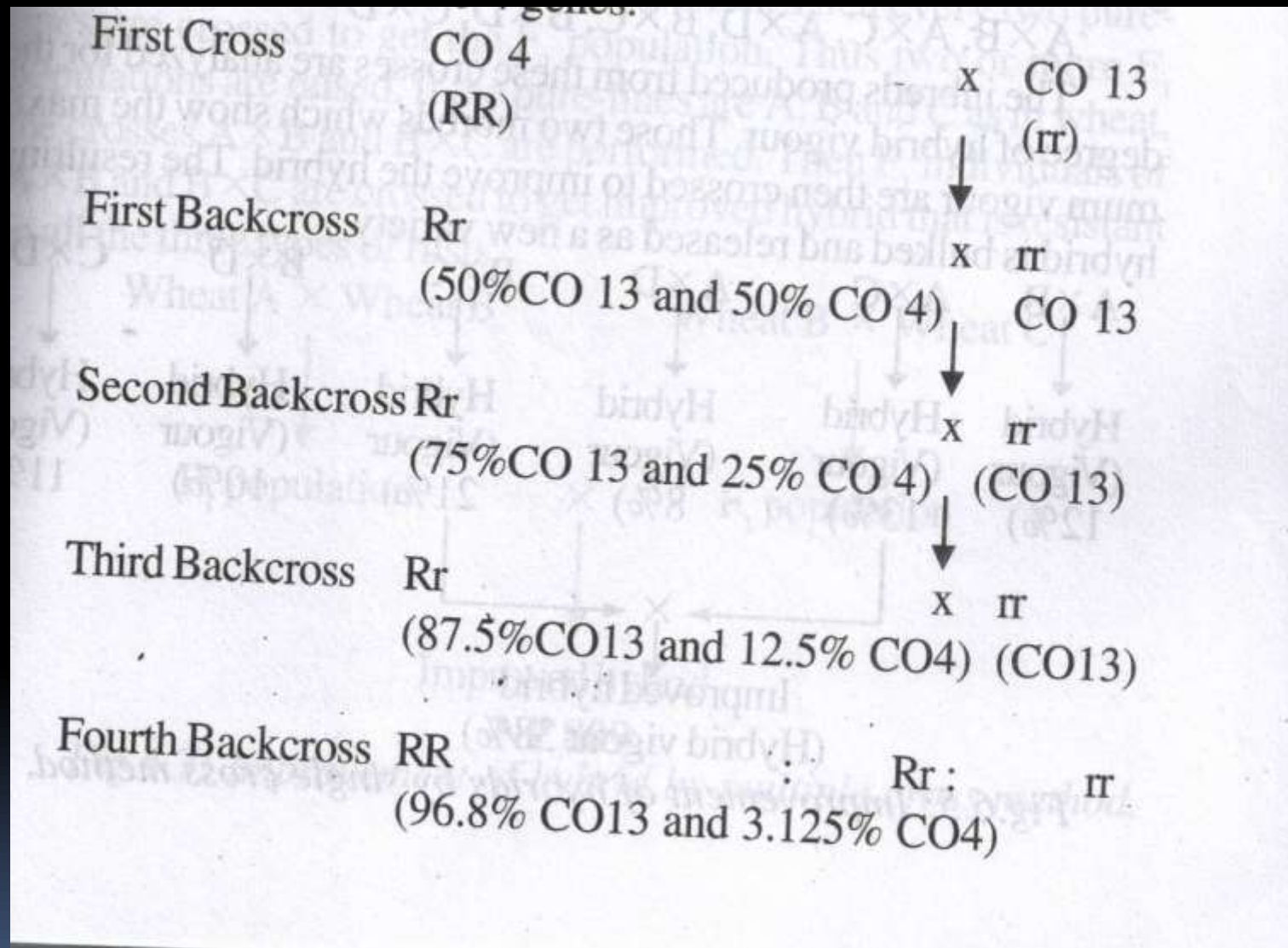
- Selected may not be high yielding
- Environment changes each year
- Little use of plant breeding skills

Back Cross Method

- Hybridization method in which the F₁ hybrid is crossed with one of its parents is called back cross method.
- Harlass & pope in 1922. this method is practised when one or two characters have to be transferred to otherwise superior variety.

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- 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