

Pedigree Method

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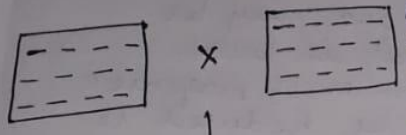
The pedigree is defined as the description of the ancestors of an individual and it is genetically generally helpful in finding out the amount of relatedness among two individuals i.e. whether they have a common parent in their ancestry.

In pedigree method, individual plants are selected from F₂ and the subsequent generations and their progenies are tested.

During the entire process, a record of all the parent-offspring relationship is kept. This is known as pedigree record.

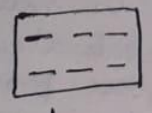
Procedure: A general outline of the pedigree method is stated below.

First year: The hybridization is done among two selected parents (P₁, P₂).



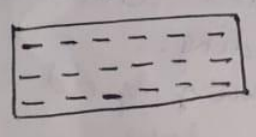
After emasculation one become female parent and another male parent. Selected parents are planted in a crossing blocks and crosses made.

2nd year
F₁



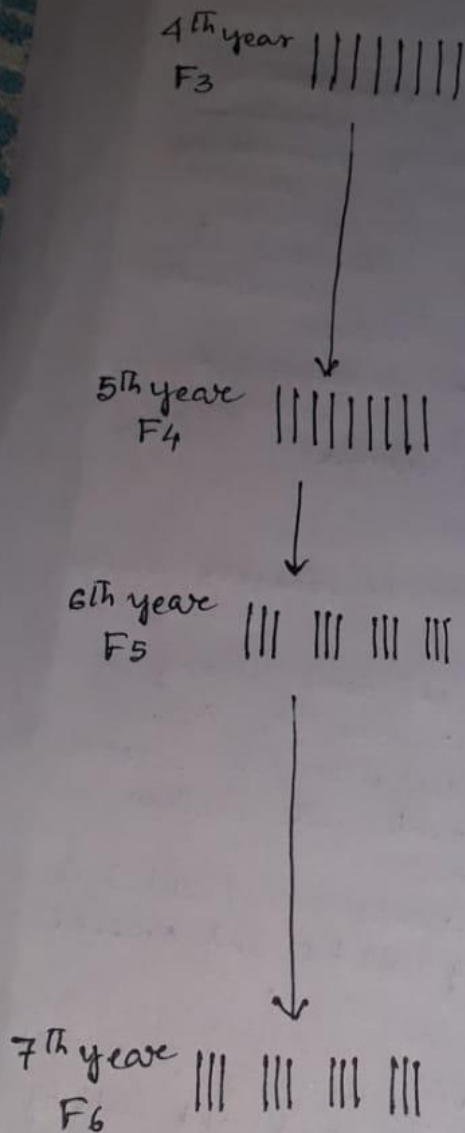
F₁ generation seeds (10-30 seeds) are space planted and selfing is allowed. F₂ seeds are collected in bulk.

3rd year
F₂



In F₂ generation 2000-10,000 plants are space planted and 100-150 superior plants are selected.

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In F₃ generation the individual plant progenies are space planted in rows. Each progeny should have about 30 or more plants. Superior plants are selected. Disease and lodging susceptible progenies and progenies with undesirable characters are eliminated.

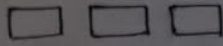
Individual plant progenies are space planted. Desirable plants are selected from superior progenies.

Individual plant progenies are planted in three or more rows for comparison. Many progenies may have become reasonably homozygous and may be harvested in bulk. The number of progenies must be reduced to 25-100.

Individual plant progenies are planted in multi-row plots and evaluated visually. Homozygous progenies are harvested in bulk. Segregating progenies are eliminated unless they are outstanding. Preliminary yield trial may be done.

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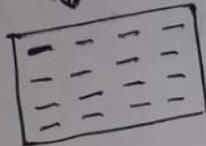
8th year
F₇



9th to 13th
year
F₈ - F₁₂



14th year
F₃



Preliminary yield trials and quality tests are conducted to identify superior lines.

The progenies are evaluated ~~by~~ for plant height, lodging, disease resistance, flowering time, maturity time etc.

Co-ordinated yield trials and quality tests have to be done.

A line that is superior to the best commercial variety in yield and other characteristics would be released as a new variety.

Seeds of the new variety will be multiplied for distribution to the farmers.

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Achievements:

Pedigree method is useful in selection of new superior recombinant types from a hybridization programme. It is suitable for improving specific characteristics, such as disease resistance, plant height, maturity time etc. yield and quality etc.

Many improved varieties have been developed through pedigree method in wheat, rice, pulses, oil seeds, cotton etc.

Wheat: (S308 x Chris) x Kalyan Sona

↓
WL 711 (dwarf, high yield)

NP 773 x K13 → K68 (good quality grain)

Rice: Taicheng Native 1 x T141

↓
Jaya and Padma

(short duration and finer grain)

Cotton: Gadag 1 x CC-2 (Combodia Coimbatore 2)

↓
Laxmi

(good fibre quality, early maturing, resistance to leaf blight)

Tomato: Meeruti x Red cloud

↓
Pusa early dwarf (more yield)

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Merits of Pedigree Method :

- ① It is well suited for the improvement of characters which can be easily identified and are simply inherited.
- ② Transgressive segregation for yield and other quantitative characters may be recovered in addition to the improvement in specific characters.
- ③ It takes less time than the bulk method to develop a new variety.
- ④ This method gives the maximum opportunity for the breeder to use his skill and judgement for the selection of plants.
- ⑤ The breeder may often be able to obtain information about the inheritance of qualitative characters from the pedigree record.
- ⑥ Plants and progenies with visible defects and weaknesses are eliminated at an early stage in the breeding programme.

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Demerits of Pedigree Method :

- ① Maintenance of accurate pedigree records takes up valuable time.
- ② Selection among and within a large number of progenies in every generation is laborious and time consuming.
- ③ The success of this method largely depends upon the skill of the breeder. There is no opportunity for natural selection to influence the population.
- ④ Selection for yield in F_2 and F_3 is ineffective. If care is not taken to retain a sufficient number of progenies, valuable genotypes may be lost in the early segregating generations.