HERIDITY — Mendel's Observation

Gregor Johann Mendel is known as Father of Genetics.

He discovered the mechanism of transmission of characters from one generation to the next.

Mendel's Experimental Material :— Mendel chose Garden Pea or Edible Pea (Pisum sativum) for his experiments because of various reasons.

Reasons / causes of selecting Garden Pea Plant.

* Easy availability of detectable contrasts traits.
* Pea plants have seven visible characters, each with two contrasting traits.
* These plants produce a large number of seeds.
* Pea plants are one type of self pollinating plant.
* These plants need less care except at the time of cross-breeding.

Seven Visible characters of Pea Plant

S.No	Character	Dominant trait	Recessive trait.
1.	Seed shape	Round	Weinkled.
2.	Seed colour	Yellow	Green.
3.	Flower colour	Violet	White.

4.	Pod Shape	Full	Constricted
5.	Pod colour	Green	Yellow.
6.	Flower Position	Axial	Terminal.
7.	Stem height	Tall	Dwarf.

Monohybrid Cross

It is a cross between two organisms of same species which studies a single pair of contrasting characters or two traits of a single character, eg tall and dwarf pea plant.

Steps of crossing :-

(1) Mendel first crossed pure-bred tall pea plants with pure breed dwarf pea plants and found that only tall pea plants were produced in the first generation F_1-generation. No dwarf pea-plants were produced and no any medium-sized plants. Plants produced in F_1-generation showed the traits of only one of the parent-plants: Tallness.

(11) Mendel then crossed the F_1-tall plants by means of self pollination and he found both types of plants (Tall and dwarf) in second / F_2-generation.

* These F_2-plants were in the ratio of 3:1
* Mendel noted that the dwarf trait of parent pea-plant which had disappeared in the first generation progeny, reappeared in the second generation.

Mendel said that the trait of dwarfness had not been lost, it was merely hidden or supressed in F_1-generation.

* Mendel called the repressed trait of "dwarfness" as Recessive trait and the expressed trait of 'Tallness' as the Dominant Trait.

In this way Mendel's experiment with tall and short-/dwarf pea plants showed that the traits may be dominant or recessive.

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Monohybrid Cross (Symbolic Form)

Parental cross

Parents Phenotype → Tall Plant × Dwarf Plant

Factors of inheritance → TT tt

Gametes → T T t t
(Formed from separation of factors)

Crossing of gametes during Fertilisation →

F1 genotype → Tt Tt Tt Tt

F1 Phenotype → Tall Tall Tall Tall

(All tall Plants)

F1 Cross.

F1 generation Phenotype → Tall Plant × Tall Plant

Factors of inheritance → Tt Tt

Gametes

Cross of gametes during Fertilisation →

F1 generation genotypes → TT Tt Tt tt

F1 generation Phenotype → Tall Tall Tall Dwarf

(Three tall and one dwarf Plant)

- Phenotypic Ratio → 3:1., Genotypic Ratio → 1:2:1