Hour : 3 BIO III - 3

Evidance of Laws of inheritance

Gregor Mental laid the foundation for the field of genetics and explained how traits are passed from parents to offspring through genes.

Key Principles are

1. Law of Segregation 2. Law of Independent Assortment
3. Law of Dominance

1. Law of Segregation :-

During the formation of gametes (eggs or sperm), the two alleles responsible for a trait separate from one another. Offspring therefore inherit one allele for each trait- from each parent. This explains why a recessive trait can appear in offspring, even if both parents exhibit the dominant trait.

2. Law of Independent Assortment.

The genes for different traits are inherited independently for each other, provided they are on different Chromosomes or far apart on the same chromosome. This means the inheritance of one trait generally does not affect the inheritance of another trait.

3. Law of Dominance :-

When an organism has two different alleles for a trait, one of the alleles (the dominant one) can mask the presence of the other allel (the recessive one). Therefore the trait associated with the dominant allele is expressed in the organism's phenotype, while the recessive allele is only expressed when an organism has two copies of it.

Mendel after carefully studied the selected pea plant for many reasons.

1. The pea plants were easy to grow & maintain.
2. It has many clearly distinct & Contrasting characters.
3. The pea plant is an annual plant and so many generations of the plant can be studied in a short period of time
4. Peas are naturally self-pollinating but can also be cross-pollinated

Mendel made a list of Contrasting characters studied.

	Flower Colour	plant Height	Seed colour	Seed Shape	Pod Colour	Pod Shape	Flower Position
1. Dominant Trait	purple	Tall	Yellow	Round	Green	Inflated	Axial
2. Recessive Trait	White	Short	Green	Wrinkled	Yellow	Constricted	Terminal

Results of Mendel's Experiments :-

Let us look at the results of Mendel's experiments on crossing a pure tall pea plant with a pure short pea plant.

* F_1 generation : Cross-pollinated two pure lines for contrasting characters.

* F_2 generation : Self pollinated F_1 generation plants.

(1) In the F_1 generation, Mendel observed that all plants were tall, there were no dwarf plants.

(2) In the F_2 generation, Mendel observed that 3 of the offsprings were tall where as 1 was dwarf.

(3) Similar results were found when Mendel studied other characters.

(4) Mendel observed that in the F_1 Generation, the characters of only one plant appeared where as, in the F_2 generation, the characters of other plant also appeared.

(5) The characters that appear in the F_1 generation are called dominant traits and those that appear for the first time in the F_2 generation are called recessive traits.

Gregor Mendel - Father of Genetics

Pea Plant Characteristics.

1. Annual plant, short life span
2. Large bisexual flowers
3. Self pollinating flowers.
4. Flowers can be cross-pollinated
5. Exhibits varieties with contrasting characters
6. Plants can be easily cultivated
7. Plant produces many seeds
8. Contrasting characters.