Lecture title: GENETICS.

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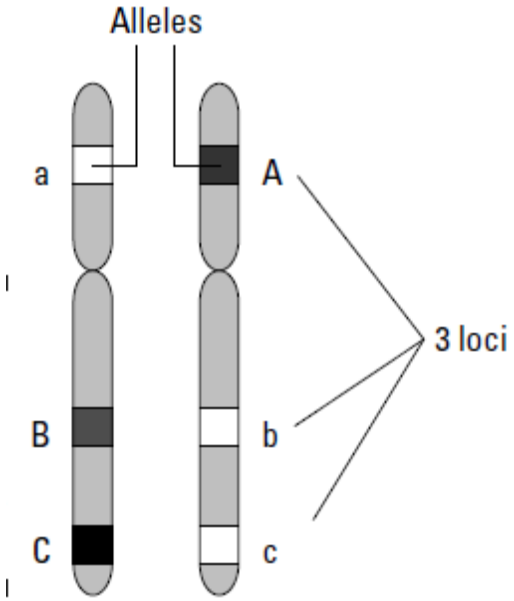
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GENETICS

Genetics: Science that studies the inheritance of traits from parents to offspring.

Gene : The genetic unit which transmitted from one generation to the next.

Allele: Is one of the possible forms of a gene, most gene have two allele a dominant allele and recessive allele , eg: (Aa).



Chromosome :A structure composed of large molecule of DNA and associated proteins (Histones) that carry genetic information.

Trait: Any observable or measurable characteristic of an individual. There are two types of traits:

1- *observable* traits—traits which described the appearance of an animal like coat color, size, head shape.

2- *measurable* traits—traits that can be measured on animal like weaning weight, lactation yield, time to run a mile, etc.

phenotype : An observed category or measured level of performance for trait in an animal.

$$P = G + E$$

where ***P*** represents an individual's phenotype, ***G*** represents its genotype**,** and ***E*** represents environmental effects .

performance: A word used instead of phenotype for traits that are measured.

Inbreeding: is the mating of relatives.

Linebreeding The mating of individuals within a particular line.

Outbreeding or **Outcrossing:** The mating of unrelated individuals.

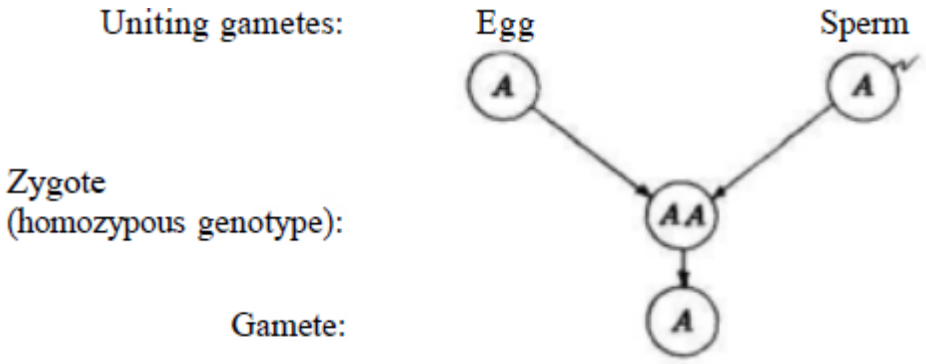
Breed: A race of animals within a species. Animals of the same breed usually have a common origin and similar traits.

Line: A group of related animals within a breed.
genotype :All of the genes possessed by an individual .

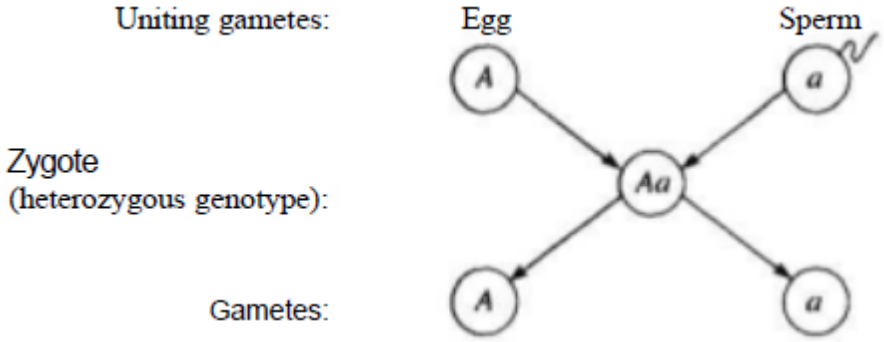
Zygote: The fertilized egg of organisms.

Gamete: It is a haploid sex cell that is a sperm in males **and** egg (oocyte) in females.

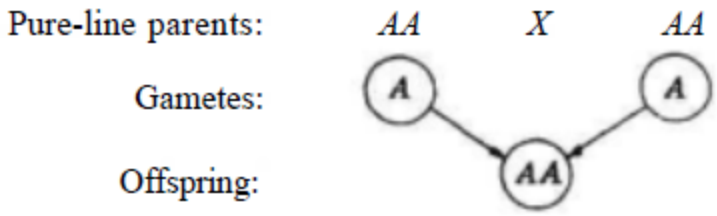
Homozygous. The union of gametes carrying identical alleles produces a homozygous genotype.



Heterozygous. The union of gametes carrying different alleles produces a heterozygous genotype.



Pure Line: A group of individuals with similar genotype .



Hybrid: is the offspring resulting from organisms of different breed varieties, species

MENDEL'S LAWS:

1- **Law of segregation**: : States the alleles of any locus segregate in to separate gametes.

2- Law of dominance: States that one of the inherited genes will be dominant and the other recessive.

3- **Law of independent assortment: States** that the alleles of each pair is not influenced by any other pair.

Codominant Alleles: Alleles that lack dominant and recessive relationships may be called incompletely dominant, partially dominant, This means that each allele is capable of some degree of expression when in the heterozygous condition. Example:

Genotype	Phenotype
BB	Black Color
bb	White Color
Codominant Bb	Black and White

SINGLE-GENE CROSSES

1. The Six Base Types of Mattings.: There are six type of mating according to parents genotypes as as the following examples:

1- **Parent** BB x BB

↓ ↓

Gametes B B

↘ ↙

F1 BB

2- **Parent** BB x Bb

↓ ↓

Gametes B B b

↘ ↙

F1 1/2 BB 1/2 Bb

3- **Parent** BB x bb

Gametes B b

F1 Bb

4- **Parent** Bb x Bb

Gametes B b B b

F1 1/4 BB 1/2 Bb 1/4bb

5- **Parent** Bb x bb

Gametes B b b

F1 1/2 Bb 1/2 bb