Animal and Plant Breeding

Plant and animal breeding

Produce offspring with **improved characteristics** to help support sustainable food production

Improved Characteristics

1. Higher food yields
2. Higher nutritional value
3. Pest and disease resistance
4. Ability to thrive in particular environmental conditions.

Inbreeding

Selected **related** plants/ animals are bred for **several generations** until the population **breeds true** to the desired type.

Advantage

This results in the **elimination** of unwanted **heterozygous alleles.**

Disadvantage

Lowers genetic diversity in populations and susceptible to **inbreeding depression.**

Inbreeding depression

An increase in individuals who have **homozygous, recessive & deleterious alleles**.

1. Lower reproductive rates/success
2. Less adaptable to changing environments

Cross Breeding

Crossbreeding

Breeding **unrelated different breeds/**cultivars with **desirable features** may produce new F1 hybrids with improved characteristics.

New alleles introduced through creation of F1 hybrid that has improved characteristics.

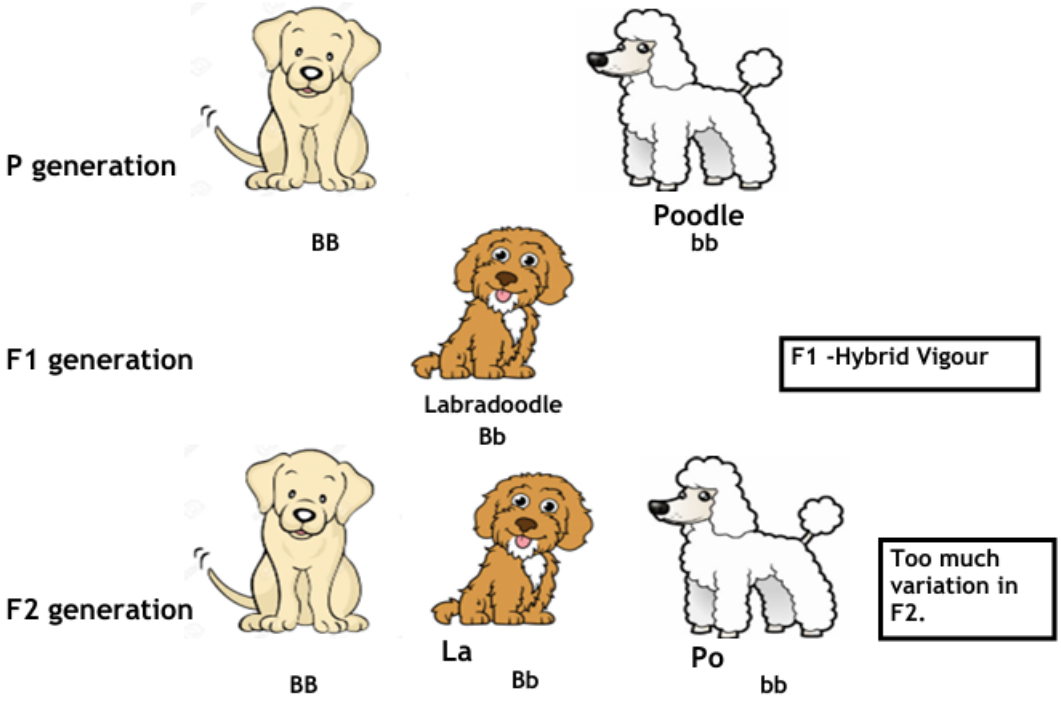
F1 Hybrids

1. Increased Vigour
2. Increased yield/growth

Producing F1 hybrids

The two parent breeds are maintained to produce more F1 hybrids.

F1 hybrids are not bred together as **F2** is **too genetically variable.**



Crossbreeding in Plants

F1 hybrids produced by crossing of two different **inbred lines**, create a **uniform heterozygous** crop.

Field Trials

Plant field trials are carried out in a **range of environments**.

Field Trial Independent Variables

1. Different cultivars
2. Different Treatments (fertilisers/pesticides)
3. GM crops vs Non GM crops

Design	Reason
Selection of Treatment	Ensure valid comparisons
Number of Replicates	To take account of variability
Randomisation of Treatments	Eliminates bias

Q	R	S	T
S	T	Q	R
R	Q	S	T
T	S	R	Q