

# **METHODS OF BREEDING IN CATTLE AND BUFFALOES**

**LPM-601(Unit-III)**



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## OBJECTIVES

- To know the methods of breeding of dairy animals.
  - To know the systems of breeding used in cattle and buffaloes.
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# INTRODUCTION

- Breeding methods: Depend upon the purpose of its utilization.
  - (i) Which breed or group of bulls to mated with which breed or group of cows (**systems of breeding**).
  - (ii) Which individual bull is to be mated to which cows (**pairing**).
- Breeding system: Alter the genotypes in a desired direction for desired levels of performance.



## Type of the breeding system depends upon:

- The size of the herd
- Likes and dislikes of the breeders
- Need for breed
- Herd registry scheme

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- **Pure breeding:** For registry in the breed associations.
  - **Crossbreeding:** Commercial producers for good performance.
  - **Individual pairing:** Depends on mating of individual bull to a given sets of cows for progeny testing.
  - Breeding individual animals to a particular bull with which close relationship or pairing related animals.

# Systems of Breeding

## A. Mating within a breed (Purebreds)

### 1. Random Breeding

- The equal probability exists for each possible mating in the population.
- The genotype frequencies remain constant through generations.



## 2. Inbreeding

- Mating system in which individuals mated are more closely related than the average of the population.
- Inbreeding increases homozygosity.
- Degree of homozygosity: Measured by inbreeding coefficient.



## Close inbreeding:

- Mating is made between very closely related individuals.
  - Full brothers crossed with full sisters or offsprings crossed with parents.
  - Continued sib mating: For line formation.
  - Mating of less closely related individuals causes very slow increase in homozygosity.
  - Formation of strains: Mild form of inbreeding.
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## Line breeding:

- Repeated back crossing to one outstanding ancestor.
  - Used by commercial and purebred producers to obtain hybrid vigour by crossing between inbred lines.
  - Matings are made to concentrate the inheritance of desired characters of some favoured individuals to bring the uniformity.
  - A good program of selection of desirable traits and culling of undesirable traits results in a breeding stock with more desirable traits.
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### 3. Out breeding

- Mating of individuals less closely related as compared to the average relationship within the population.
- Increases the proportion of heterozygosity.
- Popular system of breeding the dairy herds with average production and small livestock owners.
- Out crossing combined with selection: More improvements in most of purebreds of dairy cattle.



## Crossbreeding

- Mating of the animals belonging to two different breeds.
  - Advantage of good qualities of two or more breeds.
  - The level of exotic inheritance: Never exceed 62.5% to exploit the full genetic potential in tropics.
  - Exploit the milk production potential of the exotic breeds and heat tolerance and disease resistance of indigenous breeds.
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- Crossbreds of Jersey, Holstein Friesian and Brown Swiss for early maturing, producing more milk compared to indigenous breeds.
  - Development of synthetic breeds: Karan Swiss, Karan Fries, Frieswal and Sunandini.
  - Superior traits that results from crossbreeding are called hybrid vigor or heterosis.



## Grading up

- Mating of purebred males of a established breed with non-descript females successively over several generations.
- Mostly adopted for genetic improvement of the buffaloes.
- After seven generations of crossing, the non-descriptive females acquire the characters of a pure breed.
- Godavari breed of buffalo developed by crossing of the local buffalos of coastal region of Andhra Pradesh breed with Murrah.

## Rotational crossing

- Males from one of the pure breeds are used in alternate generations to breed the crossbred females.
- Criss crossing: Between two breeds
- Triple crossing: Among three breeds.
- The heterosis among crossbreds produced by rotational crossing will not be 100 percent.
- The individual heterosis: About 67% in the rotational crossing and about 85% in triple crossing.



## B. Selective Breeding

- Mating of selected males to selected females within a breed.
- In crossbreeding programme, *inter se* mating among males and females of a given genetic group, resulting in offspring also of the same genetic group.
- **Selective breeding:** Breeding of best males to best females.

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- ▶ Selection could be based on first lactation for high repeatability of milk yield,.
  - ▶ In selection of dams of breeding sires, it is desirable to wait until the completion of three or four lactations to ascertain the good herd life of the female.
  - ▶ Selective breeding of buffaloes to improve relatively lesser number of individuals with much better genetic potential for milk production.



**THANKS**