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## Breeding System and Their Importance in Livestock

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### Abstract

In India, the livestock played important role in Indian economy. Most of the people depend on the livestock farming. The animal breeding is one of the most important tools for the improvement of animals' genes. They also improved animal productivity as well as reproductive performances of animals. Proper breeding at proper time then increases the profitability of the farmer in terms of milk production, meat production, calving interval etc. various types of breeding system in different species are discuss in this article.

### Introduction

Breeding animals is the use of genetics and reproductive physiology in animal development. The purpose of animal husbandry is not simply to improve individual genes but also to improve the animal's overall quality of life, that is, to improve future generations of animals. The farmer is given two important tools: Selection and reproduction. The selection determines which animals will be the parents that will produce offspring for the next generation and reproduction determines which males should be preferred by females. Thus breed improvement, productivity, longevity, regular breeding and the ability to pass on these desirable traits to many generations can be expected through proper selection and breeding programs.

### System of Breeding

The mating System is divided into two according to their genetic relationship, *viz.*, Inbreeding and Outbreeding.

#### Inbreeding

Inbreeding is often defined as a union between a close relative who includes a parent - offspring, brother - sister, *e.g.* brother, sister in parent and between cousins and other co-relatives. Inbreeding is often described as mating of less closely related animals. Inbreeding played a major role in the emergence of several breeds of dairy cows, the best known example being that of the Short Horn breed in the Colling and Bates brothers. However, breeding declines in popularity as an effective breeding method for livestock until its interest is revived by experimentation - breeding of laboratory animals, especially those of Wright's guinea pigs and King of albino rats. One of the effects of inbreeding is to process interest, reducing the amount of phenotypic, especially in characters connected to strong reproductive capacity.

#### Outbreeding

- Crossbreeding
- Out crossing
- Grading up

- Species hybridization

## Crossbreeding Systems in Livestock Species

Crossbreeding is a mating process in which animals from a variety of interbreeding species cross. It is widely used to integrate the desired trait of parents into offspring. Crossbreeding is effective due to heterosis or hybrid strength and reproductive compliance. Heterosis is governed by genetically modified genes while genetic mutation is due to genetic predisposition. Heterosis refers to the height of an integrated animal that is related to the size of its direct parents and the fulfillment of the breed allows the power of one species to compensate for the weaknesses of another. Planting programs should be tailored to each job based on herd size, potential market, management level, and resources.

### Beef Crossbreeding Systems

Cross breeding in the commercial beef industry is an important management practice. Planned breeding programs are used by cattle producers to increase production. Crossbreeding allows the use of species from a variety of, but complementary, biological species and results in increased breeding and reproduction of the calf. Separation of beef cattle can produce calves with improved breeding, survival, longevity, fertility, growth, meat quality and disease resistance symptoms. Beef cattle are three different types of crossbreeding viz. system. Cross end, rotation, and integration are widely used.

#### Terminal Cross

An easy way to breed a deadly cross. In this system, all interest is marketed and replacement seedlings are imported. When F1 heifers (females with a 100% hybrid maternal hybrid) are purchased and designed for different breeds of bulls, both cows and calves use heterosis. This program allows for greater flexibility in choosing the types to be used. Crossing the terminal can be done using two types (two generations) or three types (three generations).

#### Two-Breed Terminal

The two-breed terminal system is the most basic breeding system available. The system falls on specific female breeders and bulls from another breed and breeding breed known as F1. The interest produced is very similar and marketable. F1 are sold as complementary females for other occupations. This program is suitable for herds of all sizes because only one type of alarm is used; only one pasture is needed, and women are repatriated. This is not a desirable system because it does not detect any heterosis in the cow as it is born directly.

#### Three-Breed Terminal

The final three-breed terminal system is similar to the latter two-type system except that the females are crossbred females (A×B) equated with the other genus

(T). This last plan has many benefits. It produces high hybrid strength in the cow and calf. This is an excellent program because the hybrid strength is found in both the growth rate and the maternal capacity. This program can be used for herds of all sizes. The final three breed system leads to greater hybrid power in any breeding system. This program results in 100 percent of both and maternal heterosis above the parental rate.

## Rotational Crossing Systems

### Two-Breed Rotation/ Crisscross

Two-way rotation is a simple breeding method that involves two types and two breeding grounds. The breeding of two breeds begins with the breeding of A-type 3ws to the B-type bulls. Two breeds of bulls are needed after the first two years of mating. Rotation of two types is a very efficient and simple breeding system that uses individual and maternal heterosis. The system provides 100% heterozygosity accessible in the first generation, 50% in the second, 75% in the third, and gradually remains at a constant 67% in subsequent generations.

### Three-Breed Rotation

The exchange of three species is very similar to the exchange of two species with the addition of another species. This distortion is based on the estimates of types A, B and C. Breed A loops are mated with type B-shaped females, B-type clusters are mated with type C-type females, and C-type strains are mated with type-type females. The disadvantage of exchanging three species is that another breeding ground and other breeds of cattle should be taken.

### Three-Breed Rototerminal

The three breed rototerminal system is an extension of the dual circulatory system. It is also known as two-way rotation with a terminal siren system. The rototerminal system is actually a hybrid-crossbreeding system that uses the features of the storage system and circulation system. This system allows the breeder to produce all his or her substitutes while using the maximum hybrid power on the final calves.

### Composite Breeds

Integrated breeding systems are as easy to control as straight breeds when combined. Ease of use has made blends popular among the larger, more manageable and smaller herds alike. During the construction of two, three or four breeding breeds they maintain 50%, 67% and 75% of the maximum calf and heterosis dam and improve the production of cattle herds by 12%, 15% and 17% respectively.

## Crossbreeding Systems for Swine

### Rotational Cross

A three breed rotational uses three breeds of purebred boars, rotated in a consistent order, one breed for each generation.

### Advantages

- Maintain 86% heterosis in offspring and sows.
- Produce your own replacement gilts.
- System is easy to manage.
- Offspring are uniform as all are genetically the same.
- Most common crossbreeding system.

### Terminal

In a terminal breeding system, a crossbred gilt (F1) is mated to a terminal purebred boar.

### Advantages

- Maintain 100% heterosis in both sow and marketing animals.
- It can fully utilize the power of each of the purest forms.
- Unequal market animals as all the animals produced are genetically engineered.
- The system is easy to manage when gilts are purchased and all the animals produced go to market.

### Rotaterminal

Rotaterminal combines the rotational and terminal breeding systems. In a rotaterminal, top females are selected and used in a rotational cross that produces replacement gilts.

### Advantages

- Maintain 86% heterosis in sows and 100% heterosis in market hogs.
- Produce own replacement gilts.
- Replacement gilts are produced from top sows which mean better milking performance.

## Crossbreeding System for Sheep

### Simple Cross

The simplest and most practical use of this is an easy way to cross. In this system rams of the same breed are simply matched with rams of a corresponding breed. The resulting offspring will contain 50% of the genes of each species and make full use of Heterosis.

### Rotational System

Rams of two or three different breeds are used in altering generations when this plan is implemented. Heterosis increases with the number of different ram breeds being presented to the flock. However, this system increases management concerns by forcing ewes to be separated into different flocks during the breeding season.

## Genetic Improvement of Non-Descript Zebu Cattle by

## Crossbreeding

Crossbreeding beef cattle offers two primary advantages relative to the use of only one breed: (1) crossbred animals exhibit heterosis (hybrid vigor), and (2) crossbred animals combine the strengths of the various breeds used to form the cross. The goal of a well-designed, systematic crossbreeding program is to simultaneously optimize these advantages of heterosis and breed complementarity.

Some examples are Santa Gertrudis, the Jamaica Hope, the Norwegian Red and White, the Australian Milking Zebu, Hissardale, Karan Swiss, Sunandhini, Taylor breed.

## Genetic Improvement of Non-Descript Cattle by Grading Up

To make the distance the continuous use of a single pure type of sire that begins with its base, which was another species or non-specific animal. Proper monitoring of nondescript cows' feeding system regularly and long-term can improve milk yield by 500 to 800 kg in the first generation. By using zebu bulls with high transfer capacity later in the first generations, milk production can be improved by up to 5 to 10% per year. Within 5 to 6 generations of continuous capture, non-dictionary stock will be converted into well-defined pieces.

## Outcrossing

Thorough breeds described as "out crossed" do not have any ancestors duplicated between the sire's and dam's sides of their pedigrees within five generations. If an ancestor is duplicated on the sire's side of the pedigree but not on the dam's side or vice versa - the foal is still considered to be out crossed. Breeders make use of out crossing to increase the vigor of their stock, especially when one or both of the parents to be used are strongly inbred, it draw on a wider genetic pool, and to reduce the probability of a foal's inheriting two copies of an undesirable recessive gene. The primary drawback of out crossing is that out crossed individuals are less likely to transmit their own type because of their more varied genetic backgrounds. It can also be harder to predict what bloodlines will work well as a cross.

## Species Hybridization

Hybridization is defined as interbreeding between genetically distinct populations. Hybridization between closely related species is a natural phenomenon that has been observed in all major plant and animal taxa. Animal hybridization is harmful to conservation and to ecological/evolutionary processes. Examples of species hybridization are listed in Table 1.

Table 1: Examples of hybrid of different of species

Sl. No.	Hybrid	Sire	Dam	Characteristic
1	Hinny	Stallion	Jennet	Smaller and poorer to mule as a work animal, sterile.
2	Mule	Jack	Mare	The mule is usually larger in size than a hinny, sterile.
3	Cattalo (Beefalo)	American buffalo bull	Domestic cow (Bostaur us)	Males are sterile and females are fertile, lower infant mortality rate.
4	Geep	Goat	Sheep	Offspring of goat and sheep pairings are usually stillborn.
5	Liger	Lion	Tiger	They grow to be very large very quickly, and are the biggest cats in the world. Males are sterile and females are fertile. Larger than either parent species.
6	Tigon	Tiger	Lion	Tiger sized appearance midway between tiger and lion. Males are sterile and females are fertile. Smaller than either parent species.
7	Jatsa (F1 male)	Mithun	Siri Cow	Jatsa are popular for draught power.
8	Jatsam (F1 female)	Mithun	Siri Cow	Jatsam are renowned for higher milk production and fat content.

### Conclusion

It is concluded that mating system is one of the managerial tools for breeding system. Inbreeding is have harmful effect on productive and reproductive performance, on other hand, out breeding is effective in animal breeding. Crossbreeding is form of outbreeding have own advantages and disadvantages in different species. Crossbred developed by crossbreeding. The species hybridization is another form outbreeding but the hybrids in most of the time are sterile. Grading up take time to develop new breeds.

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