
Breeding Management of Breeding Stock in Poultry

Prajakta Jadhav*, Ram Kulkarni, Sharad Avhad

Assistant Professor, College of Veterinary and Animal Sciences, Udgir, Maharashtra, India.

*Corresponding author's e-mail: drprajaktavet@gmail.com

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ABSTRACT

Poultry farming relies heavily on the strategic selection of breeding stock, which directly impacts flock health, productivity, and long-term profitability. This paper reviews the foundational methods, breeding systems, and mating practices essential for maximizing genetic potential and operational efficiency in poultry production. Effective selection target-improves critical economic traits such as egg production, feed conversion ratio (FCR), growth rate, and hatchability. While crossbreeding and strain crossing are vital for capturing hybrid vigor in commercial broiler and layer production, standardized evaluations like the Government of India's Random Sample Tests provide a critical benchmark for uniform performance verification. Ultimately, integrating systematic selection methods with appropriate breeding frameworks enables poultry farmers to reduce culling, secure superior genetic traits, and ensure sustainable economic returns.

INTRODUCTION

Success in poultry farming begins long before the first egg is laid or the first chick hatches. It starts with selecting the right breeding stock. Healthy, productive breeding birds ensure better performance, higher profits, and a stronger flock for future generations. Good breeding practices help farmers reduce culling, improve productivity, and maintain desirable traits in their birds.

WHY BREEDING STOCK SELECTION MATTERS

The quality of breeding birds determines the future of a poultry flock. Selecting superior birds offers several benefits:

- Reduced culling due to fewer undesirable birds.
- Higher profitability through improved productivity.
- Better performance in subsequent generations.
- Stronger and healthier flocks with desirable genetic traits.

Selecting breeding stock involves evaluating birds based on their past, present, and future performance.

THREE WAYS TO SELECT BREEDING BIRDS

1. PEDIGREE SELECTION: LEARNING FROM THE FAMILY TREE

Pedigree selection focuses on the performance of a bird's parents. Birds whose sire and dam were high producers are more likely to pass desirable characteristics to their offspring. Although pedigree alone cannot guarantee superior performance, it provides a useful basis for identifying promising breeding stock.

2. OWN PERFORMANCE: EVALUATING THE INDIVIDUAL BIRD

The bird's own characteristics provide valuable information for selection. Important traits include:

Vigour: Healthy, active birds with bright red combs and broad, deep bodies generally perform better and are often superior egg producers.

Breed Type: Birds should display the standard characteristics of their breed or strain to maintain genetic purity.

Body Conformation: Good laying hens typically have a broad, flat back, a wide chest, greater distance between the pubic and keel bones, wedge-shaped bodies, well-spaced legs, and good muscle development.

Moulting Pattern: Early moulters are generally poor egg layers, while birds that moult later and complete moulting quickly are usually more productive.

Broodiness: Excessive broodiness reduces egg production. Commercial egg-laying breeds such as Leghorns are naturally less broody.

Persistency: Birds that continue laying eggs consistently over a longer period are considered more valuable breeders.

3. PROGENY PERFORMANCE: THE ULTIMATE TEST

The true value of a breeding bird is measured by the quality of its offspring. Birds that consistently produce healthy, productive chicks are considered superior breeders. Progeny testing is also used to evaluate how well different breeding lines perform when crossed together.

COMMON BREEDING SYSTEMS IN POULTRY

Different breeding systems serve different purposes.

Outcrossing- Outcrossing involves mating unrelated birds of the same breed but from different strains. This helps maintain genetic diversity while reducing the risk of inbreeding.

Crossbreeding- Crossbreeding is the mating of two different pure breeds. It produces hybrid vigour, resulting in offspring with improved growth, health, and productivity. This system is widely used in commercial broiler production.

Inbreeding- Inbreeding involves mating closely related birds, such as brother-sister or parent-offspring pairs. It helps fix desirable traits but must be managed carefully to avoid undesirable genetic effects.

Line Breeding- Line breeding is a controlled form of inbreeding used to preserve the desirable characteristics of a particular family line.

Grading- In grading, superior males are repeatedly mated with successive generations of females. Over time, the offspring gradually acquire the desirable qualities of the superior male line.

MATING SYSTEMS USED IN POULTRY

Several mating systems are practiced depending on breeding objectives.

- **Flock mating:** One male is mated with 15–20 females. This method is economical and maintains good fertility.
- **Pen mating:** A group of hens is mated with a single male, allowing the parentage of chicks to be identified.
- **Stud mating:** Individual females are mated separately with a selected male for precise breeding records.
- **Artificial insemination (AI):** Common in cage systems, AI improves breeding efficiency. Semen may be used immediately after collection, with two inseminations during the first week followed by weekly insemination for optimum fertility.

TRAITS THAT MATTER MOST

Successful poultry breeding focuses on improving several important characteristics:

- Egg production
- Age at sexual maturity
- Persistency of laying
- Broodiness
- Growth rate
- Body weight
- Feed consumption
- Egg weight
- Egg quality
- Feed Conversion Ratio (FCR)
- Fertility
- Hatchability
- Chick viability

PRODUCING COMMERCIAL HYBRID CHICKS

Commercial poultry companies produce high-performing hybrid chicks in two ways:

1. Developing improved strains through closed flock selection and crossing these strains.
2. Developing highly inbred lines (with at least 50% inbreeding) and crossing compatible lines that perform exceptionally well together.

PRACTICAL INSIGHTS FOR POULTRY FARMERS

Although inbreeding and hybridization are useful breeding tools, their value depends on the production objective. In commercial broiler production, many important traits already have high heritability, making careful selection essential. For egg production, strain crossing is commonly practiced, especially for producing brown-shelled eggs, which are highly preferred in many markets.

To ensure fair comparison among commercial poultry varieties, the Department of Animal Husbandry, Government of India conducts Random Sample Tests. Under these tests, commercial layer and broiler varieties are evaluated under uniform feeding and management conditions, allowing breeders to compare the performance of their birds with others in the industry.

CONCLUSION

Effective poultry breeding is a blend of science, careful observation, and long-term planning. Selecting birds based on pedigree, individual performance, and progeny performance helps build productive, healthy, and profitable flocks. Whether using crossbreeding for hybrid vigour or maintaining valuable family lines through line breeding, thoughtful breeding decisions remain the cornerstone of successful poultry production. By combining proper selection methods with sound breeding systems, poultry farmers can continuously improve the genetic potential and productivity of their flocks.