

Genetic modification and treatment in livestock matters

Abstract

The science of breeding, along with other sciences related to animal breeding, as one of the important tools for quantitatively improving the quality of livestock products, is considered and used by animal husbandry experts. Improving the quality and quantity of livestock products by improving the genetic potential of animals, along with helping to improve environmental and management conditions, is one of the primary goals of breeding centers. Relying on its many years of experience in the field of breeding projects and using the latest techniques and hardware and software available in the world, the Livestock Breeding Center currently implements the breeding projects of purebred cows, mixed cows, native cows, sheep and goats and There are cows and sheep in the country.

Livestock breeding is aimed at obtaining animals with higher production and profit. As a result of breeding, animals with small sizes and less processing have been obtained from animals with large sizes and more processing. In the generations after that animals, more processing and more profits are obtained, it is called eugenics.

Keywords: *animal breeding, genetics, gene, breed, generation*

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Introduction

Duties of the Center for Breeding and Improvement of Livestock Production

- Designing and creating a suitable network for the exchange of breeding information at the country level for each of the species and breeds of livestock from the center to the farm level according to the type of traits and desired goals.
- Carrying out the necessary studies and investigations in order to obtain a comprehensive understanding of the current genetic status of livestock and determine the needs and priorities of livestock breeding and improvement of livestock production.
- Preparing and regulating and proposing executive policies for animal breeding and improvement of livestock products within the framework of the country's macro animal husbandry policies.
- Preparation and compilation of the national program for animal breeding and improvement of livestock production and the necessary guidance and supervision to prepare regional and provincial programs.
- Preparation and regulation of technical rules and instructions related to livestock breeding activities and improvement of livestock products and supervision of its implementation.
- Assessing and estimating the country's need for raw materials, supplies, and equipment related to animal breeding and improvement of livestock products and providing the necessary support and follow-up in order to supply and procure them through the relevant authorities.
- Monitoring the implementation of plans and projects for animal breeding in the country.
- Monitoring the effective implementation of activities related to livestock breeding and breeding improvement of livestock

products and taking necessary measures to modify related policies and programs.

- Investigating, guiding, and monitoring the implementation of model plans for livestock breeding and breeding in different regions of the country to breed livestock and improve livestock production and promote the results.
- Investigating and determining the needs of research, education, promotion, and drafting relevant standards in the field of breeding, animal breeding, and improvement of products and announcing it to the relevant unit and following up until the result is achieved.
- Setting the stage for investment and use of banking and credit facilities regarding the equipment and development of facilities and activities related to breeding and improvement of the country's livestock products.
- Guiding the executive units to promote new breeding methods within the framework of the relevant deputy's programs.
- Preparation, formulation, and implementation of national programs for the protection of the genetic diversity of indigenous livestock and the formation of a gene bank.
- Preparation and regulation of technical regulations and instructions related to the export and import of genetic material (sperm, embryo, live animal, etc.) of different livestock species in the country and monitoring their implementation.
- Communication with relevant scientific and technical societies inside and outside the country for the transfer of the latest scientific and research achievements and their application in breeding, breeding, and improvement of livestock products.
- Preparation and regulation of rules and technical instructions related to the formation of racial associations and related specialized bodies as the executive arm of breeding and

eugenics projects in the non-governmental sector and monitoring their activities.

- Planning for the development of livestock supply areas and the organization of livestock slaughterhouses in the country.
- Planning for the development and improvement of breeding and improvement of sports animals, with the cooperation of the relevant federations and popular farms.
- Preparing and compiling the required technical standards, criteria, and instructions as well as standards related to livestock products with the cooperation of the relevant units.
- Guiding the provincial units to prepare and organize programs and supervise the implementation of livestock breeding development plans, animal breeding, and improvement of their products in different regions of the country.
- Coordinating and cooperating with the relevant units to formulate policies and programs for market regulation and effective management of the supply and demand of livestock products.
- Coordination and cooperation with transformation industries related to livestock products for the processing of livestock products.
- Cooperation and coordination with relevant units in the direction of development of organizations, technical service offices of animal husbandry, and support of users within the framework of approved policies and programs.
- Preparation and preparation of technical and specialized needs for organizing gatherings, exhibitions, and festivals and offering scientific and specialized courses related to livestock breeding.
- Planning and preparation of goals and executive affairs of the stations, center of breeding, and production of genetic materials and monitoring the realization of the program of the set goals and said centers.^[1]

Genes and transmission of traits

Every animal has a multitude of traits, color, body size, horned or hornless, these are a few of the traits that are passed from parents to offspring. These traits are controlled by genes. Genes are very small and complex molecules that are located on chromosomes, and each animal contains thousands of pairs of genes, half of which are inherited from the father and the other half from the mother, and together they form the basis of the animal's genotype. Genotype is a close determinant of the animal's ability to perform in various traits. Each pair of genes controls several traits. Some traits have high heritability, but others have low heritability.^[2]

If a trait has a lot of heritability, the improvement of that trait in the animal will be done quickly, and on the contrary, for traits with low heritability, the improvement will progress slowly, in other words, to improve such traits, it is necessary

to process many generations so that one trait becomes a species. The following table shows the heritability ratio of some cattle traits. Livestock breeders select traits that are important for use in animals.

For example, in dairy cows, traits that are important to the quantity and quality of milk are modified, or in birds, the characteristics of egg-laying chickens, the growth rate, the vital property and life expectancy of chicken processing, and the rapid growth power of environmental factors such as nutrition, milking methods. And the like will determine to what extent the animal has achieved the desired ability, indeed, the performance of the animal is the sum of the effect of the environment and the genotype.^[4]

Genotype gives the animal the ability to and provides the environment necessary for executing the actions; In other words, both phenotype and genotype are important and determining.

Role and ability or efficiency

Graduates of this field acquire skills in some of the following fields according to their orientation. - Teaching courses in animal science and related sciences in agricultural schools and colleges - Research in various fields related to solving the problems and issues of production of livestock products and improving their quantity and quality - Research in the fields of animal breeding and molecular genetics - Research in the fields of physiology - planning and Directing executive affairs in various fields of livestock production.^[5]

What is sheep breeding and how is it done?

What is sheep breeding?

Breeding can create superior animals by genetically superior animals through different mating methods. Eugenics has caused the best breeds and livestock, sheep, and poultry to be obtained in this way, so eugenics is considered a very important matter that also contributes a lot to the economy of society. Many people consider transgenics and eugenics to be the same, while the science of eugenics is completely different from transgenics.^[6]

The difference between eugenics and transgenics

The science of eugenics is a science that stabilizes the effective genes in the economic production of live sheep. In the science of eugenics, sheep that are genetically superior to others create superior sheep through various appropriate mating methods. But transgenic is a type in which the sheep's genome is modified through foreign genes, and the production of these types of animals mostly has medicinal purposes and is not of much use other than this. Of course, it has other uses, including 1- increasing the ability of livestock to resist diseases, 2- producing more milk, 3- improving fertility, etc.^[7]

Why is the science of sheep breeding used?

With the passage of time and the increase in the population, people's need for food, dairy products, wool, etc. is increasing day by day, which is why it is necessary to change the genes of animals, including sheep. Types of livestock 2- Improving the performance of livestock and...^[8]

What are the goals of eugenics science?

- 1- Synthesis of high yielding breeds of sheep and other livestock according to different weather conditions
- 2- Preparation of computer simulation programs to evaluate the results obtained from breeding programs
- 3- Identifying and evaluating livestock genetic resources and preserving them
- 4- Determining the most economical and best way to preserve all kinds of livestock genetic resources
- 5- Examining livestock breeding methods
- 6- Carrying out and implementing organized hybridization to produce a combination compatible with the climate and conditions of the region and a new genetic combination
- 7- Determining different breeding programs and goals for different breeds of sheep
- 8-....^[9]

How does eugenics help livestock farmers?

Considering the increase in production costs and the poverty of pastures, raising native sheep without breeding, and also raising sheep that give birth to only one lamb in a year, is not economical and does not bring much income^[10]

Genetic modification methods

The methods of genetic modification in all kinds of animals and sheep are done in different ways, these methods are: ^[11]

- 1- Mating of different families of the same breed
- 2- Crossbreeding
- 3- Inbreeding

1 Mating of different families of the same race or (Out breeding)

In this method, sheep with a very distant family relationship, who belong to the same breed, mate with each other. The method of mating different families of the same race to prepare pure breeds is one of the most common methods that does not have the disadvantages of the mating method, which you will study.^[12]

2 Crossbreeding

In this method, two sheep that have different breeds but are genotypically pure are mated with each other. The lambs resulting from this method have many genes in the form of heterozygotes, some of which are inherited from the mother and some from the father. In this type of breeding, the number of genes in the lamb is more than the number of its parent sheep. They use the mixing method in chicken farms to prepare meat and egg chickens and grilled chicken.

3- Inbreeding

In this method, sheep that are closely related to each other mate. This method of mating causes heterozygosity to decrease and homozygosity to increase in the herd, and in this method, the phenotype of the lambs is completely similar to the parents. There may be a large number of ugly and ugly traits in a hidden and recessive form in the parents, and after mating, although these traits were hidden in the parents, they were combined in the lamb and transferred homozygously. In this case, these unpleasant traits appear in lambs.

Most researchers say that the first step in designing breeding programs is to decide on appropriate breeding goals, and some believe that the biggest factor in the ineffectiveness of livestock breeding programs is the undesiredness of breeding goals, which has caused pressure. Selection should be applied to incorrect traits.^[13]

There is no global or even national standard breeding goal for a specific species, because the economic, social, and ecological conditions are different in different regions. Each producer will have different breeding goals depending on the production system, market conditions and the merit of his herd. Diversity of breeding goals based on local production environments leads to genetic improvement to adapt breeds to their place. Several definitions have been mentioned for eugenics, among which the following can be mentioned.

The general purpose of animal breeding is to breed animals that have higher production efficiency than the current generation in the future economic and social conditions of the farm, or the purpose of animal breeding is to improve their economic efficiency.^[14]

In fact, the goal of animal breeding is to achieve maximum economic efficiency, or in other words, the improvement goals are a function of a set of traits that are effective on profitability following the development goal and the characteristics of the production system and are interested in improving. We are their genetics. The breeding objective represents the genetic value of the animal for the total true merit and is usually expressed in the form of a linear function of the true breeding values of traits that have economic importance.^[5]

Conclusion:

Livestock breeding is the science and art of stabilizing genes effective in the economic production of livestock. Breeding creates superior livestock by selecting genetically superior animals and with the help of appropriate mating methods. Breeding is an applied science and it has found a new horizon in specialized departments with the combined application of the sciences of quantitative genetics, molecular genetics, statistics, computers, and economics.

In animal breeding programs, the goal is to identify and select animals with genetic capacity higher than the average population and use them as parents of the next generation. As a result, it is expected that the average genetic capacity of the progeny is higher than the average of the parent generation. One of the most important decisions made in livestock breeding programs is the selection of breeding goals. If the objectives of breeding are not chosen correctly, genetic progress will be achieved in the wrong direction and may even lead to the deterioration of the economic condition of the herd. Genetic modification of livestock is done by changing the breed or by The selection, which is a slow but important method to increase livestock performance. Therefore, breeding programs should be considered as a long-term method to increase livestock production. Livestock breeding has made a significant contribution to improving the production of farm animals.

The reports that are currently available on livestock production show significant changes in the direction of increasing these productions compared to the past. These changes indicate the improvement of nutrition and management along with success in breeding. The important point is that in the climatic conditions of Iran, emphasis should be placed on the native breeds of the country for livestock breeding, especially sheep and goats

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Ethical approval

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