



Genetic resources of local chicken in Georgia

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The preservation of local poultry gene fund has both scientific and practical importance for Georgia. High genetic potential is important for breeders from national, state, scientific and economic points of view. It has been determined by scientists that modern poultry farming in the world is represented by a small genetic line of birds, which is why the breeds of agricultural birds are almost uniform in origin. According to the breeders, the mentioned fact will definitely lead to the disappearance of valuable and necessary alleles, which local birds are the protectors of. Further progress in poultry breeding is impossible without the use of genetic diversity. The breeding of new crosses necessarily requires extensive involvement in the selection of the “less economical” local bird gene pool. The intensification of the poultry industry, with the wide spread of imported highly productive hybrid birds, created a threat to the preservation of the gene pool of local birds, which almost created the danger of its degeneration and extermination for such breeds of chicken that have been widespread in Georgia since time immemorial, including the following local breeds: Chalisferi, Shavi, Megrula, Natsara, Keltivela. These local breed chicken are characterized by valuable genetic traits. They are a source of rare marker genes, characterized by auto-sexuality, good adaptation to hot climates, the best quality of eggs and meat, less demand for nutrition and care, and high resistance to a number of diseases.

Key words: preservation, poultry, alleles, genotype, breeds, selection, productivity

Introduction

According to the data of the United Nations Food and Agriculture Organization (FAO), over the last 100 years, 39 breeds of birds have completely disappeared across Europe, and 481 are at risk of extinction. These are breeds that are characterized by good adaptability, high resistance to various diseases, less demand for storage conditions, high taste qualities of eggs and meat.

A decrease in genetic diversity is manifested by the loss of valuable genes and their alleles. All this significantly limits the possibilities and efficiency of further selection work. In addition, local breeds and populations are valuable living cultural heritage. No less

important are the issues of keeping reserve lines of industrial poultry. That is why it is necessary to develop methods and ways of preserving the genetic diversity of agricultural poultry.

World practice shows that it is possible to use different methods: *in situ*, *ex situ*, *in vivo*, and *in vitro*. It is also worth noting the existing organizational forms in this regard: fancier-birders' associations, state and private gene pool farms, monetary incentives at the national level, and others.

Legislation regulating the use of genetic resources in our country requires improvement, which means that there should be a law on breeding livestock. It is also necessary to create a law on the preservation of genetic resources of agricultural animals and poultry

and a mechanism for its implementation. Regrettably, it is a fact that today the country does not have an organizational system for storing genetic resources.

In Georgia there are suitable conditions for the development of poultry farming, such as: moderate climate, abundance of sunny days, diversity of plants and their long growing season. The most common domestic bird is the chicken. Information about chicken farming and some taxes related to it, is also reflected in historical documents. Chicken was one of the important sources of providing the population with meat products, which contributed to the breeding of meat, egg-laying and combined breeds of chicken.

Today, the following populations of Georgian chicken are still preserved in Georgia and have been identified by scientists and named according to their color: Chalisferi, Shavi, Megrula, Keltitvela, Natsara.

Population — Georgian Chalisferi chicken

Common name: chicken. **Latin name:** *Gallus domesticus*.

Origin: mostly spread in Kartli and Kakheti. The breeding of this population in Georgia has a centuries-old history, and at the same time, its origin is still unknown.

Brief description: meat and egg-laying chicken direction, but, as noted, leans more towards meat chicken. The body is medium-sized, the head is medium-sized, the face is slightly puffy, the beak is yellow, the comb is simple (leaf-like), the mouth and ears are red, the chest is wide, the back is relatively short, the legs are not feathered and covered with yellow scales, the skin is pigmented yellow. Feather color varies from straw to light red (more carrot) in different individuals, males are somewhat darker than females. As usual, the cover is white, and on the ends they do not have mixed black feathers. The average live weight of 1-year-old females is 1.8–2.0 kg, and that of males is 2.5–2.8 kg; for adults it is 2.4–2.7 and 3.0–3.4 kg, respectively. Adolescents start laying eggs from the age of 6–7 months. The average annual egg production is 135–145. The average weight of the egg in the middle of the laying period is 53–56 g, and at the end — 58–61 g. The egg is characterized by high incubation properties: the percentage of hatching out of every 100 laid eggs is 85–88. Chicken grow quickly and are characterized by good plumage. Adolescents reach the live mass for slaughter at the age of 2.5–3.5 months. Like other local populations, one of the main virtues of the Chalisferi chicken is its ability to adapt to changing environments, high liveliness and less demanding. Along with this, in separate trials, the increased resistance of local chicken to such infectious diseases as plague, pulurosis and marek has been established. It is characterized by the high taste qualities of the meat, which is due to the fact that fat

accumulates not only under the skin and in the abdominal cavity, but also between the muscles. Its egg has a high content of lysine, leucine and isoleucine, which leads to high incubation and taste properties.

Current state: the number of Chalisferi chicken has not been established, since they are reared together with other populations of local chicken in private farms. It is very similar in appearance and structure to the Rhode Island variety bred in the USA.

Population — Georgian Black chicken

Common name: chicken. **Latin name:** *Gallus domesticus*.

Origin: it is one of the varieties in five local chicken populations. It is characterized by a broad head, a short and thick neck, a broad chest, a long back, dense feathers, a comb that is leaf-like and blood-red in color, and the comb behind the ear is also red. Limbs below the ankle joint are not inflated. The scales on the foot are small and densely covered. Brief description: The body length of chicken is 21–23 cm, the length of the breastbone is 12.5–15.5 cm, and the circumference of the chest is 30.5–32.5 cm. The corresponding measurements for roosters are: 24.0–26.0, 16.5–18.5 and 42.0–45.0 cm. The feathers on the whole body are pigmented black; there may be single white or yellowish patches (dots or short stripes) on the neck. In roosters, the black color of the feathers on the main part of the body, on the neck, wings and tail, turns into a greenish-purple-shiny-glossy color. Beak and legs blackish-grey (dark). It is resistant to changes in environmental conditions. It does not require any special maintenance conditions and shows high productivity when kept in simple poultry houses. The live weight of chicken is 2.2–2.4 kg, roosters — 2.8–3.1 kg. They start laying eggs from the age of 6–7 months. Average egg production is 130–142 pieces/year; the average mass of 1 egg is 55.5 g. Under natural conditions (under the hook), 85–88 chicken hatch from every 100 eggs. In the “Tushuri” population of black chicken, Georgian researchers have revealed a fairly high rate of resistance to bird plague.

Current state: like other local chicken populations, black chicken are raised in family and farm farms, and no official information is available on their numbers.

Population — Megrula chicken

Latin name: *Gallus domesticus*.

Origin: they have been popular since ancient times in one of the regions of Georgia — Samegrelo (the origin of the name of the chicken). It can be found in other regions of the country as well. It is durable and easily adapts to changing climates, both heat and cold. This is what caused it to be widespread in Armenia, Russia, and Ukraine in the last century.

Brief description: characteristics of physical features: medium-sized head, long neck, broad chest and relatively short back. The color of birds of both sexes is the same in adulthood: feathers are blackish-gray on the whole body, with white tips or feathers (short stripes). In individual specimens, the wing feathers are slightly golden. In roosters, the comb is large, leaf-like, red in color and often folded. It is desirable that the upper comb be leaf-like and folded. The beak and legs are light yellow, but dark coloring is also allowed. The legs are padded up to the ankle joint. The feathers of newly hatched chicken of different sexes are of different colors: on the head of the male chicken, it has white feathers, in the male chicken, such feathers are almost absent, while the rest of the body is pigmented black in the juveniles of both sexes. Such differentiated coloration allows choosing the sex of a one-day-old chicken. It is worth noting that from the age of two weeks, the chicken acquires a striped coloration. Average live weight of males — 2.8–3.2 kg, females — 2.4–2.7 kg.

Among the chickens of the Georgian population, it is the most early-maturing and productive: it starts laying eggs somewhat earlier — from the age of 160–170 days. On average, it gives us 160–165 eggs weighing 55.3 g per year. Out of every 100 laid eggs, the specific share of hatching is 80–82% of the eggs laid in the initial period of egg laying, and 88–90% of the eggs laid in the middle period. Chicks grow fast but fledge slowly.

Megrula eggs are characterized by high incubation properties, chicken grow quickly and reach slaughter age at the age of 3–4 months. Both young and adult birds are characterized by high-tasting qualities of meat, which is due to the fact that fat accumulates not only under the skin and in the abdominal cavity, but also between the muscles, which is not characteristic of other cultural breeds and crosses. Unlike other cultured varieties, its egg has a high content of lysine, leucine and isoleucine, which determines its high incubation and taste properties.

Current state: the number is greatly reduced. They are raised on family farms, together with chicken from other Georgian populations.

Population — Georgian “Keltitvela” chicken

Common name: Chicken. **Latin name:** *Gallus domesticus*.

Origin: it is assumed that the Keltitvela chicken generally originated in the territories of today's Austria, Germany, Hungary and Romania. The period of their distribution in Georgia has not been determined. In some parts of the country, Keltitvela chicken are also called Chinese (“Kitaika”).

Brief description: Georgian “Keltitvela” chicken differs from other Georgian populations in its appearance:

the head is round, the beak is short and slightly curved, the comb is simple, medium-sized, blood-red and mostly upright, the earrings are small and red, the neck is of medium length, not inflated and red, the chest is wide and rounded, the back is long and broad, the wings are tightly attached to the body, and the part of the foot is quite long and not inflated. Feather pigmentation in both roosters and hens repeats the coloring of all Georgian chicken populations. The beak and part of the foot are mostly yellow.

One of the main conditions for belonging to the Georgian “Keltitvela” group is that the chicken should not have white feathers in its coat. In terms of productivity, “Keltitvela” chicken are combinative, egg-meat oriented. Among individuals of different colors, the straw-colored keltitvela is the largest. On average, the live weight of roosters is 3.2–3.5 kg, chicken — 2.7–2.8 kg. It starts laying eggs at the age of 5–6 months, and reaches the peak in the 7th–8th month. The average production is 155–160 eggs, egg mass is 56.8–58.5 g, hatching egg yield is 90%, and the number of hatched chicken from every 100 eggs reaches 86–88. The chick is growing fast. It has tender, tasty and “white” flesh, which is also characterized by good technological/culinary properties. It is established that the “Keltitvela” chicken is characterized by high vitality, when kept in family conditions, it easily “finds” food and tolerates extremely high air temperature well.

Current state: it is not found as a separate groups in any farm/household. According to the expedition research of 2009–2012, the number of hens in Dusheti and Tianeti municipalities is 24–30% of the total mass. Probably, the situation is similar to this in other regions of the country.

Population — Georgian Natsara chicken

Common name: chicken. **Latin name:** *Gallus domesticus*.

Origin: it is one of the local chicken populations. Compared to the Black chicken, it has a longer body. It is characterized by a wide chest, medium height, dark colored and un-feathered legs, a short, dark colored and slightly curved beak, a leaf-like and mostly erect comb and a red colored earlobe.

Brief description: in females, the body is completely covered with uniformly gray feathers, which may be slightly darker in the neck area. Roosters also have body feathers that are a solid gray that fades to dark on the tail and neck areas, and some individuals may have a slightly noticeable light golden color on the wings. The live weight of adult females is 2.4–2.7 kg, males — 3.0–3.4 kg. They start laying eggs from the age of 160–170 days. In this period, the intensity of eggs is on average 14.6%, and the peak of egg production occurs at the age of 8–9 months and reaches 63.2%. The average annual egg production rarely

exceeds 150–155 eggs, and the average egg weight is 55.8 g. The hatching egg yield reaches 88.6%, and the hatching % is 83.6.

Birds of this population are characterized by high vitality and good endurance. In the experiments, it was determined that the rate of mortality of Natsara chicken in the period from 5 to 17 months of age is quite low and amounts to 15.4%. It should be considered as an important positive feature that the laying of eggs in the summer months is quite even, which indicates the high ability of chickens to adapt to the high temperature.

Current state: Natsara chicken are raised together with other local populations in family/household farms. There is no official information on their number.

As we can see, the local chicken populations spread in Georgia are characterized by a number of important positive features, such as vitality and durability, high resistance to various diseases, resistance to high temperatures, good productive indicators, etc. Today, when scientists from all over the world, including specialists in the field of animal husbandry, fight with the negative consequences caused by climate change, local chicken populations are able to breed highly productive lines and

crosses well adapted to new natural and climatic conditions as a result of targeted selection work.

It should be emphasized that the local chicken populations spread in Georgia are not only well adapted to the local natural and climatic conditions, but they can also be used in foreign countries which once again points to the need to preserve these populations. Accordingly, we believe that it is necessary to create a genetic bank in the country, where the genetic material of valuable Georgian chicken populations will be preserved.

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Генетичні ресурси місцевих курей в Грузії

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Збереження генофонду місцевої птиці має для Грузії як наукове, так і практичне значення. Високий генетичний потенціал важливий для селекціонерів з національної, державної, наукової та економічної точок зору. Вченими встановлено, що сучасне птахівництво у світі представлене невеликою генетичною лінією птахів, тому породи сільськогосподарської птиці майже однорідні за походженням. На думку селекціонерів, згаданий факт однозначно призведе до зникнення цінних і потрібних алелів, носіями яких є місцеві птахи. Подальший прогрес у птахівництві неможливий без використання генетичного різноманіття. Виведення нових схрещувань обов'язково вимагає широкого залучення до відбору «менш економічного» місцевого генофонду птахів. Інтенсифікація птахівництва з широким розповсюдженням імпортової високопродуктивної гібридної птиці створила загрозу збереженню генофонду місцевої птиці, що майже створило небезпеку його виродження та винищення для таких порід курей, які споконвіку поширені в Грузії, в тому числі місцевих порід: Чалісфері, Шаві, Мегрула, Нацара, Кельтвела. Ці місцеві породи курей характеризуються цінними генетичними ознаками. Вони є джерелом рідкісних генів-маркерів, характеризуються автосексуальністю, хорошою адаптацією до жаркого клімату, найкращою якістю яєць і м'яса, меншою вимогливістю до годівлі та догляду, високою стійкістю до низки захворювань.

Ключові слова: збереження, птиця, алелі, генотип, породи, селекція, продуктивність