

Origin and exterior features analysis of geese breeds genealogical groups in Russian gene pool herd

Anton Martsev^{1,*}

¹Vladimir State University named after A.G. and N.G. Stoletovs', Gorky Street 87, 600000, Vladimir, Russia

Abstract. The geese breeds not used in industrial poultry farming have become not numerous and exist mainly as closed populations. Therefore, the study and evaluation process of their inherent characteristics is closely related to the problem of breed conservation. Herewith the main objective is not the best genotypes selection, but the reproduction of the existing ones without their inherent qualities loss. The research objective is the analyses of the relationship between the preserved goose breeds and the study of the manifestation regularity of breed marking features in related bird groups. Materials and methods. The research was carried out on the basis of Federal State Budgetary Research Institution (FSBRI) "Verkhnevolzhsky Federal Agricultural Research Center (FARC)" (town of Suzdal). Nowadays the collection of geese in Suzdal is the richest both in Russia and abroad. It amounts 21 breeds of domestic and foreign selection. The research results identified 3 related goose groups and 7 independent breeds. Conclusion. All geese from the preserved gene pool have typical exterior features for each breed. Certain breed markers were stated to be the characteristic for the breeds of different pedigrees. These studies should be used for further breeding work in selecting producers in order to preserve and improve the geese gene pool.

1 Introduction

Animal husbandry is the second most important branch of agriculture (after crop production). It provides population with high-protein and dietary food, and a number of industries with the raw material. Its peculiarity is that the energy intensity of livestock products (energy consumption per product calorie) is 15-20 times higher than in crop production, and to expand the industry, it is necessary raise the level of the country's economy and agriculture as a whole, and the demand for meat, milk, eggs and their processed products as well [1].

The place of poultry farming in the livestock system depends on the consumer demand for meat, eggs and other products. Poultry farming transferred into the industrial basis much faster than any other industry. Due to the high reproductive qualities of poultry compared to other types of animals, modern poultry farming can be quite flexible and shortly adapt to

* Corresponding author: martsevaa@yandex.ru

the constantly changing consumer needs. New highly productive lines and hybrids have been developed, and their maintenance technology has been improved.

The geese, characterized by high precocity, growth intensity and dietary qualities of meat, play significant role in the increasing poultry meat production. Their feathers and down are valuable raw materials for the industry.

Goose breeding is a traditional occupation for the rural residents in Russia. Geese occupy a special place in terms of growth intensity, feed expenses, viability and fattening opportunities, as they are unique bird species. The following breeds of geese as the Lindov Large Gray, Shadrinsk, Kuban are used in industrial production in Russia. In addition to the domestic breeds Western breeds are also found in poultry farms in Russia: the Italian, Rhenish, Hungarian, and Landes. Many remarkable domestic breeds of geese which are not used in the industrial poultry farming (Tula, Vladimir, Arzamas, Adler, Kholmogory, Pskov, etc.) are kept only in the collection herd of FSBRI "Verkhnevolzhsky FARC" and are bred at small farms. Some breeds are currently very small in number, while others are almost extinct [1].

Preservation of poultry genetic resources has long been the global problem and, first of all, it should be based on the study of their inherent characteristics [2-4]. The main goal of breeding should not be the selection of the best genotypes, but the reproduction of the existing ones without losing their inherent qualities [5-7].

Since the working with the gene pool is closed purebred breeding, great concerns embrace drastic reduction and violation of the breed genealogical structure, causing the increase in homozygosity and decrease in genetic variability. Homozygosity increasing leads to the loss of alleles number, and hence to the heredity impoverishment, which causes inbred depression. The inbred depression consequence is the physique attenuation, body resistance decrease, increased mortality, and reduced productivity. One of the ways to increase genetic variability of traits in population and to eliminate inbred depression is a single blood transfusion (introductory crossbreeding). Herewith, it is very important to choose the goose breed similar in type and productivity to the one being improved [8]. Thus the relationship between the preserved goose breeds has been analyzed in this research. Simultaneously we have studied the regularities of the breed marking features manifestation in related groups of birds.

2 Materials and methods

The research was carried out on the basis of Federal State Budgetary Research Institution (FSBRI) "Verkhnevolzhsky Federal Agricultural Research Center (FARC)" (town of Suzdal).

Currently, the geese collection in Suzdal is the richest both in our country and abroad. It counts 21 breeds of domestic and foreign selection [9]. These are the Adler, Arzamas, Vištinės, Vladimir Clay, Italian, Chinese White, Chinese Gray, Large Gray, Kuban, Landes, Lindov, Ribbon, Pereyaslav, Pskov Bald, Rhenish, Romen, Tula Fighting, Toulouse, Kholmogory, Shadrinsk, Emden breeds. The analysis of the breed origin was carried out on the basis of available literary data.

The following external marking features have been analyzed: body shape and length, tail length, wing length and position, eye color, beak length and color, neck length and shape, and plumage color and density.

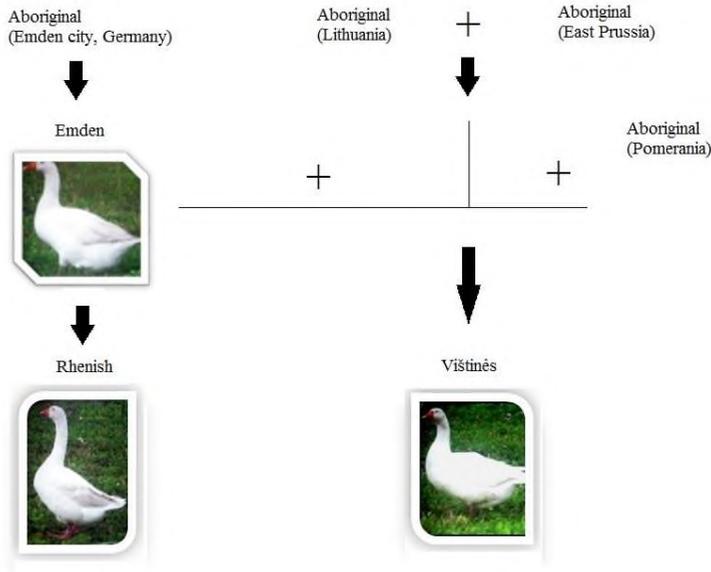


Fig. 3. III pedigree.



Fig. 4. Self-breeding breeds.

4 Discussion

In the largest group (I-th pedigree), all the presented breeds are related to each other by a common breeding ancestor, namely the Chinese Gray goose (Fig. 1). These breeds were raised for different purposes by crossing the Chinese Gray breed with local wild geese, or by crossing the newly bred geese with Toulouse breed (as in the case of breeding the Vladimir Clay goose).

The Chinese Gray goose is unpretentious to the keeping conditions, has high egg-laying capacity, but small live weight [10]. They can be used as parental forms for crossing with other breeds to increase the crossbreed indicators of live weight. This, apparently, was the

impetus for the creating a new breed that would contain economically useful qualities of the Chinese Gray, plus it would have sufficient mass (for example, Lindes breed) [11, 12].

Having analyzed the exterior characteristics of related breed groups of the I-st pedigree, we notice certain inheritance patterns in some of them. It was found that such characteristics as body shape, eye color, beak color and plumage color depend on the bird productivity type. The light breeds within this pedigree are characterized by an egg-shaped body, dark eye color, dark beak color, and dark gray plumage. The heavy breeds, on the contrary, are characterized by a massive deep and wide body, blue eyes, orange beak and white plumage. Besides it can be added that all breeds have the following similar indicators: a short tail, a long Swan neck (31-33 cm), a "bump" on the head, a skin fold ("purse") under the beak, and dense plumage.

The conditional second related group includes breed hybrids of the Toulouse and Romen. These are the Large Gray and Adler geese. The Landes breed, originated from Toulouse can also be referred there. (Fig. 2).

The Toulouse geese are sedentary, fatten well and accumulate much fat. They are not adapted to pasture conditions due to their poor constitution, they are not tolerate to cold and high humidity. The selection work in this group was basically dealing with the elimination of these disadvantages as well as with raising the breed characterized by both good productive indicators and liver fattening quality.

It is worth noting that the Vladimir Clay goose is a hybrid of representatives of the first (Kholmogory breed) and the second (Toulouse) pedigrees.

Analyzing the pedigree II, we see that all its representatives are characterized by such indicators as massive body, gray plumage, dark eyes, short orange beak (7-8 cm) and short (25-27 cm) thick neck. The exception is the Adler and Vladimir Clay geese, which breeding included the geese of other species. It should be noted that all breeds of the II pedigree are medium-heavy type, except for Toulouse one (heavy).

III pedigree consists of the three breeds: the Vištinès, Rhenish and their ancestor, Emden breed. (Fig. 3). These breeds were raised to produce poultry possessing good meat qualities. Geese of the Rhenish breed can be fattened for liver usually of 350-400 grams of weight.

The breeds of this pedigree are characterized by well-developed wings, short tail, blue eyes, short (24-26 cm) neck, short (7.5-8 cm) orange beak and pure white plumage. All the three breeds of this pedigree are heavy.

Seven breeds (the Chinese White, Shadrin, Pskov Bald, Italian, Tula Fighting, Ribbon and Arzamas) are not related to the breeds represented in the herd. (Fig. 4). Each breed has its own characteristics. For example, The Italian geese are used for liver fattening. The Chinese White geese are characterized by high adaptability to feeding and maintenance conditions and good fertility. The Shadrin geese have strong constitution and are well adapted to the severe conditions of the Urals and Siberia. The Ribbon breed has an interesting exterior. The Tula Fighting goose is an object of sports entertainment.

5 Conclusion

The analysis results prove that out of 21 breeds of the gene pool herd, fourteen breeds make up three pedigrees, and seven breeds have no related ties.

All geese of the preserved gene pool have typical exterior features for each breed. The assessment of economically significant and external marking features indicates the preservation and differentiation of breed characteristics of geese. Certain breed markers are stated to be characteristics for the breeds of different pedigrees. These studies are to be used for further breeding work in selecting producers in order to preserve and improve the geese gene pool.

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