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## **Bulgaria as a part of the world's poultry genetic resources – Bulgarian chicken breeds**

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### **Abstract**

Today, only a few major chicken breeds are used in industrial poultry farming, which leads to a considerable reduction in the genetic diversity of domestic chickens in the world. This trend is also affecting rural poultry farming. On the other hand, there is exhibition and ornamental poultry breeding, where productivity is not so important. Amateur poultry breeders play an important role in maintaining genetic diversity in domestic birds, especially in domestic chickens. In Bulgaria there are 10 known chicken breeds, two of which are recognized by the state institutions (Black Shumen and Stara Zagora Red Chicken) and the others are recognized or in the process of recognition by the Union of Fanciers and Small Domestic Animal Breeders in Bulgaria, which is a part of the Entente Européenne d'Aviculture et de Cuniculture (EE). Depending on the presence or absence of dwarfism, the breeds can be divided into standard breeds (Black Shumen Chicken, Stara Zagora Red Chicken, Katunitsa Chicken, Struma Chicken, Rhodope Painted Chicken, Southwest Bulgarian Chicken, and Bulgarian Longcrower) and miniature breeds (Bregovska Dzhinka, Struma Bantam, and Southwest Bulgarian Dzhinka). The breeds with attractive appearance have higher populations compared to the productive breeds, which are at risk of extinction.

Keywords: genetic diversity, Bulgarian chicken breeds, poultry genetic resources

### **Introduction**

The large-scale globalization in the meat and egg production industry has greatly reduced the number of companies engaged in poultry breeding (GURA, 2007). This process has concentrated a huge genetic resource in a small number of companies,

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which has led to a strong reduction in genetic diversity in poultry farming (BESBES et al., 2007). Highly productive hybrid chickens are gradually replacing local breeds, thereby further narrowing the genetic diversity of domestic chickens. Nevertheless, in some parts of the world, such as Africa, South America and some countries in Asia and Europe, significant heterozygosity is still observed among local chicken populations (MALOMANE et al., 2019). More than 1600 chicken breeds are known worldwide (DAD-IS, 2021), but only a few of them have been introduced and used in the global industrial poultry farming (TENEVA et al., 2015). Local breeds account for up to 95% of the total poultry population in developing countries contain a wealth of genetic information for phenotypic traits, some of which may eventually prove valuable for poultry breeding and humans in the future. Such examples include the use of mutations in plumage type and colour, eggshell colour, dwarfism in broiler parents, etc., to provide more attractive products for the consumer or birds better adapted to specific rearing conditions. A large number of chicken breeds have been created in Europe, but many other breeds that originated outside the continent are also bred and maintained. More than 60% of all chicken breeds in the world are bred by hobby breeders in Europe, making them an important factor in the preservation and conservation of genetic diversity in domestic chickens (LUKANOV, 2017a). Bulgaria, as a part of European hobby breeders' society, contributes with its ten local breeds of chickens to the maintenance of the genetic diversity in poultry breeding.

Table 1: Bulgarian chicken breeds by type

Breed	Breed type		
	Productive	Ornamental	Miniature
Black Shumen chicken	✓		
Stara Zagora Red chicken	✓		
Katunitsa chicken	✓	✓	
Struma chicken		✓	
Southwest Bulgarian chicken		✓	
Bulgarian longcrower	✓	✓	
Rhodope painted chicken	✓	✓	
Bregovska dzhinka		✓	✓
Struma bantam		✓	✓
Southwest Bulgarian bantam		✓	✓

Scientifically based study of local breeds in Bulgaria began in 1927, when the Central Poultry Experimental Station was established near Sofia (TABAKOV and HLEBAROV, 1930). Research at the station was carried out with local chicken breeds: Buff Elena chicken, White Sevlievo chicken, and Black Shumen chicken. At

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a later stage, the development of some Bulgarian dual-purpose breeds was started: Stara Zagora Red and “Chernaedra” chickens (HLEBAROV and TOTEV, 1963; NOZHICHEV and TSONKOV, 1969). Of all the chicken breeds bred back then, only two remain today: Black Shumen and Stara Zagora Red chickens (LUKANOV, 2011a). At that time, the local Bulgarian breeds that were kept for ornamental purposes had not yet been researched. The first more detailed descriptions of these breeds have only been produced in the last 15 years (LUKANOV, 2011ab; LUKANOV, 2012; TENEVA et al., 2015; LUKANOV et al., 2021ab). Today there are the following Bulgarian chicken breeds: Black Shumen chicken, Stara Zagora Red chicken, Katunitsa chicken, Struma chicken, Southwest Bulgarian chicken, Bulgarian longcrower, Rhodope painted chicken, Bregovska dzhinka, Struma bantam, and Southwest Bulgarian bantam (Table 1).

In Bulgaria, poultry genetic resources in the field of scientifically-based breeding are managed by two state centres that are part of the National Gene Pool which is under the control of the Executive Agency "Selection and Reproduction in Animal Breeding". The first centre is located near the town of Stara Zagora and is part of the Agricultural Institute. It maintains flocks of the two nationally recognized chicken breeds and 12 strains of egg-producing, meat-producing and dual-purpose chickens (NIKOLOV et al., 2011; GERZILOV, 2011; LALEV et al., 2011; LALEV et al., 2012; MIGINEISHVILI et al., 2021; LUKANOV et al., 2021a). Some of them are industrial strains that have been preserved in their original form for decades, while others are newly created. Ten strains are kept at the second state centre - Institute of Animal Science near the town of Kostinbrod, some of which are also original productive lines or newly created, mainly intended for dual purpose and suitable for meat production under free-range and organic farming conditions (PETKOV et al., 2020; MIGINEISHVILI et al., 2021; LUKANOV et al., 2021a; PETKOV et al., 2022). The country's amateur poultry breeders are also part of the National gene pool and support the 10 local chicken breeds and 45 Bulgarian pigeon breeds. Many breeds created and bred by amateur poultry breeders remain outside the field of vision of scientists and government agencies (PAVLOVA and LUKANOV, 2024). The scarce and incomplete information on the distribution, exterior and productivity of the Bulgarian chicken breeds determined the aim of this study: to describe the main characteristics of the Bulgarian chicken breeds that are part of the global genetic diversity of domestic chickens.

## **Egg-laying type**

### **Black Shumen Chicken**

This is the oldest Bulgarian chicken breed (Figure 1.). It was bred at the end of the 19th and beginning of the 20th century in North-Eastern Bulgaria (PETROV et al., 2011). The birds of this breed have a compact, elegant-looking body of medium size. The comb is single and of medium size. The earlobes are red. A little white in the

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central area of the earlobe is acceptable in roosters. The eyes are orange-red. The shanks and beak are dark grey. The plumage is black. Birds of this breed are extremely adaptable and undemanding (LUKANOV, 2017a; LUKANOV et al., 2021a). The live weight of roosters is 1.7-2.5 kg, that of hens - 1.3-1.9 kg (LUKANOV et al., 2018). They start laying eggs at the age of 5-6 months. Egg production is relatively low for an egg-laying type - 150-160 eggs per year weighing about 50-55 g with an almost white shell (LUKANOV, 2017a). The hens show the brooding instinct very rarely. A blue plumage colour in the breed was created (LUKANOV, 2013).



Figure 1. Black Shumen Chicken - a rooster and a hen and area of creating of the breed.

**Population status:** The population of the breed accounts for about 8% of the total number of purebred chickens in the country. Most of the animals are bred by hobby breeders (57.8%), the rest in the Agricultural Institute of Stara Zagora. The Black Shumen chicken is represented by about 70 sexually mature males and 400 females, which puts them on the list of endangered chicken breeds according to the risk categorization methodology proposed by NIKOLOV and DUCHEV (2022) for Bulgaria (PAVLOVA and LUKANOV, 2024).

### **Dual-purpose type**

#### **Stara Zagora Red Chicken**

The breed was developed in 1960s in the area of Stara Zagora, using local red hens, which were crossed with Rhode Island Red roosters (NOZHCHEV and TSONKOV, 1969). It was recognized as a breed in 1970 (NIKOLOV et al., 2011). Birds of this breed have a medium-sized body, which is set medium high (Figure 2.). The pectoral and leg muscles are well developed. The comb is single and of medium size. The earlobes are red. The eyes are red-brown. The legs are pale yellow with a brownish anterior part. The plumage is red-brown with a black tail (NOZHCHEV and TSONKOV, 1969; LUKANOV, 2011b). The breed is very well adapted to free-

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range conditions. The body weight of roosters is 2.5-3.0 kg, that of hens is 2-2.5 kg (LUKANOV et al., 2021a). Hens are early matured and begin to lay eggs at 5-6 months of age. Egg production is about 240-260 eggs per year weighing about 60 g with a brown shell. The meat has an excellent taste (LUKANOV, 2017a).



Figure 2. Stara Zagora Red Chicken – a rooster and a hen and distribution area of the main population.

Population status: According to PAVLOVA and LUKANOV (2024), the breed has a local distribution in the region of the city of Stara Zagora, with almost 60% of the entire population bred at the Agricultural Institute - Stara Zagora, and the rest by amateur poultry breeders from the region. According to the authors, the breed is represented by about 70 roosters and 450 hens, which, together with the concentration of the population in one region, poses a serious risk to its existence, classifying it as an endangered breed.

### **Rhodope Painted Chicken**

This interesting breed was created in the Eastern Rhodope region (the settlements around the towns Momchilgrad and Kardjali). According to unofficial information, it can be assumed that they were bred in this region more than 40 years ago. The birds have an unmistakable black and white spotted plumage colour (Figure 3). A red patterned plumage colour is also known, but it is not widespread (PAVLOVA and LUKANOV, 2024). The body is medium-sized with a horizontal position. Breasts are rounded and moderately well developed. The comb is medium large, single, but birds with a rose-shaped comb are also found. The earlobes are red. The eyes are orange-red. The beak is yellow with dark areas. The legs are yellow, massive, without feathering, with the presence of individual darker scales (LUKANOV et al., 2021a). The Spanish Asturian painted chicken breed has a similar

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appearance but it is larger and more massive (ANONYMOUS, 2019). Rhodope painted chickens are unpretentious and perfectly adapted to the harsh climate of the mountains. The weight of roosters is 2.7-3.5 kg, and that of hens 2.5 kg. Hens start laying eggs at 5-6 months of age. Egg production is 180-200 eggs per year. Eggs weigh about 58-60 g, with a light cream shell colour (LUKANOV et al., 2021a). The hens exhibit a brooding instinct and take good care of their offspring. The breed is characterized by its very good reproductive characteristics (LUKANOV, 2023).



Figure 3. Rhodope Painted Chicken – a rooster and a hen and distribution area of the main population.

**Population status:** The population of the breed accounts for about 4% of the total number of sexually mature representatives of the Bulgarian chicken breeds, numbering about 40 roosters and 200 hens (PAVLOVA and LUKANOV, 2024). The concentration of most of the population in an area with a radius of less than 25 km - the settlements around the city of Momchilgrad makes it extremely vulnerable according to data from 2009 (ALDERSON, 2009), ranking it among the endangered species (PAVLOVA and LUKANOV, 2024).

## **Meat type**

### **Katunitsa Chicken**

This is one of the most recognizable Bulgarian chicken breeds. It was officially recognized by the Union of Fanciers and Small Domestic Animal Breeders in Bulgaria (UFSDABB) in 2014 and it was presented at the European Exhibition in Metz, France, in 2015 (LUKANOV, 2017a). Katunitsa chicken (AN line) is a new chicken breed created by Alexander Nikolov from Katunitsa (Plovdiv region) for over a decade by selecting local heavy chickens from the Plovdiv region (NIKOLOV and GERZILOV, 2011; TENEVA et al., 2015). It is a typical meat breed with high live body weight, relatively good egg laying capacity and characteristic plumage colour except black and blue (Figure 4.). These birds have a large, deep and wide body. The pectoral and leg muscles are very well developed. The back is straight,

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wide, smoothly turning into a tail. The comb is medium large, single. The earlobes are red. The eyes are orange red. The shanks are thick, without feathering, yellow in colour with variations of yellow with dark areas. Recognized plumage colours are dark red, yellow-black, blue and black. A characteristic feature of the first two colours is the manifestation of multiple lacing (LUKANOV, 2017a). This breed is one of the heaviest purebred chickens. Birds have excellent meat characteristics. Roosters weigh 5.5-6.5 kg, and hens 4.5-5.3 kg (UFSDABB, 2014a). The meat has an excellent taste. Chicks grow intensively and reach live weight of around 2.5 kg for males and around 1.8 kg for females at the age of 12 weeks (NIKOLOV and GERZILOV, 2011; GERZILOV et al., 2015). The egg production is relatively low - 140-150 eggs per year, with an egg weight of 60-65 g and cream-colored shells (LUKANOV et al., 2021a). Chickens exhibit moderate brooding instinct (LUKANOV, 2017a).



Figure 4. Katunitsa Chicken – a rooster and a hen and distribution area of the main population.

Population status: The Katunitsa chicken has the third largest population among the Bulgarian chicken breeds, with a share of about 11%, which corresponds to about 90 roosters and just over 620 hens (PAVLOVA and LUKANOV, 2024). According to the methodology proposed by NIKOLOV and DUCHEV (2022) for determining the risk categorization for Bulgaria, it can be said that the breed is not threatened with extinction, but the concentration of most of the population in the central parts of southern Bulgaria is a cause for serious concern (PAVLOVA and LUKANOV, 2024).

### **Ornamental type Struma Chicken**

This is the most popular of the Bulgarian standard chicken breeds (PAVLOVA and LUKANOV, 2024). The breed was probably created about 40-50 years ago in the settlements along the Struma River (TENEVA et al., 2015; LUKANOV, 2017a). It has distinctive features such as feathered shanks, the presence of a beard and crest (LUKANOV, 2011a). The breed was recognized by the UFSDABB in 2013

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(LUKANOV et al., 2021a). Birds of this breed have a large, deep and wide body (Figure 5.). The crest is very well defined, voluminous, wide, and does not completely cover the eyes. The beard is very well developed, with well-defined sideburns that cover the earlobes. The comb is simple-shaped, medium size. The eyes are orange red. Birds of this breed have very well-defined feathered shanks. Recognized plumage colours are red-and-white spotted, yellow-and-white spotted, black-and-white spotted, and striped. Depending on the coloration, the colour of the metatarsus varies from yellow to flesh coloured (UFSDABB, 2013a). The body weight of roosters is 3.2-3.8 kg, that of hens 2.8-3.2 kg (UFSDABB, 2013a). Egg production is about 120-140 eggs weighing about 55 g, with a cream to brownish shell. Struma chickens are medium-mature birds. They begin to lay eggs at about 7 months of age. Hens exhibit a brooding instinct and take good care of their offspring (LUKANOV, 2017a). The breed is characterized by relatively unfavourable reproductive indicators, which is relatively common in ornamental chicken breeds (LUKANOV, 2023).



Figure 5. Struma Chicken – a rooster and a hen and distribution area of the main population.

Population status: The attractive appearance makes the breed widespread in Bulgaria and recognizable abroad. The population of the breed comprises about 130 roosters and 660 hens, which is about 12% of all representatives of Bulgarian chicken breeds. Depending on the established parameters, the breed can be classified as endangered or not at risk of extinction (PAVLOVA and LUKANOV, 2024).

### **Southwest Bulgarian Chicken**

This breed was recognized in 2021, but the data on the breeding of these chickens indicate that they have been bred in the Western Rhodopes for decades (LUKANOV et al., 2021a). They show an attractive variety of plumage colours, combined with the presence of some mutations such as feathered shanks and beard (Figure 6.). The comb is strawberry type. The birds are medium-sized, with a relatively high-set body and tail. The main plumage colours are red-mottled and black-and-white mottled.



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The red-mottled colour dominates in the breed, which has two variants - lighter and darker. The shanks are yellow or light flesh-coloured, which matches the colour of the beak. The eyes are red to orange-yellow (UFSDABB, 2021a). Live weight of roosters is 2.5 kg, hens 2.0 kg (UFSDABB, 2021a). Birds are medium-early matured, they begin to lay eggs at the age of about 6 months. Egg production is quite high 160-180 eggs per year. Eggs have a cream shell and weigh about 50-55 g. Hens are good brooders (LUKANOV et al., 2021a). Despite the decorative nature of the breed, no serious negative impact on reproductive characteristics is reported (LUKANOV, 2023).



Figure 6. Southwest Bulgarian Chicken – a rooster and a hen and distribution area of the main population.

Population status: The breed is one of the most popular in the country and accounts for about 10% of the total number of representatives of Bulgarian chicken breeds with about 70 roosters and 560 hens it makes up (PAVLOVA and LUKANOV, 2024). According to the methodology of NIKOLOV and DUCHEV (2022) for determining the risk category of breeds developed for Bulgaria, the Southwest Bulgarian chicken is not threatened with extinction. Taking into account the methodology of FAO (2013), it can be defined as "Endangered".

### **Bulgarian Longcrower**

This breed is in the recognition process by the UFSDABB and is one of the few longcrowing breeds in the world. It originates from southern Bulgaria (LUKANOV et al., 2021a). Now it is mainly bred in South (Plovdiv and Kardzhali region) and West (Blagoevgrad region) Bulgaria. These birds are very vigorous and hardy and have an appearance that differs from the other longcrowing breeds of chickens (LUKANOV, 2017b). The body is medium-sized, elegant, not very tall, with a horizontal to slightly sloping back line (Figure 7.). The plumage is black with a silvery or yellowish-golden neck, back, saddle, and shoulder area in the roosters and

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black in the hens, resembling that of the Turkish Denizli breed. The comb is pea-shaped. The birds have a medium-sized beard and moderately to slightly pronounced feathers on the shanks. The shanks are yellow or black. The eyes are red to orange-red (LUKANOV et al., 2021a). The beak is dark in birds with black coloration of the plumage and black and yellow in black-silver birds. The crowing of roosters lasts about 12-15 seconds, but there are some individuals in which it reaches 30 seconds or even more. Live weight of roosters is 2.5 kg, that of hens 2.0 kg. Hens start laying eggs at the age of 5.5-6 months. Egg production is good, about 160-180 eggs with almost white (very pale cream) shells, weighing 50-55 g (LUKANOV et al., 2021a). The breed shows relatively good results in the study of incubation characteristics (LUKANOV, 2023).



Figure 7. Bulgarian Longcrower – a rooster and a hen and distribution area of the main population.

Population status: The Bulgarian longcrower is one of the least represented Bulgarian chicken breeds with only about 270 individuals (about 40 roosters and 230 hens), which is about 4% of the total number of representatives of Bulgarian chicken breeds, which makes it vulnerable with the status - Endangered (PAVLOVA and LUKANOV, 2024).

## **Bantam chicken breeds**

### **Bregovska Dzhinka**

The term “dzhinka” (in BG) refers to local true bantam chickens (LUKANOV and PAVLOVA, 2021). Of all the small chicken breeds bred in Bulgaria, the Bregovska dzhinka is the most widespread and most popular outside the country (PAVLOVA and LUKANOV, 2024). It was most probably created in the 70s of the last century on the basis of local dzhinki in the area of the town of Bregovo and Vidin (LUKANOV, 2012; TENEVA et al., 2015; LUKANOV et al., 2021b). The breed belongs to the group of true bantams (they do not have a large version). It was

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recognized as a breed by the UFSDABB in 2013. The birds are visually attractive, extremely unpretentious, and very vital. The body is small, compact, wide and low-set (Figure 8.). The breasts are well formed, rounded, wide and convex in both sexes. The back is short, especially noticeable in roosters. The tail of roosters is relatively short and set high. The comb is single-shaped, medium-sized. The earlobes are white. The eyes are orange-red (UFSDABB, 2013b). The known plumage colours are red-mottled, black-and-white mottled, and white. The shanks are light flesh-coloured, and in birds with black-and-white mottled plumage colouring they are dark (LUKANOV, 2017a). The live weight of roosters is 500-750 g, that of hens around 400-600 g (UFSDABB, 2013b). Egg production is low - about 80-100 eggs per year weighing about 30 g with a creamy shell. The hens are good brooders (LUKANOV et al., 2021b).



Figure 8. Bregovska Dzhinka – a rooster and a hen and area of creating of the breed.

Population status: The breed has the largest population compared to other Bulgarian chicken breeds - about 34% and about 2,200 sexually mature individuals, which makes it the only breed that is not threatened with extinction according to all three methods presented by PAVLOVA and LUKANOV (2024).

### **Struma Bantam**

This breed of chicken was created in Western Bulgaria, by the inhabitants of the settlements along the Struma River (LUKANOV, 2012). It was recognized as a breed by the UFSDABB in 2014. The birds of this breed have a small, wide and relatively deep body (Figure 9.). The crest is well formed, medium in size, does not cover the eyes. The beard is also very well formed. The comb is medium in size, single by type (UFSDABB, 2014). There are also individuals with a rose-shaped comb (LUKANOV et al., 2021b). The eyes are orange-red. They have very well-defined feathered shanks. Struma bantams are recognized with black and white spotted, with red-mottled and white plumage (LUKANOV, 2017a). Birds of this breed are unpretentious and have an attractive appearance. The live weight of roosters is 750-950 g, and hens about 650-850 g (UFSDABB, 2014). Egg production is low - about

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80 eggs per year, which have a cream shell and weigh about 30 g. Hens are good brooders (LUKANOV, 2017a).



Figure 9. Struma Bantam – a rooster and a hen and distribution area of the main population.

Population status: according to PAVLOVA and LUKANOV (2024), it is the second most numerous Bulgarian chicken breed, with a share of about 12%, composed of about 90 roosters and 350 hens. The Struma bantam is a breed threatened with extinction according to all three methods presented by the cited authors.

### **Southwest Bulgarian Dzhinka**

This is a relatively new breed in the poultry world, but it is descended from the local Dzhinka chickens that have been bred in the Western Rhodope region for decades (LUKANOV and PAVLOVA, 2021). It was officially recognized as a breed in 2021 by the UFSDABB (UFSDABB, 2021b). The birds have a small, low-set body (Figure 10.). The breasts are rounded, strongly convex. They have a rose comb, beard and well pronounced feathered legs (LUKANOV et al., 2021b). The breed is characterized by an attractive plumage colour - the most common plumage colour is red-mottled, but black-and-white spotted is also common (LUKANOV and PAVLOVA, 2021). There is a similar breed bred in Turkey - Ispenç, which is characterized by the presence of a fifth toe, which the Southwest Bulgarian Dzhinka does not have (PAVLOVA et al., 2021). The live weight is 600-800 g for the roosters and 500-600 g for the hens (UFSDABB, 2021b). Egg production is low 60-80 eggs per year with a cream-coloured shell and a weight of about 30 g. The hens show a very strong brooding instinct (LUKANOV et al., 2021b).

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Figure 10. Southwest Bulgarian Dzhinka – a rooster and a hen and distribution area of the main population.

Population status: This is the least represented Bulgarian chicken breed with a share of only about 2%, represented by about 30 males and 115 females concentrated in the Razlog area (PAVLOVA and LUKANOV, 2024). The breed can be defined as "endangered", but considering its concentration in an area with a radius of <25 km, it can be classified as critical (FAO, 2013).

### **Conclusion and recommendation**

The genetic resources of the Bulgarian chicken consist of 7 standard and 3 miniature breeds and 22 productive strains. The main part of the Bulgarian chicken breeds is bred by hobby breeders, while the industrial lines are subject to the institutes, part of the National Gene Pool – Agricultural Institute – Stara Zagora and Institute of Animal Science - Kostinbrod. All Bulgarian chicken breeds, with the exception of the Bregovska Dzhinka, are now threatened with extinction. Due to the outbreaks of avian influenza in our country and the ban on national chicken exhibitions in the last 3 to 4 years, the future trend of the population status of our breeds is unfortunately not positive.

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