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ANALYSIS OF MORPHOMETRIC PARAMETERS DUCK EGGS OF LOCAL BREED SHAOXING

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ABSTRACT

The efficiency of industrial poultry farming within the optimization of poultry technology, depends on the level of genetic potential of the flock. Selection features of Shaoxing ducks make this kind optimal for its breeding in the People's Republic of China. The study aims to evaluate the morphometric characteristics of Shaoxing duck eggs, which are bred on the breeding farm of Zhejiang Generation Biological Science and Technology Co., Ltd in Zhuji, Zhejiang Province, China. The weight, length, width of the eggs and the index of the egg shape have been determined. An individual method of counting the number of eggs laid by ducks of the Shaoxing breed for 4 adjacent months has been implemented. The average weight of the egg is 67.45 ± 0.22 g with limit values $\lim \max = 89$ g $\lim \min = 45$ g. The average value of egg length is 6.02 ± 0.01 cm, width – 4.45 ± 0.01 cm. The duck egg shape index is 74.01 ± 0.12 . Thereby systematic individual studies of morphometric parameters of eggs will increase the effect of selection by expanding the indicators of lifelong assessment of the uterine population of ducks. Selection of queens for the breeding core of the breed according to the indicators of manufacturability of morphometric parameters of eggs will increase the incubation yield of ducklings and, accordingly, will be one of the effective mechanisms to ensure economic profitability of breeding Shaoxing ducks.

Keywords: *Duck, eggs, weight, genetic potential, breed*

INTRODUCTION

Traditional methods of breeding work with poultry breeds are effective due to the systematic assessment of the maximum number of parameters of economically useful traits. For ducks of the egg direction of productivity the factor of selection improvement of uterine livestock is the characteristic of morphometric indicators of eggs (Yuan *et al.*, 2013). Individual registration and egg productivity analysis helps predict genetic trend in the population and the development and implementation of programs for the preservation of genetic resources of poultry (Zhang *et al.*, 2019). Selection features of Shaoxing ducks make this kind optimal

for its breeding in the People's Republic of China. The profitability of its intensive industrial use directly depends on the incubation qualities of eggs and the intensity of their laying during the period of economic use of females (National Standard of China, 2012). The study population characteristics ducks specific breed groups in terms of the dynamics of change of weight and shapes depending on the period egg laying is part of long-term monitoring organization to streamline playback, increased phenotypic manifestation of the genetic potential productivity and management system targeted breeding poultry and receiving products. That is why the purpose of this study was to evaluate the morphological characteristics of ducks' eggs of Shaoxing breed.

MATERIALS AND METHODS

Research has been conducted in 2019 at a duck farm of Zhejiang Generation Biological Science and Technology Co., Ltd in Zhuji, Zhejiang Province, China. For experiments were used 329 ducks, which were kept under identical feeding conditions in one poultry house. Duck egg production was determined for 4 months (April, May, June, July). The experiment took into account the age of laying the first egg (days). Morphometric parameters of 838 duck eggs were evaluated for 3 days at the age of 48–52 weeks by weight (g), length and width (cm). The length (L) and width (W) of eggs were measured with an accuracy of 0,1 mm by caliper. Weighing of eggs was carried out on electronic scales JM-A 20001 with an accuracy of 0,1 g. The egg shape index was calculated using the formula:

$$SI = (W / L) * 100 \text{ (Reddy } et al, 2014)$$

The biometric processing of experimental data was conducted in accordance with generally accepted techniques. The arithmetic mean value, the error of the mean, the correlation coefficient and the coefficient of variation were calculated.

RESULTS AND DISCUSSION

Research egg productivity demolished by the number of eggs in my time allows, along with individual evaluation of breeding stock to analyze the effectiveness of economic use of birds in a particular herd. According to the obtained results (Fig. 1), the total egg production in the studied group of ducks was 37629 eggs for 4 months. The average number of eggs laid per female ranged from 27.5 in July to 29.9 in May. The highest peak of egg productivity was observed in May. In April and June, the average values for the month were 28.4 and 28.6 units, respectively. The decrease in the number of eggs laid in July is due to the maximum temperature and humidity. These features are confirmed in studies by other scientists (Biesiada-Drzazga *et al*, 2014).

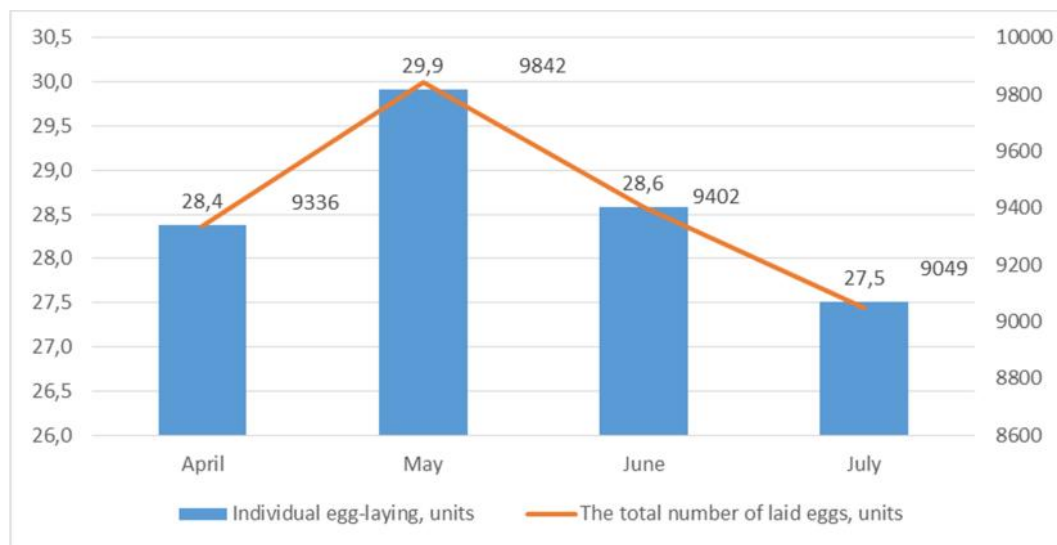


Fig. 1. Egg productivity of ducks depends on the month

The weight of eggs is one of the main indicators of technological suitability for incubation. From egg weight depends on the duration of the embryonic development of the fetus. According to the data presented in Table 1, the mass of eggs ducks breed Shaoxing ranged from 45 g to 89 g. The average weight was 67.95 g, which is consistent with the data of the Bureau of Product Quality (Zhuji, China), according to which the average weight of a duck egg should be 6 – 68 g (National Standard of China, 2012). The coefficient of variation of egg mass was 9.27%. The weight of duck eggs can vary depending on the season. In research, scientists have shown an increase in the weight of eggs of Shaoxing ducks in the period from September to December (Chepiha, A. M. *et al*, 2017a).

Table 1. Average indicators of weight, size, and shape index of eggs in the Shaoxing breed ducks

Trait	Mean \pm Sd	Lim Min-Max	Cv, %	Standard of breed
Egg weight, g	67.95 \pm 0.22	45–89	9.27	62–68
Long length of egg, cm	6.02 \pm 0.01	5.1–6.8	4.28	–
Short length of egg, cm	4.45 \pm 0.01	3.9–4.9	3.53	–
ESI, %	74.01 \pm 0.12	59.7–88.2	4.54	72–76
Age of laying the first egg, days	146.5 \pm 0.94	112–194	11.68	130–140

Indicators of egg measurements in addition to the individual characteristics of the egg productivity of females is one of the basic criteria for predicting the efficiency of incubation and the volume of industrial production of genetic resources of ducks. In studies of altitude and latitudinal measurements, the average value of egg length was set at 6.02 cm with limits of 5.1 – 6.8 cm. The width of the eggs of

ducks of the studied breed Shaoxing was on average 4.45 cm and was in the range of 3.9 – 4.9 cm. The egg shape index ranged from 59.7 to 88.2% and averaged 74.01%. The relationship between length and width reflects the proportionality of the eggs, which is due to the individual structure of the oviduct. In similar studies index of egg shape of Shaoxing ducks was 74.8 – 75.5 and depended on the color of the shell (Chepiha, A. M. *et al*, 2017a). In studies by other authors features of elongation of eggs of chickens with age of females are noted (Nedeljka Nikolova *et al*, 2006).

Calculation of the correlation coefficient revealed a direct reliable relationship of mean strength with a value of 0.331 ± 0.031 ($p < 0.0001$) between the length and width of the eggs, which indicates the effective direction of selective selection of uterine livestock to form the main nucleus of the herd. The age of puberty, along with the characteristics of reproductive ability determines the individual characteristics of the term of economic use of females. In the study group of ducks, the average age of demolition of the first was 146.5 days. The limits of the values of this indicator were in the range of 112–194 days.

CONCLUSION

Thus, according to the results of monitoring the egg productivity of ducks of all ages of the Shaoxing breed on a typical farm in Zhuji China it can be concluded that the revealed features of egg-laying of the studied females characterize the monthly cyclicality of egg laying. During the studied months, one female has an average of 27.5 pieces to 29.9 pieces, which is within the performance parameters of the breed, which are defined by its standard. The evaluation of technological characteristics of the eggs, the parameters defined medium weight and shape index correspond to the breed standard and ensure the effectiveness of the process of incubation.

Further research should focus on studying the polymorphism of the Shaoxing duck population by genes associated with productivity indicators, which will increase the efficiency of genetic resource management while maintaining the optimal level of biological diversity in the breed.

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