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EFFECT OF BODY WEIGHT HENS ON REPRODUCTIVE TRAITS OF BROILER BREEDERS

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Abstract

Investigation of the effect of body weight on reproductive performance of hens of broiler breeders was conducted in the hybrid Ross 308 and Cobb 500. At the beginning of the production cycle (24 weeks old) with hybrids Ross 308 determined the average body weight of hens 2680.40 g and 2697.80 g Cobb 500. After 42 weeks of age (mid-production cycle) weight hens was 3565.10 g (Ross 308) and 3599.05 g (Cobb 500), while at the end of the production cycle (61 weeks old) weight layers in the hybrid Ross 308 was 3841.50 g, and Cobb 500 3850.00 g. The differences found in body weight of laying hens (17:40 g, 33.95 g 8:50 g) in certain periods of the production cycle, and the difference in body weight of hens for full production cycle (23:26 g) were not statistically significant (P> 0.05). Specifically assess the influence of body weight on reproductive performance of hens of broiler breeders was determined by calculating the coefficient of phenotypic correlation between the studied parameters. Thus, the association between body weight and most hens reproductive indices of broiler breeders was positive statistically significant (P <0.001) correlation coefficient of phenotypic correlation, while the association between body weight and percentage hen chicken hatching of fertilized eggs defined negative correlation coefficients that were not statistically significant (P> 0.05), and between the layers of body weight and relative weight loss of eggs, but statistically significant (P <0.001).

Key words: hens, body weight, reproductive traits, broiler parents.

Introduction

In addition to the optimal sex ratio and age of broiler breeders on fertility and egg hatching and has a significant influence body weight, as hens, and roosters during the period of egg production (Savic et al., 2004; Ciacciariaello and Gous, 2005; Đermanovic et al. 2005; Vieira et al., 2005; Almeida et al., 2006; Đermanovic et al., 2008; Milosevic and Peric, 2008; Djermanovic et al., 2009; Djermanovic, 2010; Djermanovic et al., 2010; Mitrovic et al., 2010; Djermanovic et al., 2013). The proper functioning of the endocrine system and hormonal hens besides age and photostimulation (Lewis et al., 2005; Lewis and Gous, 2006, 2007; Usturoi et al., 2007) to a large extent depends on body development of breeding birds. At optimum body weight at a given age in the layers stimulates the ovary, and thus accelerates the maturation of oocytes, or egg production.
To the fertilized egg brought offspring, it is necessary that the fertilized egg cell, provide the necessary conditions for the development of the embryo. Only proper diet (Wilson, 1991; Barnett et al., 2004; Maiorka et al., 2004; Enting et al., 2007; Wolanski et al., 2007), breeding technology generation and utilization of parent stock can be provided pre-condition for the maximum percentage of the study and the necessary vitality and quality of eggs for incubation and izleženog offspring (Luquetti et al., 2004; Hesn Sahin et al., 2009; Schmidt et al., 2009). To the period of production of fertile eggs or day-old chicks, lasted longer period

is necessary to keep hens kept in priplodnoj shape, with special attention to the weight. It should also be borne in mind that uniformity in terms of weight especially significant factor in the second half of the production cycle.
Body weight of breeding birds, in addition to other factors, especially age, has a direct impact on reproductive performance. Therefore, special attention is paid to the influence of body weight hens during the production cycle on reproductive performance of broiler breeders. The main objective of this study was to determine the kind of impact a body weight of hens intensity weight egg hatching of fertilized eggs, day-old chicks weight, the relative proportion of chicken in egg weight, egg weight loss absolute and relative weight loss of eggs.

Material and Methods

The investigations included two parent flocks of broilers chickens Ross 308 and Cobb 500 During the production cycle used the technology proposed by the breeders of the respective hybrids (www.rossbreeders.com; www.cobb-vantress.com). Both broiler parent flocks were kept on the floor with deep litter and feeding, watering, ventilation and lighting are automatically regulated. Effective floor area per building was about 900 m^2, with a population density in the exploitation of both studied broiler parent flocks was about 6 birds/m^2 floor area.
Broiler breeder flocks tested were grown to 61 weeks of age, ie. both clusters spread the early 22 week, and were used for the incubation of eggs laid 24 weeks of age until the end of the production cycle, because then met the minimum weight of a suitable incubation (> 50.00 g). From the foregoing it follows that the period of production of eggs and day-old broiler production lasted for 38 weeks (from 24 to 61 weeks old broiler breeder).
As an initial experimental material has served a total of 5200 birds of both sexes Ross hybrids 308 and 5430 broiler breeder Cobb 500, grown in two separate building. The first building was moved in 4750 ♀ and 450 ♂ hybrid Ross 308, and in 4960 another ♀ and 470 ♂ Cobb 500, so that the sex ratio are 1: 10:56 (Ross 308) and 1:10:55 (Cobb 500).
In the preparatory period of 21 to 24 weeks of age mortality and culling flocks of laying hens in the hybrid Ross 308 was 13 birds (0.279%), and in 12 of Cobb 500 birds (12:24%). This means that at the beginning of the use of eggs for incubation in hybrids Ross broiler breeder flock was 308 in 4737 hens, or hens, 4948 Cobb 500.
In order to control body weight each week individually measured 400 hens selected randomly, ie. per 200 hens hybrid Ross 308 and Cobb 500 These measurements followed the uniformity laying flocks tested during the production cycle, and then examined the influence of body weight on laying the basic reproductive performance of broiler breeder (egg weight, hatching of fertilized eggs, day-old chicks weight, the relative proportion of chicken in egg weight, absolute weight loss eggs and egg weight relative loss).
Primary data processing was performed by standard variational - statistical methods, and testing the differences between the hybrids using the t-test. For all monitored parameters are calculated average values, error of the mean and standard deviation. In addition, the obtained results were used to calculate association and dependence of the traits by week production using correlation analysis. Statistical analysis was performed using Analyst software program SAS / STAT (SAS Institute, 2000).

Results and Discussion

Average, variability and significant differences in body weight in laying hens at certain periods of the production cycle, or for the whole period of egg production are shown in Table 1.

Table 1 Average, variability and significant differences in body weight hens (g) of the period of production cycle

The period of production cycle	**Weeks of age (production)**	**Hybrid**	$\bar{x}$ **±SEM**	**S**	$\bar{d}$
Start	24 (1)	Ross 308	2680.40±14.63	206.93	17.40^{ns}
		Cobb 500	2697.80±17.09	241.66	
Middle	42 (19)	Ross 308	3565.10±19.86	280.92	33.95^{ns}
		Cobb 500	3599.05±20.12	275.28	
End	61 (38)	Ross 308	3841.50±21.39	302.56	8.50^{ns}
		Cobb 500	3850.00±21.68	306.59	
Whole production cycle	61 (38)	Ross 308	3411.15±61.58	394.33	23.26^{ns}
		Cobb 500	3434.41±61.03	390.76	

$^{ns}P>0.05$.

Data Table 1 shows that the average body weight of hens of each strain increased gradually during the production cycle. Body weight of hens in 24 week was 2680.40 g (Ross 308) and 2697.80 g (Cobb 500), and at the end of exploitation (61 weeks old) 3841.50 g in the hybrid Ross 308 and 3850.00 g in Cobb 500 During the production cycle of Cobb 500 hens compared to hens hybrid Ross 308 had a higher average body weight, which was not statistically confirmed (P> 0,05). The average body weight of hens hybrid Ross 308 for the entire period of exploitation was 3411.15 g, and Cobb 500 3434.41 g, where the difference in body weight of laying hens (23:26 d) between the hybrids was not statistically significant (P> 0.05), indicating that genotype had no significant effect on body weight of laying hens.
Body weight of hens of each strain, was slightly higher than expected genetic potential. Similar results, in terms of average body weight of hens came Djermanovic (2010), Djermanovic et al. (2009) and Mitrovic et al. (2010). Usturoi et al. (2007) have each control measurement during rearing of broiler breeders Ross 308 hybrid found a slightly lower average body weight of hens, which according to the groups of hens, 60 weeks of age was between 3988.95 g 3990.44 g. Lewis et al. (2005) and Lewis and Gous (2006) in 60 week old Cobb 500 hens found a significantly higher average body weight of hens, between 4:21 and 4:25 kg. Also, a significantly higher average body weight of hens hybrid Ross 308 (4.43 kg) and Cobb 500 (4:56 kg) 59 weeks of age they found Lewis and Gous (2007).
Production of day-old broiler chickens of the final phase of the breeding parent flocks severe type. Therefore, apart from the flock age and body weight hens and roosters, and special attention should be paid to a number of indicators (Table 2) which determine the success of the respective type of production.

Table 2 Average values and variability of difference reproductive indices of broiler breeders

Indicators	**Hybrid**	$\bar{x}$ **±SEM**	**S**	$\bar{d}$
Egg weight, g	Ross 308	62.03±0.80	4.96	0.22^{ns}
	Cobb 500	62.25±0.90	5.57	
Hatching of fertilized eggs,%	Ross 308	82.79±1.28	7.87	0.89^{ns}
	Cobb 500	83.68±1.39	8.60	
Weight day old chicks, g	Ross 308	39.85±0.70	4.34	0.17^{ns}
	Cobb 500	40.02±0.78	4.79	
The relative proportion of chicken in egg weight,%	Ross 308	64.05±0.37	2.26	0.07^{ns}
	Cobb 500	64.12±0.38	2.32	
The absolute loss of egg weight, g	Ross 308	22.19±0.19	1.15	0.05^{ns}
	Cobb 500	22.24±0.20	1.26	
Relative egg weight loss,%	Ross 308	35.88±0.37	2.26	0.00^{ns}
	Cobb 500	35.88±0.38	2.32	

$^{ns}P>0.05$.

Similarly, the values of average body weight layers (Table 1) between the studied reproductive parameters of broiler breeders were also not statistically significant (P> 0.05) differences (Table 2).

Regardless of genotype and other authors who have studied this issue have found that the age of the flock, and therefore increased body weight broiler breeder hens of different genotypes increased egg weight. Thus, Wilson (1991) and Lewis and Gous (2007) found a similar average weight of eggs, eggs greater weight determined Luquetti et al. (2004) and Vieira et al. (2005), significantly higher Almeida et al. (2006), while Wilson (1991) and Maiorka et al. (2004) found a slightly smaller, and much less Barnett et al. (2004) and Ciacciariello and Gous (2005). Similar results on the feasibility of fertilized eggs from the chickens came Savic et al. (2004), Djermanovic et al. (2005), Djermanovic et al. (2008) and Djermanovic (2010) at approximately the same period of exploitation (36, 44 and 38 Sunday) of broiler breeders, while slightly worse results found Mitrovic et al. (2009), and much worse Milosevic and Peric (2008).

To the conclusion that the burden of day old chicks, similar to egg weight, increases with age and weight gain hens came Luquetti et al. (2004), Maiorka et al. (2004), Barnett et al. (2004), Vieira et al. (2005), Almeida et al. (2006), Wolanski et al. (2007), Enting et al. (2007), How to become Sahin et al. (2009) and Djermanovic (2010). Significantly higher average weight of day old chicks hybrids Ross determined Vieira et al. (2005) and Almeida et al. (2006) with Cobb. According to the assessed valuation of egg weight and chick weight to similar results in terms of relative share of chicken in egg weight came Luquetti et al. (2004), Maiorka et al. (2004) and Djermanovic (2010), while higher values of the above parameters determine Barnett et al. (2004), How to become Sahin et al. (2009) and Schmidt et al. (2009).

In addition to established measures of variation for body weight and reproductive indices of laying hens analyzed parent flocks, in order to better analyze the impact of body weight on reproductive performance of laying hens, calculate the correlation coefficient of phenotypic correlation between the traits (Table 3).

Table 3 Phenotype Correlation of body weight hens and broiler breeder reproductive indices

Hibrid	Indicators	Correlation coef.(r_p)
Ross 308	Body weight of hens (g): Weight of eggs (g)	0.989^{***}
Cobb 500		0.989^{***}
Ross 308	Body weight of hens (g): hatching of fertilized eggs (%)	-0.126^{ns}
Cobb 500		-0.097^{ns}
Ross 308	Body weight of hens (g): Weight day old chicks (g)	0.962^{***}
Cobb 500		0.960^{***}
Ross 308	Body weight of hens (g): The relative contributions of chicken in egg weight (%)	0.768^{***}
Cobb 500		0.765^{***}
Ross 308	Body weight of hens (g): Absolute weight loss of eggs (g)	0.644^{***}
Cobb 500		0.719^{***}
Ross 308	Body weight of hens (g): Relative egg weight loss (%)	-0.768^{***}
Cobb 500		-0.765^{***}

${}^{ns}P>0.05$; ${}^{***}P<0.001$.

Data Table 3 show that between body weight hens and egg weight, body weight and weight of hens day old chicks define a complete correlation connection in both studied hybrids. Also, the body weight between hens and most reproductive parameters of broiler breeders phenotypic correlation coefficients of correlation were positive statistically significant (P <0.001). Between body weight and percentage hen chicken hatching of fertilized eggs were established negative correlation coefficients that were not statistically significant (P> 0.05), and between the layers of body weight and relative weight loss of eggs but statistically highly significant (P <0.001).

A similar, but opposite results in terms of connectivity and dependency productive and reproductive performance of different genotypes of broiler breeders came Djermanovic et al. (2005), Djermanovic et al. (2008), Mitrovic et al. (2009), Djermanovic (2010), Djermanovic et al. (2010) and Mitrovic et al. (2010).

Conclusion

Based on the obtained results it can be concluded that the average body weight of laying hens in both studied hybrids in relation to engineering standard, smaller, both at the beginning and at the end of the production cycle. However, the difference between the weight layers of the hybrids were not statistically significant (P> 0.05), and genotype had no significant effect on body weight of laying hens.

The calculated coefficients of phenotypic correlations and their significance, we can say that the hens body weight significantly affected their breeding ability because of both parent flocks among the traits, identified statističkivrlo significant (P <0.001) correlation coefficients, except between body weight hens and chicken hatching percentage of fertilized eggs (P> 0.05), this suggests that the increase in body weight decreases the ability of breeding hens, which causes considerable shortening of the production process.

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