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CARCASS QUALITY OF CHICKENS OF DIFFERENT CONFORMATION

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Abstract: The aim of this study was to investigate the effect of conformation of chickens of different genotype on the yield of breast meat. As a typical example of the chickens of very poor conformation pure breed Naked neck chickens were taken, fattened 8 and 10 weeks (groups K_8 and K_{10}). As an example of good conformation, an imported hybrid of chickens was taken, known for its broiler qualities and as medium growing hybrid, Red Bro (R). The second experiment included commercial hybrids of fast growth (Ross, Cobb and Hubbard) reared according to all technological standards of intensive fattening until the age of 42 days. The results obtained were contrary to the conclusion obtained a few decades ago, at the beginning of the study the conformation of chicken, by *Scots and Darrow (1953),* according to which the selection of chickens of heavy type, despite the fact that, to some extent, it had improved meat yield of the breast, did not significantly improve slaughter traits of fattening chickens, confirming that better conformation and higher body weight had a positive impact on improving relative share of breast, i.e. white meat. The results regarding the slaughter traits of chicken genotypes of different conformation suggest that breeding - selection work to improve the conformation of broilers significantly improved slaughter yields and breast meat yield. In this sense, the conformation can be treated as an indicator of the slaughter value of carcasses, rather than an aesthetic category.

Key wards: genotype, conformation, share of meat

Introduction

In recent decades, in the selection of heavy-type hens, considerable attention has been given to body type or structure, or conformation of the body of chickens in broiler age, and in this regard has made remarkable progress. Even though, in broiler hybrids, in modern production certain minor differences in conformation may be established, virtually there are no significant differences in slaughter output ratios. Possible differences in these traits appear to be predominantly in genotypes of different body weight before slaughter *(Hopić 1999;*

Hopić et al., 2002; Vračar et al., 1996; Pavlovski et al., 2006; Pavlovski et al., 2007; Blagojević et al., 2009).

Back in 1951, *Asmundson and Lerner (1951)* have expressed the opinion that the selection to improve the conformation rather concerns vague aesthetic standards by which a consumer evaluates the appearance of dressed carcass than the actual amount of meat on the carcass. On the other hand, the results of some authors indicate no significant differences in the characteristics in slaughter traits of chicken of different conformation. If we compare the results of the research obtained in the last 20 years, it can be concluded that the genetic selection testing made a significant contribution to the increase in body weight of chickens and share of breast (white meat), and thus a better conformation. The results of our study in 2014 confirmed that genotype and body mass directly affect better conformation and a higher share of breast meat.

It seemed interesting to perform tests with genotypes of chickens of distinctly different conformations: Red Bro and indigenous breed Naked neck, on the one hand and commercial fast-growing hybrids, on the other hand, in terms of carcass quality.

Materials and Methods

The experimental research was conducted through two experiments. In the first experiment, as an example of good conformation, an imported hybrid of chickens was taken, known for its broiler qualities and as medium growing hybrid, Red Bro (R). In contrast, as the representative of the old, unimproved type of conformation, native breed Naked neck was taken, grown in pure blood without applying selection measures. Since the body weight of this population at the age of 8 weeks was significantly lower than that of the modern hybrids, in addition to these groups, a group of chickens was slaughtered at 10 weeks of age K_8 and K_{10}). Chickens of these groups were grown extensively in the same building, in the same conditions of keeping and feeding, except for the differences in the duration of fattening.

The second experiment included commercial fast growing hybrids (Ross, Cobb and Hubbard) which were reared according to all technological standards of intensive fattening until the age of 42 days.

Prior to slaughtering chickens spent 12 hours without food and water. After measuring of body weight, chickens were slaughtered in the experimental poultry slaughterhouse of the Institute for Animal Husbandry, Belgrade-Zemun. The following body dimensions (measures conformation) were measured: shank length, keel length, breast angle and thigh girth according to the method of *Pavlovski and Mašić (1983)*, on 15 and 12 chickens, respectively, per genotype and gender, and the obtained results are shown in absolute values. In recent years the presentation of conformation less precise but more comprehensive indexes are used which show

the relationship of live weight and linear measures or simply body weight (g) at 1 mm of corresponding body measure.

Slaughter yields (dressing percentage): traditionally dressed carcass, ready to cook, ready to grill were taken according to *Pravilnik o kvalitetu pernate živine (1981) (Rulebook on quality of poultry meat)*.

The software package STATISTICA, version 12 (Stat Soft inc.) was used for statistical analyses. The level of statistical significance of differences betwen groups was determined by Tukey-test.

Results and Discussion

Data on individual body measures that in some way reflect the body conformation of chickens are given in table 1.

Based on the data from the table, the following can be concluded:

- The difference in the average live weight of chickens between groups R and K_{10} was very strong and almost 500 g, so it does not seem justified to compare these groups in other traits;
- The average live weight of K_{10} chickens was less than the weight of chicks of group R, and in males by just over 500 g, and in females more than 300 g - in both cases the difference was statistically significant;
- Despite the significantly lower body weight, K_{10} chickens had greater shank length and the keel length compared to chickens of R group - in both case the difference was statistically significant;
- The breast angle was about 40 degrees lower in chicks of group K, and the difference compared to the R group was statistically significant;
- The differences in thigh girth of all the groups were statistically significant and approximately proportional to the difference in live weight;
- A relatively greater keel length and much smaller breast angle in chickens of group K_{10} indicated a significantly less favourable conformation of these chickens compared with chickens of group R.

Table 1. Conformation measures on carcass of chickens

Sex	Genotype	Body weight, g	Shank length, mm	Keel length, mm	Breast angle, degrees	Thigh girth, mm
Male	R	2060^{a}	71.83^{c}	92.83^{b}	113.50^{a}	133.50^{a}
	K_8	1163^{c}	84.93^{b}	93.67^{b}	71.60^{b}	114.46^{c}
	K_{10}	1588^{b}	10.29^{a}	107.65^{a}	73.18^{b}	125.53^{b}
Female	R	1513^{a}	65.50^{c}	94.67^{a}	119.50^{a}	118.17^{a}
	K_8	925^{c}	77.64^{b}	87.07^{b}	70.71^{b}	105.21^{c}
	K_{10}	1179^{b}	86.85^{a}	96.77^{a}	71.46^{b}	112.92^{b}

a-c average values in each column without common marks are significantly different on the level of 5%

Table 2 shows the index values of conformation measures measured on typical 15 chickens for each provenience and gender. Due to the uneven live weight of investigated chicken proveniences, as an relative comparable indicator of the conformation the ratio between the live weight and certain linear measures (index g / mm) was taken. Most suitable index for all the studied measures were recorded in chickens of both sexes of genotype Red Bro (R).

Table 2. Index value conformation measures, g/mm

Sex	Genotype	BW/SL	BW/KL	BW/TG
Male	R	24.24	18.74	13.09
	K_8	13.69	12.41	10.16
	K_{10}	15.83	14.75	12.65
Female	R	23.11	16.04	12.83
	K_8	11.91	10.62	8.79
	K_{10}	13.57	12.18	10.44

BW – body weight KL – keel length
SL – shank length TG – thigh girth

Table 3. Dressing percentage in % of body mass

Sex	Genotype	Yield "Traditionally dressed carcass" %	Yield "Ready to cook" %	Yield "Ready to grill" %
Petlići	R	84.43	67.81	80.32[a]
	K8	85.29	66.16	77.57[b]
	K10	85.91	67.04	77.99[b]
Kokice	R	84.57	68.68[a]	81.21[a]
	K8	82.99	64.46[b]	77.69[b]
	K10	85.14	67.22[a]	78.95[b]

a-b average values in each column without common marks are significantly different on the level of 5%

Table 3 shows the values obtained for slaughter yields of tested chickens per genotype and gender. The most favourable yield "traditionally dressed carcass" had male and female chickens of genotype K10 (85.91% and 85.14%), which were not statistically significant. The resulting yields were significantly better than the yield in the trials with the same pure breed (*Pavlovski et al., 2009*), which can be correlated with a higher body mass live chickens the measured before slaughter.

Significantly best dressing percentage "ready to cook" and "ready to grill" recorded by male and female chickens of genotype Red Bro.

Table 3 shows the values obtained for slaughter yields of tested chickens per genotype and gender. The most favourable yield "traditionally dressed carcass" was established for male and female chickens of genotype K_{10} (85.91% and 85.14%), which were not statistically significant. The resulting yields were significantly better than the yield in the trials with the same pure breed *(Pavlovski et al., 2009)*, which can be correlated with a higher pre-slaughter body weight of live chickens. Statistically significantly best dressing percentages/yields "ready to cook" and "ready to grill" were recorded in male and female chickens of genotype Red Bro.

The hypothesis that chickens of poor conformation expressed through breast angle, achieve also lower share of the breast, or the share of breast meat, is confirmed by our study and data presented in Table 4. Statistically significantly lower share of breast meat in live pre-slaughter body weight of chickens (14.7%) showed the chickens of Hubbard genotype, which had the lowest body weights and the worst conformation expressed by the breast angle.

Table 4. Effect of live mass and breast angle on share of breast meat

Genotype	n	Body mass (g)		Breast angle, degrees		Share of breast (g)		Share of breast meat (%)	
		x	Sd	x	Sd	x	Sd	x	Sd
Ross 308	12	2402.5^{a}	272.3	129.5^{x}	1.4	439.3^{x}	50.9	18.3^{x}	1.1
Cobb 500	12	2406.7^{a}	225.8	129.7^{x}	0.6	458.0^{x}	81.3	18.9^{x}	2.1
Hubbard	12	2180.0^{b}	208.5	125.0^{y}	5.6	321.7^{y}	42.8	14.7^{y}	1.3
Significance									
Genotype		p<0.05		p<0.01		p<0.01		p<0.01	

a-b average values in each column without common marks are significantly different on the level of 5%

x-y average values in each column without common marks are significantly different on the level of 1%

Bearing all this in mind, and contrary to the conclusion from a few decades ago, at the beginning of the study of the conformation of chickens, made by *Scots and Darrow (1953)*, according to which the selection of chickens of heavy type, despite the fact that, to some extent, it improved meat yield of chicken breast, it did not improve significantly slaughter traits of fattening chickens. Contrary to this claim, the present study confirms that better conformation and higher body weight have a positive impact on improving the relative shares of the breast or white meat.

Conclusion

The results of the study of slaughter traits of chicken genotype of different conformation suggest that breeding - selection work to improve the conformation of broilers significantly improved slaughter yields and meat yield of chicken breast. In this sense, the conformation can be treated as an indicator of the slaughter value of carcasses, rather than an aesthetic category.

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Kvalitet trupa pilića različite konformacije

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Rezime

Cilj rada je bio da se ispita uticaj konformacije pilića različitog genotipa na prinos mesa grudi. Kao tipični predstavnici pilića izuzetno loše konformacije uzeti su pilići čiste rase nacked neck, koji su tovljeni 8 i 10 nedelja (grupe K_8 i K_{10}). Kao primer povoljne konformacije uzeta je jedna uvozna provenijenca hibridnih pilića, poznatih po svojim brojlerskim kvalitetima i kao provenijenca srednjeg porasta, Red Bro (R). Drugim ogledom su obuhvaćeni komercijalni hibridi brzog porasta (Ross, Cobb i Hubbard) koji su gajeni po svim tehnološkim standardima intenzivnog tova do uzrasta 42 dana.

Dobijeni rezultati suprotno od zaključka koji su pre nekoliko decenija, na početku ispitivanja konformacije pilića, dali *Scots and Darrow (1953)*, a prema kojima selekcija kokoši teškog tipa, i pored toga što je u izvesnoj meri popravila mesnatost grudi, ipak nije bitno poboljšala klanične osobine pilića u tovu, potvrđuju da bolja konformacija i veća telesna masa pozitivno utiču na poboljšanje realivnog udela grudi, odnosno belog mesa.

Rezultati ispitivanja klaničnih osobina pilića genotipa različite konformacije ukazuju na to da odgajivačko – selekcijski rad na poboljšanju konformacije brojlera je bitno poboljšao klanične randmane i mesnatost grudi. U tom smislu, konformacija se pre može tretirati kao indikator klanične vrednosti trupova, nego kao estetska kategorija.

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