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COMPARATIVE STUDY ABOUT PRODUCTION AND SLAUGHTERING PERFORMANCES IN AN INDUSTRIAL COMPANY WITH ROSS 308 STANDARD CHICKEN HYBRID

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Abstract

The aim of this paper is to study production and slaughtering efficiency of a poultry flock up to 50 days of age by using technological indexes compared to a standard flock of the same age. Two groups of 50 birds each (both males and females) were randomly taken from production house in this purpose. Parameters followed were: live weight, carcass weight, slaughtering output, and also cut and of-boned pieces of significant weight when marketed as well defined products (breast and legs). Statistical data processing methods were used to process data from in slaughterhouse: media, media error and variability coefficient. During next phase a comparative analyze between data from standard and experimental group (Student test) and finding of phenotypic correlations between body weight and cut parts at both sexes were used. Obtained results led to conclusion that there are significant differences of average production performances between experimental and standard group and these differences are in favor of standard group. Slaughtering outputs have shown differences from standard.

Key words: *Ross308 hybrid, slaughtering, statistical calculation*

INTRODUCTION

Superior production and marketing of poultry meat is influenced by many different factors. Most important influence factors are the endogen factors (genetic potential of the biologic material used) and also some exogenous (technological) factors. Poultry meat production effectiveness is influenced by many factors such as live weight and carcass quality. Live weight is not limited by sex and it has direct influence on quantitative meat production. Main objective is best economical and biological efficiency of production process through a combination of factors involved in this process and poultry resources. Carcass quality assessment involves some stages as following: measuring or recording live animal conformation and finding slaughtering output yield, carcass exterior aspect assessment, determining percentage of different carcass parts and meat/bones outputs [3].

Poultry carcass cutting is performed differently, based on target market. The following pieces are generally cut: breast (with and without bones and with and without skin), superior legs, inferior legs, wings, backs, drumsticks. Carcass structure in 1- 1.5 kg broilers is generally as following: breast 20-25%, legs 32-35 %, back 30-32 %, wings 13-15 % from carcass weight and representing 75-80 % from live weight. [1,5].

Improvement companies are always at the start of production line and they are massively influencing the nutritional and sensorial attributes of poultry meat, including meat/bones share, breast percentage and fat percentage [4].

As genetics has an important role inside poultry meat production line, we are about to study ROSS 308 hybrid, one of the most productive and widespread hybrids both worldwide and in our country. Experimental results were compared with hybrid's standard results.

MATERIAL AND METHOD

Two groups of 50 birds (males and females) were formed for the experiment. Birds were randomly chosen from the same house of the production farm to fulfill an essential criterion namely an identical production environment. House flock was delivered to slaughterhouse al 50 days of age at 9% mortality and an average delivery weight of 2400 g.

At the slaughterhouse each experimental bird was individualized and weighted on an electronic weighing machine before hanging on the cutting conveyer and each individual value was recorded. After slaughtering three were also registered: carcass weight, cuts (breast, legs) weight, and de-boned meat (legs and breast) weight. Experimental data were statistically processed and arithmetical media, media error and variability coefficient of carcass, cuts and de-boned pieces were calculated: [4]. Next experiment phases were as following: slaughtering output was calculated for each flock, comparative analyzes between standard hybrid and experimental group data (test Student), and finding phenotypic correlations between body weight and cuts weight in the two sexes.

RESULTS AND DISCUSSIONS

Live weight and carcass parts weight in males and female are shown in table 1.

Broiler live body weight performances in the experiment are below standard hybrid's performances at same age and testing age significance with Student test is revealing that difference between the two groups (experimental and standard), of 16.2 % in males and 16.9 % in females is statistically assured and very significant. Weight difference between sexes is similar in both groups with 16.5 % and 15.8 % in experimental and standard group respectively. Birds uniformity in experimental group is amazing with a variability coefficient of 8.20 and 7.84 in males and females respectively (table 2).

Slaughtering yield during the experiment (73.36 % and 73.32 % in males and females respectively) had values close to standard of 73.71 % and 72.19 % in males and females respectively with no difference by sex.

Test Student was used again to see if there are significant differences between cutting areas of legs and breast in standard and experimental group. Very significant differences between samples were found (tables 3 and 4).

Cut breast weight was bigger than standard in both sexes (848 ± 0,011 g and 694±0,010 in experimental group in males g and females respectively), with 14.6% bigger and 12.6% bigger in males and females respectively. Testing difference between the two groups is revealing a very significant difference in favor of standard group. Experimental group was less uniform than standard group with a variability coefficient of 9.28% and 11.20% in males and females respectively compared to 8% in both sexes in standard group.

In experimental group legs with bones had a smaller weight with 150 g and 81 g in males and females respectively compared to 849±0.010 g and 638±0.007 in standard males and females respectively. Tests are revealing a very significant difference between the two studied groups in favor of standard group.

Cuts weight reported to la live weight were 27.83 % and 27.28 % for breast weight in males and females respectively and legs weight 22.94 % and 21.89 % in males and females respectively. Compared to average data of 16 % for breast percentage and 25 % for legs percentage reported by other authors [5], breast percentage is 11-12 % bigger and percentage of legs which are in a smaller demand from consumers is 2-35 % smaller.

The same procedure as that for cuts was followed for de-boned meat. Field data from legs and breast de-boning are shown in table 5.

Average meat percentage of breast is 22.64 % from live weight and 21.89 % from live weight in males and females respectively. Meat percentage of legs is 17.72 % from live weight and 16.7 % in males in females. Student test was used again to verify if there are significant differences between experimental and standard group.

Boneless breast weight (table 7) obtained during the experiment was 4.75 % smaller than standard in males and almost equal with standard in females. Testing difference significance is revealing that there are no significant differences between the two studied groups in none of the two sexes. Experimental female group had very low uniformity with variability coefficient of 12.74% and experimental male group had a variability coefficient of 9.28%.

Boneless legs weight was 7.22% below standard or 540±0.007 g and 13.3% below standard or 425 ±0.006 g in males and females respectively compared to 582 ±0.006 g in males and 490 ±0.005 g in females respectively in standard group. Testing differences is revealing a significant difference in males and a distinct significant difference in females in favor of standard group.

Next point of the trial was phonotypical correlation between body weight and cuts in males and females. Phonotypical correlations between live weight and cuts in males (table 8), is showing a positive correlation (r = + 0.175 ± 0.117) between live weight and breast weight. Correlation between live weight and cuts is negative.

Phonotypical correlation between carcass weight and cuts in males (table 9), is showing a slightly negative but close to zero correlation in males (r = -0.004 ± 0.142). Excepting the slightly positive but close to zero correlation between carcass weight and legs weight in males (r = + 0.029 ± 0.138), all the other correlations between carcass weight and cuts are negative.

There is also a positive correlation (r = + 0.244 ± 0.108) between live weight and breast weight in females (table 10). Correlation between live weight and cuts is also negative in females.

Phonotypical correlation between carcass weight and cuts is showing a positive correlation between carcass weight and breast weight (r = + 0,310 ± 0,098) in females (table 11). All the other correlations between carcass weight and cuts are negative.

Positive correlation between live weight and breast weight is showing that when live weight has been increasing breast weight has been increasing as well and this is a justification for efforts of hybrid's producer company to improve breast percentage from carcass.

Table 1. Live weight and weight of carcass parts (experimental group) in kg

Specification	Live weight	Breast	Legs	Wings	Back + neck	Carcass
Males	3.047	0.848	0.609	0.246	0.537	2.33
Females	2.554	0.694	0.557	0.208	0.474	1.938

Table 2. Comparative analyses for live weight at 50 days of age

Specification	Males		Females	
	Average + error (g)	Variability coefficient (%)	Average + error (g)	Variability coefficient (%)
Standard	3634±0.028	8.00	3061±0.021	8.00
Experiment	3047±0.035	8.20	2544±0.028	7.84
Student Test (t)	10.8		11.5	

[1] $t > t_\alpha$, for $P < 0.001$, differences are very significant

Table 3. Comparative analyses for breast with bones, at 50 days of age

Specification	Males		Females	
	Average + error (g)	Variability coefficient (%)	Average + error (g)	Variability coefficient (%)
Standard	724±0.008	8.00	606±0.006	8.00
Experiment	848±0.011	9.28	694±0.010	11.20
Student Test (t)	1.15		7.5	

[1]In males, $t < t_\alpha$, at the level of $P < 0.05$, differences are not significant

[2]In females, $t > t_\alpha$, at the level of $P < 0.001$, differences are very significant

Table 4. Comparative analyses for bone-in legs at 50 days of age.

Specification	Males		Females	
	Average + error (g)	Variability coefficient (%)	Average + error (g)	Variability coefficient (%)
Standard	849±0.010	8.00	638±0.007	8.00
Experiment	699±0.009	8.97	557±0.007	8.90
Student Test (t)	11.5		8.1	

[1]In males, $t > t_\alpha$ is showing that differences are very significant

[2]In females, $t > t_\alpha$ at the level of $P < 0.001$, differences are very significant

Table 5. De-boned meat weight (experiment) (kg/%)

Males				Females			
Live weight	Breast (Gr./ %)	Legs (Gr. / %)	Carcass (Gr. / %)	Live weight	Breast (Gr. / %)	Legs (Gr. / %)	Carcass (Gr / %)
3.047 100	0.690 22.64	0.540 17.72	1.230 40.36	2.544 100	0.557 21.89	0.425 16.70	0.982 38.60

Table 6. Comparative analyse for de-boned breast weight at 50 days of age

Males			Females		
	Average + error (g)	Variability coefficient (%)		Average + error (g)	Variability coefficient (%)
Standard	724±0.008	8.00	Standard	555±0.006	8.00
Experiment	690±0.011	9.28	Experiment	557±0.010	12.74
Student Test (t) = 2.7			Student Test (t) = 0.169		

[1]In both males and female differences are not significant

Table7. Comparative analyse for de-boned leg weight at 50 days of age

Males			Females		
	Average + error (g)	Variability coefficient (%)		Average + error (g)	Variability coefficient (%)
Standard	582±0.006	8.00	Standard	490±0.005	8.00
Experiment	540±0.007	9.78	Experiment	425±0.006	10.11
Student Test (t) = 4.2			Student Test (t) = 7.7		

[1]In males differences are significant and in female they are distinctly significant

Table 8. Phonotypical correlations between live weight and cuts weight in males

LIVE WEIGHT	x Wings weight	- 0.131 ± 0.124
	x Legs weight	- 0.082 ± 0.131
	x Breast weight	+ 0.175 ± 0.117
	x Back + Neck weight	- 0.103 ± 0.128

Table 9. Phonotypical correlations between carcass weight and cuts weight in males

CARCASS WEIGHT	x Wings weight	- 0.183 ± 0.116
	x Legs weight	+ 0.029 ± 0.138
	x Breast weight	- 0.004 ± 0.142
	x Back + Neck weight	- 0.001 ± 0.142

Table 10. Phonotypical correlations between live weight and cuts weight in females

LIVE WEIGHT	x Wings weight	- 0.398 ± 0.086
	x Legs weight	- 0.184 ± 0.116
	x Breast weight	+ 0.244 ± 0.108
	x Back + Neck weight	- 0.091 ± 0.129

Table 11. Phonotypical correlations between carcass weight and cuts weight in females

CARCASS WEIGHT	x Wings weight	- 0.447 ± 0.079
	x Legs weight	- 0.245 ± 0.107
	x Breast weight	+ 0.310 ± 0.098
	x Back + Neck weight	- 0.129 ± 0.124

CONCLUSIONS

During experiment average broiler production performances were below hybrid's standard performances at same age (50 days of age) of 3047 ± 0.035 g and 2544 ± 0.028 g in males and females respectively. Testing significance of differences with Student test is re3vealing that there are very significant differences between the two groups (standard and experimental) with 16.2 % and 16.9 % in males and females respectively. Weight difference between sexes is similar in both groups with 16.5 % and of 15.8 % in experimental and standard group respectively. There is a remarkable uniformity of experimental groups with a variability coefficient of 8.2% and 7.84% in males and females respectively. Difference of live weight between sexes is similar in both groups with 16.5 % and 15.8 % in experimental and standard group respectively.

Slaughtering output during trial was close to standard figure at same age with no differences by sex.
Weight of bone-in breast from cutting produced during trial was 848 ± 0.011 g in males and 18.2% smaller with 694 ±0.010 g in females and it was very significantly higher compared to standard group with 14.6% and 12.6% in males and females respectively. Experimental group was less uniform compared to standard group with a variability coefficient of 9.28% and 11.20% in males and females respectively compared to 8% in males and females in standard group.
Bone-in legs in experimental group were of 699 g ± 0.009 and 557 g ± 0.07 in males and females respectively with very significant differences in favor of standard group between the two studied groups.
Percentage of cuts weight from live weight in the studied hybrid were 11-12 % higher for breast percentage and percentage of legs which are in a smaller demand from consumers is 2-35 % smaller.
Boneless breast weight obtained during the experiment was 690 g ± 0.011 and 557 g ± 0.010 in males and females respectively with insignificant differences compared to standard group. Experimental female group had very low uniformity with variability coefficient of 12.74% and experimental male group had a variability coefficient of 9.28%.
Boneless legs weight was 7.22% below standard or 540 ± 0.007 g and 13.3% below standard or 425 ± 0.006 g in males and females respectively compared to 582 ± 0.006 g in males and 490 ± 0.005 g in females respectively in standard group. Testing differences is revealing a significant difference in males and a distinct significant difference in females in favor of standard group.
Average meat percentage of breast is 22.64 % from live weight and 21.89 % from live weight in males and females respectively. Meat percentage of legs is 17.72 % from live weight and 16.7 % in males in females.
Phonotypical correlations between live weight and cuts weight is showing a positive correlation between live weight and breast weight both in males (r = + 0.175 ± 0.117) and in females (0.244 ± 0.108). This positive correlation between live weight and breast weight is showing that when live weight has been increasing breast weight has been increasing as well and this is a justification for efforts of hybrid's producer company to improve breast percentage from carcass. Correlation between live weight and cuts weight are negative both in males and in females.
Phonotypical correlation between carcass weight and cuts, is also showing a positive correlation between carcass weight and breast weight in females (r = + 0.310 ± 0.098) and a slightly negative but close to zero correlation in males (r = - 0.004 ± 0.142). Excepting the slightly positive but close to zero (r = + 0.029 ± 0.138) correlation between carcass weight and legs weight in males all the other correlations between carcass weight and cuts are negative both in males and in females.
Following these results it is recommended a much careful observance of poultry production technology.
Considering also the high proportion of breast from carcass revealed by hybrid's standard and also the trial results farmers and especially processors of this hybrid are advise to market the poultry meat especially as de-boned and processed products which are offering them a higher economical revenue.

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