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YIELD OF MAJOR CARCASS PARTS OF BROILERS AS DEPENDENT ON THE LENGTH OF FATTENING PERIOD AND BREEDING SYSTEM

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Abstract: Complying with certain established regulations of the European Union on extensive i.e. traditional breeding of broilers as well as with the specific character of national poultry breeding, an experimental study was conducted to examine slaughter traits of broilers depending on the length of fattening period and the breeding system employed. Two fattening systems were used: the extensive system practised in a poultry house and the free-range system. Given the importance of the length of the fattening period in non-industrial poultry production, fattening lasted for 49, 56 and 63 days. At the end of each fattening period, the randomly sampled broilers were slaughtered for examination of quantitative and qualitative traits of processed carcasses. This study presents results on the share of major carcass parts (breasts, drumsticks, thighs, wings, pelvis and backs) in processed broilers. Differences in the tested breeding systems and length of the fattening period were small and statistically insignificant ($P > 0.05$). The analysis of significance revealed that the gender of broilers had a statistically very significant ($P<0.01$) effect on the share of breasts, thighs and drumsticks.

Key words: broilers, breeding system, gender, major carcass parts

Introduction

Modern tendencies in poultry breeding in developed European countries have inevitably imposed a need to define appropriate innovated breeding technologies to be used in poultry production in Serbia that will ensure the satisfaction of safe food production criteria, animal protection requirements and the need for rationalization of the production process.

The European Union regulations on non-industrial, environmentally friendly and organic production are rather stringent. The most important requirements include housing that has sufficient sunlight, limited stocking density, i.e. the

limited number of chicks per unit of area, breeding of small-growing broilers and recommendations on free-range breeding.

Nutrition and the length of fattening period are prescribed by specific regulations *(Ristić, 2003)*.

The effects of genotype and age under different breeding systems on the growth and meat quality of broilers were addressed by a number of authors: *Havenstein et al. (1994), Ristić (1994), Lewis et al., (1997), Damme and Rychlik (2001), Simon (2001), Grashorn and Clostermann (2002)* and others. Our previous findings *(Bogosavljević-Bošković et al., 2006; Bogosavljević-Bošković et al., 2006a)* showed that the hybrids most commonly bred in our country and intended for intensive fattening can be successfully bred under semi-intensive i.e. free-range conditions, as well.

This study revealed that the meat quality of broilers bred as stated was better in certain traits as compared to the meat of the intensively bred broilers.

The objective of this study was to analyze the significance of differences in the shares of major carcass parts of broilers bred under two different non-industrial systems (extensively in a poultry house and employing free range) and to examine the quality traits as affected by the length of fattening period i.e. age of broilers.

Materials and Methods

The trial material included a total of 200 one-day-old Cobb 208 broilers.

During the first 4 weeks, the broilers were bred in the same facility in a deep litter system.

On day 28, the broilers were divided into 2 groups, the first (trial group I) being kept in the poultry house at a stocking density of 12 chicks/m^2 of floor space, the second one (trial group II) being provided free range of 1m^2/chick, apart from being reared at an identical stocking density.

The broilers were fed a complete fodder mixture containing 21% of proteins until day 28, a 19% protein mixture from days 28 to 42 and a mixture of ground maize and oats, mineral and vitamin supplements and a 30% complete fodder mixture from day 42 until the end of the fattening period.

Three fattening periods were employed, lasting for 49, 56 and 63 days.

Upon fattening, 24 broilers from each fattening period (12 broilers from each trial group), half males and half females, were slaughtered.

Appropriate weighings were made at slaughter and during processing of the slaughtered carcasses to examine slaughter traits. The broilers were, first, randomly selected and weighed, and then, manually slaughtered and defeathered. The following information was recorded: slaughter weight, warm processed carcass weight and cold carcass weight. Major slaughter by-products and abdominal fat were also weighed. Subsequently, the processed and cold carcasses were dissected

into basic parts: breasts, drumsticks, thighs, wings, pelvis and backs (according to the 1981 Regulation on the Quality of Poultry Meat). The obtained data were used to determine the shares of the above parts in the processed carcasses.

Testing of the significance of differences was conducted according to the following mathematical model of an analysis of variance:

$Y_{ijkl} = \mu + BS_i + LF_j + G_k + (BSLF)_{ij} + (BSG)_{ik} + (LFG)_{jk} + (BSLFG)_{ijk} + e_{ijkl}$

i.e. in a three-factor design of 2 x 3 x 2 (2 breeding systems – BS, 3 lengths of the fattening period – LF and 2 genders – G).

The tested parameters were subjected to the analysis of variance using Anova, Microsoft STATISTICA Ver.5.0., Stat Soft Inc. (1995).

Results and Discussion

Shares of basic carcass parts of broilers are given in Table 1.

Table 1. Yield and shares of basic carcass parts of broilers at 49, 56 and 63 days of fattening

Group	Age, days	*Sex*		Thighs	Drumsticks	Breast	Wings	Pelvis	Back
				%	%	%	%	%	%
Non free-range	49	♂	$\bar{x}$	15.657	13.805	33.628	10.663	10.663	9.129
			Cv	5.595	3.477	2.831	3.198	9.997	8.358
		♀	$\bar{x}$	14.531	13.223	34.683	10.902	10.767	9.333
			Cv	3.468	9.083	8.670	7.284	5.730	6.709
	56	♂	$\bar{x}$	13.276	14.451	33.799	10.835	11.063	8.976
			Cv	6.335	12.062	8.136	4.762	7.746	9.581
		♀	$\bar{x}$	12.217	13.587	35.995	10.216	10.013	9.139
			Cv	5.279	3.282	2.573	6.725	9.018	3.534
	63	♂	$\bar{x}$	13.785	14.662	34.020	10.626	10.158	9.146
			Cv	8.923	3.185	5.500	10.465	5.848	9.042
		♀	$\bar{x}$	12.344	13.629	36.477	10.239	10.065	9.206
			Cv	4.522	3.933	4.644	5.391	4.552	8.462
Free-range	49	♂	$\bar{x}$	14.972	13.706	34.292	10.573	10.882	8.959
			Cv	2.758	4.778	6.133	3.575	5.651	3.583
		♀	$\bar{x}$	14.415	12.484	36.157	10.438	10.715	9.146
			Cv	4.523	2.235	2.661	5.394	13.794	9.414
	56	♂	$\bar{x}$	14.105	14.907	32.316	10.999	10.419	9.220
			Cv	4.658	3.568	5.839	4.791	6.075	5.369
		♀	$\bar{x}$	13.032	14.012	35.313	10.552	10.279	9.160
			Cv	10.313	5.595	7.034	6.602	18.358	9.050
	63	♂	$\bar{x}$	14.139	15.282	34.136	10.889	10.042	8.746
			Cv	6.768	6.065	6.826	5.684	6.145	6.449
		♀	$\bar{x}$	12.318	13.806	36.138	10.125	10.410	8.925
			Cv	2.768	3.976	4.156	6.716	9.798	7.003

Table 1 shows that a higher breast share (35.22%) was found in the free-range broilers slaughtered on day 49 of fattening than in the non-free-range broilers (34.16%). However, the drumstick and thigh shares were lower in the free-range broilers on day 49 of fattening.

At slaughter conducted on day 56 of broiler age, the free-range broilers had a higher share of drumsticks (13.57%) and thighs (14.46%) as compared to those in the broilers bred extensively in the poultry house which were 12.75% and 14.02%, respectively. A higher breast share was found in the non-free-range broilers. After the prolonged fattening, i.e. on day 63 of broiler age, the shares of major carcass parts in either test broilers exhibited quite uniform values. Greater differences in the examined trait were expressed in terms of the effect of broiler gender in all fattening periods. The statistical analysis showed very significant differences ($P<0.01$) in the shares of major carcass parts (breasts, drumsticks and thighs) between male and female broilers. However, the statistical analysis of differences in the shares of major carcass parts as affected by the breeding system and length of fattening period and their interaction showed that they were not significant ($P>0.05$).

Milićević (2006) and *Bogosavljević-Bošković (1994)* report the fact that the weights of major carcass parts are highly and positively correlated with the body weight and carcass weight of broilers. This study also confirms the suggestions of these authors. A more thorough analysis for comparison of results of these studies with those obtained from available literature would be quite limited, given the diversity of approaches of some authors in their studies. Nevertheless, the results of this study conform to those obtained by *Bogosavljević-Bošković et al. (2003), Yalcin et al. (1997), Moran et al. (1992), Ristić (2003)* and others.

Conclusion

The results of the study on the effect of breeding system, length of fattening period and gender of broilers on the shares of major carcass parts suggested the following:

A higher breast share in the total processed carcass weight was found in female broilers than in males, the difference being statistically significant ($P<0.01$). The males exhibited statistically very significantly higher shares of drumsticks and thighs as compared to the females. The differences in breast, drumstick and thigh shares induced by the breeding system and length of fattening period were not statistically significant ($P>0.05$).

Prinos osnovnih delova trupa pilića u zavisnosti od dužine tova i sistema gajenja

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Rezime

Imajući u vidu pojedine ustanovljene propise Evropske unije za ekstenzivan, tj. tradicionalan sistem gajenja tovnih pilića, kao i specifičnosti u živinarstvu naše zemlje, organizovana su eksperimentalna istraživanja sa ciljem ispitivanja klaničnih karakteristika tovnih pilića u zavisnosti od trajanja tova i sistema gajenja. Tov pilića organizovan je na dva načina, ekstenzivno u živinarniku i gajenjem uz korišćenje slobodnih ispusta. S obzirom na značaj dužine tova u neindustrijskoj živinarskoj proizvodnji, tov je trajao 49, 56 i 63 dana. Na kraju svakog od navedenih tovnih perioda pilići, odabrani metodom slučajnog uzorka, klani su radi ispitivanja kvantitativnih i kvalitativnih osobina obrađenih trupova. U ovom radu su prikazani rezultati ispitivanja udela osnovnih delova trupa (grudi, bataka, karabataka, krila, karlice i leđa) u masi obrađenih trupova oglednih pilića. Razlike ispoljene sa stanovišta ispitivanih sistema gajenja, kao i dužine tova bile su male i nisu bile signifikantne (P> 0,05). S druge strane, analizom značajnosti ustanovljen je statistički vrlo značajan (P<0,01) uticaj pola pilića na udeo grudi, karabataka i bataka.

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