

NAKED NECK – AUTOCHTHONOUS BREED OF CHICKENS IN SERBIA

2. CARCASS CHARACTERISTICS

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The aim of this research is to get the answer to the question how the production system influences the growth and slaughter characteristics of the carcass from naked neck chicken of different varieties. Investigations were carried out on chickens of domestic breed – naked neck of various plumage colors: white (W), black (B) and gray (G). Chickens were reared in an extensive system and fattening lasted 98 days. Chickens of both sexes of autochthonous breeds, with 98 days of fattening, reached the average body mass of 1108.93 g (W), 1080.26 g (B) and 1005.00 g (G), which cannot be accepted as sufficient body mass for slaughtering chickens in present conditions. Differences between mean values were statistically significant. The black variety had the highest relative share of breast meat (71.14%) and thighs (71.63%), and the white variety of drumstick (66.97%). The gray variety had the highest relative share of bones and skin of breasts, thighs and drumsticks, although differences were not statistically significant. The greatest mass of tibia (18.4 g) and the lowest of cross sectional cortical (14.52 mm²) was established in the gray variety (18.40) which indicated the lowest bone strength and this was confirmed by values of breaking force (30.25 kg).

Key words: naked neck; chicken; extensive system; carcass quality

ГОЛОШИЈАНЕРИ – АВТОХТОНА РАСА НА ПИЛИЊА ВО СРБИЈА

2. КЛАНИЧНИ ОСОБИНИ

Целта на овие истражувања беше да се добие одговор, како производниот систем влијае врз растот и кланичните особини на пилешките трупови кај голошијанерите од различни вариетети. Истражувањето беше изведено врз пилиња од домашна раса на голошијанери со различна боја на пердуви: бела (W), црна (B) и сива (G). Пилињата беа одгледани во екстензивни услови и гоени 98 дена. Пилињата од двата пола на автохтоните раси, по 98 дена гоеење, достигнаа просечна телесна маса од 1108,93 g (W), 1080,26 g (B) и 1005,00 g (G), што не може да се прифати како задоволителна телесна маса за колење на пилињата. Разликите помеѓу вредностите на главните делови на трупот беа статистички значајни. Црниот вариетет имаше највисок удел на градното месо (71,14%) и наткопаните (71,63%), а белиот вариетет на копаните (66,97%). Сивиот вариетет имаше највисок удел на коските и кожата од градите, копаните и наткопаните, иако разликите не беа статистички значајни. Најголема маса на тибиджата (18,4 g) и најмала површина на пресекот од кортикалната коска (14,52 mm²) беа констатирани кај сивиот вариетет, што укажува на најниска цврстина на коската, што беше потврдено и со вредностите на силата на кршење (30,25 kg) и специфичната сила на кршење (0,85 kg/mm²).

Клучни зборови: голошијанер; пиле; екстензивен систем; квалитет на труп

1. INTRODUCTION

For the last three decades, industrialization of broiler production in the world, and with us, was

given opportunity to increase the production of chicken meat by more than four times. During many years, the conventional (standard) broiler production was also led to the development of

some new methods in the production of chicken meat, such as production of broilers separated by sex, extended fattening chickens, one-portion chickens, chickens from extensive system and organic production of chickens (Pavlovski and Mašić, 1994; Milošević et al., 2003; Ristić, 2003; Bogosavljević et al., 2005; Mitrović et al., 2005; Milošević et al., 2005).

Production of chicken meat has perspective, because the assortment of chicken meat products is expanding. Lasting products are required for today, and all speak for the future. Delicatessen products are especially demanded that come from extensive production (from the pasture by the "Label Rouge", King, 1987), as fresh carcasses (roasted carcass), confectioned parts of carcass or manufactured products.

Many consumers by more rigorous criteria of tasting consider, that the chicken meat from industrial production behaves poorly, "watery" and too greasy. For this reason, the last time wider extensive way of chickens fattening in pastures for a period of 12–14 weeks, by using natural food (worms, beetles, ants, insects), and complementary mixture without fish and bone meal. In this way, meat of fattening chickens is very juicy and tasteful that cannot reproach even the strictest gourmets. For some forms of extensive production slow-growing hybrids with colored plumage are used. In Serbia, chickens of domestic, native hen of a more fattening type, naked neck hen of more fattening type (with colored plumage), New Hampshire, Amrok, Gray Plymouth Rock and similar chickens which have not white plumage can be used. Among first researches carried out in our country, was the research on New Hampshire and Amrok chickens by Pavlovski et al. (1992).

Domestic naked neck chickens, reared in our country for long time, are considered as a domestic hen. They originate from primitive hens crossed with various foreign breeds of which the effect Transylvanian naked neck is most obvious, since this trait-naked neck, is dominant. The naked neck hen as autochthonous breed can be found in all surrounding countries, and differences among them are very small (Grujić, 1928). The most significant trait of exterior is naked neck, and plumage of different colours. The quality of meat is good and the hen is extremely resistant.

Considering that in this direction no research has been realized in our conditions, Pavlovski et al. (2009) started research that contributed to the

knowledge of slaughter characteristics of meat from naked neck chickens cultivated in our country, and in this paper the shares and the tissues of the major carcass parts will be shown.

2. MATERIAL AND METHODS

Investigations were carried out on chickens of domestic breed – naked neck of various plumage colours: white (W – 28 chickens), black (B – 38 chickens) and gray (G – 38). In total 144 chickens were included in the experiment. Chickens were extensively reared on the farm of an agricultural producer and fattening lasted 98 days (14 weeks).

Composition of mixtures used in the research for 10 weeks of fattening with 19 % of protein is presented in Table 1.

Table 1

<i>Composition of mixtures, %</i>	
Ingredients	%
Maize	73.50
Soybean meal	17.00
Sunflower meal	4.00
Lucerne meal	2.00
Limestone	1.25
Dicalcium phosphate	1.00
Salt	0.25
Premix	1.00
Total	100.00

After 6 weeks of intensive fattening in the chicken coop, during day chickens used limited free range. After 10th week of fattening, chickens were fed mixture containing 16% of protein. By the method of random sample 12 chickens per each sex were taken and slaughtered manually for investigation of the shares and the tissues of the major carcass parts (breasts, thighs and drumsticks) and bones quality. The cutting into major carcass parts was based on the Regulation on quality of poultry meat (1981). Tibiotarsal bones were removed and used for morphometric and mechanical investigation.

The bone length was measured with a dial caliper and the bones mass was weighed on precision balance. Prior to breaking, on each bone, at the midpoint of diaphysis, outside diameters were measured in antero–posterior (AP) and latero–me-

dial (ML) directions. The breaking force was measured by the three-point bending test, using the IPNIS apparatus, with 4 cm of supports distance (Mašić and Pavlovski, 1994). After breaking, diameter measurements were made inside the mid-shaft of diaphysis, in antero-posterior (ap) and latero-medial (lm) directions. Because the transverse section through the femoral and tibiotarsal diaphysis approximates an ellipse, the following parameters were calculated:

TA – total area (cross sectional diaphyseal area); $TA = \pi/4 (AP \times LM)$;

MA – medullar area (cross sectional medullar area); $MA = \pi/4 (ap \times lm)$;

CA – cortical area (cross sectional cortical area); $CA = TA - MA$.

Data were analyzed using the method of the variance analysis and the Tukey test (Stat. Soft. Inc. STATISTICA, version 6).

3. RESULTS AND DISCUSSION

The average increase of the body mass of chickens of different variety at different age is presented in Table 2.

Chickens of both sexes of autochthonous breeds, with 98 days of fattening, reached the average body mass of 1108.93 g (W), 1080.26 g (B) and 1005.00 g (G), which cannot be accepted as sufficient body mass for slaughtering chickens in present conditions. Differences between mean values were statistically significant. Chickens of the autochthonous naked neck breed realized considerably lower body masses compared to the pure breeds New Hampshire and Amrok in the study of Pavlovski et al. (1992).

Table 3 shows the share of breast and tissue in the breasts of the examined naked neck variety chickens. Black variety had the biggest breasts (158.88 g), and the highest relative yields of breast meat (71.14%), in contrast to the gray variety, which had the smallest breasts (151.78 g), the lowest relative yields of meat (67.69%), the heaviest bones (31.07 g) and the highest relative yields of the skin (9.26%), although differences were not statistically significant.

Data on absolute and relative yields of thigh and tissue in the thighs (meat, bones, skin) of the examined variety are shown in Table 4. The gray variety had the highest relative share of bone and skin in thighs (32.4%, 7.79%), the black variety had the most share of meat (71.63 g), and the white variety the largest relative share of meat (60.12%) in the thigh. Differences found were not statistically significant.

Table 5 shows the absolute and relative shares of drumstick and tissue in the drumsticks of the examined naked neck different variety.

The gray variety had the lowest mass of drumstick (125.96 g) and according to that the lowest mass of meat (80.39%); the black variety had the highest mass of drumstick (132.04 g), while the white variety had the highest relative yields of meat (66.97%). The relative yields of the examined variety bones were on the limit of significance ($p = 0.05$).

In the Table 6 the average values of measuring morphometric and mechanical parameters of tibiotarsal bones in male and female naked neck chickens are presented. Between the varieties of naked neck breeds, the presence of significant difference was not established.

Table 2

Average body mass (g) of chicken of different variety

Variety	Age, weeks			
	8	10	12	14
W	473.21 ± 109.77	670.71 ± 176.63	793.21 ± 221.68	1108.93 ± 205.50
B	477.50 ± 84.80	556.84 ± 133.96	728.95 ± 177.68	1080.26 ± 224.07
G	501.92 ± 107.18	638.57 ± 173.36	826.19 ± 246.79	1005.00 ± 186.31
Average	483.10 ± 98.99	613.22 ± 164.75	773.10 ± 211.79	1072.09 ± 211.10
♂		775.14 ± 94.91	844.57 ± 238.32	1201.43 ± 178.84
♀		504.23 ± 98.29	725.00 ± 178.64	983.33 ± 185.11
	Significance (p value)			
Variety	0.516	0.038	0.326	0.01
Sex		<0.001	0.02	<0.001

Table 3

Share of breast and tissues

Variety	N	Breast, g	Meat, g	Meat, %	Bone, g	Bone, %	Skin, g	Skin, %
Average	36	156.26 ± 30.0	109.52 ± 22.8	69.95 ± 4.3	29.77 ± 6.5	19.10 ± 2.6	14.42 ± 3.7	9.21 ± 1.5
W	12	158.13 ± 26.4	112.48 ± 20.8	71.00 ± 3.3	28.27 ± 5.5	17.95 ± 2.8	14.67 ± 4.2	9.20 ± 1.5
B	12	158.88 ± 31.7	113.02 ± 23.5	71.14 ± 4.9	29.98 ± 6.8	18.87 ± 2.6	14.52 ± 3.3	9.18 ± 1.5
G	12	151.78 ± 33.5	103.05 ± 24.5	67.69 ± 4.0	31.07 ± 7.2	20.48 ± 1.9	14.07 ± 3.9	9.26 ± 1.5

Table 4

Share of thigh and tissues

Variety	N	Thigh, g	Meat, g	Meat, %	Bone, g	Bone, %	Skin, g	Skin, %
Average	36	118.20 ± 27.1	69.65 ± 16.7	58.92 ± 3.4	37.36 ± 9.5	31.52 ± 3.5	9.46 ± 2.4	8.06 ± 1.3
W	12	116.02 ± 24.1	69.81 ± 15.5	60.12 ± 3.4	35.01 ± 7.7	30.20 ± 3.1	9.46 ± 2.2	8.18 ± 1.1
B	12	122.47 ± 30.2	71.63 ± 18.4	58.45 ± 3.5	39.18 ± 10.5	31.96 ± 4.2	10.01 ± 3.0	8.21 ± 1.8
G	12	116.10 ± 28.5	67.51 ± 17.3	58.19 ± 3.1	37.88 ± 10.5	32.40 ± 3.1	8.90 ± 1.8	7.79 ± 1.1

Table 5

Share of drumstick and tissues

Variety	N	Drumstick, g	Meat, g	Meat, %	Bone, g	Bone, %	Skin, g	Skin, %
Average	36	129.42 ± 27.7	84.89 ± 20.5	65.29 ± 3.6	27.96 ± 6.5	21.78 ± 3.7	13.66 ± 2.8	10.77 ± 2.1
W	12	130.25 ± 26.8	87.31 ± 18.9	66.97 ± 2.6	25.57 ± 5.8	19.70 ± 3.0 ^B	13.46 ± 2.7	10.59 ± 2.2
B	12	132.04 ± 30.6	86.98 ± 23.1	65.38 ± 4.1	29.37 ± 6.8	22.59 ± 4.5 ^{AB}	13.64 ± 2.9	10.50 ± 1.8
G	12	125.96 ± 27.6	80.39 ± 20.3	63.51 ± 3.5	28.95 ± 6.8	23.05 ± 2.5 ^A	13.89 ± 3.1	11.21 ± 2.3

Table 6

Morphometric and mechanical parameters of tibiotarsal bone

Variety	N	Mass, g	Length, cm	TA, mm ²	MA, mm ²	CC, mm ²	Breaking force, kg
Average	36	18.28 ± 4.3	4.60 ± 0.4	36.48 ± 8.5	16.60 ± 8.4	19.24 ± 7.8	31.65 ± 6.6
W	12	18.35 ± 4.5	4.73 ± 0.3	36.08 ± 8.2	17.17 ± 10.4	18.91 ± 5.9	30.92 ± 5.3
B	12	18.06 ± 3.9	4.50 ± 0.3	36.88 ± 9.4	18.26 ± 7.7	15.81 ± 10.2	33.99 ± 9.0
G	12	18.40 ± 5.0	4.56 ± 0.5	36.52 ± 8.8	14.52 ± 7.1	22.72 ± 5.6	30.25 ± 4.8

In the grey variety, bone mass and length, of tibiotarsal bone were, 18.40 g and 4.56 cm. In the white variety, those values were 18.35 g and 4.73 cm, but these differences were not significant.

The parameters of diaphyseal cross sectional geometry of autochthonous naked neck chickens were lower than those of broiler chickens. The average values of the total cross sectional diaphyseal area and cross sectional medullar area were lower in the autochthonous naked neck breeds of chickens than in the commercial broiler chickens. In cross, sectional cortical areas there were not significant differences among varieties.

In the black variety, the average breaking forces of tibiotarsus (33.99 kg) were higher, than those in the grey and white variety chickens (30.25; 30.92 kg, respectively).

4. CONCLUSION

In general, chickens of the autochthonous naked neck breed, varieties white, black and gray, in the extensive production system and duration of fattening of 98 days (14 weeks), do not realize the body mass, which is adequate to present standards

for fattening chickens. In addition, their shares of major carcass parts and tissues are significantly below minimum acceptable values. Between the varieties of autochthonous naked neck breeds, among the values for bone mass and length, the presence of a significant difference was not established.

This indicates the need for further research of the quality, which would confirm that investigated chickens have considerably better meat quality, which is suitable, and in compliance to demands of the consumers, who prefer natural food of specific and guaranteed quality for which they are ready to pay higher price.

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