

NAKED NECK – AUTOCHTHONOUS BREED OF CHICKEN IN SERBIA: CARCASS CHARACTERISTICS **

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Abstract: Objective of the research was to establish the growth of body mass and slaughter characteristics of the autochthonous chicken breed - naked neck of different varieties (white, black, gray) in our country, reared in extensive system. Fattening lasted 98 days (14 weeks). In the paper, the growth of body mass of chickens at the age of 8, 10, 12 and 14 weeks of fattening are presented, also slaughter yields, conformation measures, shares of major carcass parts and roasting loss. Average body mass varied from 1108.93g (W), 1080.26 g (B) and 1005.00g (G). Slaughter yield “traditionally dressed carcass” varied from 75.09% (B) to 76.58% (G), yield “ready to cook” from 67.88 (W) to 68.76 (G) and yield “ready to grill” from 58.38% (W) to 58.89 (G). Obtained mean values of conformation measures indicated poor carcass built of chickens of both sexes and were result of strong effect of body mass of chickens. Considerable effect of variety and sex on differences between mean values for major carcass parts (breast, thighs, drumsticks, wings) was not established. Further research shall be necessary in order to confirm the hypothesis that naked neck chickens have better meat quality for which the consumers who prefer natural food are prepared to pay higher price.

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

Introduction and literature review

Preservation of genetic resources in animal science is still considered very current and important issue. Several authors classify poultry in two groups – for production of meat and eggs (*Crawford, 1990; Shaw and Spackman, 1996*) in four categories: industrial, medium level, autochthonous (native) and wild (untamed). In our conditions for preservation of genetic resources,

categories of autochthonous and medium level poultry are of interest (*Mašić et al., 1997*).

First step in every program of preservation of hen genetic resources is recognition or inventory (identification) of hen flocks which exist presently (*Hunton, 1995*). Our previous activity (*Mašić et al., 1996; Mašić et al., 1997; Milošević et al., 2007; Supić et al., 1997*) and probably future activity is in this field. Future work, i.e. collection, evaluation (study) and conservation of hen flocks within the program of genetic resource preservation should give the actual result expected from this measure.

Contrary to data from 1987, where private (individual) sector in poultry production was present with 47,7 % in extensive or semi intensive poultry rearing system was applied (*Pavlovski and Mašić, 1990*), today, in our country, industrial production of meat is developed and widely spread.

Basis of industrial rearing system and production in poultry is rearing of hybrids and not pure breeds, obtained by crossing of more different lines. Compared to interaction genotype-environment in native poultry, especially in conditions of tropic and subtropical countries, *Yamada (1990)* stated better adaptability of naked neck hens and raised the issue of who is responsible for scientific improvement of native hens which make 1/3 of the hen population in the World.

Considering the fact that production without the use of harmful chemical agents (so called natural, healthy, safe food) has become subject of great interest on domestic and international market and that there are conditions for this type of production in Serbia, Institute for Animal Husbandry has developed adequate program of production of poultry meat of specific and guaranteed quality. For this production, chickens fattened in industrial production (broilers) are not used, as well as chickens of white color plumage. In our conditions, only chickens of domestic, native hen of more fattening type, naked neck hen of more fattening type (with coloured plumage), New Hampshire, Amrok, Grey Plimutrok 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 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. 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. Quality of meat is good and hen is extremely resistant.

Considering that there no research in this direction have been realized in our conditions, it seemed necessary to initiate a study which would contribute to better understanding of the potential production of poultry meat based on this Program. Aim of this research is to get answer to the question how does the production system influence the growth and slaughter characteristics of the carcass from naked neck chicken of different varieties.

Materials 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 chickens). In total 144 chickens were included in the trial, chickens were reared on the farm of the agricultural producer in the vicinity of Ub. Chickens were reared in extensive system 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. Composition of mixtures, %

| 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, chickens used during day limited free range. After 10th week of fattening, chickens were fed mixture containing 16% of protein.

Chickens were weighed individually in 8, 10, 12 and 14 week of fattening. By method of random sample 12 chickens per each sex were taken and slaughtered manually for investigation of slaughter yields and conformation. Conformation measures were taken according to method by *Pavlovski and Mašić (1983)*, and slaughter yields and cutting into major carcass

part based on Regulation on quality of poultry meat (1981). Roasting loss was calculated per single chicken carcass of every variety, roasted on temperature of 250°C for the period of 1 hour.

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

Results and discussion

Average increase of body mass of chickens of different variety 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), 1080.26g (B) and 1005.00g (G), which cannot be accepted as sufficient body mass for slaughtering chickens in present conditions. Differences between mean values were statistically significant. Chickens of autochthonous naked neck breed realized considerably lower body masses compared to pure breeds New Hampshire and Amrok in study of *Pavlovski et al. (1992)*.

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 |

Data on average body mass prior to slaughtering and mass of dressed carcasses of investigated chickens are presented in table 3.

It can be concluded, based on data for chickens of both sexes since they are considered to be more reliable since the number of carcasses within one sex was very small, and based on analysis using Tukey test, that the highest average body masses of chickens prior to slaughtering were measured in chickens of black variety (1283.33 g), and the lowest in chickens of gray variety (1212.50g). Chickens of white variety realized final body masses prior to slaughtering of 1279.17g. The same trend was established for slaughter yields: traditionally

dressed carcass, ready to cook and ready to grill. Differences between mean values, as demonstrated by Tukey test, weren't statistically significant. The lowest maximum values for abdominal fat were recorded for variety black (9.1g), and the highest for variety gray. Male chickens had significantly higher body masses than females.

Table 3 . Body mass before slaughter and mass of dressed carcass

| Variety | BM before slaughter, g | BODY MASS , g | | | Abdomin. fat,g min-max |
|------------------------|------------------------|-------------------------------|-----------------|-----------------|------------------------|
| | | Traditionally dressed carcass | Ready to cook | Ready to grill | |
| W | 1279.17 ± 173.81 | 962.78 ± 145.09 | 869.40 ± 130.47 | 747.88 ± 113.91 | 0-10.5 |
| B | 1283.33 ± 234.84 | 965.48 ± 187.75 | 875.73 ± 182.29 | 756.08 ± 171.63 | 0-9.1 |
| G | 1212.50 ± 243.20 | 925.22 ± 164.97 | 831.95 ± 155.86 | 715.33 ± 150.45 | 0-13.5 |
| Average | 1258.33 ± 215.64 | 951.16 ± 163.08 | 859.03 ± 154.31 | 739.76 ± 144.11 | |
| ♂ | 1361.36 ± 179.90 | 1031.35 ± 130.10 | 931.93 ± 128.83 | 805.88 ± 124.60 | 0-13.5 |
| ♀ | 1096.43 ± 163.45 | 825.14 ± 127.59 | 744.47 ± 119.05 | 635.86 ± 108.69 | 0-10.5 |
| Significance (p value) | | | | | |
| Variety | 0.446 | 0.473 | 0.518 | 0.575 | |
| Sex | p<0.01 | p<0.01 | p<0.01 | p<0.01 | |

In table 4, data on relative yield of dresses carcass, i.e. slaughter yields are presented. Yield „traditionally dressed“ varied from 75.09% (B) to 76.58% (G), yield „ready to cook“ varied from 67.88 % (W) to 68.76 %(G) and yield „ready to grill“ had values from 58.38% (W) to 58.89 (G), however, as shown by Tukey test, there were no statistical significances between determined values. Considerable effect of the sex on calculated slaughter yields was not established.

Index values (g/mm) of conformation measures measured and calculated on chicken carcasses of both sexes and investigated varieties are presented in table 5.

Table 4. Slaughter yield, %

| Variety | YIELD, % | | |
|------------------------|-------------------------------|---------------|----------------|
| | Traditionally dressed carcass | Ready to cook | Ready to grill |
| W | 75.15 ± 1.96 | 67.88 ± 2.15 | 58.38 ± 2.18 |
| B | 75.09 ± 1.91 | 67.96 ± 2.60 | 58.51 ± 3.09 |
| G | 76.58 ± 2.12 | 68.76 ± 1.87 | 58.89 ± 1.88 |
| Average | 75.61 ± 2.06 | 68.20 ± 2.20 | 58.59 ± 2.38 |
| ♂ | 75.85 ± 2.15 | 68.44 ± 2.43 | 59.07 ± 2.44 |
| ♀ | 75.22 ± 1.93 | 67.82 ± 1.79 | 57.85 ± 2.15 |
| Significance (p value) | | | |
| Variety | 0.052 | 0.352 | 0.711 |
| Sex | 0.223 | 0.299 | 0.109 |

Chickens of variety black naked neck had higher index body mass and shank length (BM/SL) and thigh girth (BM/TG). Higher values of index keel length and breast depth were calculated in chickens of variety white. In chickens of variety gray all calculated index values were the lowest except breast angle which was the greatest (81.70 degrees), but differences between mean values were not statistically significant. Male chickens had statistically considerably higher index values than females.

Table 5. Conformation measures on carcass (index)

| Variety | BM/SL, g/mm | BM/KL, g/mm | BM/BD, g/mm | BM/TG, g/mm | BA, degrees |
|------------------------|----------------|----------------|----------------|----------------|--------------|
| W | 15.75 ± 1.59 | 14.01 ± 1.57 | 13.81 ± 1.35 | 12.02 ± 0.90 | 79.92 ± 7.39 |
| B | 16.82 ± 4.23 | 13.57 ± 1.83 | 13.61 ± 1.49 | 12.05 ± 1.25 | 80.42 ± 7.72 |
| G | 15.62 ± 2.86 | 13.64 ± 1.39 | 13.36 ± 1.58 | 11.96 ± 1.61 | 81.70 ± 8.42 |
| Average | 16.09 ± 3.06 | 13.74 ± 1.58 | 13.64 ± 1.44 | 12.01 ± 1.22 | 80.62 ± 7.61 |
| ♂ | 17.25 ± 2.91 | 14.32 ± 1.48 | 14.24 ± 1.24 | 12.58 ± 0.90 | 81.14 ± 7.75 |
| ♀ | 14.22 ± 2.34 | 12.81 ± 1.30 | 12.68 ± 1.24 | 11.09 ± 1.13 | 79.77 ± 7.61 |
| Significance (p value) | | | | | |
| Variety | 0.896 | 0.284 | 0.312 | 0.560 | 0.666 |
| Sex | p<0.01 | p<0.01 | p<0.01 | p<0.01 | 0.578 |

BM- body mass; SL-shank length; KL-keel length; BD-breast depth; TG-thigh girth; BA-breast angle

Obtained relative values of conformation measures indicate poor built of male and female chickens of all three investigated varieties and are result of strong effect of body mass which was confirmed also in research by *Pavlovski and Mašić (1983)*, *Pavlovski et al. (2006)*, *Hopić et al. (1993)*, *Hopić et al. (1996)*.

Table 6. Yield of most important part of the carcass

| Variety | Breast, %BM | Thigh, %BM | Drumstick, %BM | Wing, %BM |
|------------------------|--------------|-------------|----------------|-------------|
| W | 13.57 ± 1.01 | 9.27 ± 0.82 | 11.05 ± 2.20 | 8.82 ± 1.67 |
| B | 13.19 ± 0.66 | 9.52 ± 0.85 | 10.08 ± 2.06 | 8.19 ± 1.38 |
| G | 13.36 ± 0.67 | 9.73 ± 0.83 | 11.60 ± 2.90 | 8.90 ± 1.95 |
| Average | 13.37 ± 0.79 | 9.51 ± 0.83 | 10.91 ± 2.43 | 8.64 ± 1.67 |
| ♂ | 13.28 ± 0.75 | 9.78 ± 0.77 | 10.44 ± 2.13 | 8.30 ± 1.38 |
| ♀ | 13.52 ± 0.85 | 9.08 ± 0.76 | 10.64 ± 2.76 | 9.16 ± 1.98 |
| Significance (p value) | | | | |
| Variety | 0.629 | 0.432 | 0.402 | 0.743 |
| Sex | 0.513 | p<0.05 | 0.268 | 0.220 |

Shares of major carcass parts of investigated chickens are presented in table 6. Share of breasts varied from 13.19% (B) to 13.57% (W), share of thighs from

9.27% (W) to 9.73% (G), of drumstick from 11.05% (W) to 11.60% (G) and share of wings from 8.19% (B) to 8.90%(G). Significant effect of variety and sex on differences between men values was not established.

Loss during roasting varied from 23.52% (B), 26.03 % (W) to 26.35% (G), and share/yield of roasted meat was the highest in chickens of black variety (55.13%), followed by white (52.57%) and gray variety (46.96%).

Conclusion

In general, chickens of autochthonous naked neck breed, varieties white, black and gray in 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. Also, their yields, conformation measures and shares of major carcass parts are significantly bellow minimum acceptable values. 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 which prefer natural food of specific and guaranteed quality for which they are ready to pay higher price.

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GOLOŠIJANI – AUTOHTONA RASA PILIĆA U SRBIJI: KLANIČNE OSOBINE

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Rezime

Cilj ispitivanja je bio da se ustanovi porast telesne mase i klanične karakteristike autohtone rase pilića gološijani različitih varijeteta (beli, crni, sivi), u našoj zemlji, gajenih u ekstenzivnom sistemu. Tov je trajao 98 dana (14 nedelja). U radu su prikazani porasti telesnih masa pilića u uzrastu od 8,10, 12 i 14, nedelja tova, klanični randmani, mere konformacije , udeli važnijih delova trupa i kalo pečenja. Prosečna telesna masa pilića kretala se od 1108.93g (W), 1080.26 g (B) i 1005.00g (G). Klanični randman “klasični ogleđa” varirao je od

75.09% (B) do 76.58% (G) i randman "spreman za pečenje" od 67.88 (W) do 68.76 (G) i randman "spreman za roštilj" od 58.38% (W) do 58.89 (G). Dobijene srednje vrednost mera konformacije ukazali su na lošu građu trupova pilića oba pola i rezultat su jakog uticaja telesne mase pilića. Značajan uticaj varijeteta i pola na razlike između srednjih vrednosti vrednijih delova trupa (grudi, bataci, karabataci, krila) nije ustanovljen. Neophodna su dalja istraživanja koja će potvrditi hipotezu da pilići gološijani imaju bolji kvalitet mesa za koji su potrošači ljubitelji prirodne hrane spremni da plate višu cenu.

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Picture 1. White variety



Picture 2. Black variety



Picture 3. Gray variety



Picture 4. Naked neck varieties