

## NAKED NECK CHICKEN OF SERBIAN AND FOREIGN ORIGIN: CARCASS CHARACTERISTIC

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**Abstract:** Objective of the research was to establish the growth of body mass and slaughter characteristics of native, autochthonous breed of chickens called Naked neck of different varieties (white, black, gray) in our country and French hybrid Naked neck Farm Q, reared in extensive systems. Fattening lasted for 91 (Farm Q) and 98 (naked neck) days. In the paper, the body masses prior to slaughtering are presented, as well as slaughter yields (traditionally dressed carcass, ready to grill, ready to cook), absolute and index values of conformation measures (shank and keel length, breast deep and angle, thigh girth) and shares of major carcass parts. Average body mass of chickens prior to slaughtering varied from 1371.0 g (FQ) to 1080.26 g (B) and 1295.0g (NN). Slaughter yield, i.e. dressing percentage, “traditionally dressed carcass” varied from 79.4% (FQ) to 75.4% (NN), slaughter yield “ready to cook” from 72.4% (FQ) to 68.1% (NN) and slaughter yield “ready to grill” from 62.6% (FQ) to 58.7 (NN). Obtained mean values of conformation measures indicated poor development and built of carcasses of both sexes and were results of strong effect of body mass of chickens. Significant effect of genotype and sex on differences between mean values obtained for major carcass parts (breast, thigh + drumstick) was established in share of breast in Farm Q females and Farm Q males in share of thigh + drumstick. Farm Q chickens had statistically significantly higher share of thigh + drumstick, and chickens of genotype Naked neck had higher share of breasts. Further research is necessary which would confirm the hypothesis that naked neck chickens (both investigated genotypes) have better nutritive quality of meat for which consumers which prefer natural food are willing to pay the higher price.

**Key words:** naked neck, Farm Q, chicken, extensive system, carcass quality

## Introduction

Basis of production of poultry meat today is production of broilers. Broilers are young chickens of both sexes, usually at the age of 5 to 7 weeks, which are slaughtered when they reach body mass of approx. 2.0-2.5 kg. These chickens are most often high productive white plumage hybrids produced in industrial way (in large number, in closed production facilities with artificial heating, ventilation and light, fed commercial food mixtures, with implementation of high level of mechanization and automatization in production technology, in slaughtering and processing of meat). Industrialization of broiler production has enabled world wide increase of broiler production over the last three decades by more than four times. Conventional (standard) broiler production, over period of many years, has lead to development of some new methods in production of poultry meat, such as production of broilers separated by sex, prolonged broiler fattening, one-portion chickens, chickens in extensive system, organic production, etc. (Pavlovski and Mašić, 1994; Milošević et al., 2003; Ristić, 2003; Bogosavljević et al., 2005; Mitrović et al., 2005; Milošević et al., 2005).

Production of poultry meat has perspective, since the assortment of poultry products is expanding. Durable products today are in great demand. Especially delicatessen which originate from extensive production (from pastures according to system „Label Rouge“, King, 1987), weather fresh carcasses (roosters), confectioned parts or processed products.

Consumers of more strict criteria from the aspect of taste find that poultry meat from industrial production lacks in taste, that it is „watery“ and too fat. Therefore, lately, the expansion of extensive fattening of chickens on free ranges (pastures) in duration of 12 to 14 weeks is present, with natural nutrition (worms, ants, insects) and additional nutrition with mixtures but without fish or meat meal. Meat from chickens fattened in this way is very succulent and juicy, full of taste and even the strictest food lovers can find no complaints. For some forms of extensive production slow growing and coloured plumage hybrids are used. In our conditions it is possible to use chickens of domestic, native, autochthonous fattening type, Naked neck hens (with coloured plumage), New Hampshire, Amrok, Grey Plimuthrock and similar chickens which have no white plumage. First researches of chickens of new breed New Hampshire and Amrok in Serbia was done by Pavlovski et al. (1992).

Domestic Naked neck chickens which have been reared in Serbia for long time, are considered as domestic hen. They originated from primitive hens crossed with various foreign breeds of which the most obvious influence is that of Transylvanian Naked Neck since the trait of naked neck is transmitted as dominant trait. Naked neck as autochthonous hen is present in all neighbouring countries, and differences among them are very moderate (Grujić, 1928). The most significant

exterior trait is naked neck, and plumage of different colours. Quality of meat is good and the hen is exceptionally resistant.

Considering the fact that in our conditions there has been no researches in this direction, *Pavlovski et al. (2009)* initiated researches which would contribute to acquiring knowledge of the possibilities for production of poultry meat using autochthonous breed naked neck of different varieties reared in our country.

Since slow growing hybrids with coloured plumage are produced by selection companies in France (Hubbard ISA), it seemed justified to compare body masses prior to slaughtering and carcass characteristics of chickens of autochthonous breed and Naked neck hybrid Farm Q reared on two farms in similar housing systems.

## Materials and Methods

Investigations were carried out on two farms of private producers, using autochthonous Naked Neck breed of domestic varieties of various plumage colours and French Naked Neck hybrid under the name of Farm Q.

**First trial** was done on total of 144 chickens reared on agricultural household of individual farmer in the vicinity of Ub. Chickens were reared in extensive system and fattening lasted 98 days.

Composition of mixture used in investigation during 10 weeks of fattening, with 19% of proteins is presented in Table 1 (trial I).

**Table 1. Composition of mixtures, %**

Ingredients, %	I trial	II trial	
		Starter	Grower
Maize	73,50	58.88	59.18
Soybean meal	17.00	27.00	24.00
Full fat soybean	17.00	6.00	9.00
Sunflower meal	4.00		
Soybean oil		2.00	2.00
Lucerne meal	2.00		
Yeast		1.00	1.00
Limestone	1.25	0.80	0.80
Dicalcium phosphate	1.00	2.50	2.30
Salt	0.25	0.32	0.32
Lyzine		0.25	0.20
Methionine		0.25	0.20
Premix	1.00	1.00	1.00
Total	100.00	100.00	100.00

After six weeks of intensive fattening in the production facility, chickens used during day limited free range. After 10 weeks of fattening chickens were fed diet with 16% of proteins.

**Second trial** was carried out on 100 chickens of French Naked neck hybrid Farm Q reared on farm in the village Donja Šatornja in the vicinity of Topola. Chickens were reared in extensive system, fattening lasted 91 days. After 3 weeks of fattening, chickens were given access to free range. Composition of mixtures used by chickens during three weeks of fattening (starter and grower) is presented in Table 1 (trial II).

By method of random sample 20 chickens of both sexes per trial were chosen, slaughtered manually and used for study of slaughter yields and conformation measures. Conformation measures were taken according to method of *Pavlovski and Mašić (1983)*, and slaughter yields (dressing percentages) and cutting into main carcass parts according to Rulebook on quality of poultry meat (1981).

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

## Results and Discussion

Data on average body mass prior to slaughtering and mass of processed carcass of investigated chickens are presented in Table 2.

**Table 2. Body mass before slaughter and mass of dressed carcass**

Genotype	Sex	n	BM before slaughter, g	BODY MASS (B M), g			Abdominal fat, g min-max
				Traditionally dressed carcass, g	Ready to cook, g	Ready to grill, g	
Farm Q	♂	10	1454.0±156.1**	1157.6±121.4*	1048.7±112.3 <sup>ns</sup>	910.7±95.7*	7.0 - 39.0
	♀	10	1288.0±157.8	1021.7±144.6	993.8±138.7 <sup>ns</sup>	804.8±109.6	7.0 - 52.0
	Average	20	1371.0±174.9	1089.7±147.5	993.8±135.2	857.8±114.0	7.0 - 52.0
Naked neck	♂	10	1425.0±158.5**	1074.0±118.8**	967.5±120.3**	842.4±115.0**	0.0 - 13.5
	♀	10	1165.0±141.5	878.9±109.0	796.5±99.5	682.4±92.9	0.0 - 10.5
	Average	20	1295.0±198.0	976.5±149.4	882.0±138.7	762.4±130.8	0.0 - 13.5
Significance: p value							
Genotype			0.21	0.02	0.01	0.02	

Chickens of both sexes of autochthonous breeds, in 98 days of fattening, realized average body mass prior to slaughtering of 1295.00g, whereas Farm Q chickens realized body mass of 1.371.0g, which cannot be accepted as sufficient body mass for slaughtering in present conditions. Differences between mean values were not statistically significant. Statistically significant differences in body mass

prior to slaughtering were established between sexes of both investigated genotypes. Chickens of autochthonous Naked Neck breed and Farm Q hybrid achieved considerably lower body masses compared to pure breeds New Hampshire and Amrok obtained in research by *Pavlovski et al. (1992)*. The same trend was noticed in regard to body masses dressed carcass for slaughter yields: traditionally dressed carcass, ready to cook and ready to grill. Differences between mean values of carcass masses obtained for different genotypes, as demonstrated by Tukey test, were statistically significant. Sex had significant effect on body masses of both investigated genotypes, i.e. males had significantly higher body masses compared to females. The lowest average maximum values for abdominal fat were established for chickens Naked Neck (0.00 -13.5g), and the highest Farm Q chickens Q (7.0-52.0g).

**Table 3. Slaughter yield, %**

Genotype	Sex	n	YIELD, %		
			Traditionally dressed carcass	Ready to cook	Ready to grill
Farm Q	♂	10	79.6 ± 1.3 <sup>ns</sup>	72.1 ± 1.3 <sup>ns</sup>	62.7 ± 3.0 <sup>ns</sup>
	♀	10	79.2 ± 2.4 <sup>ns</sup>	72.7 ± 2.8 <sup>ns</sup>	62.4 ± 1.8 <sup>ns</sup>
	Average	20	79.4 ± 1.9	72.4 ± 2.1	62.6 ± 2.4
Naked neck	♂	10	75.4 ± 2.2 <sup>ns</sup>	67.8 ± 2.6 <sup>ns</sup>	59.0 ± 2.5 <sup>ns</sup>
	♀	10	75.4 ± 1.9 <sup>ns</sup>	68.3 ± 1.5 <sup>ns</sup>	58.5 ± 1.8 <sup>ns</sup>
	Average	20	75.4 ± 2.0	68.1 ± 2.1	58.7 ± 2.1
Significance: p value					
Genotype			<0.01	<0.01	<0.01

Data on slaughter yields, i.e. relative yield of processed carcasses: "traditionally dressed carcass", "ready to cook" and "ready to grill" in females and males for both investigated genotypes (Farm Q and Naked Neck) are presented in Table 3. Chickens of genotype Naked Neck had statistically significantly lower average values of slaughter yields for both sexes (75.4%; 67.8%; 59.0 %) compared to chickens of Farm Q genotype (79.4%; 72.4%; 62.6%), which is result of higher body masses prior to slaughtering. Sex had no statistically significant effect on values of investigated slaughter yields. Farm Q male chickens had statistically significantly higher values of studied slaughter yields (79.6%, 72.1%; 62.7%) compared to Naked Neck male chickens (75.4%; 67.8 %; 59.0%). The same trend was noticed in female chickens of both investigated genotypes.

Absolute and relative (index) values of conformation measures taken on carcasses of chickens of different genotypes are presented in Tables 4 and 5. Similar masses of male chickens of both genotypes prior to slaughtering didn't result in same values of conformation measures. Farm Q male chickens had higher values of conformation measures compared to Naked Neck genotype, except in

values breast angle ( $71.5^{\circ}$  vs.  $84.6^{\circ}$ ). The same trend was observed in female chickens of both investigated genotypes.

**Table 4. Conformation measures**

Genotype	Sex	n	Shank length, mm	Keel length, mm	Breast depth, mm	Breast angle, degrees	Thigh girth, mm
Farm Q	♂	10	$84.3 \pm 6.6^{**}$	$96.0 \pm 5.0^*$	$95.6 \pm 4.9^{**}$	$71.5 \pm 6.9^{ns}$	$115.0 \pm 7.5^*$
	♀	10	$76.6 \pm 3.7$	$89.1 \pm 6.9$	$88.9 \pm 4.0$	$76.2 \pm 8.2^{ns}$	$108.4 \pm 6.0$
	Average	20	$80.5 \pm 6.5$	$92.5 \pm 6.9$	$92.2 \pm 5.6$	$73.8 \pm 7.7$	$111.7 \pm 7.4$
Naked neck	♂	10	$82.5 \pm 6.5^{ns}$	$95.9 \pm 5.6^{ns}$	$97.2 \pm 4.5^{**}$	$84.6 \pm 7.6^{ns}$	$111.9 \pm 7.8^{**}$
	♀	10	$77.7 \pm 7.9^{ns}$	$89.6 \pm 8.7^{ns}$	$89.3 \pm 6.6$	$82.3 \pm 6.7^{ns}$	$101.7 \pm 5.8$
	Average	20	$80.1 \pm 7.5$	$92.8 \pm 7.8$	$93.3 \pm 6.9$	$83.4 \pm 7.1$	$106.8 \pm 8.5$
Significance: p value							
Genotype			0.87	0.93	0.61	<0.01	0.06

Based on data presented in Table 5 it can be concluded that there were no statistically significant differences between investigated genotypes in regard to relative values of conformation measures. Significantly higher relative values of conformation measures were established in Naked Neck male chickens compared to females, whereas this difference was not established in Farm Q genotype. Chickens of Naked Neck genotype had statistically significantly greater breast angle ( $83.4^{\circ}$ ), whereas chickens Farm Q had higher relative values for breast depth ( $14.8^{\circ}$ ) and absolute values for shank length in male chickens ( $84.3$  mm) male chickens of genotype Naked neck had statistically significantly higher index values compared to female chickens, whereas this difference was not established in Farm Q chickens.

Presented data indicate better development of legs in chickens of Farm Q genotype, which means that selection program is adjusted to extensive rearing of chickens, whereas Naked neck chickens have better breast conformation i.e. body development. Obtained absolute and relative values of conformation measures indicate poorer development and built of carcass in male and female chickens of both genotypes and are result of strong effect of body mass which was confirmed in the research of *Pavlovski and Mašić (1983)*, *Pavlovski et al. (2006)*, *Hopić et al. (1993)*, *Hopić et al. (1996)*, and *Pavlovski et al. (2009)*.

Absolute and relative values of the share of major carcass parts of investigated chickens are presented in Table 6.

**Table 5. Conformation measures on carcass (index)**

Genotype	Sex	n	BM/SL, g/mm	BM/KL, g/mm	BM/BD, g/mm	BM/TG, g/mm
Farm Q	♂	10	17.2 ± 0.9 <sup>ns</sup>	15.1 ± 1.5 <sup>ns</sup>	15.2 ± 1.2 <sup>ns</sup>	12.6 ± 0.8 <sup>ns</sup>
	♀	10	16.8 ± 2.2 <sup>ns</sup>	14.4 ± 1.2 <sup>ns</sup>	14.4 ± 1.3 <sup>ns</sup>	11.8 ± 0.9 <sup>ns</sup>
	Average	20	17.0 ± 1.7	14.8 ± 1.4	14.8 ± 1.3	12.2 ± 0.9
Naked neck	♂	10	17.4 ± 2.4*	14.9 ± 1.5**	14.6 ± 1.3**	12.7 ± 0.7**
	♀	10	15.1 ± 1.9	13.0 ± 1.3	13.0 ± 1.1	11.4 ± 1.0
	Average	20	16.2 ± 2.4	13.9 ± 1.6	13.8 ± 1.4	12.1 ± 1.1
Significance: p value						
Genotype			0.22	0.09	0.03	0.63

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

Statistically significantly higher share of breast was obtained in female and male chickens of naked neck genotype (13.5%; 13.7%). Males of Farm Q genotype had higher share of mass thigh + drumstick compared to genotype Naked Neck (317.9 g vs. 271.7g), as well as higher shares of BM (21.8% vs. 19.0%).

**Table 6. Yield of most important part of the carcass**

Genotype	Sex	n	Breast, g	Share, % BM	Thigh and drumstick, g	Share, % BM
Farm Q	♂	10	172.5 ± 36.7 <sup>ns</sup>	11.8 ± 1.8	317.9 ± 35.4**	21.8 ± 0.8**
	♀	10	172.3 ± 30.1 <sup>ns</sup>	13.3 ± 1.3*	268.2 ± 30.9	20.8 ± 0.7
	Average	20	172.4 ± 32.7	12.6 ± 1.7	293.1 ± 41.2	21.4 ± 0.9
Naked neck	♂	10	192.7 ± 24.7*	13.5 ± 0.5 <sup>ns</sup>	271.7 ± 46.3 <sup>ns</sup>	19.0 ± 1.7 <sup>ns</sup>
	♀	10	158.8 ± 16.1	13.7 ± 0.9 <sup>ns</sup>	237.5 ± 31.1 <sup>ns</sup>	20.5 ± 2.0 <sup>ns</sup>
	Average	20	175.8 ± 26.7	13.6 ± 0.7	254.6 ± 42.2	19.7 ± 2.0
Significance: p value						
Genotype			0.72	0.02	<0.01	<0.01

BM- body mass

Obtained data confirmed that previously stated assumption, that Farm Q chickens were selected for extensive system considering better development of legs, whereas chickens of the autochthonous breed naked Neck had higher share of breast which is suitable for consumers who prefer white meat and represent majority in Serbia.

## Conclusion

In general, chickens of autochthonous naked neck breed and hybrid Farm Q in extensive production system and duration of fattening of 91 and 98 days, 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 below 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. Obtained data confirmed that previously stated assumption, that Farm Q chickens were selected for extensive system considering better development of legs, whereas chickens of the autochthonous breed naked Neck had higher share of breast which is suitable for consumers who prefer white meat and represent majority in Serbia.

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## Gološijani domaćeg i inostranog porekla: klanične osobine

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## Rezime

Cilj ispitivanja je bio da se ustanovi porast telesne mase i klanične karakteristike autohtone rase pilića naked neck različitih varijeteta (white, black, gray), u našoj zemlji, i francuskog hibridnog naked neck Farm Q, gajenih u ekstenzivnim sistemima. Tov je trajao 91 (Farm Q) i 98 (naked neck) dana. U radu su prikazane telesne mase pilića pred klanje, klanični randmani (traditionally dressed carcass, ready to grill, ready to cook), apsolutne i indeksne vrednosti mere konformacije (shank and keel length, breast deep and angle, thigh girth) i udeli važnijih delova trupa. Prosečna telesna masa pilića pred klanje bila je od 1371.0 g (FQ) do 1295.0 g (NN). Klanični randman "traditionally dressed carcass" varirao je od 79.4% (FQ) do 75.4% (NN), randman "ready to cook" od 72.4% (FQ) do 68.1% (NN) i randman "ready to grill" od 62.6% (FQ) do 58.7 (NN). Dobijene srednje vrednosti mera konformacije ukazali su na lošu građu trupova pilića oba

pola i rezultat su jakog uticaja telesne mase pilića. Značajan uticaj genotipa i pola na razlike između srednjih vrednosti vrednijih delova trupa (grudi, bataci + karabataci) je ustanovljen kod udela grudi kokica Farm Q kao i petlića Farm Q kod udela batak + karabatak. Pilići Farm Q su imali statistički značajno veći udeo batak + karabatak, a pilići genotipa naked neck udeo grudi. Neophodna su dalja istraživanja koja će potvrditi hipotezu da pilići naked neck (oba ispitivana genotipa) imaju bolji nutritivni kvalitet mesa za koji su potrošači, ljubitelji prirodne hrane spremni da plate višu cenu.

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