

GROWTH RATE AND CARCASS TRAITS IN THREE GENOTYPES OF CAPONS**

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Abstract: Growth performance and carcass characteristics of capons (castrated cockerels) from three breeds/strains locally presented in Slovenia and Austria were investigated. Growth and feed consumption data were collected for a 156-d and 199-d period, when randomly chosen animals were slaughtered and their carcasses dissected. The feed conversion rate in barred Prelux, Sulmtaler and Styrian capons for the whole growing period was 6.24 kg, 6.32 kg and 7.53 kg, respectively. Average body weight in barred Prelux and Styrian capons increased only in the first 156 days of age, but not further on. Cumulative mortality rate in Sulmtaler capons was 19.05 % and was 2.7- to 4.4-fold higher as compared with Styrian and barred Prelux capons (6.90 % and 4.31 % respectively). Sulmtaler capons had the lowest abdominal fat content. Barred Prelux capons, as compared to capons from other two breeds were characterized by higher pre-slaughter weight, higher carcass weight and higher dressing out percentages. This indicates that the layer type barred Prelux cockerels have a potential to be as capons put to profitable use.

Key words: capons, Styrian hen, barred Prelux, Sulmtaler, growth, carcass traits

Introduction

Many pastured poultry producers in Slovenia and in its neighbouring countries raise the same broilers used in conventional confined production, although they would like to raise birds that are better suited to range production than the broilers from classical Cornish crosses. Furthermore, pasture-based producers are also interested for breeds of chickens that may be suitable for providing premium products to consumers who are willing to

pay extra for a pasture-raised, poultry delicacy. A capon production is in this regard an opportunity especially well-suited for increasing income of the small poultry producers. In caponization, the surgical castration of male chickens, the testes of the male chicken are completely removed. Caponizing produces a unique type of poultry meat that is very appreciated by consumers. It is claimed that the capon meat is more tender, juicier, and more flavorful than regular chicken (*Jacob in Mather, 2000*). The purpose of this research was to investigate the effects of caponisation on growth and carcass traits in three locally adapted poultry breeds/strains from Slovenia and Austria.

Materials and methods

A total of 116 Styrian hen, 117 barred Prelux and 107 Sulmtaler vent-sexed chicken males were obtained from a local hatchery. The Styrian hen is the native breed of chicken in Slovene and Austrian Styria, the Sulmtaler breed is of Austrian origin and the barred Prelux is a layer-type Slovenian hybrid. After sexing, males were individually weighed and marked by toe punching. Animals were distributed to three floor pens in a light-tight facility. The pens contained litter composed of new wood shavings. For the first four weeks, supplemental heat was provided, and the birds were confined to the heated area. The birds were surgically castrated at 47 days of age. After the 84 days brooding/rearing period in a confinement facility was over the capons were shifted to a separate grower house and reared on a concrete floor with 10 cm thick straw litter and had access to free range up to the end of the experiment. A pasture area of 4 square meters per bird was provided. They were fed *ad libitum* with commercial diets in the form of a dry mash: complete feeding mixture for chickens (21.0 % CP, 13.28 MJ ME/kg - to four weeks of age) and complete feeding mixture for pullets (14.8 % CP, 11.21 MJ ME/kg - from five weeks to the completion of the trial). Drinking water was freely available all the time. Feed consumption and body weight were recorded biweekly until 199 days of age. Mortality was recorded on daily basis. After 156 and 199 days of age 20-30 of the birds in each experimental unit were randomly selected and slaughtered. The total number of slaughtered animals and the number of carcasses where thigh and breast were dissected is presented in Table 1. The birds were fasted for overnight, weighed before slaughter and then slaughtered, bled, plucked, eviscerated and weighed. Cold carcass weight and carcass measurements were obtained after a 20-h chill at 4°C. The carcass measurements included

abdominal fat weight, giblets weight, thigh weight, thigh meat weight, breast weight and breast meat weight. The calculated values were expressed as:

- Dressing out percentage I = Carcass weight I/Pre-slaughter live weight \times 100

Carcass weight I = the carcass with head and feet and including liver, spleen, heart, and the gizzard less its contents and lining.

- Dressing out percentage II = Carcass weight II/Pre-slaughter live weight \times 100

Carcass weight II = the carcass minus head and feet and without giblets.

- Breast percentage = Breast weight (meat + bones)/Carcass weight I \times 100

- Breast meat percentage = Breast meat weight/Carcass weight I \times 100

- Thigh percentage = Thigh weight (meat+bones)/Carcass weight I \times 100

- Thigh meat percentage = Thigh meat weight/Carcass weight I \times 100

- Abdominal fat percentage I = Weight of abdominal fat/Carcass weight I \times 100

- Abdominal fat percentage II = Weight of abdominal fat/ Pre-slaughter live weight \times 100

Table 1. Number of capons slaughtered for carcass yield and composition analysis

Breed/strain	Age at slaughter (days)	Number of slaughtered and eviscerated animals	Number of dissected carcasses
Barred Prelux	156	26	16
	199	28	10
Sulmtaler	156	25	15
	199	30	10
Styrian hen	156	20	10
	199	25	10

Data were analyzed using the GLM procedure of SAS/STAT package (SAS/STAT, 2000). The statistical model included age at slaughter, breed/strain and their interaction. Statistical difference was considered to be significant when the P value was ≤ 0.05 .

Results of investigations and discussion

Growth of chickens/capons from hatch to 199 days of age was recorded, the growth of Sulmtaler capons was found better than barred Prelux and Styrian capons in the last period of fattening (156-199 days of age)

(Table 2). Among breeds/strains mean body weights of Styrian capons were the lowest at all weeks. At the end of the experiment Sulmtaler capons had almost 4.4-fold higher mortality rate than barred Prelux capons, where the mortality rate was the lowest. Capons from Styrian breed had the higher feed conversion ratio at all ages in comparison to other two experimental breeds/strains (Table 2). Data for the feed conversion ratio could not be statistically analyzed because of the group feeding. Carcass yield parameters in three genotypes of capons are presented in Table 3. The results show that live weight before slaughter, carcass weights I and II and dressing out percentage I were significantly higher in barred Prelux capons than in Sulmtaler and Styrian capons. Barred Prelux is a strain which is bred for egg-laying but its males are no use for rearing for eating as roasting chicken.

Table 2. Production traits of capons from three breeds/strains at four different ages

Breed/strain	Trait	Age (days)			
		14	84	156	199
Barred Prelux	Number of animals	117	115	111	41
	Mortality rate (%)	0	1.71	4.31	4.31
	Average body weight(kg)	0.18	1.70	2.91	2.91
	Feed conversion ratio (kg)	1.41	2.57	4.84	6.24
Sulmtaler	Number of animals	105	92	87	30
	Mortality rate (%)	1.87	12.38	17.14	19.05
	Average body weight(kg)	0.16	1.45	2.77	3.10
	Feed conversion ratio (kg)	1.23	3.11	5.21	6.32
Styrian	Number of animals	116	112	108	55
	Mortality rate (%)	0	3.45	6.90	6.90
	Average body weight(kg)	0.15	1.32	2.07	2.08
	Feed conversion ratio (kg)	1.24	3.30	5.61	7.53

They are available in large numbers as a by-product of commercial rearing of laying hens and the vast majority of them are subjected to euthanasia. It is not economically viable to keep the males of laying strains for meat production (*Murawska and Bochno, 2007*). Based on results presented in tables 2 and 3 one can concluded that an alternative to euthanasia would be to use male barred Prelux chicks for capon meat production in free range conditions. Differences in dressing out percentage II, thigh percentage, thigh meat percentage, breast percentage and breast meat percentage were statistically non significant between barred Prelux capons and Sulmtaler capons but were significant in comparison with Styrian capons. Styrian capons had significantly lower thigh percentage,

thigh meat percentage and breast percentage. In addition abdominal fat percentage expressed either as percent of pre-slaughter body weight or as percent of carcass weight I was significantly lower in Sulmtaler capons in comparison with capons from other two breeds. The statistical analysis on carcass yields and dressing out percentages showed significant genotype effect in all traits studied. Significant interaction effect between genotypes and age at slaughter was observed for dressing out percentage I and dressing out percentage II. Thigh percentage, thigh meat percentage, breast percentage and breast meat percentage of eviscerated capons were not affected by age at slaughter (Table 3).

Table 3. Carcass traits in three different genotypes of capons

Carcass traits	Least Square Means (LSM) ± Standard errors (SE) for three different genotypes			P-values for three sources of variation		
	Barred Prelux	Sulmtaler	Styrian	Age	Breed	Interaction
Body weight(g)	3006.87 ^a ±42.24	2853.15 ^b ±42.00	2351.30 ^c ±46.53	0.0001	0.0001	0.5514
Carcass weight I (g)	2657.22 ^a ±39.49	2467.28 ^b ±39.27	1964.75 ^c ±43.50	0.0001	0.0001	0.5381
Dressing out percentage I (%)	88.29 ^a ±0.26	86.43 ^b ±0.26	83.40 ^c ±0.29	0.0001	0.0001	0.0001
Carcass weight II (g)	2094.95 ^a ±31.57	1985.16 ^b ±31.39	1526.10 ^c ±35.45	0.0001	0.0001	0.6870
Dressing out percentage II (%)	69.63 ^a ±0.24	69.51 ^a ±0.24	64.81 ^c ±0.28	0.0001	0.0001	0.0001
Abdominal fat I (%)	4.30 ^a ±0.19	3.59 ^b ±0.19	4.55 ^a ±0.21	0.0245	0.0028	0.1854
Abdominal fat II (%)	3.80 ^a ±0.16	3.10 ^b ±0.16	3.81 ^a ±0.18	0.0086	0.0045	0.2260
Thigh (%)	12.91 ^a ±0.13	13.00 ^a ±0.13	11.65 ^c ±0.15	0.3526	0.0001	0.1004
Thigh meat (%)	8.76 ^a ±0.15	8.39 ^a ±0.15	7.47 ^c ±0.17	0.3213	0.0001	0.3288
Breast (%)	20.48 ^a ±0.29	19.69 ^a ±0.29	18.57 ^c ±0.32	0.4587	0.0003	0.7625
Breast meat (%)	15.64 ^a ±0.29	14.86 ^{a,c} ±0.30	14.07 ^c ±0.33	0.2828	0.0031	0.4963

^{a-c}Least Square Means within a row with no common superscript differ significantly ($P \leq 0.05$)

Conclusion

The results obtained in this study give some insight into the growth and carcass parameters of the capons who originated from three different genotypes of chickens. The study indicates that in terms of body weight before slaughter, carcass weight, dressing out percentage, breast percentage and breast meat percentage capons from barred Prelux performed much better than capons from Styrian and Sulmtaler breeds. Consequently using these layer-type cockerels as capons is a viable alternative to euthanasia. Average body weights of barred Prelux and Styrian capons were initially steadily increased until the age of 156 days. After that age a stagnation in body weight occurred. On the contrary, growth curve of Sulmtaler capons showed increase also after 156 days of age. It can be concluded that barred Prelux and Styrian capons reach mature body weight at an earlier age than Sulmtaler capons.

BRZINA PORASTA I OSOBINE TRUPA TRI GENOTIPA KOPUNA

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Rezime

Ocenjeni su proizvodni rezultati kopuna štajerske i sulmtalerske rase i prugava Prelux linija. Kopuni štajerske (n=116) i sulmtalerske rase (n=105) i prugasti Prelux kopuni (n=117) su odgajani od 1. do 84. dana uzrasta u zatvorenom prostoru u tri odvojena podna boksa u brojlerskom testnom objektu. Nakon toga, kopuni su davani malim farmerima u ruralnim oblastima da ih dalje odgajaju u sistemu duboke prostirke sa stalnim pristupom ispustu. Telesna masa i potrošnja hrane su praćeni dvonedeljno i izračunavana je konverzija hrane po jedinici prirasta. Obroci su se sastojali od kompletne smeše za piliće (21.0 % SP, 13.28 MJ ME/kg – prve četiri nedelje) i kompletne smeše za kokice (14.8 % SP, 11.21 MJ ME/kg – od pete nedelje do kraja ogleada). U uzrastu od 156 i 199 dana, po 20-30 ptica svakog genotipa je uzeto slučajnim odabiranjem i zaklano radi ispitivanja osobina trupa. Trupovima su izvađene iznutrice, određivana je masa iznutrica (bubac, slezina, srce, jetra) i masa abdominalne masti. Nakon toga

odvajani su bataci i grudi i secirani u kožu sa potkožnom masti, meso i kosti. Karakteristike trupa u smislu mase trupa i randmana su bile signifikantno različite između rasa/linija. Abdominalna masa kao procenat u telesnoj masi živog kopuna i kao procenat u masi trupa je bila signifikantno niža kod kopuna sulmtalerske rase nego kod štajerskih kopuna i prugasti kopuna Prelux linije. Sulmtalerski kopuni su takođe imali više prosečne telesne mase

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