

## The effect of genotype and sex on performance and meat composition of geese

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The aim of study was to compare performance and meat quality between 2 genotypes of geese, traditional breed Czech Goose CG and hybrid combination Novohradská Goose NG, depending on sex. 1 day old goslings (20 males and 20 females of CG, 40 males and 40 females of NG) were weighed and divided to 4 groups according to genotype and sex. Weighing and the evidence of feed consumption was conducted weekly. 8 goslings of each group were slaughtered at the age of 56 days, selected slaughter parameters and chemical composition of meat were determined. Significant interactions between genotype and sex were found out in live weight at the age of 1 day of goslings ( $P < 0.001$ ), final live weight ( $P < 0.001$ ), daily weight gain ( $P < 0.001$ ), feed conversion ratio ( $P < 0.001$ ) and hot carcass weight ( $P < 0.001$ ). Protein content in meat was significantly ( $P = 0.025$ ) affected by genotype, with higher values in CG. Ash content was significantly ( $P = 0.029$ ) influenced by sex and higher content was observed in males.

**Keywords:** geese, genotype, sex, performance, meat quality

### 1. Introduction

Geese rearing in the Czech Republic has a long tradition. For intensive meat production hybrid geese are used in particular, Czech Goose has an importance especially in small farming.

Geese have a rapid growth rate during the first weeks of life, they reach 70–80 % of adult weight at 9 weeks of age. Males exceed females in growth rate by more than 10 % up to age of 8 weeks (Tilki et al., 2005). Saatci et al. (2009) observed that sex influences also weight of carcass and its single parts are significantly higher in males. However, dressing percentage is higher in females. Live weight and carcass traits are affected by genotype as well (Isguzar and Pingel, 2003). Kapkowska et al. (2011) mentioned that hybrid geese have significantly higher live weight, carcass weight and dressing percentage than traditional breeds.

The quality of poultry meat may be affected by numerous factors such as age, sex, breed, rearing and feeding system. Although meat quality characteristics of several poultry species have been investigated widely, reports on meat quality characteristics of geese are limited. Isguzar and Pingel (2003) observed different contents of protein and fat in various local Turkish breeds of geese. Study of Wężyk et al. (2003) showed significant differences in ash content between two hybrid geese strains. Liu et al. (2010) found out the effect of sex on water and protein content of geese meat.

The aim of the study was to compare performance and meat composition between traditional breed Czech Goose and hybrid geese depending on sex.

### 2. Material and methods

The experiment was carried out on breed Czech Goose (CG) (20 males and 20 females) and hybrid combination Novohradská Goose (NG) (40 males and 40 females). One day old goslings were divided into 4 groups according to genotype and sex, weighed and housed in pens on litter (20 goslings per pen). Terms of fattening period met the usual requirements and gosling were fed complete feed mixtures, VH1 to the 4 weeks of age and VH2 until the end of fattening period which ran until 8 weeks of age of goslings. Weighing and the evidence of feed consumption was conducted weekly. Eight birds of each group were slaughtered at the age of 56 days on average weight of the group. After the slaughtering the abdominal fat was removed. The carcasses were weighed to obtain hot carcass weight and dressing percentage was calculated.

Chemical composition of thigh meat was determined. Dry matter of meat was determined by drying in oven at 105 °C and free fat content was obtained by extraction with petroleum ether in a Soxtec 1043 apparatus (FOS Tecator AB, Höganäs, Sweden). Protein content in meat was determined using a Kjeltac Auto 1030 Analyser (FOS Tecator AB, Höganäs, Sweden). Ash content was

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determined according to procedure 920.153 of AOAC International (2005). Hydroxyproline was determined by acid hydrolysis according to Diemar (1963). Energy value of meat was obtained by calculation based on protein content in meat.

The results were processed in SAS software (SAS Institute Inc., Cary, NC, 2003) by multiple analysis of variance with interaction of genotype and sex.

### 3. Results and discussion

Results of growth performance and selected slaughter parameters are presented in Table 1. There were highly significant interactions between genotype and sex in initial live weight, final live weight, daily weight gain, feed conversion and hot carcass weight. Live weight of 1 day old goslings was influenced by both sex and genotype. The significantly higher values were observed in hybrid goose than in the Czech Goose. As regards the sex females were heavier than males. Wittmann (1997) also observed higher live weight of goslings at the 1<sup>st</sup> day of age in females. On the contrary at 8 weeks

of age males were distinctly heavier than females, but interactions were expressed mainly by larger differences in live weight of NG compared to CG with higher values for NG. Kapkowska et al. (2011) observed that live weight of hybrid goslings was on average of 350 grams higher than in goslings of the Zatorska breed. Higher live weight was observed in males of both genotypes. The results of daily weight gain correspond with those of final live weight. The highest daily weight gain was detected in males of NG, the lowest in females of CG. Tilki et al. (2009) also observed higher daily weight gain in males as an expression of sexual dimorphism. Feed conversion ratio was influenced mainly by genotype, higher values were found in CG. Within this genotype higher values were noted in males, but in NG it was the opposite. Our results are agreement with those presented by Kapkowska et al. (2011), they also observed lower feed conversion in hybrid goose than in breed Zatorska. Hot carcass weight was the highest in males of NG and the lowest in females of CG. Similar results were published in study of Kapkowska et al. (2011). Tilki et al. (2005, 2009) and Saatci et al. (2009)

**Table 1** Performance and selected slaughter parameters

Genotype / Sex		Initial live weight in g	Final live weight in g	DWG in g day <sup>-1</sup>	FCR	HCW in g	Dressing percentage in %
CG	ganders	97.50 <sup>d</sup>	3730 <sup>c</sup>	64.93 <sup>c</sup>	2.97 <sup>a</sup>	2468.75 <sup>c</sup>	71.07
	geese	104.50 <sup>c</sup>	3440 <sup>d</sup>	59.54 <sup>d</sup>	2.67 <sup>b</sup>	2197.50 <sup>d</sup>	69.92
NG	ganders	118.50 <sup>b</sup>	4960 <sup>a</sup>	86.48 <sup>a</sup>	2.45 <sup>c</sup>	3257.50 <sup>a</sup>	70.84
	geese	121.00 <sup>a</sup>	4160 <sup>b</sup>	72.21 <sup>b</sup>	2.85 <sup>a</sup>	2683.75 <sup>b</sup>	71.68
RMSE		0.00	0.28	5.04	0.17	106.57	1.80
<b>Significance</b>							
Genotype		<0.001	<0.001	<0.001	<0.001	<0.001	0.244
Sex		<0.001	<0.001	<0.001	0.215	<0.001	0.809
Genotype × Sex		<0.001	<0.001	<0.001	<0.001	<0.001	0.130

CG – Czech Goose, NG – Novohradská Goose, DWG – daily weight gain, FCR – feed conversion ratio, HCW – hot carcass weight, RMSE – root mean square error  
a, b, c, d  $P \leq 0.05$

**Table 2** Chemical composition of goose meat

Genotype / Sex		Dry matter in %	Protein in %	Fat in %	Ash in %	HPR in %	Energetic value in MJ kg <sup>-1</sup>
CG	ganders	24.18	20.53	2.02	1.15	0.11	4,20
	geese	24.42	20.42	2.43	1.12	0.11	4,33
NG	ganders	23.95	20.30	2.18	1.13	0.11	4,22
	geese	24.05	20.19	2.25	1.10	0.10	4,23
RMSE		5.24	2.75	5.70	0.36	0.12	0.20
<b>Significance</b>							
Genotype		0.115	<b>0.025</b>	0.966	0.177	0.923	0.556
Sex		0.374	0.255	0.248	<b>0.029</b>	0.675	0.323
Genotype × Sex		0.702	0.999	0.407	0.730	0.215	0.371

CG – Czech Goose, NG – Novohradská Goose, HPR – hydroxyproline, RMSE – root mean square error

observed higher hot carcass weight in males, but up to 10 weeks of age of goslings. The dressing percentage was not significantly affected by genotype or sex, higher values were detected in NG. Within this genotype slightly higher dressing percentage was detected in geese. On the contrary, dressing percentage of CG was nonsignificantly higher in males. Regardless of genotype, nonsignificantly higher values were recorded in males. Our results are in accordance with those of Isguzar and Pingel (2003). Kapkowska et al. (2011) stated, that there were no significant differences between genotypes, nonsignificantly higher values were found in geese. Gumulka et al. (2009) reported that dressing percentage of hybrid geese was significantly higher than that of the Zatorska breed.

Table 2 shows the chemical composition of goose meat. There were not significant interactions between genotype of geese and sex. Dry matter of meat was not influenced by any factor as well as fat, hydroxyproline and energy value. Protein content was significantly affected by genotype, higher values were observed in CG. Within the sex higher protein content was in males. These results are in agreement with Isguzar and Pingel (2003) who present significant differences in protein content in meat among various Turkish breeds of geese. Liu et al. (2011) also shows higher protein content in males. Ash content was influenced by sex. Significantly higher values were observed in males. Our results are consistent with those of Wężyk et al. (2003).

#### 4. Conclusions

Our results indicate that Novohradská Goose had higher final weight, daily weight gain and hot carcass weight than Czech Goose. However, dressing percentage and chemical composition of meat was similar in both genotypes. It is obvious that Czech Goose is breed with good meat performance comparable with commercial hybrid.

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