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Original Paper

Differences in carcass composition of males and females of two turkeys hybrids

Darina Chodová*, Eva Tůmová, Jana Svobodová, Linda Uhlířová

Czech University of Life Sciences Prague, Czech Republic

The objective of this study was to evaluate the effect of hybrid and sex on carcass composition in turkeys. A total of 240 turkeys (males and females) of two different hybrids (BUT Big 6 and Converter) were used in experiment. Birds were housed in housing conditions suitable for turkeys. Turkeys were fed *ad libitum* with commercial feed mixture for given category of turkeys. Six males and six females of each genotype were slaughtered at 17th weeks of age. Live weight and carcass composition were determined. The significant interactions between hybrid and sex were detected in live weight ($P \leq 0.001$), carcass weight ($P \leq 0.001$) and liver percentage ($P \leq 0.006$). The highest live weight and carcass weight was observed in Converter males (17410 g, 13360 g, respectively), while the lowest was detected in Converter females (12115 g, 9390 g, respectively). Converter females had the highest liver share (1.47 %), whereas the lowest liver share was noted in BUT Big 6 females (1.20 %). The significant effect of hybrid was found in live weight, carcass weight and thigh percentage. The significantly higher live weight ($P \leq 0.003$), carcass weight ($P \leq 0.002$) and share of thigh ($P \leq 0.010$) was detected in BUT Big 6 compare to Converter. Males had significantly higher ($P \leq 0.001$) live weight, carcass weight and share of thigh than females.

Keywords: turkeys, hybrids, sex, carcass traits

1. Introduction

Advances in genetic selection positively affect growth of poultry (Le Bihan-Duval et al., 2003) thereby it increase live weight and muscular development (Fernandez et al., 2001). Since 1990, average time required for typical tom turkey to reach a target live weight of 16 kg has been decreasing an average of 1.5 day annually (Roberson et al., 2003). The selection of fast-growing turkeys focuses on high growth intensities and correspondingly high yields of the breast muscles. Laudadio et al. (2009) stated that changes in breast development can produce transformation in the growth of other muscles. However, Marks (1990) reported that fast growing birds deposit more fat than the slow-growing ones. The slow-growing turkeys are intended for organic production (Sarica et al., 2011). Slow-growing birds are selected by reduced live weight at slaughter and slower growth rates (Fernandez et al., 2001; Updike et al., 2005). Small strains are mostly sold as whole birds, whereas fast-growing birds are usually processed further (Werner et al., 2008).

Together with growth performance enhancement, genetic selection increases dressing out percentage (Werner et al., 2008; Sarica et al., 2009), share of different parts of turkey carcasses (Lilburn and Nestor, 1991) and also influences quality of poultry meat (Le Bihan-Duval et al., 2003; Chiang et al., 2008). Some authors stated that rapid growth can lead to meat quality defects. On the other hand Fernandez et al. (2001) and Le Bihan-Duval et al. (2003) noted that incidence PSE (pale, soft, exudative) is independent on speed of growth.

Carcass composition can be affected by sex. Brake et al. (1995) found significant differences between sexes in chilled carcass weight and weight of legs and dressing out percentage.

The aim of present study was to evaluate the effect of turkey hybrid and sex on some carcass traits.

2. Material and methods

The effect of hybrid and sex was observed in turkeys of two different hybrids (BUT Big 6 and Converter). A total of 240 turkeys (males and females) were used in experiment. Birds were housed on litter and fed with 6 commercial feed mixtures for turkeys: KR1 from 1 to 3 weeks (crude protein (CP) 262.0 g kg, metabolizable energy (ME) 11.85 MJ kg), KR2 from 4 to 6 weeks (CP 230.0 g kg, ME 12.15 MJ kg), KR3 from 7 to 9 weeks (CP 217.2 g kg, ME 12.24 MJ kg), KR4 from 10 to 12 weeks (CP 201.0 g kg, ME 12.32 MJ kg), KR5 from 13 to 16 weeks

*Correspodence: Darina Chodová, Czech University of Life Science, Faculty of Agriculture, Food and Natural Resources, Department of Animal Husbandry, Kamýcká 129, 165 21 Prague 6 – Suchdol, Czech Republic, phone: +420 224 383 060, e-mail: chodova@af.czu.cz

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(CP 174.0 g kg, ME 12.56 MJ kg) and KR6 at 17th week (CP 168.6 g kg, ME 12.57 MJ kg). Turkeys were fed *ad libitum* and also water was provided *ad libitum* throughout the experiment. Microclimate and housing conditions were in accordance with requirements for turkeys.

Turkeys were weighed individually before slaughter. A total of 24 birds were slaughtered at17th weeks of age (6 females and 6 males from each hybrid).

Slaughtered turkeys were bled, and defeathered after hot bath. Carcasses were eviscerated manually and head and distal portion of legs were removed. Weight of carcasses and edible viscera were determined. Both deboned breast muscles together with skin and also thighs with skin were removed and weighed. Thereafter, the percentages of these parts from carcasses were calculated. Dressing out percentage was expressed as a percentage of carcass with edible viscera from live weight.

Two-way analysis of variance ANOVA (hybrid and sex) for carcass characteristics evaluation was used. The GLM procedure of SAS 9.0 (SAS Institute Inc., 2003) was applied. The significance of differences was tested by the Duncan test. P-value P <0.05 was considered significant.

3. Results and discussion

Live weight and carcass trait values are showed in Table1. The significant interaction between hybrid and sex was detected in live weight (P <0.001). The highest live weight was measured in Converter males (17410 g), while the females of this hybrid had the lowest live weight (12115 g). The results are consistent with Brake et al. (1995) who observed effect of strain and sex on live weight in turkeys. In our experiment, BUT Big 6 turkeys had significantly (P <0.003) higher live weight than Converter. Likewise, Fernandez et al. (2001) and Damaziak et al. (2013) discovered large differences in live weight at slaughter among genetic types. On the other hand, Roberson et al. (2003) did not observe significant differences between strains for live weight. Males had significantly higher (P <0.001) live weight than females.

Also carcass weight was significantly influenced by interaction of hybrid and sex (P <0.001) with the highest carcass weight in Converter males (13360 g), whereas the lowest carcass weight was found in Converter females (9390 g). Carcass weight was significantly (P <0.002) higher in BUT Big 6 (11848 g) than in Converter (11375 g), which agrees with Werner et al. (2008) who also found the highest carcass weight in BUT Big 6. Likewise, sex had significant (P <0.001) effect on carcass weight with higher values in males. Compared to carcass weight, dressing out percentage was not affected by any evaluated factor. On the other hand, Brake et al. (1995) found the significant effect of sex on dressing out percentage.

Share of abdominal fat was significantly affected just by sex (P <0.001). Males had higher abdominal fat percentage (3.20 %) than females (1.29 %). Stomach and heart percentage was not affected by any monitored factors. Contrarily, Brake et al. (1995) determined

Table 1 Carcass trait of different genotype and sex of turkeys

Hybrid	Sex	Live weight in g	Carcass weight in g	DOP in %	Abdo-minal fat in %	Stomach share in %	Heart share in %	Liver share in %	Thigh share in %	Breast share in %
BUT Big 6		15218^{a}	11848^{a}	80.22	2.32	1.15	0.52	1.35	29.26^{a}	32.70
Converter		14763^{b}	11375^{b}	79.43	2.17	1.12	0.49	1.33	28.02^{b}	32.45
RMSE		2444.5	1843.1	1.33	1.14	0.19	0.10	0.22	1.61	1.56
	M	17283^{a}	13331^{a}	80.25	3.20a	1.17	0.51	1.34	29.84^{a}	33.08
	F	12697^{b}	9893^{b}	79.40	1.29b	1.09	0.50	1.34	27.45^{b}	32.07
	RMSE	542.81	483.76	1.32	0.55	0.19	0.10	0.23	1.21	1.47
BUT Big 6	M	17157^{a}	13302^{a}	79.96	1.37	1.17	0.51	1.45ab	29.04	31.49
	F	13278^{b}	10395^{b}	80.47	2.97	1.12	0.47	1.20c	27.00	33.42
Converter	M	17410^{a}	13360^{a}	78.84	1.21	1.01	0.49	1.23bc	30.63	32.65
	F	12115^{c}	9390^{c}	80.02	3.43	1.23	0.55	1.47a	27.89	32.75
RMSE		333.88	324.67	1.30	0.54	0.18	0.10	0.19	1.06	1.45
Significance										
Hybrid		0.003	0.002	0.155	0.505	0.737	0.507	0.745	0.010	0.684
Sex		≤0.001	≤0.001	0.127	≤0.001	0.283	0.854	0.958	≤0.001	0.103
Hybrid x sex		≤0.001	≤0.001	0.536	0.181	0.102	0.190	0.006	0.427	0.138

RMSE – root mean square error; M – male, F – female; DOP – dressing out percentage; $^{a, b, c, d}$ P ≤0.05

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significant differences between strains but not between sexes in share of heart.

In comparison with other edible viscera, there was detected significant interactions between hybrid and sex (P <0.006) in liver percentage. The highest liver share was observed in Converter females (1.47 %) compare to BUT Big 6 females which had the lowest liver percentage (1.20 %).

Share of thigh from the carcass was significantly higher (P <0.010) in BUT Big 6 (29.26 %) than in Converter (28.03 %). This is in contrast with Roberson et al. (2003) who did not observe differences in share of thighs between different turkey strains. Higher (P <0.001) share of thigh was found in males (29.84 %) than in females (27.45 %).

Percentage of breast was not affected by any factors. The results are consistent with Roberson et al. (2003) who did not detect differences between turkey strains at 16 or 18 week of age. On the other hand, Werner et al. (2008) found significant differences in different turkey hybrids.

4. Conclusions

The results of the present experiment showed that the significant interactions between hybrid and sex were detected only in live weight, carcass weight and share of liver. The highest live weight and carcass weight was detected in Converter males, on the other hand, Converter females had the lowest values of live weight and carcass weight and the highest liver percentage. The lowest liver share was found in BUT Big 6 females. Inspite of the significant interactions in carcass weight, dressing out percentage was not affected by any factor. Live weight, carcass weight and share of thigh were significantly influenced by hybrid with higher values in BUT Big 6. These carcass traits together with abdominal fat share were significantly affected by age with higher values in males.

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6. References

BRAKE, J. et al. (1995) Relationship of sex, strin, and body-weight to carcass yield and offal production in turkeys. In *Poultry Science*, vol. 74, no. 1, pp. 161–168.
DOI: http://dx.doi.org/10.3382/ps.0740161.

DAMAZIAK, K. et al. (2013) Effect of genotype and sex on selected quality attributes of turkey meat. In *Archiv für Gelflügelkunde*, vol. 77, no. 3, pp. 206–214.

FERNANDEZ, X. et al. (2001) Post mortem muscle metabolism and meat quality in three genetic types of turkey. In *British Poultry Science*, vol. 42, no. 4, pp. 462–469.
DOI: http://dx.doi.org/10.1080/00071660120070604.

CHIANG, W. et al. (2008) The effect of heat stress on thyroid hormone response and meat quality in turkeys of two genetic lines. In *Meat Science*, vol. 80, no. 3, pp. 615–622.
DOI: http://dx.doi.org/10.1016/j.meatsci.2008.02.012.

LAUDADIO, V. et al. (2009) Growth performance and carcass characteristics of female turkeys as affected by feeding programs. In *Poultry Science*, vol. 88, no. 4, pp. 805–810. DOI: http://dx.doi.org/10.3382/ps.2008-00082.

LE BIHAN-DUVAL, É. et al. (2003) Genetic parameters of meat technological quality traits in a grand-parental commercial line of turkey. In *Genetics, Selection, Evolution*, vol. 35, no. 7, pp. 623–635. DOI: http://dx.doi.org/10.1186/1297-9686-35-7-623.

LILBURN, M.S. and NESTOR, K.E. (1991) Body weight and carcass development in different lines of turkeys. In *Poultry Science,* vol. 70, no. 11, pp. 2223–2231.
DOI: http://dx.doi.org/10.3382/ps.0702223.

MARKS, H. L. (1990) Genotype by diet interaction in body and abdominal fat weight in broilers. In *Poultry Science*, vol. 69, no. 6, pp. 879–886. DOI: http://dx.doi.org/10.3382/ps.0690879.

ROBERSON, K.D. et al. (2003) Evaluation of the Growth Potential, Carcass Components and Meat Quality Characteristics of Three Commercial Strains of Tom Turkeys. In *Journal of Applied Poultry Research*, vol. 12, no. 2, pp.229–236.

SARICA, M. et al. (2009) Growth, slaughter and gastrointestinal tract traits of three turkey genotypes under barn and free-range housing systems. In *British Poultry Science*, vol. 50, no. 4, pp.487–494. DOI: http://dx.doi.org/10.1080/00071660903110919.

SARICA, M. et al. (2011) Evaluation of meat quality from 3 turkey genotypes reared with or without outdoor access. In *Poultry Science*, vol. 90, no. 6, pp. 1313–1323.
DOI: http://dx.doi.org/10.3382/ps.2009-00600.

UPDIKE, M.S. et al. (2005) Turkey breast meat functionality differences among turkeys selected for body weight and/or breast yield. In *Meat Science*, vol. 71, no. 4, pp. 706–712. DOI: http://dx.doi.org/10.1016/j.meatsci.2005.05.014.

WERNER, C. et al. (2008) Slaughter performance of four different turkey strains, with special focus on the muscle fiber structure and the meat quality of the breast muscle. In *Poultry Science*, vol. 87, no. 9, pp. 1849–1859. DOI: http://dx.doi.org/10.3382/ps.2007-00188.

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