

## AN INFLUENCE OF COMBINATION OF HYBRIDIZATION AND SEX ON CARCASS PIGS MEATNESS

*L. Sládek, V. Mikule, M. Čechová, P. Trčka*

*Mendel University of Agriculture and Forestry, Brno, Czech Republic*

### Abstract

The aim of this study was to do operational testing of carcass pigs of three hybrid combinations: (CLW x CL) x D (239 animals), (CLW x CL) x (Pn x H) (258 animals) and (CLW x CL) x CLW sire line (179 animals) and to determine an influence of combination of hybridization and sex on reached meatness. On the basis of reached results it is possible to enunciate that carcass pigs of combination (CLW x CL) x D had the highest lean meat percentage (55.24 %). On the contrary combination (CLW x CL) x CLW sire line reached the lowest value of this trait (54.13 %). Surprising finding was the fact that pigs of combination (CLW x CL) x D with the highest carcass modified body weight reached the highest percentage of lean meat compared to other studied combinations. Among gilts and hogs there was found conclusive difference in lean meat percentage in all combinations. Gilts reached for 1 – 2 % higher lean meat percentage compared to hogs.

A quality of pure breeds which are used for hybridization is one of the basic presumptions for reaching required meatness of final hybrids. Reached percentage of lean meat is a result of intermediary heritability which means that mother participates with 50 % on reached level and the same father.

It is possible to make prediction of reached lean meat percentage in final carcass hybrids according to sire breed which is used. PULKRÁBEK and PAVLÍK (2000) mention together with other authors that it is possible to reach quite fast good results by selection of sires specialized on high level of meatness. American breed Duroc and Hampshire as well as boars of Pietrain or hybrid boars which originate from hybridization of mentioned breeds they are used in sire position for production of final carcass pigs in breeders developed countries DEMO et al. (1994).

Sex is another influence which has effect on carcass body composition. With the same slaughter weight gilts have higher meatness for 2 – 3.5 % in comparison with hogs. The reason is that hogs have higher deposition of fat than gilts. On the basis of meatness evaluation of 134 158 carcass pig bodies and after determination highly significant differences in gilts and hogs ENGEL and WALSTRA (1993) proposed to determine different quadratic for lean meat portion prediction according to sex.

### Material and Methods

Operational testing of hybrid pigs of three combinations of multibreed commercial hybridization was used for acquirement of studied traits of carcass value: (CLW x CL) x D (239 animals), (CLW x CL) x (Pn x H) (258 animals) and (CLW x CL) x CLW sire line (179 animals).

In the end of fattening pigs of tested combinations were slaughtered on slaughter houses. After slaughter carcass modified bodies were weighed. Next through helping traits (back fat thickness and muscle deep) a portion of lean meat was determined by two point method (ZP Zwei-Punkt-Verfahren) with electromechanical apparatus IS-D-04.

Measured values were evaluated according to studied combinations and in a frame of combination according to sex.

These basic statistical characterizations – mean and standard deviation were determined in studied traits. Student-Newman-Keuls test was used for determination of statistical conclusive differences among determined values. Statistical program UNISTAT 5.1. was used for this purpose.

### Results and Discussion

Results of traits – weight of carcass modified body, back fat thickness and meatness of pigs of tested hybrid combinations are shown in Table 1.

The highest average weight of carcass modified body was found in carcass pigs of combination (CLW x CL) x D (93.39 kg). The lowest weight was found in combination (CLW x CL) x (Pn x H) (90.71 kg). There was a statistical conclusive difference between these two combinations ( $P \leq 0.05$ ).

ŠIMEK et al. (2004) tested four hybrid combinations: (CLW x CL) x (CLW sire line x BL); (CLW x CL) x (H x Pn); (CLW x CL) x (D x Pn) and (CLW x CL) x CMP. The highest weight of carcass modified body found in combination (CLW x CL) x (H x Pn) – 96.9 kg. Combinations (CLW x CL) x (D x Pn) and (CLW x CL) x CMP with the same weight of 93.1 kg followed.

Pigs of combination (CLW x CL) x (CLW sire line x BL) they had the lowest weight of carcass modified body. BORZUTA et al. (2002) found in two combinations (Polish Large White x Polish Landrace) x Polish Large White and (Polish Large White x Polish Landrace) x (Hampshire x Pietrain) weight of carcass modified body 75.83 kg and 80.20 kg.

PULKRÁBEK et al. (2003) evaluated file of carcass pigs (n = 37716) from common conditions of the Czech Republic and they did designation of animals according to carcass modified body weight. The highest percentage of animals (57.8 %) was in weight interval 80 – 100 kg of carcass modified body.

Hogs reached in experiment statistically conclusive higher weight of carcass modified body in a frame of each studied combination in comparison with gilts, which is shown in Table 1.

The lowest average value of back fat thickness was measured in combination with Duroc breed, which corresponds with the highest average values of lean meat in these combinations. The lowest average value of back fat thickness (17.17 mm) was found in three-breed hybrid combination (CLW x CL) x D. The highest average value (18.85 mm) was found in combination (CLW x CL) x CLW sire line and in comparison with the others tested combinations, in this one there was found very high conclusive difference ( $P \leq 0.001$ ). ŠIMEK et al. (2004) found in three-breed combination (CLW x CL) x CMP 15.7 mm of back fat thickness.

The lowest average value of back fat thickness they found in hybrid combination (CLW x CL) x (Pn x H) – 13.9 mm, which is less than our result with the same combination – 17.51 mm. The highest average values of lean meat percentage were found in hybrid combination with Duroc breed. In combination (CLW x CL) x D there was measured the highest average value of lean meat percentage – 55.24 %.

Statistically conclusive the lowest lean meat percentage (54.13 %) in comparison with others combinations it was found in combination (CLW x CL) x CLW sire line. In combination (CLW x CL) x (Pn x H) there was determined lean meat percentage 54.85 %. Lower lean meat percentage in the same combination was determined by KERNEROVÁ et al. (2004) – they mention 53.86 % of lean meat. On the contrary higher average value they found in hybrid combination (CLW x CL) x (CLW sire line x Pn) – 55.97 %.

BORZUTA et al. (2002) found in two combinations (Polish Large White x Polish Landrace) x Polish Large White and (Polish Large White x Polish Landrace) x (Hampshire x Pietrain) statistical conclusive difference ( $P \leq 0.01$ ) in lean meat portion on behalf of the second combination - 54.83 % compared to 50.66 % LM.

ROGELJ (2000) determined higher percentage of lean meat 55.64 % in hybrid combination (Large White x Swedish Landrace) x Pietrain compared to combination (Large White x Swedish Landrace) x German Landrace (53.40 %) in his experiment.

**Tab. 1: Basic statistical characterizations of traits: Weight of modified carcass body (kg), back fat thickness (mm) and meatness of pigs of studied combinations**

Combination of hybridization	Sex	N	Weight of modified carcass body (kg)		Back fat thickness (mm)		Meatness (%)	
			$\bar{X}$	$S_x$	$\bar{X}$	$S_x$	$\bar{X}$	$S_x$
(CLW x CL) x D	Hog	126	95.59 <sup>d</sup>	10.26	17.41 <sup>a</sup>	4.76	54.65 <sup>b</sup>	2.67
	Gilt	113	90.92 <sup>d</sup>	10.80	16.92 <sup>a</sup>	4.03	55.83 <sup>b</sup>	2.96
	Total	239	93.39 <sup>a</sup>	10.76	17.17 <sup>c</sup>	4.19	55.24	2.87
(CLW x CL) x (Pn x H)	Hog	126	92.56 <sup>b</sup>	10.90	18.23 <sup>b</sup>	4.48	54.36 <sup>a</sup>	3.11
	Gilt	113	89.05 <sup>b</sup>	9.47	16.78 <sup>b</sup>	4.12	55.34 <sup>a</sup>	3.09
	Total	239	90.71 <sup>a</sup>	10.30	17.51 <sup>d</sup>	4.35	54.85	3.13
(CLW x CL) x CLW – sire line	Hog	103	94.48 <sup>c</sup>	10.35	21.33 <sup>c</sup>	5.10	52.30 <sup>c</sup>	3.22
	Gilt	76	89.96 <sup>c</sup>	8.32	16.36 <sup>c</sup>	4.70	55.96 <sup>c</sup>	3.59
	Total	179	92.56	9.77	18.85 <sup>d,e</sup>	5.50	54.13 <sup>d,e</sup>	3.83

a:  $P \leq 0.05$   
b,c:  $P \leq 0.01$   
d:  $P \leq 0.001$

a:  $P \leq 0.05$   
b:  $P \leq 0.01$   
c,d,e:  $P \leq 0.001$

a:  $P \leq 0.05$   
b,d:  $P \leq 0.01$   
c,e:  $P \leq 0.001$

Among gilts and hogs there was found conclusive difference in lean meat percentage in all combinations in our experiment. In combination (CLW x CL) x (Pn x H) the difference was very highly conclusive ( $P \leq 0.001$ ).

PIAO et al. (2004) determined the same conclusive differences among gilts and hogs in carcass value after slaughter – lean meat percentage was statistically conclusive higher in gilts compared to hogs ( $P \leq 0.001$ ).

PULKRÁBEK (2004) mentions higher percentage of lean meat in gilts for 2 – 3.5 % compared to hogs which was confirmed in our study especially in combination (CLW x CL) x CLW sire line.

The lowest average values of lean meat percentage in our study (52.30 %) was reached in hogs in combination (CLW x CL) x CLW sire line, on the contrary the highest percentage of lean meat (55.96 %) was reached in gilts of the same combination.

## References

- BORZUTA, K., STRZELECKI, J., GRZEŠKOWIAK, E., LISIAK, D. (2002): Slaughter value of pig hybrids with Pietrain and Hampshire boar inheritance in comparison with Polish large white fatteners. *Ann. Anim. Sci., Suppl.*, No. 2, s. 15-18.
- DEMO, P. (1994): Hodnotenie jatočných tiel ošípaných podľa podielu cenných mäsových častí pomocou regresných rovníc. *Živočišná výroba*, 39, (7), s. 629 – 642.
- ENGEL, B., WALSTRA, P. (1993): Accounting for subpopulation in prediction of the proportion of lean meat of pig carcasses. *Anim. Prod.*, 57, s. 147-152.
- KERNEROVÁ, N., MATOUŠEK, V., VEJČÍK, A., KOUĞLOVÁ, P., HANYKOVÁ, Z. (2004) : Výsledky testace hybridních prasat v provozních podmínkách. *Chov hospodářských zvířat v podmínkách EÚ*, Nitra, s. 48-49.
- PIAO, J.R., TIAN, J.Z., KIM, B.G., CHOI, Y.I., KIM Y.Y., HAN, I.K. (2004): Effect of sex and market weight on performance, carcass characteristics and pork quality of market hogs. *Asian Australasian Journal of Animal Sciences*, 17 (10), s. 1452 – 1458.
- PULKRÁBEK, J., BARTOŇ, L., MILERSKI, M. (2004): Hodnocení jatečných těl prasat, skotu a ovcí podle SEUROP-systému. Aktuální otázky produkce jatečných zvířat, mezinárodní vědecká konference, Brno, s.21-31.
- PULKRÁBEK, J., PAVLÍK, J. (2000): Možnosti podstatného zvyšování podílu svaloviny u prasat po otcích specializovaných populací. *Acta fytotechnica et zootechnica*, XIX. Dni genetiky, s. 109.
- PULKRÁBEK, J., PAVLÍK, J., VALIŠ, L., ČECHOVÁ, M. (2003): Pig carcass classification based on the lean meat content. *Acta univ. agric. et silvic. Mendel. Brun.*, LI, No. 4, s.109-114.
- ROGELJ, I. (2000): Slaughter quality of crossbred pigs with German Landrace and Pietrain as terminal breeds. *Agriculture Scientific and Professional Review*, 6(1), s. 157-159.
- ŠIMEK, J., GROLIHOVÁ, M., STEINHAUSEROVÁ, I., STEINHAUSER, L. (2004): Carcass and meat quality of selected final hybrids of pigs in the Czech Republic. *Meat Science*, 66, s. 383-386.

The study was supported by MSM 6215648905