

COMPARISON OF THE FATTENING AND SLAUGHTER PARAMETERS OF THE SELECTED CROSSBRED PIGS

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Abstract

The aim of our experiment was to assess the effects of the particular crossbreeds and sex on the fattening and slaughter parameters of pigs. 21 animals were evaluated altogether, where two crossbreeds - LW x L x PIC (11 animals) and LW x PIC (10 animals) were used for our testing purposes. The same dry mixture was used for feeding of all the tested pigs. During the growth period - from 30 kg to 100 kg - the following parameters were evaluated: the average daily gain - ADG (g) and feed consumption ratio - FCR (kg). Before slaughter, the final body weight (kg) was monitored and after slaughter, the meat percentage-MP (%), ham percentage-HP (%), loin eye area-LEA (cm²) and back fat thickness-BF (mm) were evaluated. The crossbreed LW x L x PIC (ADG 920.7±85.1 g, FCR 2.66±0.19 kg) had a better growth intensity and efficiency of the feed utilization than the crossbred LW x PIC (ADG 909.0±88.1 g, FCR 2.88±0.25 kg), the differences were not statistically significant. However, comparison of the slaughter parameters have shown that better results were achieved by the crossbreed LW x PIC. Differences between the crossbreeds were not statistically significant, except for the indicator HP (LW x PIC 22.9±1.3 %, LW x L x PIC 21.4±0.9, $p < 0.05$). Better ADG (953.3±66.7 g) was achieved by barrows in comparison to gilts (853.1±75.6 g), this difference was statistically significant ($p < 0.01$). On the other hand, gilts achieved better slaughter efficiency and also had a statistically significantly larger LEA than barrows. Summarization of the above mentioned results shows that fattening parameters and the carcass efficiency of both crossbreeds were similar. However, in view of the market demand for pigs containing a high proportion of meat, the hybrid combination LW x PIC may be considered more advantageous.

Keywords: Crossbred pigs, carcass traits, growth performance

The process of hybridization in pig breeding must ensure production of the final product, which has an excellent growth capacity at low consumption of the nuclear feed and excellent slaughter parameters. The slaughter efficiency is expressed as a proportion of the valuable meat parts by the thigh – bone share, the MLT area and the height of back bacon (Pulkrábek et al., 2015). Qualitative meat indicators, especially the pH value, colour, and the ability to bind water, are also contributing to the slaughter efficiency (Čítek et al., 2007).

Pigs of different genetic groups might respond to the same feed differently (Bosi and Russo, 2004; Peloso et al., 2010). The growth intensity, as well as the breeding economy, is also significantly influenced by the sex of the slaughter pigs (Stupka et al., 2009). The final performance is important due to the economic sustainability of the production system, although its usefulness concerning the breed suitability evaluation also depends on the market requirements (Martins et al., 2002).

Today, a worldwide pork production is mainly focused on the meat yields (Ingr, 2011). Therefore, it is important to identify a suitable end combination of the pig hybrids with a good growth potential and good meat yields (Svoboda, 2002). Therefore, the aim of the experiment was to assess the effects of crossbreeds and sex on the fattening and slaughter parameters of pigs.

Material and Methods

The experiment was performed in the Experimental Centre of the Farm Animals at the Slovak Agricultural University in Nitra. The analysed group consisted of 21 animals. We have used the crossbreeds LW x L x PIC (11 animals) and LW x PIC (10 animals) for the testing purposes.

The tested pigs (30 - 100 kg) were housed in pairs (a barrow and a gilt, within the limits). The pen floor was divided into the solid lying area and a dunging yard. There was a pin-type feed-pump and a trough with a tube-shaped feed hopper. The

air temperature was controlled within 18 - 20 °C. Feeding pigs with dry mixture was the same way of feeding for all the pigs. According to the growth phase, we used the following kinds of the complete feed mixtures: FM 04 (30-65 kg) and FM 05 (65-105) (table 1).

The following parameters were evaluated during the growth period - from 30 kg to 100 kg: the average daily gain (ADG) in grams and feed consumption ratio (FCR) in kilograms,

before slaughter - the final body weight (FBW) in kilograms (kg) and after slaughter - the lean meat percentage (LMP) in %, the ham percentage (HP) in %, the loin eye area (LEA) in cm² and the back fat thickness (BF) in mm.

The results were processed in the SPSS 20 program. The differences between groups were tested using the analysis of variance (ANOVA). We used the Pearson correlation coefficient in order to evaluate the correlation relations.

Table 1. Composition of the Experimental Diets for Feeding Growing Pigs (30 – 65 kg) and Finishing Pigs (65 – 105 kg)

Diets	Growing stage	Finishing stage
Ingredients in %		
Spring Barley	25	27
Winter Wheat	25	27
Maize Kernel	28.2	27
Soybean meal	18	13
Wheat bran	-	3
Acidulant	0.5	-
Vitamin – mineral premix	3.3	3
Total	100	100

Results and Discussion

Results of the pigs fattening parameters are shown in the Table 2. The FBW was similar in both final hybrids and without any statistically significant differences. Also, there was no proof of differences found in FBW between gilts and barrows. The hybrid combination LW x L x PIC reached higher ADG (920.7 ± 85.1 g) than LW x PIC (909.0 ± 88.1 g). This difference was not statistically significant and we can conclude that excellent growth intensity was achieved by both hybrid combinations. Cámara et al. (2016) found that L x LW x PIC L62 had achieved a higher average daily feed intake (ADFI) and ADG than L x LW x Pietrain. Similarly, Hamilton et al. (2003) showed that the crossbreeds from the lean Pietrain sire line had lower ADG and were less efficient than the crossbreeds from a leaner sire (a synthetic line comprised of the Large White, Landrace, Duroc and Pietrain). A higher growth intensity of over 100 g per day was found in barrows (953.3 ± 66.7 g) compared to gilts (853.1 ± 75.6). This difference was statistically significant

($p < 0.01$). In contrast to our results, Jaturasitha et al. (2006) did not find out any significant differences during the fattening period from 30 to 110 kg among boars, barrows and gilts. The differences in feed efficiency - based on the FCR assessment - were not statistically significant. Nevertheless, the FCR achieved by the LW x L x PIC crossbreeds was by 0.19 kg lower compared to LW x PIC and in barrows by 0.12 kg less than in gilts. Similarly, Jaturasitha et al. (2006) found that barrows had significantly better FCR than gilts ($p < 0.05$) in the growth period from 30 to 60 kg and also at weight from 30 to 100 kg, but at this stage of growth without any significant differences.

In the fattening and slaughtering parameters, there weren't recorded any statistically significant interactions between the sex and hybrid combinations. This study results are similar to those of Guimarães et al. (2011) and Oliveira Carvalho et al. (2016), who evaluated pigs of different strains and sexes and also had not observed any interaction between the factors and performance characteristics.

Table 2. Effects of Crossbreeding and Sex on the Growth Performance of Pigs

	Crossbreed		Sex		Significance		
	LW x PIC	LW x L x PIC	Barrow	Gilt	Cross-breed	Sex	Crossbreed x Sex
n	10	11	13	8			
FBW	102.3 ± 3.1	102.5 ± 2.6	102.5 ± 3.0	102.3 ± 2.4	NS	NS	NS
ADG	909.0 ± 88.1	920.7 ± 85.1	953.3 ± 66.7	853.1 ± 75.6	NS	**	NS
FCR	2.85 ± 0.27	2.66 ± 0.19	2.71 ± 0.21	2.83 ± 0.29	NS	NS	NS

NS: not significant; * p<0.05; ** p<0.01

Comparing the given slaughter indicators (Table 3), we have found that the LW x PIC crossbreed was characterized by better blending than the crossbreed LW x L x PIC. The crossbreed LW x PIC had by 1.7% higher LMP, 1.5% larger HP, 2.1% larger LEA, and by 1.6 mm lower BT. As far as the slaughter parameters are concerned, a statistically significant difference between the crossbreeds was recorded only in the HP indicator (p <0.05). The gender based comparison showed that gilts have achieved more favourable results in all slaughter parameters than barrows, while the difference in the LEA indicator was statistically significant. In accordance with the results of our work, Matoušek et al. (2004) found - comparing the slaughter efficiency of barrows and gilts - lower back bacon in gilts than in barrows.

Similarly, Silva et al. (2015) observed that females had reached larger depth values in the sirloin and ribeye areas and had more lean meat in relation to barrows. According to Moraes et al. (2010), sex can significantly influence the carcass development because - when assessing males and females in the growth phase as subject to the same nutrition and weighing similarly at

slaughter, females tend to have higher protein deposition and smaller lipid deposition compared to males.

We have found out within the frame of the correlation analysis (Table 4) that the LMP decreases (r = -0.455, p <0.5) in accordance with the weight increase before slaughter. Increasing the growth intensity - ADG improves the effectiveness of fattening - FCR (r = -0.649, p <0.01), can lead to deterioration of the slaughter indicators.

There was a statistically significant negative correlation dependence between ADG and LEA (r = -0.574, p <0.01). We also found high positive correlation dependencies between LMP, HP and LEA (p <0.01). High BF negatively affects LMP (r = -0.580, p <0.01) and HP (r = -0.743, p <0.01). Kiefer et al. (2014) observed that the back fat showed a highly negative correlation with the lean meat percentage (r = - 0.91). These authors stated that back fat thickness was associated with the amount of fat in the carcass and was inversely proportional to the amount of meat. These responses show a direct correlation between the back fat thickness and the percentage of the lean meat both in the measures taken by the ultrasound in vivo and those made directly in the carcass.

Table 3. Effects of Crossbreed and Sex on the Slaughter Parameters of Pigs

	Crossbreed		Sex		Significance		
	LW x PIC	LW x L x PIC	Barrow	Gilt	Cross-breed	Sex	Crossbreed x Sex
n	10	11	13	8			
LMP	55.3 ± 2.3	53.6 ± 1.5	54.0 ± 2.2	55.1 ± 1.8	NS	NS	NS
HP	22.9 ± 1.3	21.4 ± 0.9	21.8 ± 1.4	22.7 ± 1.0	*	NS	NS
LEA	42.9 ± 3.5	40.8 ± 3.7	40.5 ± 2.6	43.9 ± 4.3	NS	*	NS
BF	16.7 ± 2.8	18.3 ± 3.0	18.2 ± 2.6	16.3 ± 3.2	NS	NS	NS

NS: not significant; * p<0.05; ** p<0.01

Table 4. Correlation Analysis of the Production Parameters of Pigs

	FBW	ADG	FCR	LMP	HP	LEA	BF
FBW	1	-0.112	0.062	-0.455*	-0.330	-0.122	0.350
ADG		1	-0.649**	-0.290	-0.264	-0.574**	0.127
FCR			1	0.157	0.200	0.432	-0.094
LMP				1	0.824**	0.622**	-0.580**
HP					1	0.427	-0.743**
LEA						1	-0.139
BF							1

NS: not significant; * $p < 0.05$; ** $p < 0.01$

Conclusion

The crossbreed LW x L x PIC had a better intensity of growth and efficiency of the feed utilization than the crossbreed LW x PIC, the differences were not statistically significant. However, the comparison of the slaughter parameters showed that better results were achieved by the crossbreed LW x PIC. Differences between the crossbreeds were not statistically significant, except for the indicator HP ($p < 0.05$). Barrows achieved better ADG in comparison to gilts, this difference was statistically significant ($p < 0.01$). On the other hand, gilts achieved better slaughter efficiency and had a statistically significantly larger LEA than barrows ($p < 0.05$). Summarizing the results, it can be stated that fattening parameters and carcass efficiency of both crossbreeds were similar. However, in view of the market demand for pigs with a high proportion of meat, the hybrid combination LW x PIC may be considered more advantageous.

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