

## The influence of sex and hybrid on the fattening parameters of pigs

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In the experiment, we investigated the effect of the hybrid combination and sex on the fattening parameters of pigs fed with the same feed. The analyzed group consisted of 27 animals. We used the final hybrids of BU × L × PIC (17 animals) and BU × PIC × (10 animals) for the testing purposes. Feeding pigs with the mixture was the same for all the tested pigs. According to the growth phase, we used the following complete mixtures (FM): FM 02 (weaning to 20 kg), FM 03 (20–35 kg), FM 04 (35–65 kg), and FM 05 (65–105 kg). We evaluated the average daily gain (ADG) in grams (g), feed consumption ratio (FCR) in kilograms (kg), number of feeding days (FD) in two growth phases: Phase 1 – piglets (from weaning to 25 kg), Phase 2 – test (30–100 kg). The pigs of the hybrid combination LW × L × PIC (ADG – 533.6 g,  $P < 0.01$ ) had a higher intensity of growth after weaning, but the PIC × LW hybrid combination achieved a better efficiency of feed utilization (FCR – 1.56 kg,  $P < 0.05$ ). The sex differences were not statistically significant. During the growth period from 30 to 100 kg, better fattening parameters were reached by the hybrid LW × PIC (bigger ADG – 975.8 g, a smaller number of FD – 72.3,  $P < 0.01$ ). The differences regarding the FCR factor between the hybrids were not statistically significant. Better fattening parameters from 30 to 100 kilograms were achieved by barrows (ADG – 929.6 g,  $P < 0.05$ ; FD – 76.9,  $P < 0.01$ ; FCR – 2.69 kg, insignificant) in comparison to gilts.

**Keywords:** crossbreed, growth, sex, pigs

### 1 Introduction

The slaughter weight and the plan of nutrition are the important factors in the pig production influencing the profitability as well as the meat quality (Latorre et al., 2004). In general, pigs are capable of extremely rapid growth after weaning but there are a lot of factors that might limit the extent to which this potential is expressed. The pig weight at the time of weaning, its nutrition and the growth rate in the immediate post-weaning period are the interacting factors determining the food intake and its subsequent growth (Williams, 2003). Genetic selection during many decades has improved ADG, feed conversion ratio and lean meat percentage of the slaughtered pigs (Rauw et al., 1998). Pigs of different genetic groups might respond differently to the same feed (Bosi and Russo, 2004; Peloso et al., 2010). The intensity of growth and the breeding economy are also significantly influenced by the sex of the slaughter pigs Stupka et al., 2009).

The goal of experiment was to review the impact of particular hybrid combination and sex on the fattening parameters of pigs fed with the same diet.

### 2 Material and methods

The experiment was performed in the Experimental Centre of the Farm Animals at the Slovak Agricultural University in Nitra. The analyzed group consisted of 27 animals. We used the final hybrids BU × L × PIC (17 animals) and BU PIC × (10 animals) for the testing purposes.

The weaners were housed in the grid pens with the solid lying area. A part of the pen was the heated spot with the temperature of 24–26 °C. The pen was equipped with a pin-type feed-pump and the feeder enabling the feed humidification. 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 the pigs with dry mixture was the same for all the pigs. According to the growth phase, we used the following kinds of the complete feed mixtures: FM 02 (from weaning to 20 kg), FM 03 (20–35 kg), FM 04 (35–65 kg), and FM 05 (65–105 kg).

We have reviewed the growth potential of pigs in two growth phases: phase 1 – weaners (weaned to 25 kg),

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phase 2 – a test (30–100 kg). We evaluated the average daily gain (ADG) in grams (g), Feed Consumption Ratio (FCR) in kilograms (kg), and the number of feeding days (FD).

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.

### 3 Results and discussion

Results of the pigs' fattening parameters are shown in the Table 1. In the weaners, we found out higher ADG in the hybrid LW × L × PIC (533.6 g) in comparison with LW × PIC (454.0 g) ( $P < 0.01$ ). However, we found out a statistically significantly lower FCR ( $P < 0.05$ ) in the hybrid PIC × LW (1.56 kg). The differences in the number of FD were not statistically significant between the hybrids. It has resulted from the comparison of the weaners fattening parameters observed by the sex that better ADG (515.2 g) and at the same time FCR (1.64 kg) were achieved by the gilts, but these differences were not statistically significant.

In the pigs weighing from 30 to 100 kg, better fattening parameters were achieved by the hybrid BU × PIC. The BU × PIC hybrid reached in average by 138.0 g better ADG ( $P < 0.01$ ), by 13 days shorter FD ( $P < 0.01$ ) and by 0.04 kg lower FCR (not significant) in comparison to LW

× L × PIC. In terms of the achieved results it seems more preferable to use the BU × PIC combination for feeding. Cámara et al. (2016) investigated the effect of different energy content of the feed on the growth potential of pigs. They found that L × LW × PIC L62 achieved a higher average daily feed intake (ADFI) and ADG than L × LW × Pietrain. Similarly, Hamilton et al. (2003) showed that the crossbreds from the lean Pietrain sire line had lower ADG and were less efficient than the crossbreds from a leaner sire (a synthetic line comprised of the Large White, Landrace, Duroc and Pietrain).

In the test (30–100 kg), barrows achieved ADG on the level of 929.6 g, which was by 109.8 g more in comparison with the gilts ( $P < 0.05$ ). Since the growth of barrows was faster at the observed stage, the overall length of the fattening period was shorter by 11 days compared to gilts ( $P < 0.01$ ). At the same time, barrows made use of more effectively accepted feed intake, which resulted in the lower FCR (2.69 kg) compared to gilts (2.80 kg). This difference was not statistically significant. Similar results were also reached by Serrano et al. (2013) who indicate that barrows had higher ADFI (2.46 kg vs. 2.28 kg;  $P < 0.001$ ) and ADG (0.940 vs. 0.904 kg;  $P < 0.01$ ) and worse FCR (2.62 kg vs. 2.52 kg;  $P < 0.01$ ) than gilts. Also Matoušek et al. (2004) found that barrows had a higher growth potential than gilts.

It results from the correlation analysis of the fattening parameters that pigs with a high intensity of growth

**Table 1** Effects of sex and hybrid on the growth performance in pigs

	Sex		Hybrid		Total	Significance	
	Barrows	Gilts	LW × PIC	LW × L × PIC		Sex	Hybrid
<i>n</i>	17	10	10	17	27		
ADG weaners	497.6 ± 73.2	515.2 ± 60.5	454.0 ± 38.8	533.6 ± 64.8	504.1 ± 68.1	NS	**
ADG test	929.6 ± 107.1	819.8 ± 106.8	975.8 ± 89.3	837.8 ± 103.1	888.9 ± 118.0	*	**
FCR weaners	1.74 ± 0.27	1.64 ± 0.20	1.56 ± 0.15	1.80 ± 0.25	1.71 ± 0.24	NS	*
FCR test	2.69 ± 0.28	2.80 ± 0.25	2.71 ± 0.22	2.75 ± 0.30	2.73 ± 0.27	NS	NS
FD weaners	35.7 ± 0.5	35.6 ± 0.5	35.0 ± 0.0	36.0 ± 0.0	35.6 ± 0.49	NS	NS
FD test	76.9 ± 9.4	87.9 ± 10.9	72.3 ± 6.9	86.1 ± 10.1	81.0 ± 11.2	**	**

NS: not significant; \*  $P < 0.05$ ; \*\*  $P < 0.01$

**Table 2** Correlation Analysis of the Growth Performance Parameters of Pigs

	FD test	ADG weaners	ADG test	FCR weaners	FCR test
FD test	1	0.283	-0.975**	0.361	0.422*
ADG weaners	0.283	1	-0.259	-0.431*	0.201
ADG test	-0.975**	-0.259	1	-0.365	-0.498**
FCR weaners	0.361	-0.431*	-0.365	1	-0.141
FCR test	0.422*	0.201	-0.498**	-0.141	1

\*  $P < 0.05$ ; \*\*  $P < 0.01$

achieve the desired slaughter weight more quickly. We have recorded a strong correlation dependence in the test ( $r = -0.975$ ) between the number of FD and ADG ( $P < 0.01$ ). In addition, we have also found out that pigs that grow faster make better use of feed mixture to produce the increasing gains. This follows from the correlation dependence between ADG and FCR in weaners ( $r = -0.431$ ;  $P < 0.05$ ) and also pigs in test ( $r = -0.498$ ;  $P < 0.01$ ). Our findings are consistent with Sobotka et al. (2010) who state that the feed conversion improves with the increasing gains. Mlynek et al. (2011) have also found out that by increasing the ADG in test the FCR in test is decreasing assay ( $r = -0.814$ ;  $P < 0.001$ ) as well as the number of the fattening days from the birth to slaughter ( $r = -0.820$ ;  $P < 0.001$ ).

#### 4 Conclusions

It has come out of the experiment results that pigs of the hybrid combination LW × L × PIC (ADG – 533.6 g,  $P < 0.01$ ) had a higher intensity of growth after weaning, but a better effectiveness in the use of feed (FCR – 1.56 kg,  $P < 0.05$ ) was achieved with the hybrid combination LW × PIC. The sex differences were not statistically significant. During the growth period from 30 to 100 kg, better fattening parameters were achieved by the hybrid LW × PIC (greater ADG – 975.8 g, a smaller number of FD – 72.3,  $P < 0.01$ ). The FCR indicator differences between hybrids were not statistically significant. Better fattening parameters in the weight from 30 to 100 kg were achieved by barrows (ADG –  $P < 0.05$ , FD –  $P < 0.01$ , FCR – statistically insignificant differences). In terms of the achieved results, using the BU × PIC combination for fattening seems to be more suitable. It has resulted from the correlation analysis of the fattening parameters, regarding the weight from 30 to 100 kg, that pigs with a high growth intensity are able to achieve the desired slaughter weight faster (ADG vs. FD:  $r = -0.975$ ,  $P < 0.01$ ) and they also use the feed mixture for the production gain better (ADG vs. FCR:  $r = -0.498$ ;  $P < 0.01$ ).

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