

THE EFFECT OF SEX, WEIGHT AND LEAN MEAT CONTENT ON THE PIG CARCASS REALIZATION

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Abstract

Into the observation were included 460 final hybrids of pig carcasses. The sample of carcasses was evaluated on the base of the current valid Czech price-mask. The observation focused closely on the sex, carcass weight and the lean meat content and its effect on the cash sales in selected categories. The fattening of gilts is more effective than by barrows. The difference makes 1.64 CZK on one kg of the carcass. The best price evaluation reached the weight categories from 80.0 to 89.9 kg and from 90.0 to 99.9 kg (cash sales 43.02 and 42.8 CZK/kg of carcass). Best evaluated SEUROP grades were the E (55.0 – 59.9%) and the S class (more than 60.0%) where the cash sales reached 43.5 respectively 43.6 CZK/kg of carcass).

Key Words: Pig, sex, weight, lean meat, carcass realisation

The pig carcass grading according to the SEUROP system is established in the Czech republic since the 1st april 2001. The carcasses are graded and realized according to the lean meat content and the carcass weight. The lean meat content (LMC) is estimated on the base of measured characteristics (measured within 45 min from the slaughter). These characteristics are put into the regression formula to estimate the LMC. The price evaluation of the carcasses is realized depending on the price-mask which prefers carcasses with higher LMC (above 56%) according to the preferences of meat producers. The carcasses, which does not match the unpenalized weight range (80.4 – 97.9 kg) are depending on their weight penalized according to the price-mask. The actual price-mask is shown in the Figure 1a and 1b.

The carcass value is comparable in the whole republic and is objectively defined compared to the market price, which differs between the regions and factories during the whole year. The price is among others influenced by the supply and demand on the Czech and also on the international meat-market, also influenced by the export and import of the pork meat.

The main factors leading to the improvement of the breeding economics are the increment of the count of reared piglets on one sow, betterment of the health and also a high management level of the breeding. The costs can be affected by the breed efficiency, the number of reared piglets and their grow-ability which influences the feed conversion (BOUDNÝ and ŠPIČKA, 2012). The other economical aspects influencing the pig breeding describe e.g. HOUŠKA *et al.* (2004) and QUINTON *et al.* (2006).

The positive evaluation of the final hybrids is subjected to the well-balanced carcass weight and corresponding LMC in the whole carcass supply. The principles of the economical breeding of pigs in the Czech republic should take in account also the evaluation of the carcasses on the base of the price-mask.

The influence of sex on the economics of fattened pigs dealt e.g. STUPKA *et al.* (2004). The authors mention on the base of a gain function that in the *ad-libitum* fattening system (separately for gilts and barrows) brings a difference of 111.06 CZK in the gain respectively 5.86 % of rentability on behalf of gilts. According to ŠPRYSL *et al.* (2010) the *ad-libitum* feeding causes a decrease of 4.1 % in the work efficiency. Fattening of the barrows causes a decrease of 6.6 % in the work efficiency.

The composition of the carcass changes with the increasing carcass weight, especially the distribution of meaty and fatty parts. With the increasing carcass weight also increases the share of fatty parts and the dressing percentage. Along with it decreases the LMC in the carcass. According to PULKRÁBEK (2003), the increase in carcass weight of 10 kg causes a decrease in LMC from 1.0 to 1.5 %.

The influence of the weight of the carcass (x) on the LMC (y) is determined by the linear regression function: $y = 63.636 - 0.0937x$ (VÍTEK *et al.*, 2006).

The aim of the work was to evaluate the supplier sales for the concrete pig carcass sample according to the current valid price-mask (tab. 1a and 1b). Also the influence of sex, carcass weight and LMC on the price realization was observed.

Material and Method

The sample of 460 pig final hybrids was cyclical fattened and the ratio of sex was there 1:1. By the slaughter pigs were measured with the FOM device the measurements S (fat thickness) and M (muscle depth), and also the carcass weight. The sales were estimated on the base of the actual price-mask (tab. 1a and 1b), which is the base for the realization in the Czech republic. As the basic price for the cold carcass was taken the price from the 32nd week of 2012 (SZIF) – it was 42.89 CZK /kg, rounded on 43.0 CZK/kg.

The costs were not evaluated because they were of the same level by the gilts as by the barrows. The cyclic fattening system was realized, together for both - gilts and barrows.

The sales are mentioned in average for one pig carcass and for 1 kg of carcass and for the relevant category.

The results were calculated with the aid of the SAS ver. 9.1 program, using the GLM and MEANS procedures.

Results and Discussion

The basic characteristics for the sample of carcasses are shown in the Table 2. The average cold carcass weight was 88.3 kg and the average LMC reached 56.63 %. The average sales for one fattened pig calculating with the price 43.0 CZK/kg reached 3 751,- CZK. The sales recomputed on 1 kg of the carcass reached the value 42.49 CZK. Table 2 presents selected characteristics stratified regarding the sex. All the differences between the results were evaluated as statistically significant. The barrows reached at once higher cold carcass weight (difference 6.2 kg) and also lower LMC (difference 3.7%). The differences in the carcass composition between gilts and barrows described BUČKO *et al.* (2001). Practically all the studies confirm the higher meatiness of gilts in comparison with barrows. That is the reason for the realization of the separated fattening system according to gender. This system has a positive impact on the economical efficiency of the breeding. (ČECHOVÁ *et al.* 2001, PULKRÁBEK *et al.* 2002, and others). The sales for 1 kg of carcass were more profitable by gilts (difference 1.43 CZK/kg). STUPKA *et al.* (2004) found out

the difference at the level of 1.64 CZK/kg, also on behalf of gilts. The average sales for the whole carcass were higher by barrows (difference 128,- CZK). In comparison of the sales on the whole sample were these differences 29 517,- CZK on behalf of barrows. Seeing that the costs for fattening the both sexes were equal, we can deduce, that the fattening of gilts is economically more effective than by barrows. Regarding to these facts arising there from the different grow-abilities between gilts and barrows, we recommend the fattening system separately for each gender.

In the table 3 is the sample evaluated according to six categories in the total range between 60 to 120 kg. With increasing carcass weight increased also the fat thickness and the depth of the muscle, compared to the decrease of the LMC. These facts are in consequence with the researches made e.g. by PULKRÁBEK (2003). In the selected sample, there were 70 % of carcasses in the demanded weight range 80 – 100 kg. The highest sales per kg reached the weight range 80 – 90 kg (43.02 CZK), compared to the lowest sales which was reached by the subrange 110 – 120 kg (36.13 CZK). Nevertheless the heaviest subrange reached a very good level of LMC – 56.3 %. These results are though only orientative because of the low number of pigs in this weight range. The discounts for the weight appeared also by the lowest weight range, but the sales by there were higher for 3.07 CZK than by the heaviest weight subrange 110 -120 kg. The overall sales were the highest by the subranges 80 – 89.9 kg and 90 – 99.9 kg. The aim of the slaughter pig producers should be for better rentability of breeding to produce the carcasses in the weight range 80 – 90 kg.

Table 1a. The price-mask – the discounts and surcharges for the LMC in the carcass

Class	LMC (%)	Price (%)
S	60,0 a více	103,0
E	59,0 - 59,9	104,0
E	58,0 - 58,9	104,0
E	57,0 - 57,9	102,5
E	56,1 - 56,9	101,0
E	56,0	100,0
E	55,0 - 55,9	99,0
U	54,0 - 54,9	97,5
U	53,0 - 53,9	96,0
U	52,0 - 52,9	94,5
U	51,0 - 51,9	93,0
U	50,0 - 50,9	91,5
R	49,0 - 49,9	90,0

Class	LMC (%)	Price (%)
R	48,0 - 48,9	88,5
R	47,0 - 47,9	87,0
R	46,0 - 46,9	85,5
R	45,0 - 45,9	84,0
O	44,0 - 44,9	81,0
O	43,0 - 43,9	78,0
O	41,0 - 42,9	75,0
O	40,0 - 40,9	50,0
P	< 39,9	50,0
N	all	50,0
T	all	70,0

Table 1b. The price-mask – the discounts for the carcass weight

Cold carcass weight (kg)	Live weight (kg)	Price discount (%)
60,0 - 68,5	78,0 – 89,1	-15,0
68,6 - 73,4	89,2 – 95,4	-5,0
73,5 - 80,3	95,5 – 104,4	-2,5
80,4 - 97,9	104,5 – 127,3	0,0
98,0 - 102,8	127,4 – 133,7	-2,5
102,9 - 107,7	133,8 – 140,0	-5,0
107,8 - 120,0	140,1 – 156,0	-15,0

Table 2. The basics characteristics of the sample stratified according to sex

Characteristics	Whole sample (n=460)		Sex		
			gilts (n=230)	barrows (n=230)	
	\bar{x}	$s_{\bar{x}}$	LSM	LSM	SE
Cold carcass weight (kg)	88,3	0,42	85,2 ^a	91,4 ^b	0,56
FOM – fat thickness (mm)	15,6	0,18	13,5 ^a	17,8 ^b	0,21
FOM – muscle depth (mm)	69,2	0,43	71,2 ^a	67,2 ^b	0,59
FOM – LMC (%)	56,6	0,16	58,5 ^a	54,8 ^b	0,19
Average sales (CZK/carcass)	3751	18,6	3687 ^a	3815 ^b	26,1
Average sales (CZK/kg)	42,49	0,094	43,20 ^a	41,77 ^b	0,125
Overall sales (CZK)	1 725 409	18,6	847 946	877463	28,6

Means in a row with the same superscripts are not statistically different ($P \leq 0.05$)

Table 3. The evaluation of the sample according to the weight subranges

Characteristics	Weight range											
	60-69,9 kg n = 8		70-79,9 kg n = 82		80-89,9 kg n = 169		90-99,9 kg n = 154		100-109,9 kg n = 44		110-119,9 kg n = 3	
	LSM	SE	LSM	SE	LSM	SE	LSM	SE	LSM	SE	LSM	SE
Cold carcass weight (kg)	67,6 ^a	0,94	76,0 ^b	0,29	85,6 ^c	0,20	94,2 ^d	0,21	103,3 ^e	0,40	112,2 ^f	1,53
FOM – fat thickness (mm)	13,1 ^a	1,29	13,7 ^a	0,40	15,5 ^{ab}	0,28	16,3 ^{ab}	0,29	18,2 ^b	0,55	17,1 ^b	2,11
FOM – muscle depth (mm)	62,1 ^a	3,11	64,7 ^{ab}	0,97	68,6 ^{abc}	0,68	71,4 ^{bc}	0,71	73,1 ^c	1,32	76,1 ^c	5,07
FOM – LMC (%)	57,8 ^a	1,19	57,6 ^a	0,37	56,7 ^a	0,26	56,4 ^a	0,27	55,1 ^a	0,51	56,3 ^a	1,94
Average sales (CZK/carcass)	2654 ^a	69,7	3214 ^b	21,8	3684 ^c	15,2	4026 ^d	15,9	4224 ^e	29,7	4051 ^d	113,8
Average sales (CZK/kg)	39,2 ^a	0,64	42,3 ^{bc}	0,2	43,02 ^c	0,14	42,8 ^c	0,15	40,9 ^b	0,27	36,1 ^d	1,05
Overall sales (CZK)	21 233	84,0	263568	17,7	622589	15,6	620006	15,8	185859	34,9	12154	82,3

Means in a row with the same superscripts are not statistically different ($P \leq 0.05$)

The evaluation of the sample according to the LMC is shown in the table 4. The sample was divided into four intervals (>60% / 55-59.9 / 50-54.9 / 45-49.9). Together with the decreasing LMC increased the carcass weight, the highest level reached the weight by the LMC subrange 45-49.9 % (91.3 kg). The average sales were significantly higher by the subranges of LMC 55-59.9 and above 60 %

compared to the two other groups. The overall sales were the highest by the carcass group with the LMC inbetween 55 and 59.9% of LMC because of the highest number of carcasses ranked in this subrange (48 % of carcasses). The aim of the producers should be focused on the carcasses with the LMC higher than 55 %.

Table 4. The evaluation of the sample according to the LMC

Characteristics	LMC							
	nad 60% (n=87)		55 – 59,9% (n=222)		50 – 54,9% (n=137)		45 – 49,9% (n=14)	
	LSM	SE	LSM	SE	LSM	SE	LSM	SE
Cold carcass weight (kg)	86,3 ^a	0,95	87,7 ^{ab}	0,59	90,3 ^b	0,76	91,3 ^b	2,37
FOM – fat thickness (mm)	10,8 ^a	0,18	14,7 ^b	0,12	19,3 ^c	0,15	24,9 ^d	0,47
FOM – muscle depth (mm)	76,4 ^a	0,84	70,5 ^b	0,53	63,4 ^c	0,67	60,6 ^c	2,1
FOM – LMC (%)	61,2 ^a	0,14	57,5 ^b	0,08	53,12 ^c	0,11	48,5 ^d	0,34
Average sales (CZK/ carcass)	3767 ^a	41,9	3821 ^a	26,3	3660 ^a	33,4	3434 ^b	104,5
Average sales (CZK/kg)	43,6 ^a	0,13	43,5 ^a	0,08	40,58 ^b	0,11	37,7 ^c	0,33
Overall sales (CZK)	327738	47,1	848200	27,3	501388	28,6	48083	86,9

Means in a row with the same superscripts are not statistically different ($P \leq 0.05$)

Conclusion

From the results flow, that the sales for 1kg/ carcass were significantly higher (43.2 CZK) by gilts when comparing the both sexes. The evaluation of the sample (for 1kg) regarding to the carcass weight was the best for the weight subrange 80 – 89.9 kg (43.02 CZK) and 90 – 99.9 kg (42.8 CZK). The sales pro 1kg were significantly higher by the LMC categories 55 – 59.9 % and above 60 % (43.5 resp. 43.6 CZK). An indispensable criterion for the carcass realization is to keep the correct and unpenalized weight range 80 – 100 kg. The demands of the meat producers (slaughterhouses) are forcing the breeders to produce a homogenous groups of pigs. Nevertheless the penalization for the heaviest weight subrange are too high in comparison to its very good LMC that the moderne genotypes can hold also up to the higher weight levels. In the cyclic fattening should be also evaluated the very good growth ability by the heavier pigs in accordance with the good health level.

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