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S.40 „Pig Production Free Communications“

THE MODEL FOR PROFITABILITY ESTIMATION IN PIG PRODUCTION

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Objective

This work is concerned with the quantification of the influence of genotype, of nutrition, sex, growth intensity, the extent of reproduction, prices of feed, and of carcass on the effectiveness of pig breeding, which is determined by given expense, profits, and profitability. At the same time the interdependence of the monitored factors on the economics of production, which enable these factors to be changed, is shown.

Materials and Methods

Data were obtained from two station tests of animals, representing two groups of crossbred pigs of for a total number of 144 animals. With each pig, the fattening parameters were monitored at weekly intervals during the entire period: average live weight in kg (LW), daily feed consumption – consumption of CFM in kg per day (DFI), average daily gain in g (ADG), feed conversion ratio (FCR), lean meat percentage (LMP). The economic parameters which were used for the calculation of costs, revenues and profitability were the result of the parameters of production potential of the pigs tested and from average commodity prices in the Czech Republic in 2007. The total cost per fattened pig (TC) included the costs per weaned piglet up to 25 kg (CPI), feed (CFE) and other costs (COT), weaned piglets /sow/year (PIY). Revenues per pig (RE) represented the sale price for one pig at slaughter.

We constructed a multivariable hierarchical model to assess the relationship between the factors: $Y = \mu + A_i + R_j + C_k + J_l + B_m + F_n + S_o + AF_{in} + e$, where: Y - measured values of costs, revenues and profitability, μ - overall average, A_i - average daily gain, R_j - reproduction, C_k - feed cost, J_l -sale price of carcass per kg, B_m - breed, F_n - nutrition intensity, S_o - sex, AF_{in} - interaction between the ith average daily gain and the nth nutrition intensity.

Conclusions

The economic analysis of production indexes shows that the overall costs for the fattened piece are considerably influenced by the number of bred piglets, feed price, not by the carcass price and growth intensity. The existence of a relation between the price for a pig and reproduction was not proven – price for the feed. The revenues per 1 piece are significantly influenced by the price of 1 kg carcass and growth intensity. The profitability is then considerably influenced by ADG, higher reproduction, feed price and price of 1 kg carcass.

The results of this work are following models enabling cost estimation, total income and profitability, pursuant to efficiency parameters and input resp. output prices. The models are for cost estimation in CZK per pig (R^2=0,73) y = 3633.006781 -0,543349*ADG -50.403655*PIY +129.815364*CFM +0.1063*ADG*CFM, total income estimation in CZK per pig (R^2 = 0,88) y = -2250.8248 +2.622693*ADG +87.926498*RP, profitability estimation in % (R^2 = 0.83) y = -214.292164 +0.1333936*ADG +1.6983062*PIY +0.3753065*CFM +2.850505*RP -0.0094251*ADG*CFM.

It was further proven that the feed intensity significantly influences the overall costs per 1 fed pig. For the producers of pigs in the fattening of hogs it represents an increase in overall costs by EUR 5.39 applying the ad-libit feeding technique of EUR 3.80 per piece.

Also the important of a selection of breed combination was proven, where the fattening of four-breed combinations against three-breed combinations represents a decrease in overall costs by 1.5% and increase in revenues by EUR 1.3954 per piece.

As regards the efficiency, significant associations were proven with the intensity of nutrition, sex and breed. Ad-libit feed and fattening of hogs decrease efficiency by 4.1% - 6.6%. The use of four-breed genotypes can increase the efficiency of fatted pigs by 3.4%.

Results

Table 1. Descriptive statistics of the factors and the variables included in the calculation of the profit margin (PM) (€)

Variable		TC [a]		RE [b]	PR [c]		
	n	Mean	S.D.	Mean	S.D.	Mean	S.D.
Total	136	93.73	5.43	94.78	10.66	1.55	12.85
Sex							
barrows	72	94.87	5.20	93.59	11.44	-0.93	13.47
gilts	64	90.56	4.85	98.06	7.32	8.38	7.68
Breed							
(LWS x PN)x(LWD x L)	72	92.73	5.25	98.36	6.73	6.22	7.08
PNx (LWD x L)	64	94.85	5.46	90.69	12.72	-3.78	15.66
Feed							
ad libitum	71	93.82	5.56	96.92	8.74	3.65	10.93
restricted	65	93.41	5.07	87.29	13.29	-5.80	16.19

a - TC = cost of feed + price per weaned piglet + fixed costs (€), b - RE= carcass weight * price per kg carcass weight (€), c - PR = [(RE -TC)/TC]*100

Table 2. Estimates of the effects of the model describing the total cost (€)

Variable	Estimate	S.E.	p-value
Intercept	121.2078	0.090	<0.0001
ADG	-0.0183	0.000	0.1355
PIY	-1.8111	0.001	<0.0001
price CFM	129.8154	0.430	0.0035
Breed			
(LWS x PN)x(LWD x L)	-1.3954	0.006	0.0255
PNx (LWD x L)	0		
Feed			
ad libitum	3.8017	0.006	<0.0001
restricted	0		
Sex			
barrows	5.3959	0.006	<.0001
bilte	0		
total gain* priceCFM	0.1063	0.001	0.074

Table 3. Estimates of the effects of the model describing profitability (€)

Variable	Estimate	S.E.	p-value
Intercept	-205.737	0.2999	<0.0001
ADG	0.1307	0.0003	<0.0001
PIY	1.7636	0.0014	<0.0001
price CFM	1.6552	1.561	0.0008
carcass price	80.8584	0.0324	<0.0001
Breed			
(LWS x PN)x(LWD x L)	3.3913	0.0152	0,0032
PNx (LWD x L)	0		
Feed			
ad libitum	-4.1377	0.0186	<0.0001
restricted	0		
Sex			
barrows	-6.6097	0.0136	<0.0001
bilte	0		
total gain* priceCFM	-0.2618	0.0017	0.0534

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