



ESTIMATION OF GENETIC PARAMETERS FOR GROWTH PERFORMANCE BULLS IN THE PERFORMANCE-TEST STATIONS

L. Vostrý¹, J. Příbyl², H. Krejčová², Z. Veselá², I. Majzlík¹

¹Czech Uni. of Life Sci. Prague, 165 21, Czech Republic, e-mail: vostry@af.czu.cz,

²Institute of Animal Science, Uhřetěves, 104 00, Czech Republic,



OBJECTIVES

Estimate genetic parameters of the growth of beef bulls at a performance-test station as related with pre-weaning growth.

MATERIAL AND METHODS

The field data comprised 20 277 records of birth weight (W0), 15 598 records of weight at 120 days of age (W120) and 14 452 records of weaning weight (W210) for young bulls and heifers of 10 breeds of beef cattle. The data from the performance-test station involved 2 819 bulls (ADG). Each breed was represented by individuals with the gene proportion of 88 – 100% of the given breed born in 1990 – 2005.

The estimation of genetic parameters was done by a multi-trait animal model based on animal models used for the routine estimation of the breeding value of field test and bulls at a performance-test station.



Model		AgeD	SEX	HYS	HO	bAB + b ² AB	bWW + b ² WW	a	m	tp	pe
1	PWW	F	F	F				R	R	R	
	ADG	F		F	F	F		R			
2	PWW	F	F	F				R	R	R	R
	ADG	F		F	F	F		R			R
3	PWW	F	F	F				R	R	R	
	ADG	F		F	F	F	F	R			
4	PWW	F	F	F				R	R	R	R
	ADG	F		F	F	F	F	R			R

PWW - pre-weaning weight (W0, W120, WW), ADG - average daily gain, AgeD - effect of dam's age, SEX - effect of sex, HYS - effect of herd×year×season, HO - effect of herd level of calf's origin, bAB+b2AB - linear and quadratic regression on age at the beginning of test, bWW+b2WW - linear and quadratic regression on WW, a - effect of animals, m - maternal genetics effect, tp - maternal permanent environment effect, pe - permanent environmental effect of animal, F- fixed effect, R – random effect.

AIC, direct heritability and residual variance

	AIC	h ²	σ ² _e - W0	σ ² _e - W120	σ ² _e - WW	σ ² _e - ADG
Model 1	245528	0.287	10.93	304.60	659.60	34430
Model 2	245287	0.289	3.81	78.86	46.12	33600
Model 3	245383	0.286	10.92	304.60	659.30	34430
Model 4	245205	0.287	3.84	80.61	41.35	33620

RESULTS

Correlations between direct effect

Model	Traits	W120	W210	ADG
1	W0	0,440	0,406	-0,162
	W120		0,893	0,212
	W210			0,203
2	W0	0,441	0,408	-0,142
	W120		0,894	0,232
	W210			0,214
3	W0	0,441	0,409	-0,159
	W120		0,893	0,212
	W210			0,201
4	W0	0,441	0,408	-0,140
	W120		0,894	0,226
	W210			0,199



Correlations between the permanent environment of an individual

		Model 3			Model 4	
Trait	W120	W210	ADG	W120	W210	ADG
W0	0.194	0.135	0.536	0.195	0.134	0.519
W120		0.905	0.371		0.905	0.273
W210			0.059			-0.050

CONCLUSIONS

Coefficients of direct heritability for the particular models were not markedly influenced by the inclusion of *pe* and *bWW + b2WW*. The inclusion of the effect of *pe* in the evaluation of tested bulls allowed better explanation of variability and more exact genetic evaluation. The evaluation of bull testing along with the field test (a multi-trait model) may reduce the influence of pre-selection of bulls for the test on the evaluation of ADG.