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EFFECT OF BOARS OWN PERFORMANCE ON PROGENY FATTENING AND CARCASS TRAITS IN TWO DIFFERENT ENVIRONMENTS[1]

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Abstract: The effect of own performance traits of meat breed boars on fattening and carcass parameters of progeny in two different test stations (Bučany and Nitra) was evaluated. Own performance traits of boars were average daily gain (ADG) from birth to 100 kg live weight, backfat thickness (BF) and lean meat content (LMC) in field conditions. Progeny of boars was housed in pairs (gilt and barrow) and fed standardised feed mixture semi ad libitum. Progeny test lasted from 30 to 100 kg live weight. There were evaluated following parameters: ADG and feed consumption/kg gain (FC) at test from 30 to 100 kg live weight, slaughter weight (SW), proportion of meaty cuts (PMC), proportion of ham (PHAM), eye muscle area (EMA), and BF. At Bučany and Nitra was found the effect of genotype of boars on progeny BF and/or FC respectively. Better tested boars from own performance test individually as well as a group achieved in progeny better fattening and carcass traits than worse tested boars at Bučany (+33 g ADG, -0.21 cm BF, +2.34 % PMC). Progeny performance from better evaluated boars at Nitra did not exceed the progeny performance from worse tested boars. There was found significant effect of dams on progeny performance.

Key words: boars, own performance, progeny, fattening capacity, carcass value, test stations

Introduction

The knowledge of the genetic base of the animals have great importance for genetic improvement of population. Despite of successive implementation of BLUP Animal model in pig breeding, own performance tests have been used still in the Slovak Republic. Many authors suggest the necessity of testing the breeding boars (*Liu et al., 1991; Kralik et al., 1996*; *Kratz et al., 1999*). *Gráčik et al. (1994)* observed dependences of daily gain and feed conversion of sons on sires, and daughters on dams respectively. They stated, that performance of daughters was more influenced by sows than of sons by boars. *Ehrhardt et al. (1993)* found out greater paternal effect on lean meat production of progeny than maternal effect. The main aim of our paper was to

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study the effect of meat boars on fattening and carcass traits of progeny in two different environments.

Material and Methods

Own performance traits: average daily gain (ADG) in g from birth to 100 kg live weight, average backfat thickness (BF) in cm and proportion of lean meat content (LMC) in % of meat breeds and combinations boars were evaluated. They were tested in field conditions. Progeny of these boars were tested at the Station of fattening capacity and carcass value (SFCCV) Bučany and test station at the Research Institute of Animal Production (RIAP) in Nitra. Animals were housed in pairs (gilt and barrow) and fed standardised feed mixture semi ad libitum. Pigs were killed at 100 kg (± 3 kg) live weight by electro stunning. Chilling of the carcasses started approximately 60 min post mortem and was continuing overnight. The day after slaughter was done dissection of half carcasses. There were evaluated following parameters: ADG (g) and feed consumption per 1 kg gain (FC) in kg at test from 30 to 100 kg live weight, slaughter weight (SW), proportion of prime meaty cuts in % (PMC), proportion of ham in % (PHAM), eye muscle area in cm^2 (EMA) and average backfat thickness in cm (BF).

The breed structure, line and own performance of boars, the progeny of which was tested at the SFCCV Bučany is following:

Breed/combination	Line and register	ADG (g)	BF (cm)	LMC (%)
Slovakian Meaty (SM)	Pinkas 1028	659	1.13	60.3
Slovakian Meaty	Pinkas 1008	759	0.97	56.6
Slovakian Meaty	Pinkas 1011	702	1.10	56.1
Slovakian Meaty	Valus 1007	663	1.03	59.5
Slovakian Meaty	Valus 1006	591	1.17	58.7
SM x Pietrain	Fuessen 1012	546	1.06	60.6
SM x Pietrain	Fuessen 1014	547	0.73	64.8
Duroc x Pietrain	Jus 1007	582	0.86	55.4
Duroc x Pietrain	Jus 1012	657	1.19	56.4
Pietrain x Yorkshire	Ambre 1004	659	1.03	59.9
Pietrain x Yorkshire	Baron 1002	641	0.90	63.3

The breed structure, line and own performance of boars, the progeny of which was tested at the RIAP Nitra is following:

Breed/combination	Line and register	ADG (g)	BF (cm)	LMC (%)
Yorkshire	Lanzo 1003	800	1.28	56.8
Yorkshire	Lanzo 1007	703	0.93	62.0
Yorkshire	Hipro 1002	697	1.06	58.4
Yorkshire	Jando 1002	654	0.88	60.7
Yorkshire	Jando 1009	644	0.59	62.4
Duroc x Pietrain	Jus 1005	588	1.01	61.4
Duroc x Pietrain	Jus 1004	588	1.02	58.5
Pietrain x Hampshire	Rahlen 1001	596	0.77	57.0
Pietrain x Hampshire	Rahlen 1002	596	1.01	59.0
Pietrain x Hampshire	Rahlen 1003	617	0.83	62.0

The mathematical-statistically calculations were done by methods described in the study of *Grofik* and *Fľak* (*1990*).

Results and Discussion

The effect of genotype of boars, the progeny of which was tested at the SFCCV Bučany (Table 1), was significant on BF of progeny only. Individual boars significantly influenced (min $P \leq 0.05$) all observed traits of progeny except for slaughter weight and eye muscle area. Individuality of dams significantly influenced progeny's growth intensity and EMA.

The results from RIAP Nitra are shown in Table 2. FC was highly significantly influenced by genotype of boars. The effect of individual boars on progeny performance was not significant. However, the effect of dams was very important. There were observed statistically significant differences among groups of progeny in FC, BF, ADG and EMA.

The comparison of progeny performance of individual boars at SFCCV Bučany are shown in Table 3. The highest growth intensity achieved the progeny of boars Jus 1007 and Pinkas 1008 (924 and 912 g resp.). Boar Pinkas 1008 had the highest ADG (759 g) in own performance test also. Progeny growth intensity of these two boars was significantly different (min $P \leq 0.05$) from progeny of boar Fuessen 1014 (726 g). Non significant differences among progeny groups were found in FC and SW. However, many significant up to highly significant differences were found in PMC. The best results had the progeny of boars Baron 1002 and Fuessen 1014 (59.79 and 58.15 % resp.). Both boars achieved the highest LMC in own performance test (63.3 and 64.8 % resp.) also. Similar differences in favour of progeny of boars Baron 1002 and Fuessen 1014 were observed also in PHAM. The lowest BF had the progeny of boars Baron 1002, Fuessen 1014 and Ambre 1004 (1.32-1.52 cm). These results were significantly up to highly significantly better than those of other progeny groups. Boars

Fuessen 1014 and Baron 1002 achieved very good results of BF in own performance test also.

On the other hand, very different results were found in progeny testing at RIAP Nitra (Table 4). Non significant differences among progeny groups were observed in all the fattening and carcass traits. Individuality of better tested boars from own performance test was not shown in higher performance of progeny.

There was observed also the effect of group of better or worse tested sires. In Table 5 are shown the results of progeny of boars at SFCCV Bučany. Progeny from a group of better tested boars had higher growth intensity, PMC and lower BF than progeny from a group of worse tested boars (+33 g, +2.34 %, -0.21 cm). These differences were statistically significant up to highly significant. At RIAP Nitra was confirmed that better tested boars not even as a group achieved in progeny better results than worse tested boars (Table 6).

It is stated that at SFCCV Bučany was shown expressively the individuality of better tested boars from own performance test. Their progeny achieved better results mainly in PMC and BF than progeny from a group of worse tested boars. Similar results stated *Demo et al. (1995)* and *Gráčik et al. (1995)*. In conditions of RIAP Nitra was not shown the superiority of individual boars or a group of better tested boars. There was found significant effect of dams on progeny performance. Other factors (pretest environments, differences in test conditions between boars and their progeny) had probably the effect on progeny peformance also. These results are in agreement with the studies of *Bates* and *Buchanan (1988)* and *Van Alst* and *Robison (1992)*.

Conclusion

The results confirmed the importance of evaluating the own performance traits of meat breed boars and combinations. It can be expected to have better progeny performance from better tested boars, however, it is necessary to give adequate attention not only to reproduction performance of dams but to fattening and carcass traits also. Further studies of pretest environmental effects and various types of genotype x environment interactions are needed.

UTICAJ PROIZVODNIH REZULTATA NERASTOVA NA TOVNOST I OSOBINE TRUPA POTOMAKA GAJENIH U RAZLIČITIM SREDINAMA

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Rezime

Proučavan je uticaj proizvodnih osobina mesnih nerastova na kapacitet tovnosti i vrednost trupa kod potomaka na dvema različitim oglednim farmama (SFCCV Bučani i RIAP Nitra). Praćen je prosečan dnevni prirast od rođenja do 100 kg žive mase, prosečna debljina leđne slanine i udeo posnog mesa, u spoljnim uslovima. Potomci nerastova držani su u parovima (nazimica i kastrirani nerast) i hranjeni standardnim smešama ad libitum i imali slobodan pristup vodi preko pojilica. Klanje je

urađeno kada su životinje distigle 100 kg (± 3 kg) žive mase. Dan posle klanja urađena je disekcija polutki. Ocenjivani su sledeći parametri: prosečan dnevni prirast i konzumacija hrane po 1 kg prirasta od 30 do 100 kg žive mase, težina na klanju, udeo primarnih mesnih delova, udeo šunke, poprečni presek mišića *M. Longissimus dorsi* i debljina leđne slanine. Nerastovi koji su imali bolje rezultate individualno pokazali su bolje rezultate i u odnosu na potomke koji su imali bolje osobine tovnosti i trupa od nerastova sa lošijim rezultatima na farmi SFCCV Bučani (+33 g PDP, -0.21 cm LS, +2.34 % udeo posnog mesa).U uslovima farme RIAP Nitra nije uočena superiornost individualnih nerastova ili grupe nerastova sa boljim rezultatima. Primećen je značajan uticaj majki na rezultate potomaka.

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Table 1. Effect of genotype, sire and dam on progeny performance at SFCCV Bučany
Tabela 1. Uticaj genotipa, oca i majke na rezultate potomaka na farmi SFCCV Bučani

Trait Osobina		Genotype (A) Genotip (A) $f_A = 3$	Sire (B) $f_{B:A} = 7$	Dam (C) $f_{C:BA} = 50$	Error Greška $f_e = 81$
Average daily gain, g	MS	51821.4329	37516.1068	13265.4013	7248.0475
	F	1.381	2.828*	1.830**	
Prosečan dnevni prirast,g					
Feed consumption	MS	0.3686	0.3568	0.1465	0.1170
per 1 kg gain, kg	F	1.033	2.435*	1.253	
Konzumiranje hrane po 1 kg prirasta, kg					
Slaughter weight, kg	MS	26.6150	6.7255	3.2905	2.6286
	F	3.957	2.044	1.252	
Težina na klanju, kg					
Proportion of prime	MS	136.3122	43.4561	8.6189	7.2341
meaty cuts, %	F	3.137	5.042**	1.191	
Udeo primarnih delova mesa, %					
Proportion of ham, %	MS	35.5410	11.7051	3.1666	2.2533
	F	3.036	3.697**	1.405	
Udeo šunke, %					
Eye muscle area, cm^2	MS	79.6146	81.8168	42.1954	27.9009
	F	0.973	1.939	1.512*	
Udeo M.long.dorsi, cm^2					
Average backfat	MS	1.8713	0.3388	0.0901	0.0931
thickness, cm	F	5.523*	3.763**	0.967	
Prosečna debljina leđne slanine, cm					

*P≤ 0.05 **P≤ 0.01

Table 2. Effect of genotype, sire and dam on progeny performance at RIAP Nitra
Tabela 2. Uticaj genotipa, oca i majke na rezultate potomaka na farmi RIAP Nitra

Trait Osobina		Genotype (A) Genotip (A)	Sire (B)	Dam (C)	Error Greška
		$f_A = 2$	$f_{B:A} = 7$	$f_{C:BA} = 30$	$f_e = 98$
Average daily gain, g	MS	2501.8110	16891.7704	12991.6448	3992.1265
	F	0.148	1.300	3.254**	
Prosečan dnevni Prirast, g					
Feed consumption	MS	1.6671	0.1389	0.1437	0.0796
per 1 kg gain, kg	F	12.003**	0.966	1.806*	
Konzumiranje hrane po 1 kg prirasta, kg					
Slaughter weight, kg	MS	6.5459	6.6600	6.0669	6.0283
	F	0.983	1.098	1.006	
Težina na klanju, kg					
Proportion of prime	MS	2.5146	3.7759	5.9797	5.5388
meaty cuts, %	F	0.666	0.631	1.080	
Udeo primarnih delova mesa, %					
Proportion of ham, %	MS	4.4313	2.8477	1.8742	1.5852
	F	1.556	1.519	1.182	
Udeo šunke, %					
Eye muscle area, cm^2	MS	68.7035	67.9320	46.0468	23.3217
	F	1.011	1.475	1.974**	
Udeo M.long.dorsi, cm^2					
Average backfat	MS	0.1631	0.2714	0.1663	0.0978
thickness, cm	F	0.601	1.632	1.699*	
Prosečna debljina leđne slanine, cm					

Table 3. Comparison of progeny performance in SFCCV Bučany in regard to sires
Tabela 3. Poređenje rezultata potomaka na farmi SFCCV Bučani u odnosu na očeve

Trait /Osobina (cm)	ADG (g)		FC (kg)		SW (kg)		PMC (%)		PH (%)		EMA (cm^2)		BF	
Sire	x	s	x	s	x	s	x	s	x	s	x	s	x	s
1. Pinkas 1008 (n = 10)	912.0	72.37	3.03	0.36	100.40	1.96	55.99	4.37	22.91	2.08	50.94	5.41	2.03	0.48
2. Pinkas 1011 (n = 12)	883.0	81.09	3.20	0.40	101.00	1.71	52.63	2.62	21.66	1.77	47.74	3.91	2.02	0.19
3. Pinkas 1028 (n = 14)	786.0	90.51	3.24	0.39	100.57	1.99	53.43	2.34	21.53	1.64	45.91	6.12	1.81	0.25
4. Valus 1006 (n = 12)	771.0	98.08	3.19	0.45	98.83	0.94	53.21	1.72	21.43	1.01	46.82	3.08	1.76	0.19
5. Valus 1007 (n = 12)	802.0	94.25	2.82	0.39	100.33	2.10	54.57	2.65	21.93	1.54	51.61	6.56	1.61	0.32
6.Fuessen 1012 (n = 14)	822.0	44.59	2.86	0.19	102.36	1.15	55.12	2.90	22.40	1.88	48.39	5.54	1.79	0.28
7.Fuessen 1014 (n = 10)	726.0	62.04	3.00	0.19	102.30	1.57	58.15	1.92	23.60	1.03	53.62	7.71	1.51	0.32
8. Jus 1007 (n = 12)	924.0	88.66	2.86	0.28	101.08	1.44	54.76	2.98	22.21	1.76	49.65	6.36	1.96	0.32
9. Jus 1012 (n = 10)	853.0	65.19	3.02	0.31	99.70	1.42	52.11	2.71	21.00	1.21	48.74	6.53	2.05	0.27
10.Ambre 1004 (n = 20)	863.0	96.48	3.04	0.40	100.20	1.88	55.89	3.12	22.75	1.79	50.05	5.97	1.52	0.40
11. Baron 1002 (n = 16)	845.0	80.90	2.76	0.40	100.88	1.89	59.79	2.54	25.13	1.45	53.39	5.38	1.32	0.19
Significant differences Značajne razike	7:1*, :8**		NS		NS		7:3,4*, :2,9** 11:10*, 11:2-6,8,9**		11:10* 11:2-6,8,9**		NS		11:1-3,6,8,9** 11:4*, 7:1,2,8* 10:1,2,8,9**	

Table 4. Comparison of progeny performance in RIAP Nitra in regard to sires
Tabela 4. Poređenje rezultata potomaka na farmi RIAP Nitra u odnosu na rezultate očeva

Trait Osobina	ADG (g)		FC (kg)		SW (kg)		PMC (%)		PH (%)		EMA (cm^2)		BF (cm)	
Sire	x	s	x	s	x	s	x	s	x	s	x	s	x	s
1. Lanzo 1003 (n = 15)	877.0	75.93	2.89	0.14	101.57	2.87	51.40	2.98	20.90	1.72	43.13	5.21	2.24	0.42
2. Lanzo 1007 (n = 10)	934.0	57.23	3.00	0.20	101.50	1.43	51.41	2.07	20.67	1.00	40.10	5.38	2.29	0.25
3. Jando 1002 (n = 18)	829.0	83.57	2.89	0.29	102.57	3.86	52.14	2.42	21.50	0.95	40.86	5.12	1.91	0.28
4. Jando 1009 (n = 10)	940.0	63.55	2.95	0.40	100.50	2.07	50.86	2.64	20.84	1.47	37.10	5.13	2.18	0.31
5. Hipro 1002 (n = 26)	872.0	89.81	2.94	0.16	101.85	2.56	51.82	2.84	20.91	1.34	41.27	4.89	2.24	0.41
6. Jus 1004 (n = 10)	880.0	97.93	3.26	0.38	101.60	1.58	51.91	2.14	21.35	1.11	42.15	6.50	2.01	0.26
7. Jus 1005 (n = 10)	904.0	90.69	3.23	0.56	100.40	1.58	52.11	2.83	21.93	2.05	44.20	6.55	2.03	0.46
8. Rahlen 1001 (n = 10)	865.0	71.94	3.43	0.41	101.10	2.02	50.54	1.56	20.86	1.02	39.80	5.01	2.30	0.40
9. Rahlen 1002 (n = 11)	884.0	40.81	3.03	0.40	102.00	1.61	51.26	1.40	20.96	0.92	41.14	3.19	2.11	0.20
10. Rahlen 1003 (n = 18)	870.0	72.95	3.24	0.20	100.78	2.10	51.96	1.54	22.02	0.92	45.22	6.20	2.08	0.19
Significant dfferences Značajne razlike	NS		NS		NS		NS		NS		NS		NS	

Table 5. Comparison of progeny performance at SFCCV Bučany according to level of sire`s own performance

Tabela 5. Poređenje rezultata potomaka na farmi SFCCV Bučani u odnosu na rezultate očeva

	Group of sires/Grupa očeva					
	ADG (g)		BF (cm)		LMC (%)	
	<650	≥650	<1.0	≥1.0	<59.0	≥59.0
Progeny performance Rezultati potomaka	825.0	858.0	1.66	1.87	53.78[1]	56.12[1]
Differences Razlike	+33.0		-0.21		+2.34	
Significance Značajnost	*		*		**	

[1] means proportion of prime meaty parts in progeny, * P≤ 0.05 ** P≤ 0.01/ prosečan udeo primarnih mesnih delova, P≤ 0.05; P≤ 0.01.

Table 6. Comparison of progeny performance at RIAP Nitra according to level of sire`s own performance

Tabela 6. Poređenje rezultata potomaka na farmi RIAP Nitra u odnosu na rezultate očeva

	Group of sires/Grupa očeva					
	ADG (g)		BF (cm)		LMC (%)	
	<650	≥650	<1.0	≥1.0	<59.0	≥59.0
Progeny performance Rezultati potomaka	888.0	871.0	2.11	2.11	51.56[1]	51.71[1]
Differences Razlike	-17.0		0.0		+0.15	
Significance Značajnost	NS		NS		NS	

[1] means proportion of prime meaty parts in progeny, * P≤ 0.05 ** P≤ 0.01 NS – non significant/ prosečan udeo primarnih mesnih delova, P≤ 0.05, P ≤ 0.01; NS – nije značajno