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EFFECT OF GENOTYPE ON FATTENING AND SLAUGHTER CHARACTERISTICS OF PIGS

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Background:
Over the past thirty years or so crossbreeding has become a dominant way of pig production on big industrial farms in Yugoslavia. Today a discontinuous system of three-breed crossing, most frequently of crossbred sows of F_1 generation and of special boar breeds, is in use on most farms.

Objectives:
The objectives of the study was to evaluate the effect of genotype on fattening and slaughter characteristics of pigs

Methods:
Investigations on the effect of genotype on fattening and slaughter characteristics of pigs were carried out at the Station for Investigating Pig Productivity, "Belgrade" Agricultural Combine, Padinska Skela-Belgrade, Yugoslavia.
Investigations were conducted on the most important fattening performances and slaughter values in three breed crosses of Large White (L), Swedish Landrace (S), Duroc (D), Belgian Landrace (B), German Landrace (G) and Hampshire (H). Comparative investigations comprised six combinations of three breed crosses (LS x B; LS x G; LS x H; LD x B; LD x G; LD x H) deriving from crossing between crossbred sows of F_1 generation (LS, LD) and boars of terminal breeds (B, G, H). A total of 300 fattening pigs, i.e. 50 head per genotype were examined.
Fattening pigs were slaughtered at 100 kg ± 2 kg body weight. After a 24-hour chilling of split carcasses at 4^0C, the length of *Os pubis – first rib* and backfat thickness on shoulder, mid-back and loin was measured on the right split carcass in a hanging position. A print of *M. longissimus dorsi* (MLD) was taken at the intersection of 13th and 14th ribs.
Results were analyzed by the method of least squares using the LSML programme package (Harvey, 1986).

Results and discussions:
During fattening three breed crosses achieved, on average, high growth intensity (781 g), good feed conversion (3.239 kg), reaching 100 kg body weight at average age of 175.59 days, i.e. in 90.54 fattening days (Table 1).
Dam breed did not have any effect on differences in daily gain and age at the termination of investigations. However, it had statistically significant effect on differences in feed utilization rate per kg of liveweight gain. Fattening pigs descending from LD dams achieved higher liveweight gain by 11 g, lower feed conversion by 64 g/kg of liveweight gain compared with fattening pigs descending from LS dams.
Sire breed had a very significant effect on differences in growth intensity, feed utilization rate per liveweight gain and age at the termination of fattening. Progeny of Hampshire breed had highest daily gain (796g) and lowest feed conversion (3.138kg).
Interaction between dam breed and sire breed did not have any statistically significant effect on differences in the most prominent results of fattening. Three breed crosses LD x H achieved highest daily gain (799 g) and lowest feed conversion (3.097 kg). In contrast, three breed crosses LS x B achieved lowest daily gain (759 g) and highest feed conversion (3.358 kg).
Our results are in agreement with those reported by Gajic and Pusic (1994) who found higher daily gain and better feed utilization rate in three breed crosses descending from Yorkshire x Duroc dams compared with three breed crosses descending from Yorkshire x Landrace dams. The said authors have also found, as evidenced by our investigations, that there are differences in daily gain and feed utilization rate between sire breeds.
For 300 fattening pigs in total, average chilled carcass weight is 79.33 kg, whilst differences occurring under the influence of other factors investigated are minimal and have no statistical significance.
In all three breed crosses average *Os pubis – first rib* length of split carcasses, backfat thickness and MLD area amounts to 80.46 cm, 31.57 mm and 34.25 cm^2.
Statistically significant difference in split carcass length was not found between dam breeds like between sire breeds. Progeny of German Landrace boars has longest split carcasses (81.43 cm), while progeny of Hampshire boars has shortest split carcasses (79.68 cm). In the investigated combinations of three breed crosses there are no significant differences in the *Os pubis – first rib* length of split carcasses. Three breed crosses LS x G have longest split carcasses (81.84 cm) compared with three breed crosses LD x H that have shortest split carcasses (79.60 cm). Results obtained lead to the conclusion that Duroc breed, Hampshire in particular, effected the shortening of split carcasses in fattening pigs of three breed crosses.
Three breed crosses descending from LD sows have statistically significantly thinner backfat than three breed crosses descending from LS sows (31.09 : 32.05 mm). Sire breed has no statistically significant effect on average backfat thickness in three breed crosses, despite the fact that progeny of Hampshire boars have, on average, thinner backfat by 1.20 mm compared with progeny of Belgian Landrace boars. Interaction between dam breed and sire breed has statistically

significant effect on average backfat thickness. Three breed crosses LD x H have thinnest backfat (29.97 mm), whilst three breed crosses LS x B have, on average, thickest backfat (33.03).

Dam breed and sire breed have statistically very significant effect on MLD area. Fattening pigs descending from LD dams have larger MLD area compared with fattening pigs descending from LS dams (34.91 : 33.59 cm^2). Variability of MLD area, as affected by sire breed, ranges from 32.09 (German Landrace) to 35.44 cm^2 (Hampshire). Interaction between dam breed and sire breed has not statistically significant effect on MLD area. Three breed crosses LD x H have largest MLD area (36.85 cm^2), whilst three breed crosses LS x G have smallest MLD area (31.78 cm^2).

Our results are in accord with those reported by Arent et al. (1990), Smith et al. (1990), Zeneci et al. (1990), Gajic and Pusic (1994) who established significant effect of terminal sire breeds on split carcass length, backfat thickness and MLD area. Most researchers found that Hampshire, as a terminal breed, has favourable effect on backfat thickness and MLD area in three breed crosses.

Conclusions:

Results of comparative investigations on six combinations of three breed crosses lead to the following conclusions:

1. Investigated combinations of three breed crosses achieved high average growth intensity (781 g), good feed conversion (3.239 kg), satisfactory backfat thickness (31.57 mm) and MLD area (34.25 cm^2).
2. According to the results they achieved during fattening from 30-100kg, the most prominent three breed crosses are LD x H that had highest daily gain (799 g), lowest feed conversion (3.097 kg), thinnest backfat (29.97 mm) and largest MLD area (36.85 cm^2).

Pertinent literature:

1. Arent, E., Pavlik J., Pulkrabek J., Fiedler J. (1990): Fattening capacity and carcass value variation in final pig hybrids sired by Hampshire and Duroc boars. Živočisna Vyroba, 52: 191-196.
2. Gajic Z., Pusic M. (1994): Genetic aspects of improving pig's productivity traits. Veterinarski glasnik 48 (5-6), 375-381.
3. Smith W. C., Pearson G., Purchas R.W. (1990): A comparasion of the Duroc, Hempshire, Landrace and Large White as terminal sire breeds of crossbred pigs slaughtered at 85 kg liveweight. I. Performance and carcass characteristics. New Zeland Journal of Agriculutal Research, 33, I, 89-96.
4. Zeneci N., Stoicea M., Doncean C., Petreanu M. (1992): The effect of terminal sires on the performance of commercial hybrid pigs. Animal Breeding Abstracts, 1992.

Table 1. - Fattening and slaughter results[a]

Genotype	n	Characteristics											
		Daily gain, g		Feed conversion, kg		Age at slaughter, days		Carcass length *Pubis* - 1st rib, cm		Backfat thickness, mm		Eye muscle area, cm^2	
		LSM	SE	LSM	SE	LSM	SE	LSM	SE	LSM	SE	LSM	SE
Average (μ)	300	781	5	3,239	0,016	175,59	0,67	80,46	0,12	31,57	0,22	34,25	0,25
Dam breed:													
LS	150	776	6	3,271	0,023	176,07	0,95	80,66	0,17	32,05	0,31	33,59	0,35
LD	150	787	6	3,207	0,023	175,12	0,95	80,26	0,17	31,09	0,31	34,91	0,35
F-test		NS		*		NS		NS		*		**	
Sire breed:													
B	100	765	8	3,325	0,028	179,21	1,16	80,27	0,21	32,23	0,37	35,21	0,43
G	100	784	8	3,256	0,028	172,38	1,16	81,43	0,21	31,45	0,37	32,09	0,43
H	100	796	8	3,138	0,028	175,19	1,16	79,68	0,21	31,03	0,37	35,44	0,43
F-test		*		**		**		**		NS		**	
Dam breed x Sire breed													
LS x B	50	759	11	3,358	0,039	180,78	1,64	80,38	0,30	33,03	0,53	34,94	0,61
LD x B	50	771	11	3,291	0,039	177,64	1,64	80,16	0,30	31,44	0,53	35,49	0,61
LS x G	50	777	11	3,277	0,039	172,96	1,64	81,84	0,30	31,03	0,53	31,78	0,61
LD x G	50	790	11	3,234	0,039	171,80	1,64	81,02	0,30	31,87	0,53	32,39	0,61
LS x H	50	792	11	3,178	0,039	174,46	1,64	79,76	0,30	32,10	0,53	34,03	0,61
LD x H	50	799	11	3,097	0,039	175,92	1,64	79,60	0,30	29,97	0,53	36,85	0,61
F-test		NS		NS		NS		NS		*		NS	

[a] LSM - Lest squares means, SE = standard error for the LSM, NS = not significant (P>5%), *P<5%, **P<1%.