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EFFECT OF GENOTYPE ON MEATINESS AND QUALITY OF PIG'S MEAT

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Background:
New breeding programmes, selection and crossbreeding have been launched in pig production in Yugoslavia to improve meatiness and quality of pig's meat. After the introduction of American breeds Duroc and Hampshire, imported according to a scheduled programme for developing elite (nucleus) herds of these breeds, investigations have become intensified, especially on big industrial farms and at Research Centres.

Objectives:
The objective of this study was to investigate effect of genotype on meatiness and quality of pig's meat

Methods:
Investigations on the effect of genotype on meatiness and quality of pig's meat were carried out at "Belgrade" Agricultural Combine, Padinska Skela-Belgrade, Yugoslavia.
Comparative investigations comprised six combinations of three breed crosses deriving from crossings between Large White (L), Swedish Landrace (S), Duroc (D), Belgian Landrace (B), German Landrace (G) and Hampshire (H), i.e. from crossings between crossbred sows of F_1 generation (LS, LD) and boars of terminal breeds (B, G, H). A total of 300 slaughter pigs of three breed crosses, i.e. 50 slaughter pigs per genotype were examined.
Pigs were slaughtered at 100 kg ± 2 kg body weight. After a 24-hour chilling of split carcasses at 4°C, the right carcass was subjected to a full tissue dissection using the method as described by Weniger et al. (1963). Indicators of meat quality were colour (Göfo number) and water binding capacity (WBC). Meat colour was determined by means of a photometer – Göfo apparatus - on a fresh cross-section cut between 13th and 14th ribs of a chilled *M. longissimus dorsi* (MLD). The WBC was measured by the compression method (Grauu and Ham, 1953) on a sample of MLD taken above 14th ribs 24 hours after slaughter. The size of the area (cm^2) wetted by juice squeezed out on a filter paper Schleisher-Schull No 589^3 Blauband ø 7 cm was a measure of WBC.
Results were analyzed by the method of least squares using the LSML programme package (Harvey, 1986).

Results and discussions:
Effect of genotype on meat yields of ham, MLD, shoulder and total meat yield of split carcasses as well as meat quality is presented in Table 1.
It should be pointed out that weight of chilled split carcasses averaged 79.33 kg, whilst differences occurring under the influence of the factors studied were minimal and had no statistical significance.
Total dissection of the high priced parts of split carcasses yielded 6.60 kg ham meat, 1.74 kg MLD and 4.13 kg shoulder meat, i.e. 40.82 kg meat or 52.37% relative to the weight of chilled split carcasses.
Effect of dam breed on meat yields of ham, MLD and shoulder as well as on total meat yield of split carcasses is statistically very significant. Progeny of LD dams, compared with progeny of LS dams, produced higher meat yields of ham (6.70 : 6.50 kg), MLD (1.78 : 1.69 kg), shoulder (4.22 : 4.05 kg) and total meat yield of split carcasses (41.38 : 40.27 kg , i.e. 53.05 : 51.70%).
Sire breed has statistically very significant effect on meat yields of ham, MLD and shoulder as well as on total meat yield of split carcasses. Progeny of Hampshire sires produced highest meat yields of ham (6.82 kg), MLD (1.78 kg) and shoulder (4.31 kg) as well as highest total meat yield of split carcasses (42.42 kg, i.e. 54.15%). In contrast, progeny of German Landrace sires produced lowest meat yields of ham (6.34 kg), MLD (1.64 kg) and shoulder (3.96 kg) as well total meat yield of split carcasses (39.42 kg, i.e. 50.95%).
Interaction between dam breed x sire breed has no statistically significant effect on yield of high priced cuts and total meat yield in split carcasses, respectively. Highest meat yields of ham (6.97 kg), MLD (1.84 kg) and shoulder (4.43 kg) as well as total meat yield of split carcasses (43.24 kg, i.e. 55.14%) were produced by three breed crosses of LD x H combinations, whilst three breed crosses of LS x G combinations produced lowest meat yield of ham (6.27 kg), MLD (1.60 kg) and shoulder (3.90 kg) as well as total meat yield of split carcasses (38.95 kg, i.e. 50.62%).
Our results are in accord with those reported by Gajic and Pusic (1994) who found that three breed crosses descending from Large White x Duroc dams produce higher meat yield of split carcasses compared with three breed crosses descending from Large White x Landrace dams. Our results also comply with reports of Arent et al. (1990), Blasco et al. (1994), Gajic and Pusic (1994) who established that sire breed has significant effect on meat yield of split carcasses. Higher meat yield in three breed crosses descending from Hampshire sires was established by Arent et al. (1990), Gajic and Pusic (1994).
Results pertaining to meat colour measures indicate that studied combinations of three breed crosses have, on average, satisfactory meat colour (70.87 Göfo units).

Dam breed has statistically significant effect on meat colour. Three breed crosses of LD sows have slightly darker meat colour than three breed crosses of LS sows (71.58 : 70.16 Göfo units).
Sire breed has no effect on meat colour. Progeny of Belgian Landrace x German Landrace boars have slightly paler meat colour than progeny of Hampshire boars (70.41 and 70.74 : 71.46 Göfo units).
Interaction between dam breed and sire breed has no effect on differences in meat colour with studied combinations of three breed crosses. The LS x B three breed crosses have palest meat colour (69.14 Göfo units), whilst LD x H three breed crosses have darkest meat colour 72.08 Göfo units).
The MLD samples have, on average, satisfactory WBC (11.10 cm^2).
Dam breed, sire breed, and interaction between dam and sire breed have no statistically significant effect on differences in meat WBC.

Conclusions:
Results of comparative investigations on the effect of genotype on meat yield of some individual body parts as well total meat yield of split carcasses and meat quality lead to the conclusions as follows:
1. Dam breed and sire breed has statistically significant effect on meat yields of ham, MLD and shoulder as well as on total meat yield in split carcasses. Three breed crosses of LD x H combinations have highest meat yield of split carcasses (55.14%).
2. Considering meat quality (Göfo values, WBC), meat of the investigated combinations of three breed crosses is satisfactory in respect of technological quality.

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. Blasco A., Cou P., Gispert M., Estany J., Soler Q., Destre A., Tibau J. (1994): Comparasion of five types of pig crosses. I. Growth and carcass traits. Livestock Production Science, 40, 2, 171-178.
3. Gajic Z., Pusic M. (1994): Genetic aspects of improving pig's productivity traits. Veterinarski glasnik 48 (5-6), 375-381.

Table 1. - Effect of genotype on meatiness and meat quality

Genotype	n	Characteristics											
		Meat of ham, kg		Meat of MLD, kg		Meat of shoulder, kg		Meat in the carcass, kg		Göfo units		WBC, cm^2	
		LSM	SE	LSM	SE	LSM	SE	LSM	SE	LSM	SE	LSM	SE
Average (μ)	300	6,60	0,03	1,74	0,01	4,13	0,02	40,82	0,15	70,87	0,22	11,10	0,09
Dam breed:													
LS	150	6,50	0,04	1,69	0,02	4,05	0,03	40,27	0,21	70,16	0,31	11,18	0,13
LD	150	6,70	0,04	1,78	0,02	4,22	0,03	41,38	0,21	71,58	0,31	11,02	0,13
F-test		**		**		**		**		**		NS	
Sire breed :													
B	100	6,64	0,05	1,80	0,02	4,13	0,03	40,64	0,26	70,41	0,37	10,81	0,15
G	100	6,34	0,05	1,64	0,02	3,96	0,03	39,42	0,26	70,74	0,37	11,23	0,15
H	100	6,82	0,05	1,78	0,02	4,31	0,03	42,42	0,26	71,46	0,37	11,20	0,15
F-test		**		**		**		**		NS		NS	
Dam breed x Sire breed													
LS x B	50	6,56	0,07	1,76	0,03	4,06	0,04	40,26	0,36	69,14	0,53	10,83	0,22
LD x B	50	6,72	0,07	1,84	0,03	4,21	0,04	41,01	0,36	71,68	0,53	10,78	0,22
LS x G	50	6,27	0,07	1,60	0,03	3,90	0,04	38,95	0,36	70,51	0,53	11,49	0,22
LD x G	50	6,42	0,07	1,67	0,03	4,01	0,04	39,89	0,36	70,97	0,53	11,10	0,22
LS x H	50	6,68	0,07	1,71	0,03	4,19	0,04	41,60	0,36	70,83	0,53	11,21	0,22
LD x H	50	6,97	0,07	1,84	0,03	4,43	0,04	43,24	0,36	72,08	0,53	11,19	0,22
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%.