QUALITY OF HALVES AND MEAT OF PIGS OBTAINED IN DIFFERENT MODELS OF CROSSBREEDING WITH LARGE YORKSHIRE

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Introduction

The use of different selection and crossbreeding models in modern production of pork results in a bigger production range and higher yield of meat in halves. Fattening hybrids are obtained by permanent selection in pure races and their two-, three- and four-race cross-breeding *e.g.* maximal use of heterozys and complementarity. The characteristics of these hybrids are high growth and good quality of halves *e.g.* best characteristic of each cross-bred race. The quantitative values of the above characteristics are considered to have reached their maximum, however, other research (Fischer *et al.*, 2000; Oliver *et al.*, 1999), and our previous experience (Džinić *et al.*, 2001; Tomović *et al.*, 2003) point to the fact that the higher the meat yield in halves, the lower the technological meat quality. The high incidence of extremely changed quality – PSE meat – is unacceptable. The aim of this work was to find how the set model of selection and cross-breeding of pigs with Large Yorkshire as the basic race, affects the meat yield in halves, *e.g.* the quality of *M. semimembranosus.*

Materials and Methods

The investigations included 7 genotypes of pigs obtained as the result of selection and crossbreeding on a pig farm, (»Čenej« IM »Neoplanta«) in Novi Sad, Serbia and Montenegro: Large Yorkshire (LY=29); Large Yorkshire♂ x Svedish Landrace♀ (LY x SL=36); Large Yorkshire♂x(Large Yorkshire♂xSvedish Landrace♀)(LYx(LYxSL))=26; Duroc♂x(Large Yorkshire ♂ xSvedish Landrace ♀)(Dx(LYxSL))=25; Hampshire ♂x(Large Yorkshire♂xSvedish Landrace♀)(Hx(LYxSL))=18);(Duroc♂xPietren♀)♂x(LargeYorkshire♂xSvedishLandrace♀)♂ ((DxP)x(LYxSL)=20);(Hampshire♂ x Pietren♀) ♂ x (Large Yorkshire♂x Svedish Landrace♀)♂ (HxP)x(LYxSL)=10. The pigs were fed standard feed during fattening, and pigs of approximately uniform age and mass were transported to the abattoir (*ca* 15km). After a night's rest, the pigs were stunned, slaughtered and processed by the standard technological procedure.

The pH_i was determined in right halves 45 min p.m., and pH_u 24h *post mortem*., in caudo-medial part *of M. semimembranosus* (MS), using the portable pH-meter ULTRA X. Quality and class (SEUROP) of meat were determined by the partial dissection method of cooled left halves (Commission Regulation (EC) No 3127/94., 1994; Walstra and Merkus, 1996). Samples (200-300g) taken from the caudio-cranial part (MS) were used for the determination of $colour_u$ and water holding capacity (WHC_u). Colour was determined using the MOM Colour 100 device and the colour charateristics were expressed in CIEL*a*b* system (Robertson, 1977). WHC_u was determined by compression method and expressed as % of bound water (Grau and Hamm, 1953). On the basis of parameters and criteria for MS quality (Petrović, 2000; Džinić, 2005) (PSE: pH_i<5.8, pH_u<6.2, WHC_u<50%, L*>50; RSE: pH_i<5.8, pH_u<6.2, WHC_u<50%, L*=43-50; RFN: pH_i>5.8, pH_u<6.2, WHC_u>50%, L*=43-50; PFN: pH_i>5.8, pH_u<6.2, WHC_u>50%, L*>50; DFD: pH_i>5,8, pH_u>6.2, WHC_u>70%, L*<43), the incidence of different MS quality in the investigated hybrids was determined.

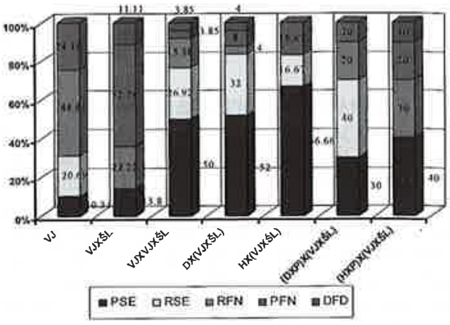
Results and Discussion

The highest average relative meat yield in halves was found in four-race hybrids (H×P)×(LY×SL) – 58.35% (class E), folowed by four-race hybrids (D×P)×(LY×SLe). with average relative meat yield 57.85% (class E), reciprocal hybrid LY×(LY×SL) – 57.39% (class E), LY rac – 56.75% (class E), three-race hybrids H×(LY×SL) – 56.21% (class E), three-race hybrids D×(LY×SL) – 54.52% (class U), while the two-race hybrids LY×SL had the lowest average relative meat yield – 53.9% (class U). The difference of mean values of meat yield between LY race and two-race hybrids LY×SL is statistically significant (P > 0.05). Statistically significant difference of mean values of meat yield, determined by partial dissection was also found between two-race hybrids LY×SL and hybrids LY×(LY×SL), (D×P)×(LY×SL), (H×P)×(LY×SL); as well as between hybrids D×(LY×SL) and (D×P)×(LY×SL) with 95 probability. The analysis of meat yield values, obtained by partial dissection of pig halves, showed that the applied selection and crossbreeding model resulted in the effect of complementarity (Cartwright, 1970). The produced lines of commercial hybrides (H×P)×(LY×SL) and (D×P)×(LY×L) are characterized by high quality of halves, however, further work on quality improvement of sow LY×SL, showed that quality can be higher. The results presented in Figure 1 show that the incidence of DFD muscles (SM) in two-race hybrids LY×SL is 11.11%, of reciprocal three-race LY×(L×SL) 3.85%, three-race D×(LY×SL) and four-race (H×P)×(LY×SL) 10%. The highest incidence of PFN muscles was found in halves of two-race hybrids LY×SL – 52.78%. The incidence of RFN muscles (SM) in halves of pure race LY was 44.83%, lower in four-race hybrids (H×P)×(LY×SL) – 30%, and very low in other investigated halves, in the range from 4%, for three-race hybrids D×(LY×SL) to 22.22% in two-race hybrids LY×SL. In SM muscles from halves of four-race hybrids, the incidence of RSE was the highest – 40%. The incidence of PSE muscles was very high; the highest in three-race hybrids H×/LY×SL) – 66.66%, in multi-race hybrids D×(LY×SL), LY×(LY×SL), (H×P)×(LY×SL) and (D×P)×(LY×SL) the incidence was 52%, 50%, 40% and 30%, respectively.

Table 1: Effect of genotype on meat yield (%) class of halves.

Genotype	Prinos mesa (%)	Klasa polutki
VJ	56,75^{a} ± 4,27	E
VJ×ŠL	53,90^{b} ± 3,85	U
VJ×(VJ×ŠL)	57,39^{a} ± 5,68	E
D×(VJ×ŠL)	54,52^{a} ± 4,01	U
H×(VJ×ŠL)	56.21^{a} ± 2,45	E
(D×P)×(VJ×ŠL)	57,85^{a} ± 4,67	E
(H×P)×(VJ×ŠL)	58,35^{a} ± 4,45	E

Figure 1: Effect of genotype on incidence of different meat and quality of *M. semimembranosus*.



Conclusions

The set selection and crossbreeding model resulted in lines of hybrids with average meat yield in halves from 53.9% (LY×SL) to 58.35% (H×P)×(LY×SL). The higher the level of crossbreeding, the higher the meat yield in halves; however, the increase of meat yield is followed by decrease of technological meat quality.

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