

## THE EFFECT OF PIG BREEDS ON SOME CHARACTERISTICS OF PORK IN ESTONIA

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**Key words:** crosses of pigs, boar lines, pork quality, lean meat content.

**Abstract.** The aim of the present research work was to investigate possibilities to improve pork quality (to increase lean meat content and to decrease PSE-meat) by using the crosses of pigs. The following crosses were under investigation: Estonian Landrace (EL) x Estonian Yorkshire (EY); Finnish Yorkshire (FY) x Estonian Yorkshire (EY), and Estonian Yorkshire as control. Carcass weight, pH<sub>1</sub>, pH<sub>24</sub>, pH<sub>48</sub>, lean meat content, water, ash, protein, fat, iron and zinc content, water binding capacity (WBC), colour and sensoric characteristics were determined. Maximum value of lean meat content in carcasses (55.42%) was observed in progeny of boar line Jetty 238 (FYx EY); among FYx EY most of the carcasses belonged to S+E-class. Meat with better WBC was obtained from the crosses FYx EY. Meat with higher Fe and Zn content was got from the crosses ELx EY; the meat of EY was of higher sensoric quality. In perspective it is expedient to carry on the investigation of pork quality of different crosses to produce pork with high technological characteristics.

**Introduction.** At present the quality of pork, produced in Estonia, is relatively unstable and low - low lean meat content and high level of PSE-meat. Our experimental data from 1991-95 showed, that the lean meat content of carcasses, produced on the Tartu Experimental Pig Farm (TEPF) was 52.5%. Above 50% of investigated pork carcasses was PSE-meat. As it is known from the literature the quality characteristics of pork can be improved by raising and using the crosses of pigs.

**Objectives.** The aim of this research work was:

- to investigate quality characteristics of pork produced on the TEPF on the basis of crosses and boar lines;
- selection of boar lines for breeding better crosses of pigs to produce high-quality pork.

**Materials and methods.** The experiments were carried out on 100 pig carcasses on TEPF in 1996. Piglets were brought from different cooperatives or farms. The origin by breeds and boar lines was known. The following crosses were under investigation: Estonian Landrace x Estonian Yorkshire - (EL x EY); Finnish Yorkshire x Estonian Yorkshire - (FY x EY), and Estonian Yorkshire as control. Carcass weight, pH<sub>1</sub> and lean meat content /Verordnung... 1990/ were determined after slaughtering. pH<sub>24</sub> was measured after chilling 24 hours with Sentron 1001. Water content - ISO 1442-73; ash content - ISO 936-78; fat content - GOST 23042-85; protein content - ISO 937-78; water binding

Table 1. Carcass and meat characteristics of different crosses

Boar	Crosses		Carcass characteristics			Pork characteristics							
	B	S	Carcass weight, kg	pH <sub>1</sub>	Lean meat content, %	pH <sub>24</sub>	pH <sub>48</sub>	Colour, max 9 points	Water content, %	Fat content, %	Ash content, %	Protein content, %	Water binding capacity, %
Ula 8351	EL x EY		70.0	6.2	53.15	5.4	5.4	5.1	74.26	0.65	1.64	23.21	45.83
Ponsori 250	FY x EY		68.0	6.2	53.08	5.4	5.4	5.5	73.92	1.46	1.30	23.32	46.88
Jetty 238	FY x EY		71.4	6.4	55.42	5.5	5.5	5.1	74.22	1.67	1.32	22.81	46.58
Control	EY x EY		67.4	6.3	54.75	5.5	5.5	5.1	74.16	1.58	1.32	22.96	44.57
Mean values			68.5	6.3	54.39	5.5	5.5	5.1	74.15	1.45	1.36	22.88	45.43

N.: EL - Estonian Landrace; EY - Estonian Yorkshire; FY - Finnish Yorkshire; B - boar; S - sow.

capacity (WBC) - method by Graw and Hamm; taste, odour and colour - sensorically; Fe and Zn content at Rakvere Meat Plant by using atomabsorption spectrophotometer "Shimadzu AA-660".

**Results and discussion.** The data of carcasses and meat quality are presented in Table 1. The distribution of carcasses by pH<sub>24</sub> and by lean meat content are given in Tables 2 and 3. Mean values of all 100 carcasses were as follows: carcass weight - 68.5 kg; pH<sub>1</sub> - 6.3; pH<sub>24</sub> - 5.5; pH<sub>48</sub> - 5.5; water content - 74.15%; fat content - 1.45%; ash content - 1.36%; protein content - 22.88%; WBC - 45.43%; lean meat content - 54.39% and colour - 5.2 points. Maximum value of lean meat content in carcasses (55.42%) was observed in progeny of boar line Jetty 238 (FY x EY), followed by EY x EY - 54.75%; minimum value was observed in Ponsori 250 (FY x EY) - 53.08%. Among FY x EY most of the carcasses belonged to S + E class: in progeny of boar Ponsori 250 - 60.0% and in progeny of boar Jetty 238 - 53.0%. Among EL x EY only 28.6% of carcasses belonged to S + E class.

Meat with better WBC was obtained from the crosses FY x EY: in progeny of boar Ponsori 250 - 46.88% and in progeny of boar Jetty 238 - 46.58%. Minimum value of WBC (44.57%) was observed in control (EY x EY).

66.0% from all investigated meat belonged to PSE-meat and only 34.0% from meat was with normal characteristics. From meat of progeny Jetty 238 (FY x EY) only 11.7% belonged to normal-meat; 88.3% of meat belonged to PSE-meat.

Meat with higher Fe and Zn content was got from crosses EL x EY: Fe - 5.61 mg/kg; Zn - 21.76 mg/kg.

Table 2. Distribution of carcasses by pH<sub>24</sub> on the basis of different crosses

Boar	Crosses		Distribution of carcasses, %		
	B	S	PSE (pH≤5.59)	N (5.6≤pH≤6.29)	DFD (pH≥6.3)
Ula 8351	EL x EY		64.3	35.7	-
Ponsori 250	FY x EY		66.6	33.4	-
Jetti 238	FY x EY		88.3	11.7	-
Control	EY x EY		59.3	40.7	-
Mean	value		66.0	34.0	-

Table 3. Distribution of carcasses by EUROP-classification on the basis of different crosses

Boar	Crosses		Distribution of carcasses, %					
	B	S	S	E	U	R	O	P
Lean meat content, %			≥60	55...60	50...55	45...50	40...45	≤40
Ula 8351	EL x EY		14.3	14.3	35.7	21.4	14.3	-
Ponsori 250	FY x EY		20.0	40.0	27.0	6.5	6.5	-
Jetti 238	FY x EY		17.7	35.3	41.2	5.8	-	-
Control	EY x EY		22.2	24.1	40.7	13.0	-	-
Mean	value		20.0	27.0	38.0	12.0	3.0	-

**Conclusions.** 1. Carcasses with better quality characteristics were obtained from crosses FY x EY: lean meat content - 55.42% and 53.08%; S+E class - 60.0% and 53.0%; WBC - 46.88% and 46.58% respectively.  
2. The best boars were Ponsori 250 and Jetti 238 (FY).  
3. In perspective it is expedient to carry on the investigation of pork quality of different crosses to produce pork with high technological characteristics.

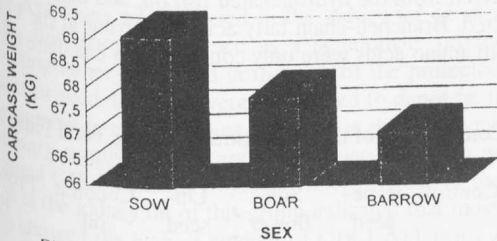


Fig. 1. The effect of sex on carcass weight.

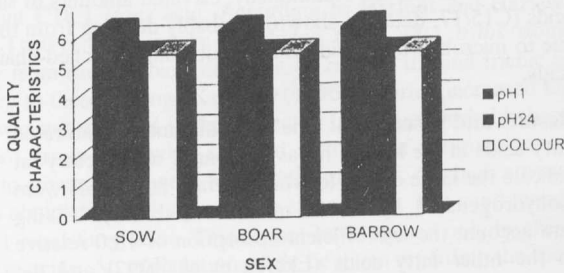


Fig. 2. The effect of sex on pH<sub>1</sub>, pH<sub>24</sub> and colour.

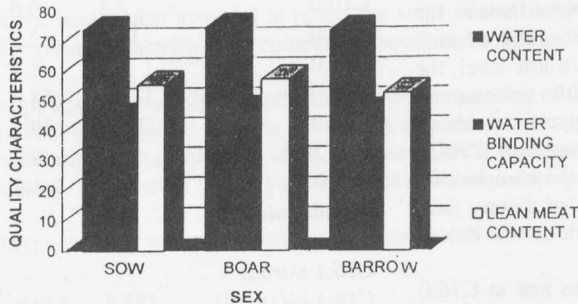


Fig. 3. The effect of sex on some quality characteristics.

**References:** 1. GOST 23042-85. Meat products. Determination of fat content  
2. Grau, R. and Hamm, R. 1953. Eine einfache Methode zur Bestimmung der Wasserbindung in Muskel. Naturwissensch. 40:29-30  
3. ISO 936-78. Meat products. Determination of ash content  
4. ISO 937-78. Meat products. Determination of nitrogen content  
5. ISO 1442-73. Meat products. Determination of moisture content  
6. Perkin-Elmer. Analytical methods for Atomic Absorption Spectrophotometry. Norwalk, CT, USA, 1971  
7. Verordnung über gesetzliche Handelsklassen für schweinehälften. Vom 16. August 1990. Bundesgesetzblatt. Jahrgang 1990, Teil 1.