

SOME BIOLOGICAL CHARACTERISTICS OF HYBRIDS (*SUS DOMESTICUS* X *SUS SCROFA* L.)

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As wild boars (*Sus scrofa* L.) are progenitors of pigs (*Sus domesticus*), they can copulate reciprocally and give prolific progeny. However, wild boar and pig not only have different appearance, but also different biological features. In 2004 – 2008, in stockyard located in Telšiai district (Lithuania), two groups of investigated animals were formed: I – Lithuanian Whites copulated with a wild boar, striving to receive hybrids of the first generation (F_1), having 50 % of wild boars blood, and II – female hybrids, one more time copulated with wild boar, striving to receive hybrids of the second generation (F_2), having 75 % of wild boars blood. The aim of this study was to investigate the growth rate, meatiness and meat quality of F_1 hybrids. It was indicated that in the period of control (approx. from 30 to 80 kg weight) average daily gain of hybrids (n=12) was 474g. Entire boars grew faster (490 g), gilts - longer (457 g). Five entire boars (approx. 100 kg weight) were slaughtered for evaluation of meatiness traits and meat (*musculus longissimus dorsi*) quality, while gilts were left for further breeding. Average half carcass length of hybrids was 95 cm, backfat thickness at 6–7 and last ribs, respectively, 29 and 16 mm, lean meat content 50.7 %. Their meat pH_{48} was 5.48, redness 18.16 ext. u., water holding capacity 58.15 % and cooking loss 27.35 %. In the dry matter of the meat 23.62% of protein, 1.54% of fat and 1.13% of ash were found. In comparison with Lithuanian White pigs, the hybrids grow more slowly, their carcass have lower meatiness traits. However, meat of F_1 hybrids has more intensive red colour, less cooking losses and is characterised by good chemical composition in respect of nutritive value. Besides that, the meat of male hybrids has very good palatability without negative specific aroma.

Key words: wild boar, pig, hybrid, growth, meatiness, meat quality.

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INTRODUCTION

As wild boars (*Sus scrofa* L.) are progenitors of pigs (*Sus domesticus*), they can copulate reciprocally and give prolific progeny. There are 26-28 subspecies of wild boars. In Lithuania there can be found Middle European wild boar (*Sus*

scrofa scrofa) (Baleišis et al. 2003). Cultural pigs of Lithuanian White breed are coming of aboriginal (local) pigs, and the latter – of Middle European wild boar, found in our country (Makoveckas 1986). Because of long-lasting evolution domestic pigs are significantly different from their wild ancestors. Human being,

domesticating wild pigs (wild boars), changed their natural living conditions. Because of sufficient and abundant feeding, metabolism of pigs has changed, bones have become thinner, covering of body and the colour of bristle has changed. Domestic animals became short-legged, productivity was changing, and the exterior was changing in its direction. For wild boars the front part of body is more developed, when for pigs – hinder and middle parts of the body. Activity of sexual glands has changed as well. Wild boars are rutting one, more rarely – two times a year, when seasonality of copulating of pigs has vanished. Pregnancy of wild and domestic sows lasts approximately 4 months, however their prolificacy is different. Wild sow is delivering on average 5 wild piglets (from 1 to 10) (Baleišis et al. 2003), but pigs are delivering 10-14 and more piglets (Jančienė 2005). Prolificacy of domestic pigs also depends on their breed. Average litter size of Lithuanian Whites reaches 11.2 piglets (Džiaugys et al. 1998, Klimas et al. 2006). Domestic pigs are sexually maturing in their age of 5-6 months (Jančienė 2005), and wild boars – in the next year of their life (Baleišis et al. 2003). Pigs have become calmer, their aggressiveness has decreased, therefore they are more rapidly growing and accumulating fat in hypodermic and muscular tissues. However, wild boar and pig not only have different appearance, but also different biological features. It should be noted that in Great Britain, Poland and other countries pig and wild boar hybrids meat and its products is also becoming popular (Marchiori & Felicio 2003, The British Wild Boar Association 2005, Szczepanski et al. 2007, Szmanko et al. 2007).

Though in Lithuania wild boars are prevalent in the wild, breeding of them in stockyards has also been started. In the year 2004 there were 26 stockyards of such kind in our country. In some stockyards – farms experiments of their hybridization with pigs on exceptional cases are also being accomplished. It was determined that when increasing a part of wild boar genes (till 75%), litter size of pigs is decreasing and approaching the prolificacy typical to wild boars. When copulating white homozygous pigs of

Lithuanian White breed with boars, in the first generation (F_1) white colour is dominating, and when copulating white, but heterozygous in respect of colour female hybrids with wild boar, in the second generation (F_2) hybrids of white colour and striped (torched) ones are distributing in proportion of 1.25:1 (Klimas & Klimienė 2008).

The aim of this study was to investigate the growth rate, meatiness and meat quality of F_1 hybrids (pigs of cultural breed x wild boar).

MATERIAL AND METHODS

Investigation has been fulfilled in the period of the years 2004 – 2008 in Telšiai district A. Vaitkevičius farm and in 1 ha stockyard equipped nearby. After evaluation of the territory for suitability to keep wild boars in the year 2003, State Food and Veterinary Service of Telšiai district determined that the object corresponds to requirements of rules for keeping wild animals in captivity, therefore Department of Environment Protection of Šiauliai region issued the licence No. 14 for equipping a stockyard – farm. There two groups of investigated animals were formed: I – Lithuanian Whites copulated with a wild boar, striving to receive hybrids of the first generation (F_1), having 50 % of wild boars blood, and II – female hybrids, one more time copulated with wild boar, striving to receive hybrids of the second generation (F_2), having 75% of wild boars blood. Wild boars, pigs and their hybrids older than 2 months have been fed by the same feedstuff (flour of barley, peas and wheat), supplementing them with minerals and vitamins additives. Offsprings till 2 months of age have been fed by special starter compound feed, produced in stock company “Kretingos grūdai”. Rations prepared according to the recommended feeding standards. For experiment purebred Lithuanian White gilts were brought from the „Berka“ breeding centre (Kelmė district).

Growth rate. Twelve F_1 hybrids (six entire boars and six gilts) were selected at the age of 111 – 116 days for control fattening test. During the control

period (approx. from 30 to 80 kg weight), housing and feeding conditions in the stockyard – stable were equal for all fattening animals. When the hybrids were grown to approx. 80 kg weight, their fattening length, average daily gain and age in days from birth were estimated.

Control slaughter. Five entire boars (approx. 100 kg weight) were slaughtered at the meat – processing plants for evaluation of meatiness traits and meat (*musculus longissimus dorsi*) quality, while gilts were left for further breeding. Lean meat percentage of the fresh carcasses was determined with apparatus „Fat-o-meter“(FOM). Other meatiness traits as half carcass length, backfat thickness and loin lean area of cooled left carcasses (at 0...+4 °C in 24-hours period) was defined according to the accepted methodology (Saikevičius 2003).

Muscle samples (500 g) for the meat quality evaluation were taken at the last rib from *musculus longissimus dorsi* after 48 hours of control slaughter. The quality studies of meat were carried out at the Lithuanian Veterinary Academy by using commonly accepted methods. pH of meat was determined by ISO 2917:1999, colour - with Minolta Chroma Meter by measuring the lightness (L), redness (a) and yellowness (b), water holding capacity by the method of Grau and Hamm as described by G. Offer and P. Knight (1988), cooking loses by the Warner – Bratzler test, dry matter content by drying samples at 105 °C, protein content according to Kjeldahl method, intramuscular fat by ISO 1443:1973, ash (mineral matter) by ISO 936:1998.

Statistical analysis. The investigation data were processed using statistical package Statistica for Windows version 6.0 (StatSoft 2001) and following the basic guide to the statistical

analysis of biological data by L. A. Tucker (2003). Reference to the pig breeding record (Rimkevičius et al. 2008), the investigation data of hybrids were compared with data of purebred Lithuanian White pigs kept in the breeding centre of „Berka“.

RESULTS AND DISCUSSION

It was indicated (Table 1) that in the period of control fattening (approx. from 30 to 80 kg weight) average daily gain of hybrids was 474 g. Entire boars grew faster (490 g), gilts – longer (457 g). Hybrids of F₁ generation reached the weight of 80 kg in 211 days. Pigs of such age already weigh 100 kg and more (Klimas et al. 2006, Rimkevičius et al. 2008). Therefore, hybrids are growing more slowly than pigs (Szczepanski et al. 2007), however more rapidly than wild boars (The British Wild Boar Association 2005).

Compared to Lithuanian Whites (Table 2), backfat of F₁ hybrids at 6–7 rib was by 6.7 mm thicker, and lean meat content in the carcass – by 4.0% lesser. The lesser muscularity of hybrids was determined not only by thicker backfat, but also by smaller loin lean (*musculus longissimus dorsi*) area (36.2 cm²). Besides that, half carcasses of investigated animals were by 3.0 cm shorter than of pigs. According to the data of other research (Szczepanski et al. 2007), carcass of hybrids have lower meatiness traits than pigs of cultural breed.

Animal muscle consists of both red and white fibres. In the wild boar and the domestic pig, the ratio of these fibres is virtually the direct opposite of the other. Wild boar muscle is structured 70 % red fibre to 30 % white whereas the domestic pig comprises 20 % red to 80 % white. This diversity

Table 1. Growth rate of F₁ hybrids (approx. from 30 to 80 kg weight)

Gender	No. of animals	Initial weight, kg	Finish weight, kg	Fattening length, d.	Daily gain, g	Age from birth, d.
Male	6	31.0±1.2	79.0±2.0	98±0	490±15	210±1
Female	6	30.2±0.8	75.0±2.4	98±0	457±22	212±1
Total	12	30.6±0.7	77.0±1.5	98±0	474±13	211±1

affects not only the colour and texture of the two meats but the taste too (The British Wild Boar Association 2005). Referring to the data of investigation (Table 3), wild boars really had positive influence on hybrids meat quality, especially on its physical features. The meat of F₁ hybrids has by 3.58 ext. u. more intensive red colour and by 1.35 % less cooking losses than Lithuanian White pigs. The meat of male hybrids is characterised by good chemical composition too (Table 3). Protein in the dry matter of their meat was by 0.20 % higher and intramuscular fat by 0.21 % lower than those of domestic pigs. Analogous tendency in investigations of pig and wild boar hybrids meat quality was determined by Polish scientists as well (Szczechanski et al. 2007, Szmanko et al. 2007).

The use of entire male pigs for pork production is limited because their meat is affected by the presence sensory defect, known as boar taint. This defect on the meat of entire boars depends

on metabolic of androstenone and skatole (Babol et al. 1999, Font et al. 1999). However, the meat of all slaughtered male hybrids has very good taste without negative boar taint. It can be supposed that wild boar is suppressing (retarding) sexual maturation of entire male hybrids, therefore their meat in the first year of life has no specific aroma.

CONCLUSIONS

In comparison with Lithuanian White pigs, the hybrids grow more slowly, their carcass have lower meatiness traits. However, meat of F₁ hybrids has more intensive red colour, less cooking losses and is characterised by good chemical composition in respect of nutritive value. Besides, the meat of male hybrids has very good palatability without negative specific aroma. Consequently, biological characteristics of pig and wild boar hybrids allow enriching assortment of qualitative meat and its products.

Table 2. Meatiness traits at 100 kg weight

Item	F ₁ hybrids	Lithuanian White pigs*	hybrids/pigs (±)
Lean meat %	50.7±0.6	54.7	-4.0
Half carcass length, cm	95.0±0.5	98.0	-3.0
Backfat thickness:	At 6-7 rib, mm	29.0±0.6	+6.7
	At last rib, mm	16.0±0.8	-1.5
Loin lean area, cm ²	36.2±1.2	38.3	-2.1
Ham weight, kg	11.5±0.2	11.8	-0.3

Table 3. Physicochemical parameters of meat (*musculus longissimus dorsi*) at 100 kg weight

Item	F ₁ hybrids	Lithuanian White pigs*	hybrids/pigs (±)
Physical parameters:			
pH ₄₈	5.48±0.02	5.48	0
Colour ext. u.:	Lightness (L)	42.27±1.19	-10.96
	Redness (a)	18.16±0.21	+3.58
	Yellowness (b)	5.56±0.21	-1.67
Water holding capacity, %	58.15±0.67	57.67	+0.48
Cooking loss, %	27.35±0.99	28.70	-1.35
Chemical composition:			
Dry matter, %	26.68±0.36	26.05	+0.63
Protein, %	23.62±0.25	23.42	+0.20
Fat, %	1.54±0.12	1.75	-0.21
Ash (mineral matter), %	1.13±0.01	1.17	-0.04

* the data of pig breeding record (Rimkevičius et al. 2008)

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