

MUSCLE CONTENT IN PIG CARCASSES OF DIFFERENT GENOTYPES

Ilie ROTARU, Serghei SECRIERU

The State Agrarian University of Moldova, 58, Mircesti str., MD 2049, Chisinau,
Republic of Moldova, Phone: +373 22432083, E-mail: i.rotaru@uasm.md

Corresponding author email: i.rotaru@uasm.md

Abstract

The objective of this experiment was to determine the effect of diverse production systems on pig performance, muscle characteristics, and their relation to pork quality measures. Carcasses were evaluated with two methods: the Zwei Punkte method and UE reference method (hams, chests, shoulders and chops were dissected into bone, skin, fat and lean). The received results certify a higher quality of meat in experimental groups, with significant differences.

Key word: breed, carcasses, genotype, hybrid, meat.

INTRODUCTION

Nowadays, the preferences of pig breeders are aimed for achieving fast growing animals and low specific consumption, while the consumers and processors request housing with higher percentage of muscle tissue and qualitative meat. [5] state that hybrids are animals obtained after crossing two, three or even four races or groups of animals. In comparison with forms from which it were obtained, hybrids result from a larger production use more efficient food, are more resistant to diseases and have more important advantages. [2], say that crossing different races of pigs with different qualities create the heterosis phenomenon. Heterosis is a phenomenon which appears at the hybridization between two or more animal races with different heredity, having as a result individuals with special qualities and exceptional productivity especially the growth of vitality or adjustment power. Heterosis is caused by heterozygous and represent a high value towards character average between descendants, causing an excess of positive

characters towards parents and which appears as a result of hybridization [1] [3] sustain that the value of carcasses is represented by the content of muscle tissue in carcass, protein composition and the ratio of essential aminoacids, like digestability and assimilation of protein in the body. Thus, it was made a study, in what concerns the determination of muscle tissue percentage in pig carcasses, of different genotypes.

MATERIAL AND METHOD

The experiment was accomplished in the unit of swine growth and weight gain, Vergecom, Hincesti, r. Moldova. To obtain hybrids as maternal form there were used sows of Yorkshire race and the paternal form represented by Hampshire, Landrace and Pietrain breed boars and biracial boars of Landrace and Pietrain. To obtain experimental biologic material, there were formed five lots of piglets which will be presented in the scheme below

Table 1. The scheme of the experiment

Lot	Parental forms		Result	
	maternal	paternal	sows	Piglets at fattening
I	Yorkshire	Yorkshire	6	15
II	Yorkshire	Landrace	6	15
III	Yorkshire	Hampshire	6	15
IV	Yorkshire	Landrace x Pietrain	6	15
V	Yorkshire	Pietrain	6	15

During gestation, sows were fed in analog conditions and forms, using combined feeds of complete value which provided the needs in nutrients. The feeding recipe represented : 35% of corn, 35% of barley, 10% of soy, 10 of marc, 4% of meat-bone meal, 3% of bran, 1.5% of forage chalk, 1% of premix, 0.5 % salt.

After slaughter weight was determined using the total mass

In order to establish the muscular mass percentage value two methods were used:

1. Caracas section using the EU reference method which derivates from the german DLG approach and dissection of the main parts (leg, shoulder, chest, chop). These parts were sectioned by separation the muscles, bones, skin and fat (subcutaneous & inter muscular). The calculation of the meat percentage in carcass is made using the following formula:

Y = meat percentage in carcas;

C = 1,3 (constant factor);

J = the section mass before dissection;

SSF = the mass of subcutaneous fat + skin;

IF = the weight of intermusculat fat;

B = the bones weight;

T = sirloin mass;

Σ = suma greutateilor porțiunilor: pulpa, spata, cotletul și pieptul;

12

Σ = total weight of 12 components

2. Method Z.P. (Zwei Punkte) consist in performing of 2 linear measurements on the carcas: the thickness of the fat layer covering

the muscle „Gluteus medius” which includes the skin and meat thickness on a straight line between the medullary canal and the anterior tip of the „Gluteus medius” muscle.

Based on the 2 methods described above, the muscular percentage is calculated by following the algorithm:

RESULTS AND DISCUSSIONS

In similar nutritional and keeping conditions, the growth and developing capacity of the experimental piglet’s carcasses showed a wide range of results:

The previous tables results demonstrate a higher developing rate of muscular mass in the whole range of carcasses for the Yorkshire X Pietrain breed as following: 64.92% for legs, 55.31% for chop, 60.54% for shoulder, 55.17% in the chest area. Opposite results were obtained from the pure Yorkshire experimental pigs – they showed the lowest muscular mass and the highest fat value

Significant muscular mass differences were recorded in the lots # 5 & 1 : 973g (B>0.999) & 929g (B>0.99) accordingly. This difference is explained by the fact that the Pertrain breed swine have a better developed ham, with a higher perimeter and weight compared to other breeds.

Both methods showed that the muscular mass percentage had fluctuated in each lot and had registered a higher value for hybrids obtained by using the X Landrace & Pietrain pure breed bores

Table 2. Morphological pulp structure related to pig's genotype

Lot		I	II	III	IV	V
Weight	g	8584±255	8992±104	9108±156	9365±201	9557±187**
	%	61,46	62,92	63,02	64,11	64,92
Muscles	g	5276±153	5658±76	5740±105	6004±123	6205±107***
	%	22,39	21,58	21,73	21,04	20,55
Skin and fat under skin	g	1922±64	1941±34	1980±44	1971±23	1964±31
	%	10,27	10,08	9,83	9,71	9,62
Bones	g	882±26	907±24	896±16	910±22	920±17
	%	5,46	5,04	5,07	4,81	4,63
Inter-muscular weight	g	469±15	454±21	462±18	451±15	443±17
	%	0,40	0,35	0,32	0,30	0,26
Loss	g	35	32	30	29	25

** (B>0,99), *** (B>0,999)

Table 3. Morphological structure of the chop

Lot		I	II	III	IV	V
Weight	g	5830±187	6145±191	5850±165	6376±144	6425±137
	%	47,92	52,72	51,82	54,48	55,31
Muscles	g	2794±98	3240±86	3032±56	3474±61	3554±56
	%	30,15	26,44	27,07	25,20	24,87
Skin and fat under-skin	g	1758±38	1625±26	1584±19	1607±24	1598±21
	%	12,31	12,33	12,63	12,24	12,07
Bones	g	718±37	758±25	739±17	781±15	776±20
	%	8,97	7,92	7,89	7,49	7,14
Inter-muscular fat	g	523±17	487±15	462±14	478±15	459±13
	%	0,63	0,56	0,56	0,56	0,59
Loss	g	37	35	33	36	38

Table 4. Morphological structure of the shoulder depending on the pig's genotype

Lot		I	II	III	IV	V
Weight	g	4612±151	4678±134	4639±178	4712±166	4745±211
	%	56,48	57,31	58,59	59,04	60,54
Muscles	g	2605±102	2681±112	2718±67	2782±89	2873±65
	%	17,71	17,22	17,00	16,59	16,12
Skin and fat under skin	g	817±36	806±41	789±45	782±37	765±28
	%	11,96	12,03	11,79	11,73	11,14
Bones	g	552±29	563±21	547±19	553±31	529±29
	%	11,07	12,93	12,15	12,16	11,75
Inter-muscular fat	g	511±18	605±13	564±22	573±26	558±11
	%	0,58	0,49	0,54	0,46	0,42
Loss	g	27	23	21	22	20

Tabel 5. Morphological structure of the chest

Lot		I	II	III	IV	V
Weight	g	3907±112	3926±87	4142±93	4196±119	4281±54
	%	45,07	47,60	51,40	51,83	55,17
Muscles	g	1761±34	1869±22	2129±54	2175±37	2362±41
	%	23,82	22,82	21,07	20,68	19,08
Skin and underskin fat	g	931±26	896±15	873±33	868±17	817±28
	%	7,62	7,53	7,55	7,65	7,14
Bones	g	298±15	296±13	313±19	321±24	306±23
	%	22,42	21,11	19,12	18,99	17,82
Intermuscular fat	g	876±31	829±44	792±29	797±32	763±27
	%	1,04	0,91	0,84	0,83	0,77
Loss	g	41	36	35	35	33

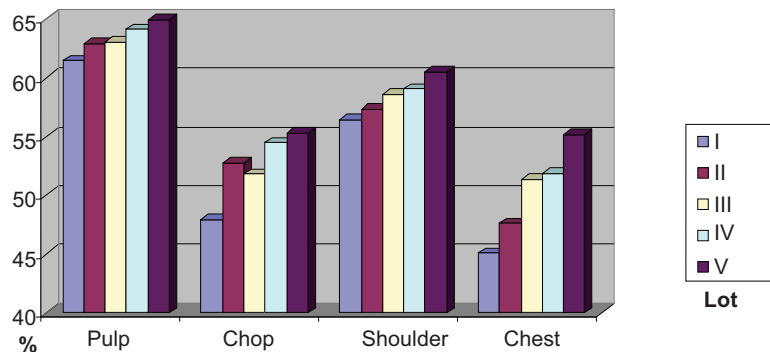


Fig. 1. Lean meat content in the dissection parts

Table 6. Percentage of muscular mass in experimental piglet's carcasses

Lot	E.U method.	Z.P Method	Class
I	49,08	49,37	R
II	51,32	50,85	U
III	51,87	52,08	U
IV	54,29	55,12	E
V	54,08	54,78	U

CONCLUSIONS

1. The swine genotype has a big impact over the growth energy and the productive capacity of the commercial hybrids used for crossbreeding.
2. The muscular mass assessment confirmed that meat percentage varied inside of each lot and had the highest overall value by using

REFERENCES

For book

[1] Alban L., Stege H., Dahl J - The new classification system for slaughter-pig herds in Denmark 2002, pag 133-146.

For article in Book

[2] Dalgaard, R., Halberg, N., Kristensen, P., 2006. *Representative and coherent Danish farm types based on farm accountancy data for use in environmental assessments.* Agriculture, Ecosystems and Environment 117, pag 223-237.

hogs of Pietrain X Landrace breed and Pietran pure breed hogs.

3. Carcasses with the highest percentage of muscular tissue were recorded in the lot #4 with 55.12% E grade, followed by piglet carcasses from the lot #5 with 54.78% U-grade.

[3] Kosovac O., Zivkovic, Radovic C., Smiljakovic T. 2009. *Quality indicators : Carcas side and meat quality of pigs of diferent genotype.* Biotechnology in Animal Husbandry vol.25, pag. 173-188

[4]. Максимов Г.В., Гетманцева Л.В. 2012 *Генетическое детерминирование продуктивных качеств свиней,* РусьАгроЮг отраслевой агропромышленный портал, <http://www.rusagroug.ru/articles/1445>

[5]. Мамонтов Н.Т., Михайлов Н.В 2011 *ЗАПАДНОСИБИРСКИЙ СЕЛЕКЦИОН-НЫЙ ЦЕНТР «ЛОЗОВОЕ» ЗАО «ПЛЕМ-ЗАВОД ЮБИЛЕЙНЫЙ» ТЮМЕНСКОЙ ОБЛАСТИ,* перспективное свиноводство , теория и практика, pag. 25-26, http://piginfo.ru/images/article_list/379135_702.pdf