

Reproductive Capacity and Hematological Indices of Blood Concerning the Genotype Pigs

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Abstract

In this paper different genotypes were studied at the reproductive capacity and hematological indices of pigs. It was found that sow productivity and energy hybrid growth were influenced by terminal boar breed. Swine lots resulted from crossing Yorkshire and Hampshire breeds, Landrace x Pietrain and Pietrain showed an intense growth in the lactation period. Hematological and biochemical indices were included in existing norms and important differences depending on genotype were not registered.

Keywords: breeding, blood, calcium, erythrocyte, genotype, glucose, growth

1. Introduction

Labor is necessary to produce qualitative pork, by the use of the most efficient biological and productive potential of swine. (as discussed by Aurelia Cuc et. al. [1], I. Rotaru,[2]).

The practice of some technology and hybridization selection, modern and efficient feeding and exploitation must assure the continue growth of housing and meat quality by permanent reduction of the fodder consumption per kg gain and labor. Performance and competitiveness in obtaining commercial production of pork can be made, only by producing, growing and fattening commercial hybrids with the use of hybridization schemes of the most productive breeds, lines and types of pigs well acclimatized and selected in normal conditions (as discussed by Monin G. [3], Sellir P.[4], Willam G. et. al.[5]).

Research papers in swine improvement are necessary for the creation of new lines, breeds and hybrids, a proces that needs to be started very soon, because swine growth can not survive and prosper only by using import animals grown in several climacteric conditions that not always manifest productive superior capacities (as discussed by Dinu I.et. al. [6]).

2. Materials and methods

There were performed experiences in the complex for reproduction and growth of swine, Hincesti district, Moldova.

For the accomplishment of research papers were formed five experimental batches of purebred sows by the analogical principle, taking into account their origin, age and weight.

In every experimental lot the maternal form of sows was Yorkshire and paternal, breeds as: (first lot-Yorkshire, second- Landrace, third-Hampshire, forth-Landrace x Pietrain, fifth-Pietrain). During gestation, the sows were maintained and fed by

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strict rules, using combined feeds of complete value which assured every necessity in nutrient needs.

The body mass of piglets was determined by weighing each individual, calculating the weight of piglets lot at birth, 30 and 60 days.

While performing experiments it was studied: the capacity of reproduction of sows, prolificacy-number of alive obtained piglets at a farrowing, weight of piglets and of the piglets' lot at birth, lot weight of piglets at the age of 30 and 60 days. It was fulfilled the general analysis of blood and of the hematological and biochemical parameters.

The experimental results were statistically processed (as discussed by Плохинский Н. А. [8]).

3. Results and discussion

Investigation results accomplished in different countries confirm that a significant growth of pig productivity can be obtained after the manifestation of heterosis phenomenon. Blending between different breeds, types and lines of pigs contribute to the increase prolificacy, energy growth and viability of piglets (as discussed by Sellir P.[4], Dinu I.et. al. [6], David H.et. al. [7]).

Based on analogical conditions of nurture and maintaining, as well as on the genetically identical peculiarities, the capacity of sow reproduction manifested differently.

Table 1. Reproductive capacity of sows

Lot	n	Prolificacy, heads	Piglet's weight at birth, kg
I	6	11.33 ± 0.89	0.89 ± 0.06
II	6	12.00 ± 0.58*	0.93 ± 0.04
III	6	10.33 ± 0.42	1.18 ± 0.03
IV	6	11.33 ± 0.62	1.01 ± 0.05
V	6	10.33 ± 0.50	1.22 ± 0.05**

* $B_1 > 0.95$; ** $B_2 > 0.99$

The results from table 1 show a difference of prolificacy between lots, the biggest being between second and third lot of 1.67 piglets ($B > 0.95$), which is explained by a capacity of inferior reproduction of the Pietrain and Hampshire breed compared with Yorkshire and Landrace, specific particularities to this swine breeds.

The maximum number of piglets (12) at birth was obtained by crossing females from Yorkshire breed with Landrace breed boars.

Piglet weight at birth ranged from 0.89 to 1.22 kg, the highest being obtained by using Hampshire boars with Pietrain representing 1.18 and 1.22 kg. A

smaller body mass was seen at piglets obtained by crossing Yorkshire and Landrace boars with Yorkshire sows.

So, the most obvious difference equaled with 0.33 kg ($B > 0.99$) between hybrid piglets from fifth lot with those from the first one. These differences are explained by the number of foaled piglets and their different genetic characteristics.

The appreciation of growth energy of piglets' lots in the first 60 days was made by weighting each lot at the age of 1, 30, 60 days and the dynamic of body mass is presented in table 2.

Table 2. Dynamic weight of piglet's lot during lactation period and growth, kg

Lot	Piglets' age		
	1	30	60
I	10.08 ± 0.62	73.65 ± 3.02	143.05 ± 5.03
II	11.16 ± 0.38	85.53 ± 2.72	165.16 ± 4.73
III	12.18 ± 0.33**	87.77 ± 2.61	165.38 ± 4.56
IV	11.44 ± 0.41	88.22 ± 1.93**	171.43 ± 4.09**
V	12.60 ± 0.39	84.28 ± 2.32	169.87 ± 4.61

** $B_2 > 0.99$

The results from the table above prove a bigger weight at birth of hybrid piglets obtained by using boars with good paternal characteristics (Hampshire and Pietrain) this, being 12.18 kg and 12.60 kg.

The lowest weight of piglets' lot was registered in first lot, due to the lower body mass of the piglets.

During the first 2 months, it was noticed a large growth in almost every lot of hybrid piglets, due to the good maternal capacities of lactation and breed sows Yorkshire attendance.

A lower weight was recorded in the first lot of piglets obtained by using Yorkshire boars, this being the only difference between the III and I lot, of

14.57 kg ($B > 0.99$) in the first month IV and I of 28.38 kg ($B > 0.99$) in the second month.

The difference between body mass of lots concerns the fact that the last four lots are formed from hybrid piglets and the first lot is formed from Yorkshire breed.

Besides genotype and growth speed, the weight lot was influenced in great measure by the number of pigs in the lot.

Dynamic weight of piglets in different periods of growth varied depending on parents' genotype and is presented in table 3.

Table 3. Hematological indices of blood depending on genotype pigs

Lot	n	Erythrocyte, $10^{12}/l$	Leucocyte, $10^9/l$	Hemoglobin, g/l
I	5	6.89 ± 0.45	30.2 ± 3.42	123.2 ± 6.21
II	5	6.72 ± 0.32	27.4 ± 1.49	125.1 ± 3.54
III	5	7.52 ± 0.34	24.8 ± 1.81	127.2 ± 4.67
IV	5	7.08 ± 0.21	26.7 ± 2.53	125.7 ± 3.94
V	5	7.38 ± 0.26	28.3 ± 2.34	126.8 ± 4.26

The results presented in table 7 show a growth tendency in the content of erythrocytes in the third lot that reached the share of $7.52 \times 10^{12}/l$ which varied till $6.72 \times 10^{12}/l$ at the second lot. The content of leucocytes varied from $24.8 \times 10^9/l$ and the third lot

till $30.2 \times 10^9/l$ in the first lot, and the content of hemoglobin from 123.2 g/l in the second lot, till 127.2 g/l in the third lot. There weren't significant differences between lots, evidenced to any hematological index.

Table 4. Biochemical indices of blood concerning swine genotype

Lot	n	ALT u/l	ASAT u/l	Protein, /g/l	Albumin, g/l	Glucose, mmoli/l	Calcium, mmoli/l
I	4	83.7 ± 5.8	87.2 ± 6.8	67.2 ± 3.6	30.8 ± 1.81	6.83 ± 0.62	3.05 ± 0.09
II	4	91.4 ± 6.4	89.5 ± 8.3	71.4 ± 2.8	32.5 ± 1.62	6.71 ± 0.53	3.01 ± 0.08
III	4	87.4 ± 3.4	86.7 ± 7.9	87.1 ± 3.2	35.7 ± 1.31	6.54 ± 0.81	2.87 ± 0.10
IV	4	82.3 ± 7.1	91.7 ± 5.7	84.6 ± 2.4	35.8 ± 1.22	6.65 ± 0.73	2.93 ± 0.11
V	4	$101.2 \pm 6.1^*$	88.6 ± 8.4	$89.2 \pm 3.7^{**}$	35.6 ± 2.12	6.46 ± 0.85	2.85 ± 0.09

* $B_1 > 0.95$; ** $B_2 > 0.99$

The biochemical analysis of blood proves that the maximum content of protein was observed in lot number V, being 89.2 g/l and in other experimental lots varied from 67.2 g/l to 89.2 g/l. A difference was seen between the V and I lot, of 22 g/l ($B > 0.99$). Significant differences between lots haven't been registered at the albumin quantity, this varying from 30.8 g/l in I lot to 35.8 g/l in lot number IV.

The authenticity of differences between V and I lot was confirmed ($B > 0.95$) in the case of biochemical index, ALT being 17.5 u/l. In what concerns the glucose, calcium and ASAT content, significant differences were not mentioned. The content of ASAT varied from 86.7 u/l third lot, till 91.7 u/l IV lot, of glucose from 6.46 mmoli/l lot V till 6.83 mmoli/l lot I and calcium from 2.85 mmoli/l lot V till 3.05 mmoli/l lot I.

Table 5. Characteristics of protein fractions in experimental piglets blood

Lot	n	A/g	Alb	α_1	Fractions, %		
					α_2	β	γ
I	4	0.51	33.1	1.12	20.12	17.15	22.23
		± 0.04	± 2.81	± 0.19	± 1.91	± 1.98	± 3.21
II	4	0.63	31.2	1.17	19.23	18.34	21.27
		± 0.06	± 2.55	± 0.16	± 1.71	± 2.15	± 2.34
III	4	0.58	34.8	0.97	17.34	17.67	22.35
		± 0.03	± 1.83	± 0.13	± 1.83	± 2.31	± 2.65
IV	4	0.56	34.3	1.09	19.20	19.34	24.21
		± 0.03	± 2.11	± 0.09	± 1.16	± 1.76	± 3.11
V	4	0.55	32.14	1.15	19.58	18.66	23.21
		± 0.04	± 2.23	± 0.14	± 2.07	± 2.45	± 2.75

The data presented in table 5, reveal that protein fractions of piglets from all experimental lots were fit in the existent norms and great deviations concerning the animal genotype were not registered. There were noticeable some tendencies of content growth of beta globulins by 19.34% and in the other content by range globulins of 24.21% in IV lot.

4. Conclusions

The growth energy and productive qualities of the commercial hybrids are largely influenced by the animal genotype using crossing and swine hybridization.

During first 2 growth months, it was noticed and intense growth in the last three lot of hybrid piglets due to the well prepared maternal characters of lactation and care for sows of Yorkshire breed, as well as the paternal qualities of Hampshire and Pietrain boars.

The research results of the hematological, biochemical and protean fractions swine indices from all experimental lots were included in the existing norms and deviations conforming the animal genotype and differences have not been noticed.

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