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THE SWINE PRODUCTIVE CAPACITY DEPENDING ON USED BREEDS FOR THE HYBRID PRODUCTION

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Abstract

This paper explains the swine productive capacity study and the swine growth during the lactation period and the breeding under the animal genetic type influence. It was concluded that by crossing the Yorkshire x Pietrain breeds, a young swine breed has been fetched, defined by a more advanced intensive growth; made by boars and sows similar to Landrace breed resulting in a bigger body mass of the studied swine family at the age of two months, explained by the manifestation of the heterosis phenomenon.

Key words: *boar, breed, growth, heterosis, swine.*

INTRODUCTION

Research carried out worldwide proves that nowadays the main technique of increasing productivity is hybridization. The hybrids obtained from crossing breeds, types and specialized lines have a higher productivity, with 8-10% than pure breed animals and with 5-6% towards half-breeds from crossing breeds (Rotaru, 2013; Rotaru et al., 2015).

In order to obtain higher and more efficient productivity quantitatively and qualitatively there are certain methods for proficient exploitation of heterozis phenomenon.

Swine populations formed and improved in our country, as well as import genotypes could be very useful in this process, being provided efficiently, this is why, genetic resources must be rationally used in swine growth and hybridization system (Rotaru, 2009).

For improving genetic swine background, a selection of individuals used on reproduction is made, in order to create parental forms capable of producing descendents with a valuable productive potential, among products resulted, there are chosen those who submit special characters.

Based on reported facts, the aim of the research was to study the reproductive capacity of swine according to breeds used for producing hybrids (Ladosi, 2010; Polen, 2007).

Scientific postulates submitted were focused on testing productive qualities of swine by using boars on Danish selection Duroc and Pietrain and determining growth and development performances on young biracial swine during lactation period until the age of 2 months.

MATERIALS AND METHODS

The research was made at P.E "Moldsuinhibrid". The subject of investigations was the swine for breeding Yorkshire, Landrace- maternal form and Duroc, Pietrain-paternal form.

Table 1. The scheme of obtaining young biracial swine of reproduction

Lot	**Parental forms**				**Young selected swine**	
	Maternal	Sow no.	Paternal	Boar no.	Young boars	Sows
I- witness	Landrace	14	Landrace	5	6	11
II-experim.	Yorskhire	11	Duroc	4	6	16
III-experim.	Landrace	14	Pietrain	4	5	23

In order to obtain young Yorkshire x Duroc x Pietrain biracial swine there were selected 11 Yorskhire sows and 14 Landrace sows, which were tested according to their body mass and length at 2, 4, 6 months. The young swine was set to analogical conditions of sustenance and nutrition during the testing period. Before artificial seeding sows were assessed according to their own performances to determine the body mass, body length and fat depth using electronic scales, ribbon and ultrasonic equipment. For the insemination there were used 4 Duroc boars and 4 Pietrain boars. Experimental swine was appointed pursuant to evaluation marks in elite and I categories.

The productivity of swine was appreciated on calving according to prolificacy (number of living piglets), the weigh of a piglet and piglet lot at birth. At piglet weaning there could be determined the fertility of swine, based on the number of weaned piglets.

The average weigh of a piglet at birth was calculated by weighing individually each boar and sow using electronic scale.

The development of piglets in lactation and growth period was appreciated according to body mass and average daily gain, indexes being determined individually on each animal.

The young swine was selected for reproduction after 2 months (6 boars and 16 Yorskhire x Duroc sows and 5 boars and 23 Landrace x Pietrain boars) appreciated according to their own performances. The control lot (Landrace x Landrace) was represented by 6 boars and 11 sows.

The results obtained following the investigations were processed statistically by calculating parameters of variation series, arithmetic average (M), average error (m) and variation coefficient (Cv).

RESULTS AND DISCUSSIONS

Growth and fattening units of swine could perform and be competitive, only by practicing intensive system based on selection and hybridization technologies, feeding and modern exploitation. Using these technologies can assure continuous growth of carcass and meat quality by reducing feed consumption per kg and work force.

Table 2. Testing swine on body mass, kg

Age	Breed					
	Yorkshire			Landrace		
	$\overline{X} \pm S\overline{x}$	Limits	C_v	$\overline{X} \pm S\overline{x}$	Limits	C_v
2 months	18.55±0.21	17-19	3,71	18.00±0.30	15-20	6.16
4 months	47.09±0.83	42-50	5,81	44.86±1.44	29-52	12.05
6 months	81.36±2.09	71-95	8,52	79.50±2.78	51-85	13.07

The results of determining body mass presented in this table, show that together with increasing the age of sows, in different periods, the intensity of growth differs. During the growth period between 2 and 4 months, absolute gain was of 28.54 kg, while between 4 and 6 months, the body weigh on Yorkshire breed increased with 34.27 kg.

Such results were obtained also on Landrace breed.

The selection effect, but also hybridization depends on the quality of biologic material used for this aim, which must be valued according to their own performances until seeding. The results of these papers are presented in table 3.

Table 3. The appreciation of sows own performances on seeding

Breed						
Yorkshire				**Landrace**		
	$\bar{X} \pm S\bar{x}$	**Limits**	**C_v**	$\bar{X} \pm S\bar{x}$	**Limits**	**C_v**
Body mass, kg	119.46±3.18	104-132	8.82	104.93±3.21	80-133	11.44
Breed						
Yorkshire				**Landrace**		
Body length, cm	134.55±1.07	128-142	2.65	135.0±0.55	131-138	11.44
Fat depth, mm	14.18±0.35	13-16	8.23	13.64±0.33	12-16	8.91

The sows were appreciated according to their own results before seeding, determining their body mass, stem length and fat depth. Following the research, there was proved that between breeds, no significant differences based on body length and fat depth were signaled, but in what concerns body mass the differences were of 14.53 kg, which is considered significant. (B>0.95).

Sows proved a characteristic development for breeding animals, and fat depth complied within the limits of 12-16 mm, the average varying between 13-14 mm, which corresponds to the requirements of biologic material used for this experiment.

Table 4. Sows productivity

Lot	**Parental combinations**	**No.**	**Prolificacy, head**	**1 Weight piglet at birth, kg**	**Piglet weigh lot at birth, kg**
I – witness	L x L	10	11.50±0.54	1.37±0.04	15.24±0.57
II – witness	Y x D	4	11.25±1.37	1.32±0.08	14.27±0.99
III- witness	L x P	12	10.58±0.78	1.37±0.05	14.18±0.90

The data from this table prove that sows prolificacy on experimental lots vary within the limits from 10.58 to 11.50 on piglets, the difference between Landrace the combination of L x P was equal with 0.92 piglets, being insignificant. The results concerning the weight of a piglet at birth, prove that between lots there were no significant differences, varying between 1.32-1.37 kg. The lot weigh of piglets at birth is higher with 1.06 kg based on a prolificacy higher that 11 piglets.

The results analyzed lead to the conclusion that indexes used for the appreciation of swine productivity are more optimal so that young swine could be selected for reproduction from them.

Table 5. Sows fertility

Lot	**Parental combinations**	**Weaning**		**Piglet lot weight, kg**
		No. of piglets, head	**1 weight at birth, kg**	
I – witness	L x L	10.90±0.46	8.57±0.17	93.00±3.62
II – experim.	Y x D	10.50±0.96	8.02±0.40	84.25±8.80
III – experim.	L x P	10.00±0.67	8.37±0.60	81.67±6.84

The data form the table confirm the fact that the number of piglets at seeding is decreasing from 0.60 in control lot, until 0.75 in experimental lot II, but there could be mentioned that the fertility of sows is good enough in every lot.
The average weight of a piglet varies from 8.02 kg in lot II of piglets obtained by crossing Yorskhire and Duroc breeds, and 8.57 kg in control lot of piglets, the differences varying within the limits of 0.35-0.55 kg. Such differences were noticed on lot weigh of piglets at seeding.

Table 6. Piglets development during embryonic period

Lot	Parental combinations	Average weight of piglets at birth, kg					
		Boars			Sows		
		No	Mass	Limits	No	Mass	Limits
I – martor	L x L	6	1.42±0.02	1.30-1.50	18	1.39±0.02	1.3-1.5
II –experim.	Y x D	6	1.41±0.03	1.30-1.50	16	1.37±0.02	1.2-1.5
III–experim.	L x P	5	1.50±0.03	1.40-1.60	23	1.37±0.02	1.2-1.5

The embryonic development of piglets appreciated by the weigh of a piglet at birth, confirm that it varies from 1.3 until 1.5 kg on boars and sows, the average being higher in experimental lot III. Important differences between lots were not noticed, but there could be mentioned the fact that at birth piglets had a weigh that could be appreciated as being in accordance with optimal indexes of development.
During lactation period, the piglets must develop intensively, but such factors as swine genotype could influence this process.

Table 7. Development of piglets during lactation period

Lot	Parental combinations	Piglet weigh on weaning, kg					
		Boars			sows		
		No	Mass	Limits	No	Mass	Limits
I – witness	L x L	6	10.0±0.00	10.0-10.0	18	9.03±0.24	7.8-10.0
II – experim.	Y x D	6	8.30±0.33	7.10-8.90	16	7.32±0.85	7.10-8.9
III –experim.	L x P	5	8.66±0.21	8.30-9.00	23	8.38±0.50	2.3-10.8

The results presented in this table prove that on boars, important differences between lot were not noticed, these being insignificant and equal with 0.36 kg.
The best results on sows were obtained in control lot and experimental lot III. Differences between I and II lot were equal with 1.71 kg, III and II-1.06,I and III -0.65 kg. The limits in every lot were 2.2-2.5 kg.
In selection units, for the appreciation of development level of young swine, there is analyzed the average weigh of a piglet at 2 months, period which includes the duration of lactation and piglets growth. The results obtained in this period are presented in table 8

Table 8. Results of piglets growth until 2 months

Lot	Parental forms	Average weigh of a piglet at 2 months, kg					
		Boars			sows		
		No	Mass	Limits	No	Mass	Limits
I – witness	L x L	6	18.23±0.85	17-21	11	16.46±0.41	14-19
II –experim.	Y x D	6	17.83±1.14	16-21	16	17.31±0.85	14-26
III-experim.	L x P	5	19.80±0.97	17-23	23	18.39±0.59	15-25

In the growth period from birth until 2 months, the development of piglets was within optimal limits, but a smaller average weigh of a sow, was registered in control lot, equal with 16.46 kg, and one bigger in experimental lot III -18.39 kg, formed from biologic material obtained by crossing Landrace and Pietrain breeds (B>0.95), the results being insignificant. The limits were between 16 and 23 kg on boars and 25 kg on sows.

The results of growth and development of young swine during lactation and growth period until 2 months, prove that the number obtained could be selected from the necessary number of boars and sows for reproduction, because it correspond with the requirements submitted by the instruction of evaluation marks of swine, especially the aim presented during the research.

The ratio of meat in carcass at hybrids is influenced by the growth intensity of young swine during seeding, because the formation of muscular tissue happens more intensive during post embryonic period.

It must be mentioned that beginning with 2 months the weigh of sow fits within the normal limits.

The results of growth speed appreciation on young swine are presented in table 9.

Table 9. Growth speed on young swine

Lot	Parental combinations	Average daily gain,g							
		boars				sows			
		No	$\bar{X} \pm S\bar{x}$	Limits	C_v	No	$\bar{X} \pm S\bar{x}$	Limits	C_v
I – witness	L x L	6	282.0± 13.9	388-458	8.79	11	191.6± 7.79	148-221	13.48
II-experim.	Y x D	6	190.0± 11.7	153-220	15.08	16	186.1± 8.84	140-275	18.99
III-experim.	L x P	5	214.2± 11.8	180-253	12.4	23	204± 70	160-266	11.61

The results presented in this table prove that the average daily gain on boats in experimental lots varied from 190 g in lot II until 214 g in lot III and 186 at 204 g corresponding to differential swine being insignificant. This confirms the fact that the development standard of young swine from experimental lots is almost at the same level, but we can observe a tendency of increase in experimental lot III.

CONCLUSIONS

1. Yorkshire and Landrace sows, according to body weigh and length during the growth period from 2 months until seeding fits within the standard of elite class and I, and according to fat depth in elite class.
2. Their own performances and reproductive qualities of Pietrain and Duroc boars fit within the standard of this breeds according to the age of each animal.

3. The development of boars and sows during lactation period was more intensive in experimental lot III and the body weigh at seeding was 8.38 kg on swine and 8.66 kg on boars, while the body mass of young swine from experimental lot II was of 7.32 kg on swine and 8.30 kg on boars, the difference being significant and equal with 1.06 kg on boars and 0.36 on sows.
4. During the growth period from birth and until 2 months young swine developed within normal limits, but the body weight of swine was smaller than control lot equal with 16.46 kg, and swine from experimental lot III had a weigh of 18.39 kg, the difference being insignificant and equal with 1.93 kg (B>0.95). Such differences were noticed on boars between experimental lots.

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