THE REPRODUCTIVE CAPACITY OF SOWS ACCORDING TO THE FAT LAYER THICKNESS AND GENETIC TYPE OF PARENTAL FORMS

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Abstract

The paper presents new results based on the study of reproductive capacities of hybrid sows according to the thickness of fat layer, parental forms genotype and the rank of farrowing. The growth speed of piglets that came out from using different paternal forms proved various values on a 21 days period. On sows that had a fat layer thickness up to 21 mm, the reproductive value was higher, regardless of farrowing rank, the prolificacy being stable and piglet's growth index was superior to those who had fat thickness greater than 23 mm.

Key words: swine, genetic, prolificacy, thickness, weight

INTRODUCTION

Pork producers have the aim of increasing their income, which implies the fast growth of young swine, efficiently use of food and produce qualitative carcasses. [5] In order to achieve these goals, besides growth, exploitation and feeding technologies, the genetic improvement has a great importance. An effective means of genetic potential improvement is the hybridization that aims the obtaining of hybrid swine by systematic combinations in order to benefit of character complementary and heterozis effect. Only hybrids are used to produce qualitative pork in economic and intensive conditions, because productive performances of modern farms are raised regardless races used on crossing [1].

For these reasons, a great importance has the experimentation of reproductive capacities and carcass quality on different genetic types depending on the thickness of fat layer of parental forms used on hybrid production. [2,4].

In order to achieve this aim, there was used the prolificacy evaluation and lactation capacity of sows. Comparative appreciation of piglets body mass index studied the growth speed of young swine in the period until 21 days. [6]

MATERIAL AND METHODS

The Department of Zootechnics and the production unit carried out the research for swine growth and fattening, SRL "Vergecom", Hancesti district. There were formed two experimental lots of sows, depending on genetic type and thickness of fattening layer, each of them being in two forms, less than 21 mm and more than 23 mm. For freshening sows in lot I, we used Pietrain boars and for lot II, biracial Pietrain boars. Each version consists of 6 sows and 20 youth swine, each lot consisting of 12 sows and 40 youth swine. The process of experimental lot formation was based on analogical process, where it was taken into account: the origin, the body mass and the age of sows. There were used 12 months sows (primiparous) and 18.24 months sows (multiparous) The fat layer was measured at the beginning (insemination) and at the end (farrowing). The reproductive capacity of sows was studied on a lot of 24 sows and the appreciation indexes were: prolificacy determined by the number of piglets born alive, the weight at birth, the capacity of lactation measured by weighing the lot of piglets at 21 days. In order to establish a parameter which will offer informations on birth weight of each piglet,

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taking into account the number of piglets in a lot, a weight index was used, combining two informations and proposed by dr. Ferreira (France). The index was calculated using the formula:

I = piglet weight x batch size.

This index allows the distribution of lots with small piglets, avoiding prolific lots where the piglets were normally smaller. In order to appreciate the growth rate, 80 heads of youth swine were selected, analogically by origin, age, and lean body mass from 24 sows of reproduction of 40 from each lot. The animals were weighed at birth and at 21 days, to determine the growth speed and average daily gain, according to standards in effect.

RESULTS AND DISCUSSIONS

The results of reproductive qualities appreciation of sows, depending on genotype and thickness of fat layer are represented in table 1.

Table 1 Reproductive qualities of sows depending on fat layer thickness at first farrowing

Lot	Genotype	Thickness of fat layer	Prolificacy, head	The weight of a piglet at birth, kg	Piglets weight index, kg
I	The Great White x Landrace x (Pietrain)	≤21 ≥23	10.00±0.28 9.00±0.15	1.00±0.01 0.95±0.03	10.00±0.12 9.66±0.14
II	The Great White x Landrace x (Landrace x Pietrain)	≤21 ≥23	10.80±0.30 10.57±0.25	0.98±0.02 0.90±0.02	10.61±0.19 9.50±0.23

Measuring the thickness of fat on the day of farrowing proves that sows with a thickness less than 21 mm formed a superior weight index of piglets than those with a thickness higher than 23 mm. The difference was significant and in the first lot it was equal with 0.40 (B≥0.99). In experimental lot II, the difference was of 1,11 (B≥0.999). The prolificacy was reduced in lot I, compared to lot II of piglets, when the thickness of fat is less than 21 mm and equal with 0.80 piglets. It is important to mention the influence of fat layer thickness of sows.

The results are presented in table 2.

Table 2 The influence of fat layer thickness of sows at first farrowing on the growth and development of piglet with different genotypes

Lot	Genotype	Thickness of fat layer	Piglet weight at 21 days, kg	Weight of piglet lot at 21 days, kg	Average daily gain, g
I	The Great White x Landrace x (Pietrain)	≤21 ≥23	5.4±0.12 5.0±0.13	51.60±0.86 49.00±0.77	200±2.01 160±4.56
II	The Great White x Landrace x (Landrace x Pietrain)	≤21 ≥23	5.5±0.09 4.97±0.11	49.60±0.32 50.00±0.28	190±4.18 172±3.12

Young swine obtained from primiparous sows that had a thinner fat layer has developed better, the weight of a piglet at 21 days being 5.4-5.5 kg, the weight differences from the first lot equaled with 0.4 kg and those in II lot with 0.53 kg, the degree of significance being higher with (B≥0.99 B≥0.999).

There were no significant differences from lot I and lot II, regarding the weight of a piglet at 21 days. The important fact is that sows possess a lactation capacity that fits the standard I class. Authentic differences could be noticed between lots of sows that formed a fat layer ≤21 and ≥23 mm regarding the weight of the lot at 21 days. The differences were significant and were equal with 2.60 kg in experimental lot I and 0,4 kg in experimental lot II. Average daily gain varied from 160 to 200 g in lot I and 172-190 g in lot II. The differences were significant, equalizing 40 g (B≥0.999) and 18 g (B≥0.999).[3]

Table 3 The reproductive value of second farrowing sows depending on the thickness of fat layer

Lot	Genotype	Thickness of fat layer	Prolificacy, head	The weight of a piglet at birth, kg	Piglets weight index, kg
I	The Great White x Landrace x (Pietrain)	≤21 ≥23	11.5±0.21 10.6±0.18	1.1±0.01 1.0±0.02	11.5±0.15 10.20±0.12
II	The Great White x Landrace x (Landrace x Pietrain)	≤21 ≥23	10.7±0.35 9.0±0.27	1.16±0.03 1.04±0.01	10.8±0.19 9.4±0.20

A research on sows established the degree of influence on the number of farrowing concerning the index on piglets weight, from the second farrowing and the result proved that the last one is higher with 1.3 in case of sows with fat layer lower than 21 mm from lot I (B≥0.999). In lot II the growth index of piglets equalized 1.4 (B≥0.999), the significance degree being higher. Authentic differences could be noticed regarding the prolificacy of sows that varied from 9-11.5 piglets. In lot I, the difference was of 0,9 piglets (B≥0.999), in lot II 1.7 piglets (B≥0.999), compared to sows with a fat layer thicker than 23 mm.

Table 4 The growth and development of piglets with different genotypes regarding the thickness of sows fat layer from second farrowing

Lot	Genotype	Thickness of fat layer	Prolificacy, head	The weight of a piglet at birth, kg	Daily average gain, g
I	The Great White x Landrace x (Pietrain)	≤21 ≥23	4.92±0.15 4.38±0.08	56.5±0.91 53.2±0.83	186±4.6 191±5.3
II	The Great White x Landrace x (Landrace x Pietrain)	≤21 ≥23	5.5±0.11 5.12±0.14	50.0±0.38 46.0±0.52	186±6.52 194±4.83

In the growth period from birth until 21 days, the weight of piglet lot on sows from lot I with the thickness of fat layer less than 21 mm was higher than 2.6 kg (B≥0.999), compared to those on which the thickness of fat layer was higher than 23 mm. In lot II, the difference equalized 4 kg (B≥0.999). There were no significant differences regarding daily average gain.

Table 5 The reproductive capacity of third farrowing sows regarding the thickness of fat layer at farrowing

Lot	Genotype	Thickness of fat layer	Prolificacy, head	The weight of a piglet at birth, kg	Daily average gain, g
I	The Great White x Landrace x (Pietrain)	≤21 ≥23	10.00±0.26 9.06±0.19	1.10±0.01 1.05±0.02	11.00±0.24 10.14±0.20
II	The Great White x Landrace x (Landrace x Pietrain)	≤21 ≥23	10.00±0.25 8.87±0.21	0.90±0.01 0.91±0.01	9.00±0.16 8.07±0.23

The results from the table prove that the reproductive value of multiparous sows with a thickness of fat layer that enclosed between the limits of 21 mm or less, was higher. The growth index of piglet from lot I on this sows equalized 11 kg (B≥0.999), being significantly higher with 0.86 kg, than on sows with fat layer not higher than 23 mm. Lot II presented the same results but the value of the index on this genotype proved to be less than 2 and 2.07 respectively. The difference regarding the prolificacy between sows with a fat layer thinner than 21 mm and thicker than 23 mm, regarding the piglets weight index equalized 0.93 kg, having a higher degree of significance, (B≥0.999).

This data confirmed that the prolificacy of sows from both lots was higher on those with a fat layer less than 21 mm. The differences between maternal forms on lot I, regarding the prolificacy consisted 1.94 kg and 1.13 kg in lot II (B≥0.999).

Table 6 The influence of boar genotype and thickness of sows fat layer from third farrowing on the growth and development of piglets

Lot	Genotype	Thickness of fat layer	Piglet weight at 21 days, kg	Weight of piglet lot at 21 days, kg	Average daily gain
I	The Great White x Landrace x (Pietrain)	≤21 ≥23	5.60±0.10 5.05±0.12	50.0±0.64 46.0±0.25	214±6.54 190±8.02
II	The Great White x Landrace x (Landrace x Pietrain)	≤21 ≥23	4.5±0.18 4.8±0.23	50.0±0.81 49.6±0.78	171±6.31 166±7.62

The researches confirm that the growth and development were under the influence of maintenance of sows and animal genotype. The weight of a 21 days piglet was 4.5-5.6 kg with a difference regarding the thickness of fat layer and the genotype of parental forms of 0.55 kg from lot I (B≥0.999) and 1,1 kg between lot I and II (B≥0.999). In lot I, the lactation capacity equalized 50 kg, when the fat layer was no more than 21 mm and 46 kg, adequate higher than 23 mm.

The difference is of 4 kg, compared to young swine obtained from sows with a fat layer more than 23 mm (B≥0.999). There were significant differences in lot I regarding the daily average gain, more than 24 mm on young swine from sows where the fat layer did not exceed 21 mm, compared to sows that formed a fat thickness of more than 23 mm.

CONCLUSIONS

The sows with a fat layer less than 21 mm formed a superior weight index than those with a fat layer higher than 23 mm. The differences were significant in the first lot and were equal with 0.4 kg (B≥0.999) and in the second lot with 1,11 kg (B≥0.999).

Young swine obtained from primiparous sows with a fat layer less than 21 mm has shown an intensive increase and so the weight of a piglet at 21 days was of 5.4-5.5 kg and the differences in lot I have equaled 0.4 kg and in lot II 0,53 kg (B≥0.99); (B≥0.999).

The reproductive capacity of sows regarding the rank of farrowing and thickness off at layer differs and the prolificacy varies from 9-11.5 piglets, the difference in lot I being of 0.9 piglets and in lot II 1.7 piglets (B≥0.999).

The reproductive value of multiparous sows, that had a thickness of fat within the limits of 21 mm or less, was higher. The weight index of piglets equaled 11 kg and was significantly higher with 0.86 kg, compared to sows that had a fat layer higher than 23 mm.

In order to improve the reproductive capacity of sows, the most efficient solution is insemination of those with a fat layer less than 21 mm.

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