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REPRODUCTIVE TRAITS OF SOWS IN TWO-WAY CROSSING

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Abstract. *The article presents the results of research into reproductive traits of sows in pure breeding and crossbreeding. It shows the advantage of the ♀LW × ♂L variant of crossing in most of the traits. The sows manifested high indices of reproductive traits. An increase in litter size led to a higher litter weight on the 21st day of the suckling period, the correlation being between r = 0.65 in LW sows and r=0.81 in sows of the ♀P × ♂D group.*

Key words: *crossing, reproductive traits, litter weight, litter weight at weaning, selection index*

Reproductive traits of sows are one of the main factors determining the scale of rearing and fattening of piglets, the amount of breeding products, and pig production sector profitability. Raising the efficiency of using sows and getting large litter sizes is one of the main directions in pig production **[**5]. Specialized meat breeds are somewhat inferior in their reproductive characteristics to mother breeds [6], that is why such scientists as M.D. Berezovskyi, B.V. Bankovskyi, V.P. Rybalko [1,2] consider the use of large white breed pigs as a maternal form and boars of specialized meat breeds as a male parent form to be an appropriate crossing variant. In connection with the appearance of new genotypes in the country, at the first stage of research we conducted a comparative evaluation of reproductive traits of sows in pedigree breeding and in two-way crossing using breeding boars of meat genotypes of foreign origin.

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The goal of research. Finding the most high-performance matching combinations of boars and sows of meat genotypes for observing the manifestation of heterosis.

Materials and methods of research. The experiments were carried out under the conditions of Open Company Freedom Farm Bacon in the Kherson region. For our studies were selected purebred Large White sows and cross Large White x Landrace (♀LW×♂L) sows mated with cross boars Duroc x Pietrain and Pietrain x Duroc (♀D×♂P, ♀P×♂D).

The sows were fed with special mixed fodder according to their age, live weight and physiological condition.

The reproductive traits of sows were estimated using conventional methods[4]. The breeding index of reproductive traits of sows (BIRTS) was calculated by the method of O. Tsereniuk [7].

- where *BIRTS* – breeding index of reproductive traits of sows
- X_1- litter size, heads;
- X_2- litter weight at weaning, kg;
- X_3 - weaning period, days
- *6* and *9,34* - coefficients.

Research results. According to estimates of litter size in sows covered by boars of different breeds, sows of the control group were distinguished by the highest rates of the given trait (10.58 heads.), which was 0,22 heads higher than in ♀LW×♂L sows, and 1,31 and 1,48 heads, respectively (P<0,05), higher than in animals of the ♀D×♂P and ♀P×♂D combinations (Table.1).

The heaviest were cross piglets of the ♀P×♂D variant (1,44 g), they exceeded their purebred counterparts by +0,12 kg and group ♀LW×♂L by +0,04 kg. Piglets of the ♀D×♂P variant with high probability (P<0,05) exceeded their purebred counterparts by +0,11 kg.

1. Reproductive traits of sows

Index	♀LW×♂LW	♀LW×♂L	♀D×♂P	♀P×♂D
At farrowing				
Litter size, heads	10,58±0,43	10,36±0,47	9,27±0,38*	9,10±0,50*
Litter weight, kg	1,32±0,04	1,40±0,05	1,43±0,03*	1,44±0,05
Litter weight at farrowing, kg	13,94±0,57	14,39±0,58	13,25±0,62	13,08±0,77
At the age of 21 days				
Litter weight, kg	52,19±2,34	61,50±3,27*	51,34±2,05	45,07±2,00*
Live weight of a piglet, kg	5,13±0,19	6,05±0,15**	5,89±0,09**	5,21±0,13
Survival rate, %	96,85	98,26	94,39	96,06
At weaning at the age of 30 days				
Live weight of the litter, kg	76,63±3,33	86,78±5,29	72,82±3,30	62,98±2,52**
Live weight of a piglet, kg	7,63±0,20	8,84±0,26**	8,29±0,16*	7,54±0,16
Survival rate, %	95,28	94,84	93,64	93,00
BIRTS, points	87,36±3,48	89,20±4,14	78,00±3,06	74,21±3,70*

Note: * - P<0,05; ** - P<0,01

Litter weight at farrowing depends on the number of piglets in the litter and their body weight. So, the highest level of this trait was observed in sows covered by Lanrace boars (14,39 kg), which was +0,45 kg more than in control sows and +0,31 kg more than in the ♀P×♂D variant. Litter weight on the 21st day of the suckling period was the highest in large white sows combined with Landrace boars (61,5 kg), which was +9,31 kg higher than in the control group (P<0,05) and +6,27 kg higher than in the ♀D×♂P group of sows. The lowest litter weight on the 21st day of the suckling period was observed in ♀P×♂D sows (45,07 kg), they were inferior to the control group by -7,12 kg (p <0,05) and by -16,43 kg to sows of the ♀LW×♂L combination.

The highest average piglet weight on the 21st day was registered in the litter of ♀LW×♂L sows (6,05 kg), which is significantly (P <0,01) higher (+0,92 kg) than in

the control group. The highest survival rate was observed in the litter of ♀LW×♂L sows (98,26%).

♀LW×♂L sows were characterized by the highest litter weight at weaning at the age of 30 days (86,78 kg); they dominated the control group by 10,15 kg, and ♀D×♂P sows by 13,96 kg. The lowest litter weight was observed in the litter of sows of the ♀P×♂D variant (62,98 kg), which is -13,65 kg less than in purebred counterparts (P<0,001) and -9,84 kg less than in ♀D×♂P sows. Accordingly, the average weight of one head at the time of weaning was the highest in ♀LW×♂L sows, which significantly (P<0,01) exceeded the performance of animals in the control group (+1,21 kg).

The highest survival rate at weaning was in the litter of LW sows (95,28%), which is 2,28% more than in sows of the ♀P×♂D crossing variant.

According to the selection index of reproductive traits of sows (BIRTS), ♀LW×♂ L sows were characterized by the highest values (89,20 points), which was +1,84 points higher than in purebred sows and + 11,2 points and 14,99 points respectively higher than in ♀ D×♂P and ♀P×♂D sows.

Thus, the combination of LW sows with Landrace boars appeared to be the best by most indicators of reproductive traits of sows. Litter weight at weaning time was more than in the control group (+8,81%). Sows of this group had a higher BIRTS index.

The correlation between the traits is important not only from a scientific point of view, but also from a practical one [3].

Our studies have revealed a negative correlation between litter weight and litter size (Table, 2). The research has determined a highly significant (P<0,01) relationship between litter weight at the time of weaning and litter size in groups ♀LW×♂LW (r=0,79), ♀P×♂D (r=0,89), and a reliable correlation (P<0,05) in groups ♀LW×♂L (r=0,69) and ♀D×♂P (r=0,64). Higher litter size values led to higher litter weight on the 21st day of the suckling period, the correlation being between r=0,65 (P<0,05) in the ♀LW × ♂LW variant and r=0,81 (P<0,01) in the ♀P × ♂D group.

2. Correlation between reproductive traits of sows

Ознаки	Litter size, heads	Litter weight, kg	Litter weight at farrowing, kg	Litter weight at the age of 21 days, kg	Live weight of the litter at weaning, kg	Survival rate up to 30 days of age, %
	X1	X2	X3	X4	X5	X6
♀LW×♂LW						
X1	1,00	-0,40	0,73**	0,65*	0,79**	-0,14
X2	-0,40	1,00	0,33	-0,38	-0,22	0,16
X3	0,73**	0,33	1,00	0,37	0,66*	0,13
X4	0,65*	-0,38	0,37	1,00	0,86***	0,01
X5	0,79**	-0,22	0,66*	0,86***	1,00	0,13
X7	-0,14	0,16	0,13	0,01	0,13	1,00
♀LW×♂L						
X1	1,00	-0,57	0,67*	0,80**	0,69*	-0,09
X2	-0,57	1,00	0,22	-0,09	-0,06	0,63
X3	0,67*	0,22	1,00	0,86***	0,73**	0,44
X4	0,80**	-0,09	0,86***	1,00	0,95***	0,41
X5	0,69*	-0,06	0,73**	0,95***	1,00	0,50
X7	-0,09	0,63	0,44	0,41	0,50	1,00
♀D×♂P						
X1	1,00	0,27	0,94***	0,75**	0,64*	-0,50
X2	0,27	1,00	0,59	0,20	0,28	-0,28
X3	0,94***	0,59	1,00	0,70*	0,64*	-0,52
X4	0,75**	0,20	0,70*	1,00	0,94***	0,12
X5	0,64*	0,28	0,64*	0,94***	1,00	0,26
X7	-0,50	-0,28	-0,52	0,12	0,26	1,00
♀P×♂D						
X1	1,00	-0,21	0,77**	0,81**	0,83**	-0,46
X2	-0,21	1,00	0,46	0,32	-0,06	0,35
X3	0,77**	0,46	1,00	0,95***	0,70*	-0,17
X4	0,81**	0,32	0,95***	1,00	0,71*	-0,41
X5	0,83**	-0,06	0,70*	0,71*	1,00	-0,07
X7	-0,46	0,35	-0,17	-0,41	-0,07	1,00

Note: * - P<0,05; ** - P<0,01, ***- P<0,001

Variance analysis determined a share of impact of breeding boars on the average weight of one head at the time of weaning 40,48% (P<0,001) and on litter weight of sows in the same period 33,03 % (P <0,001), as well as on litter weight on the 21st day of the suckling period 34,90 % (P <0,001).

Conclusions

In general, the results of the studies on reproductive traits of sows crossed with breeding boars from different breeds have shown that ♀LW×♂L pigs were the best in most traits. Litter weight at weaning time was +8,81 % higher than in the control group. Those sows were distinguished by high reproductive performance. Analysis of correlations showed a highly reliable relationship between litter size and litter weight at weaning r = 0,64…0,89 and litter weight on the 21st day of the suckling period r=0,65…0,81.

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ВІДТВОРЮВАЛЬНІ ЯКОСТІ СВИНОМАТОК У ДВОПОРОДНОМУ СХРЕЩУВАННІ

С. В. УШАКОВА

Анотація. *Викладено результати відтворювальних якостей свиноматок у чистопородному розведенні і схрещуванні. Встановлена перевага за більшістю ознак варіанту схрещування ♀ВБ×♂Л. Свиноматки відрізнялися високим показником індексу відтворювальних якостей. Із підвищенням багатоплідності підвищувалася молочність свиноматок, величина кореляційного зв'язку знаходилася у межах від r=0,65 у маток великої білої породи до r=0,81 у маток групи ♀П×♂Д.*

Ключові слова*: схрещування, відтворювальні якості, великоплідність, маса гнізда на час відлучення, селекційний індекс*

ВОСПРОИЗВОДИТЕЛЬНЫЕ КАЧЕСТВА СВИНОМАТОК В ДВУХПОРОДНОМ СКРЕЩИВАНИИ

С. В. УШАКОВА

Аннотация. *Изложены результаты воспроизводительных качеств свиноматок в чистопородном разведении и скрещивании. Установлено преимущество по большинству показателей варианта скрещивания ♀ВБ×♂Л. Свиноматки отличались высоким показателем индекса репродуктивных качеств. С повышением многоплодия повышалась молочность свиноматок, величина корреляционной связи находилась в пределах от r=0,65 у маток крупной белой породы до r=0,81 у маток группы ♀П×♂Д.*

Ключевые слова: *скрещивание, воспроизводительные качества, крупноплодие, масса гнезда при отъеме, селекционный индекс*